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UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
DOCTOR OF PHILOSOPHY IN NURSING

A Qualitative Descriptive Study of the Work of Nurses in Interventional Radiology

by

Brenda Naef Boone

A dissertation presented to the
FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE
UNIVERSITY OF SAN DIEGO

In partial fulfillment of the
Requirements for the degree
DOCTOR OF PHILOSOPHY IN NURSING

May, 2012

Dissertation Committee

Mary-Rose Mueller, PhD, RN, Chairperson

Jane M. Georges, PhD, RN

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Abstract

This dissertation study explored the work of nurses in interventional radiology. Interventional radiology (IR) is an emerging field of practice in health care. More and more procedures that were historically done in the operating room are being performed in IR. This has led to higher acuity patients and an increased need for specialized nursing care. The work of nurses in this area of practice is not well described and as such can lead to a lack of understanding of nursing involved in high tech low touch areas. This qualitative descriptive research study was conducted to shed light on this under examined practice area of nursing. The background of the study and its findings are presented in three individual manuscripts. The first manuscript entitled, "Work Domain of Nurses in Interventional Radiology" supplies the context for the work of nurses in IR. The work in IR involves a team of professionals including physicians, technologists and others; it is useful to understand the context of IR as a practice setting in a hospital environment. The second manuscript entitled, "Procedural Work of Nurses in Interventional Radiology", describes the findings for one of the main research questions of this study. What is the work of nurses in interventional radiology? The findings suggest that nurses engage in work practices that may be in variance to standards and guidelines of practice in these areas. Finally, the third manuscript entitled, "Learning the Work of Interventional Radiology Nursing", describes the findings for the other main research question of this study. How do nurses learn the work practices of interventional radiology? The findings suggest that the current orientation methods in IR could be improved with the use of guidelines from the Association of Radiologic and Imaging Nurses, policies and procedures.

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Dedication

I dedicate this dissertation to my daughter, Morgan, whose never-ending love and support has carried me through this journey. To my parents, Kathy and Steve, who have always believed in me and have instilled in me a sense of compassion and wonder for others. To my brother Mark, who had a joy for life that inspires me to this day, I only wish he would have lived long enough to see this day. I also dedicate this dissertation to my Lord and Savior, Jesus Christ, without whose grace I would not be who I am today.

Acknowledgements

Thank you to my dissertation chair, Mary Rose Mueller, PhD, RN, who tirelessly supported my ideas and made this mission, to give Radiology nurses a voice, a reality. She also listened to me with such compassion and empathy that I realized that I could actually get a PhD. It has been my honor to work with her and learn from her.

I would like to thank the other two members of my dissertation committee: Jane M. Georges, PhD, RN and Ross Christensen, MD. I learned so much from Dr. Georges, especially about how important having a voice is. Her inspirational words echoed through my head many times as I completed my dissertation and sustained me through the journey. Dr. Christensen is more than just a committee member, he is a colleague and makes my daily work life manageable and he inspires me to new heights. It is extremely gratifying that he sees the value in this work and is a champion for nurses.

Thank you to Scripps administration for their support throughout the program which made it possible for me to work and pursue this degree. A special thank you also to my friend and partner in “spa day”: Amy Stuck, her laughter and kindness made this journey a real joy.

I wish to express my sincere gratitude to my fellow Radiology nurses who care for patients every day in such a compassionate manner and under, at times, extreme circumstances. You were my inspiration for this study. I want to thank the participants of my study for their time and candor, without their insight and generosity this study would not have been as rich. Thank you also to the Board of Directors of the Association of Radiologic and Imaging Nurses, without their generosity of access this study would not have been successful.

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Chapter 1: Focus of the Study

Background and Statement of the Problem

Interventional Radiology is a rapidly advancing field in medicine and a subspecialty of the general field of Radiology. Interventional Radiologists utilize various imaging techniques (i.e., CT scanners, MRI scanners, ultrasound, fluoroscopy) to guide small instruments through blood vessels and organs to treat and diagnose diseases. These minimally invasive procedures offer less risk, less pain and a shorter recovery time. Interventional procedures have been replacing surgical procedures as imaging technology has advanced. Procedures performed in the interventional radiology setting are likely to result in a shortened length of stay in the hospital or no stay at all, as most can be done on an outpatient basis (SIR, 2011). In the US in 2008, nearly 22,000 interventional radiology procedures were performed per 1 million persons and it was predicted that in 2010, nearly 30,000 interventional procedures would be performed (Baerlocher, Owen, Poole & Giroux, 2008).

The medical field of radiology evolved after the discovery of x-rays in 1895 but the specialty of radiology nursing did not really solidify until 1981 with the advent of the professional organization, the Association of Radiologic and Imaging Nurses (formerly the American Radiological Nurses Association). Nursing came into the “radiology” picture well after radiologic technologists entered the field (ANA, 2007; ASRT, n.d.). History of occupations and professions demonstrate that as new fields of work arise,

develop and complexify, new occupational workers emerge to accomplish work practices (Hughes, 1994). Such is the case for Interventional Radiology. Nurses, physicians, technologists and others support the work of Interventional Radiology. Interventional radiology (IR) nursing is now an emerging subspecialty of radiology nursing.

Interventional radiology nurses are responsible for the care of patients who are increasingly more acutely ill and undergoing procedures that are increasingly more complex (Clark & McClain, 2004). Anecdotal reports suggest that IR nurses are similar to ICU nurses in that they have to balance care in a highly technical, fast paced arena (Clark & McClain, 2004). This approach to nursing differs from more traditional forms of practice which has been characterized as “high touch” and patient contact intensive (Kenner, Guzzetta & Dossey, 1985). But, as nursing leader Henderson (1980) argues, the “essence” of nursing needs to be sustained in the face of such technologic advances. Morse (1992) asserts that nursing care can indeed be “high touch” in a “high tech” environment as she found in her study of ER nurses. What do we know about the work of nurses in IR? How did they come to be involved in this field of medical practice?

To date the literature on nurses in IR appears more anecdotal than empirical. For example, Woods (1980) notes that nurses initially became involved in Radiology to administer contrast material, monitor patients and give sedation for invasive procedures. In addition they were “recruited” in the field to care for patients of various acuity levels in order to provide continuity of care. An American Nurses Association publication, dated 2007, notes that a Joint Commission on Accreditation of Health Care Organization’s mandate that patients in procedural areas receive care on par with those in inpatient settings led to the increase and elevation of nursing practice in Radiologic units

(ANA, 2007). Urbanowicz (2011) maintains that nursing practice in the IR setting is very dynamic and rapidly changing. Thus it appears that limited research has been conducted on this subfield of IR nursing and no current publications describe the actual work of an IR nurse.

To be sure, questions of work, occupations and professions have long interested social scientists. Sociologists, in particular, have developed a theoretical and conceptually rich approach to the study of occupational workers and professions and to the study of actual work practices (Abbott, 1988; Freidson, 1988; Hughes, 1994; Starr, 1982; Strauss, Fagerhaugh, Suczek & Wiener, 1985). For example, Everett C. Hughes' seminal writings on professions and division of labor gave rise to Andrew Abbott's theoretical perspectives on how professional groups establish their authority over jurisdictions of work practice as well as how the boundaries over jurisdictions of work are contested by other occupational workers (Abbott, 1988). Nurse sociologists, such as Allen, Melosh, Mueller and Street continued the tradition of studying occupations and professions with their work on nursing practice and professional development (Allen, 2001; Melosh, 1982; Mueller, 2001; Street, 1992). Such sociological insights and concepts will provide the backdrop for this qualitative descriptive nursing research study of the work practices of nurses in Interventional Radiology.

Statement of Purpose and Aim of the Research

The overall purpose of this study is to describe the work of the nurse in interventional radiology. Uncovering the tacit aspects of their occupational life could develop significance for their practice. My interest in this topic emerges from my own

work trajectory. I have been a procedural nurse the majority of my career, first in emergency medicine then as a nurse in the Cardiovascular Cath Lab (CVL). After completing my Master's degree in Nursing, I became the Advanced Practice Nurse in Imaging Services. This role was developed to increase the nursing presence in Imaging and to elevate nursing practice in this area. I function in a clinical nurse specialist role but am not a CNS. My organization felt that there was room for nurses with considerable clinical expertise and a strong research base in their Master's program to be Advanced Practice Nurses (APN). I am recognized in my organization as an APN, and as such, I straddle the boundaries of clinical nursing and administration, advocating for nursing. As a novice researcher, I find that what interests me arises from my day to day clinical experiences. Anecdotally, I know there are some ambiguities in the nurse's role in IR and some ambivalence on their part concerning their roles. These nurses work in a male dominated, practice environment in which the majority of their coworkers are technologists, not RNs I know there is little empirical evidence on the work of nurses in IR. I think that my being a nurse working in an Imaging setting will lend some credibility with the participants as I can relate to their experiences and know the language they use.

My interest in pursuing this study as a qualitative endeavor is due to the interpretive nature of qualitative research. I have a commitment to the qualitative research tradition and believe in the value of understanding human experience. Interpretation of the socially constructed meaning and knowledge of nursing experience has significance and may lead to practice changes, policy changes and subsequently advance nursing practice.

Qualitative research centers on how people interpret and make meaning of their experiences and their environment. Qualitative inquiry is suitable for the study of incompletely understood phenomenon and the researcher makes interpretations of the meaning of the data (Creswell, 2009; Holloway & Wheeler, 2002).

Qualitative descriptive studies are designed to answer the “what is this?” question and to describe the dimensions and meaning of the phenomena, and to explore relationships among phenomena as individuals do not exist in a vacuum (Fain, 2004; Holloway & Wheeler, 2002; Polit & Beck, 2004, Sandelowski, 2000, 2010). Sandelowski (2000) contends that qualitative description is an approach that is frequently employed but not well described. She asserts that qualitative description presents the phenomenon in everyday terms and in its natural state based on the general premises of naturalistic inquiry. When thick description of a phenomenon is desired then qualitative description is the method of choice (Polit & Beck, 2004; Sandelowski, 2000, 2010).

Significance of the Study

The overall purpose of this study is to explore and describe the work of nurses in Interventional Radiology. The work of nurses in this arena of practice is not well described and as such leads to a lack of understanding of nursing’s involvement in these high tech, low touch areas. What are the day to day work practices of IR nurses? Also to be attended to is how they learn the work practices in IR. This qualitative descriptive study will utilize traditional qualitative methods for data collection; in-depth interviews with currently practicing IR nurses, and data analysis; content analysis (Hsieh &

Shannon, 2005). The result of this exploration will be a rich description of the work of the Interventional Radiology Nurse.

It is important for the research to accurately describe the work of nurses in IR to contribute to the larger body of literature on nursing's work and professional development. It should also include a focus on nurses who work in IR. In doing so, this research may shed light on a previously under examined domain of nursing practice. It might also contribute to nursing scholarship that would be useful to nurse educators, health practice experts, and patient advocacy organizations.

One of the limitations of this study would be that the results of the study would not be generalizable to all nurses working in IR settings. This is a small study but will begin to address the gap in the literature and may lead to other studies in this area.

The remaining chapters of this dissertation will include a more extensive background and significance section; the methods to be utilized in the study; results of the study and a discussion section. The background and significance chapter will outline the social science research and sociological theories of professions and occupations and set the ground work for the context in which the IR nurse works.

Chapter II: Context of the Study

As mentioned previously, sociological studies of occupations and professions provide the broader intellectual context for this research study. The purpose of this chapter is to situate this study in the larger context of the work domain of nurses in Interventional Radiology. This practice specialty of nursing grew out of a subspecialty of medicine, Radiology. How did this come about? In order to understand the circumstance of how nurses came to be involved in IR, we need to review the work of social scientists concerning the development of new fields of work and occupations. I will also discuss the history of the medical fields of Radiology, Interventional Radiology and also Radiology nursing.

Sociological Perspectives on Occupations and Professions

Social scientists trace the development of new fields of work and occupations, including how work and occupations develop, emerge and are defined. They also study the historical trajectories, jurisdictions of practices and division of labor within new and extant professional and occupational workers. There are catalysts that lead to the development of new occupations.

A few of these social scientists were Everett C. Hughes, Andrew Abbott and Eliot Freidson. They have described professions and professionalization. They agree in principle that professionalization follows a certain path or trajectory; creation of theory,

formal training at a university, establishment of and jurisdictional control over domains of work, code of ethics, licensure (Abbott, 1988; Freidson, 1988; Hughes, 1994). What these three have in common is the assertion that medicine is a profession and that nursing is a “paraprofession” subordinate to medicine.

Professional Development: Medicine and Nursing

The field of medicine has been studied by social scientists (Abbott, 1988; Freidson, 1988; Hughes, 1994; Starr, 1982; Strauss et al., 1985). Some of the seminal work on the development of medicine as a profession was conducted by Everett C. Hughes. His work concerned the study of the development of occupations and professions within divisions of labor that were prototypical medicine. His work also involved discussions of the license and mandate of occupations and also how an occupation becomes a profession and what defines a profession (Hughes, 1994).

Hughes (1994) stated that division of labor, which is a basic social process, is best described in occupations. Division of labor appears to be technical but is based on the concrete dispersal of tasks to specific persons, not on components of talents or of automatic or intellectual actions. There are exchanges that occur between occupations in divisions of labor; exchanges between individuals in their occupational role and between the occupation and society. The exchanges that occur between the occupation and society have certain features that lie beneath that exchange; license and mandate. Hughes (1994) asserted that:

an occupation consists in part in the implied or explicit *license* that some people claim and are given to carry out certain activities rather different from those of other people...if the people in the occupation have any sense of identity and

solidarity, they will also claim a *mandate* to define—not merely for themselves, but for others as well—proper conduct with respect to the matters concerned in their work (p.25).

The three most established defined professions, according to Hughes, are medicine, law and clergy. Hughes makes a distinction between occupations and professions and that occupations endeavor to become professions. One distinction is that professions can claim broad mandates such as legal, moral and intellectual mandates (Hughes, 1994).

Hughes (1994) stated “...there are more and more kinds of workers in a division of labor ever changing in its boundaries between one person’s work and another’s. But it is not so much the numbers of people who intervene that seems to bother the professional most; it is rather the differing conceptions of what the work really is or should be, of what mandate has been given by the public, of what it is possible to accomplish and by what means; as well as of the particular part to be played by those in each position, their proper responsibilities and rewards” (p. 55-56).

The study of work is interactional. Hughes (1994) claimed that as a new field opens up the group defines the field, and has control over the field, then over time practice become routine and subsequently practice devolves to other occupations. He posited that nursing as an occupation came about through the devolution of duties from medicine. Nursing has a role in the division of labor but is subordinate to the physician and physicians endeavor to maintain their authority in this division of labor. Division of labor in medicine is a rigid hierarchy but technology can drive role changes (Hughes, 1994).

Abbott, a student of Hughes, took the work of Hughes forward and described how boundaries around work get defined and the strategies that they use to lay claim to jurisdiction; ex. code of conduct, licensing, nurse practice act. Abbott (1988) stated “it is the control of work that brings the professions into conflict with each other and makes their histories interdependent” (p.19). He continued:

The central phenomenon of professional life is thus the link between a profession and its work, a link I shall call jurisdiction. To analyze professional development is to analyze how this link is created in work, how it is anchored by formal and informal social structure, and how the interplay of jurisdictional links between professions determines the history of the individual professions themselves (p. 20).

Abbott (1988) posited in the division of labor there are professional boundaries, such as those delineated in job descriptions, which may not be as clear in reality but are distinct rules of “professional jurisdiction”. Professions are interdependent systems. A change in one profession affects the other. Jurisdictional claims are a means of overcoming jurisdictional disputes by professions (Abbott, 1988).

He also discussed how technology brings new specialties to the divisions of labor. Additional groups or occupations come forward in the hospital setting as tasks deemed subordinate to medicine emerge, creating these new subordinate groups to accomplish the tasks. In this manner, subordinate groups such as radiology technologists have emerged. He described the case of nursing, as envisioned by Florence Nightingale, as an independent authority equal with medicine but due to various factors nursing became subordinate to medicine (Abbott, 1988).

Within professions, there may be occupational autonomy dependent on their skill and expertise. Nursing is not a true autonomous practice as some of their work depends on the orders of physicians. They work under the authority of physicians (Abbott, 1988).

Recent nursing professional development has shed light on the professionalization of nursing and paints a different picture from those of Abbott and Hughes. Nurses have been compared to physicians to answer the question as to whether nursing is a profession. Nursing leaders have taken to heart the professionalization of nursing and mobilized strategies to move this effort forward. Academic programs have been established to endorse a core body of knowledge that emphasizes science, theory and research. In addition, licensing requirements have been established to regulate nursing practice (Apesoa-Varano, 2007; Salhani & Coulter, 2009). This has led many to grant nursing professional status. The move towards a body of knowledge based on science and theoretical approach has been an attempt to gain independence from medicine and establish autonomous practice (Apesoa-Varano, 2007). While great strides have been made, certain governing agencies have been reluctant to grant nursing full autonomous practice (Salhani & Coulter, 2009).

Nursing sociologists have conducted very interesting ethnographic studies utilizing the concepts of professions and work (Allen, 2001; Melosh, 1982; Mueller, 2001; Street, 1992). Allen (2001) described boundaries between nurses and several other occupations and how that shapes nursing practice. Street (1992) utilized these concepts to discuss power relations inherent in these relationships and its influence over nursing practice. Mueller (2001) described delegation and boundaries in her study on the work of

nurses in clinical trial coordination. Melosh's (1982) work centered on the occupational history of nursing and professionalization concepts.

Studies of Work: Medicine and Nursing

Social scientists conducted studies specifically about medicine (Freidson, 1988; Starr, 1982; Strauss et al., 1985). This work was based on the concepts of professions and occupations put forth by Hughes, Abbott and other social scientists.

Freidson (1988), also a student of Hughes, wrote about the medical division of labor and the historic emergence of medicine as a profession. His work included exploration of the work of medicine and how it dominated other occupations. Freidson (1988) also took the discussion of professions further and stated, "the most strategic distinction lies in legitimate, organized autonomy—that a profession is distinct from other occupations in that it has been given the right to control its own work" (p. 71). He described nursing as a "paraprofessional" occupation; that they are organized around a profession. Nursing can build the same institutions as those occupations with professional status; formal training in universities, code of ethics, licensure to control who may do the work. Freidson (1988) stated: "but what they persistently fail to attain is full autonomy in formulating their training and licensing standards and in actually performing their work. Their autonomy is only partial, being second-hand and limited by a dominant profession" (p. 76).

Strauss, Fagerhaugh, Suczek and Weiner (1985) conducted research in seven San Francisco Bay area hospitals between 1977 and 1982. Their study was conducted utilizing observation and interviews over a 4 year period. They analyzed in detail the several kinds of work and relationships that make up "medical-nursing" work. Strauss et

al. (1985) contended that traditional writing in sociology of work begins with division of labor, work roles, etc., rather than focus on analysis of “work” itself. They also suggest that the “worked-on” become part of the division of labor. I found it interesting that this was the first time I have seen the patient specifically mentioned in the discussions of division of labor.

Strauss et al. (1985) described several types of work; “comfort work”, “composure work”, “clinical safety work”, “kin work”, “machine work”, “biographical work”, “psychological or sentimental work” “body work” and the “total arc of work”. They stressed that it was important to remember that “work” must be linked with the work place. The work place is interactional and changing (Strauss et al., 1985).

Strauss et al. (1985) followed the trajectory of chronic illness and that the diagnosis and treatment of illness contributed to the development of drugs and the increasing number and variety of machinery. New occupations have been developed to maintain and utilize the equipment, such as radiology technicians. Strauss et al. (1985) posited that specialization in medical fields leads to technology advances and that in turn requires new skilled personnel in this changing division of labor.

There is a difference between medicine, technicians and nurses in how they learn “machine work”. There is little focus on equipment in med school except for interpretation; with the exception of radiology, which does focus on the equipment. They found with nursing, that training on equipment is learned on the job. Technicians have specific training on equipment built into their programs with some additional training completed “on the job” (Strauss et al., 1985).

Strauss et al. (1985) did caution that, “although we have emphasized the primacy of trajectories and the arc of work in the division of labor, we should also emphasize that the ideologies and conceptions of workers (especially powerful or influential workers) constituted conditions that affect definition of the work and its associated tasks” (p.276).

Starr’s (1982) thought provoking seminal work on the history of American medicine set the stage for much discussion about the medical profession. Starr discussed how power and authority over the jurisdiction of medicine came into being and how physicians acquired a dominant position in the division of medical labor. He asserted that physicians exercise authority over patients, their co-workers, and the public within and at times outside their jurisdiction (Starr, 1982). He termed this “professional sovereignty” and writes about the social origin of this sovereignty. He pointed out that physicians have “unparalleled levels of autonomy” (Starr, 1982). Starr (1982) stated that:

Authority, therefore, incorporates two sources of effective control: legitimacy and dependence. The former rests on the subordinates’ acceptance of the claim that they should obey; the latter on their estimate of the foul consequences that will befall them if they do not... Thus the twin supports of dependence and legitimacy introduce a stability into authority relations; when one is weak, the other may take over, and so authority as a mode of control, is stronger and more reliable than either force or persuasion (p. 9-10).

Starr (1982) qualified this sovereignty at the end of his book by discussing how medicine has seen their authority erode. The advent of managed care and the insidious nature of insurance payers have eroded the boundaries and jurisdiction of medicine. This

undermining of the profession of medicine's authority and control had led to a decline in power and professionalization (Starr, 1982)

Since this seminal work was published in 1982, social scientists have continued to write about the decline of power for the medical profession with some qualification. According to Timmermans and Oh (2011), the medical profession has been resilient when faced with the challenges of change in health policy and other social changes and it has continued to transform to meet these challenges.

Case of Radiologic Field of Medicine

As social scientists have endeavored to define how new occupations develop out of new fields of work and over time begin to sub-specialize, the specific case of radiologic medicine and the subfield of Interventional Radiology has been studied (Burri, 2008; Golan, 2004; Halpern, 1992; Pasveer, 1989). Radiology developed as a sub field of medicine and both Golan (2004) and Pasveer (1989) described how professionalization helped this evolution.

Pasveer (1989) discussed how the professionalization of radiology was dependent on the productions of radiographic images and who was deemed competent to interpret such images. He contended that it wasn't until 1920 that radiology became a qualified specialty. He referred to jurisdictional control as an important element to their professionalization.

Golan (2004) also described 1920 as the time that radiology was "able to successfully claim a monopoly over x-ray practice and institute common standards of education, training, competence, and ethics" (p.469). After the discovery of X-rays, medicine used the images acquired for diagnosis and treatment. But there were a

plethora of x-ray operators, photographers, physicists, engineers, and electricians, who obtained the images. To develop their specialty, Radiologists had to differentiate the image acquisition from interpretation. They had to assert that only a physician trained in Radiology could interpret the images (Golan, 2004). Thereby, laying claim to their jurisdiction over radiologic medical practice.

Halpern (1992) and Burri (2008) describe the course of this specialization through the boundary and jurisdiction work with ancillary professions like radiologic technologists. Halpern (1992) describes how Radiology has historically dominated ancillary workers and was able to maintain this power by jurisdictional control of these associated occupations such as radiologic technologists. Jurisdictional control requires the ancillary group's subordination (Halpern, 1992).

Burri's (2008) work was on boundaries and their use in regaining professional authority. Burri also uses Abbott's definition of jurisdiction. Burri (2008) asserts that the jurisdiction that Radiology has over other disciplines is their authority of the medical image visualization. They have had to assert that authority and Burri (2008) contends that technology advances challenge "the traditional roles and order among radiologists and technologists" (p.38).

Case of Field of Radiology Nursing

Hughes, Hughes & Deutsher (1958) reported on research studies that were conducted between 1952 and 1957 commissioned by the American Nurses Association. These studies were part of a five-year program of research on nursing functions and financed by nursing associations. There were twenty projects in seventeen states. All of

the studies that were conducted were based on the assumption that some particular knowledge is basic to nursing. Hughes, et al. (1958) predicted that:

“the medical division of labor will continue to become greater, in that there will be more different kinds of things to be done and in that the health institutions will be more complicated and require more different kinds of people to operate them. In the course of this, physicians will learn more new techniques and will continue to reorganize their work by delegation to others, especially nurses, of many tasks and responsibilities... The doctor will keep control over the economy of his time and by continuing such delegation, although naturally enough, he probably will continue to complain that the woman to whom he delegates work and responsibility is not always there when he wants her on a moment’s notice. The physician’s work will become more and more difficult and demanding; he will ask for help and will get it—and probably have to pay for it in changes of behavior and position which he will not especially like. There will be more work for nurses to do, and more and more kinds of nurses will be required to do it.” (p. 7-8).

This work by Hughes, et.al, sets the ground work for the professionalization of nursing and the specialization of nursing. In particular, this statement by Hughes, et.al, appears to be prophetic 50 years later. The emergence of specialty nurse’s professions would seem to come forward in the devolution of duties from physicians. This is typically seen in social dynamics of work especially medical work. As technology advances, work is delegated along the hierarchy of professions from higher status to lower status workers (Abbott, 1988; Freidson, 1988; Hughes, 1994).

Woods (1980) described how expanding technology in Radiology led hospitals to realize that they needed dedicated skilled nurses in this area. This is similar to the emergence of PACU nursing that followed the evolution of anesthesia care (Barone, Pablo & Barone, 2003). Nursing is a broad generalist field and then a subspecialty emerges. This leads to that subspecialty developing its own organization, creating their own journal, conducting annual meetings, local chapters and certifications, and specialty programs. This all signals a jurisdiction of practice and a path to professionalization as described by social scientists (Abbott, 1988; Freidson, 1988; Hughes, 1994).

A literature review reveals that the evolution of nursing practice in Radiology, much less Interventional Radiology, has yet to be empirically studied by social scientists or nurse scholars. There are no fully realized studies of the history of nursing practice in Radiology. My dissertation seeks to fill the gap in literature by exploring and describing the work of nurses in IR.

History of Radiology and Interventional Radiology

There have been no fully realized studies of the history of Radiology, IR and nursing within Radiology. Putting together anecdotal reports that have been published on these domains of work is important to understand the current context within which my study of the work of nurses in IR. What I could uncover utilizing reports that have been published, I am using to sketch out the historical trajectory of Radiology, IR and nursing practice within these fields. Situating nursing within the broader context of Radiology will provide the background for my study on work of nurses in IR.

Radiology as a specialty in medicine developed after the discovery of x-rays in 1895. The first society of this new specialty, the American Roentgen Ray Society, was founded in 1900. This society was established as a “forum for progress in radiology...is dedicated to the goal of the advancement of medicine through the science of radiology and its allied sciences” (ARRS, n.d.).

With the advent of angiography, Interventional Radiology became a subspecialty of Radiology. Charles Dotter, MD was credited with the birth of Interventional radiology. Rosch, Keller and Kaufman (2003) stated that “Interventional radiology was born January 16, 1964, when Dotter percutaneously dilated a tight, localized stenosis of the superficial femoral artery in an 82-year-old woman with painful leg ischemia and gangrene who refused leg amputation” (p.841). The American Medical Association formally recognized Interventional Radiology as a medical specialty in 1992 (Clark & McClain, 2004).

Literature on the history of Interventional Radiology seems to focus on the technology advancements that drove the practice. Although clearly other professions have developed out of this expansion of medicine, there was no discussion about the development of other professions with them, i.e. Radiologic Technologists or Radiology Nurses. I had to explore the specific organizational societies to find any information about the history of those professions.

Radiologic Technologist

In Radiology, the work began with physicians then opened up opportunities for other occupations such as technologists and nurses as described by Abbott (1988). These occupations moved in under the authority and control of physicians. By the 1910s,

physicians purchased x-ray equipment for their offices and specialized as Radiologists. As technology advanced with the mechanics of the x-ray equipment, they found that they did not have time to do both the mechanics and the patient care. Physicians delegated the mechanics of the x-ray equipment to others, initially it was the secretaries in their offices then it was nurses in the hospitals, functioning as x-ray technicians. The radiologic technologist occupation developed and assumed that role. The radiologic technologist had jurisdiction then of the equipment and image acquisition. Radiologists took control of the interpretations of the images but the images were obtained by technologists (ASRT, n.d.).

Radiology technology evolved into an occupation with licensure and assumed the control of the radiation and equipment. Eddy Jerman is credited with bringing education and organization to the x-ray technician. In 1920, the first national technicians society was established, The American Association of Radiological Technicians. The name was changed to American Society of X-Ray Technicians in 1932. By the 1950's the organization established formal education standards for the profession. The current name of the organization is American Society of Radiologic Technologists and was adopted in 1964 (ASRT, n.d.).

I found it interesting that the early x-ray technologists were nurses and predominantly female. Today, Interventional Radiology is a male dominated field and Radiologic Technologists outnumber nurses in the setting. While the exact number of technologists working in Radiology is unknown, as of 2010, ASRT data lists 137,746 active members (ASRT, 2010).

History of Radiology Nursing

It would appear that years after the technologists, designated nurses became involved in Radiology to administer contrast material, monitor patients and give sedation for invasive procedures (Woods, 1980). The role of the nurse in radiology was expanded by advances in technology and changes in organizations (ANA, 2007). How and why nurses came to inhabit this field of practice is unclear. Empirical research is needed to uncover the historical, technological and occupational factors that led to the specialty practice of radiologic nursing. In the absence of such empirical research, however, it is clear that some nurses have claimed radiologic nursing as a subspecialty of nursing practice.

The Association for Radiologic and Imaging Nurses (formerly known as American Radiological Nurses Association) was founded in 1981. There is limited information in the literature about the history of the development of the specialty of Radiology nurses except for the founding of their society. I was able to find documentation that dedicated radiology nurses were present in Radiology departments well before the Association was established, as early as the 1970s (Goodhart & Page, 2007; Wright, 1987). While the exact number of nurses working in radiology is unknown, ARIN data lists 2,018 active members with 22 local chapters (ARIN, 2010).

To date, Schools of Nursing do not offer formal degree granting program in Radiology Nursing. However, nurses interested in pursuing advanced knowledge of the specialty practice can access the *Core Curriculum for Radiological Nursing*, which was first published in 1999 (ANA, 2007). In addition, nurses can seek certification from the

Radiologic Nursing Certification Board (RNCB) in radiologic nursing by taking the certification examination, which has been available since 1998 (ANA, 2007).

History of Interventional Radiologic Nursing

Little is written about when Radiology nurses specialized into Interventional Radiology. The anecdotal articles in professional journals that have been published provide the background for this study. The authors of some of these articles describe the need for nurses for sedation in invasive procedures. These authors illustrate the evolution of the sedation in procedural areas and the standards of practice driven by the Joint Commission of Accredited Healthcare Organizations and the American Society of Anesthesiologists (Epstein, 2003; Holzman, Cullen, Eichhorn & Philip, 1994; Odom-Forren, 2005). Odom-Forren (2005) specifically mentions ARIN as one of the nursing specialty organizations that was involved in authoring the first national nursing position statement on the administration and monitoring of conscious sedation in 1991.

Two studies, conducted by radiologists in the US and Europe, did survey Interventional Radiologists about practice and included questions about the presence of dedicated radiology nurses and nursing care. Interestingly, 87% of surveyed Interventional Radiologists in the US and 83% of those surveyed in Europe stated they had dedicated radiology nurses (Haslam, Yap, Mueller & Lee, 2000; Mueller, Wittenberg, Kaufman & Lee, 1997).

There has been no formal specialty training for nurses in Interventional Radiology. How do nurses learn the work of IR? Nurses are trained “on the job” with preceptors when they begin working in Radiology. ARIN has written guidelines for

nurses in IR but the rapid advancement of technology and procedures can make it difficult to maintain current and up to date guidelines (Clark & McClain, 2004). Clark & McClain (2004) conducted a study to evaluate the current orientation practices in IR. They also found there was limited research in the area of IR nursing. They surveyed IR nurses at an ARIN conference. One interesting finding was generated from the comments elicited on the survey; the nurses perceived a lack of knowledge of IR nursing on the part of other nursing specialties and nursing administration (Clark & McClain, 2004). This would seem to validate the need for a study to describe the work of IR nurses.

The IR nurse currently is part of a team that includes IR physicians and Radiologic Technologists. Anecdotally, I know that there are “blurred” lines of jurisdiction within that team. We need to explore the work of nurses in IR.

Summary

I have benefited knowing this social science research and the broader history of medicine, nursing and historical trajectory of occupations and work. This provides the context of my study; I am not aspiring to develop a sociologic theory but to contribute to nursing development borrowing approaches to situate this nursing research study within the greater social science work on occupations. Sociologists have not studied Radiology nursing and there is a need to describe the work on nursing in IR.

The context for nursing in IR, as described by the social scientists, is one of subordination to medicine and as a paraprofessional with the superior profession maintaining control of the division of labor (Abbott, 1988; Freidson, 1988; Hughes,

1994). As I have set the stage for the context in which the IR nurse works, we need to describe what the work of the IR nurse is. This has not been previously well described in the literature and there exists no previous foundation of empirical research into description of the work of nurses in IR. Abbott (1988) recommended that “work” get studied rather than just individual professions. A gap in the literature exists for the study of work of nurses in IR.

I propose a nursing research study drawing on social science concepts of work to inform my qualitative descriptive nursing research study on IR nurses. This proposed study of nurses in IR seeks to contribute to the growing body of scholarship on nursing work. The design and setting of this study will be discussed in the next chapter.

Chapter III: Methodology

This methods chapter describes in detail how this qualitative descriptive study will be conducted. First, the purpose of the study is revisited to frame the objectives in studying the work of nurses in Interventional Radiology. Second, the rationale for choosing the qualitative description methodology research design is presented. Data collection methods including sampling and setting will be described along with ethical considerations. Next, data analysis procedures will be detailed. Finally, the strengths and limitations of the proposed study are attended to.

Purpose

The purpose of this research study is to explore and describe the work of nurses in Interventional Radiology. To accomplish this purpose, I will explore the work of the nurse in Interventional Radiology and present a rich description of the work of nurses in this area from the emic perspective. Questions to guide this inquiry are as follows: What are the day to day work practices of nurses in IR? How do nurses learn the work practices of IR?

Research Design

Qualitative research in general is used to explore and understand the meanings people ascribe to the social reality in their lives. This paradigm utilizes an inductive

approach to inquiry. Quantitative research in general is a means for testing hypotheses or theories by a methodical examination of the relationship among variables. This paradigm also utilizes a deductive approach to inquiry (Creswell, 2009; Holloway & Wheeler, 2002). Each approach is used for answering different questions and the research question determines the research approach. Qualitative research is used when there are no predetermined theoretical framework and focus on the emic perspective. The centrality of qualitative research is interpretation. The interpretation of data may create new theoretical beliefs, alter existing theories or reveal the core of the phenomena (Holloway & Wheeler, 2002). The qualitative research paradigm resonates with me as you can find out the “why” and the “how come” not just the “what” and “how many” as with the quantitative research paradigm.

Given the gaps of knowledge presented in the prior chapters, I will utilize qualitative descriptive methodology to describe the work of the Interventional Radiology nurse. There are several methods typically used in qualitative research, i.e. ethnography, phenomenology and grounded theory. One method that is overlooked in this list of qualitative research is qualitative description (Polit & Beck, 2004; Sandelowski, 2000, 2010). Sandelowski (2000) contends that qualitative description is a method that is frequently employed but not well described. She asserts that qualitative description presents the phenomenon in everyday terms and in its natural state based on the general premises of naturalistic inquiry. When thick description of a phenomenon is desired then qualitative description is the method of choice (Polit & Beck, 2004; Sandelowski, 2000, 2010). As the work practices of nurses in IR are neither well known nor described empirically, I chose qualitative description method for exactly that reason.

Data collection will be through in-depth interviews and data analysis will utilize content analysis as each are typically utilized in qualitative descriptive studies. It is important for the research to accurately describe the work of nurses in IR to contribute to the body of literature on nursing's professional development in general and specifically that of nurses who work in IR.

Sampling and Setting

Based on my study's purpose and significance and my desire to obtain information-rich data, a purposeful sampling method will be used in this study (Patton, 1990). Patton (1990) stated, "the logic and power of purposeful sampling lies in selecting *information-rich cases* for study in depth. Information-rich cases are those which one can learn a great deal about issues of central importance to the purpose of the research, thus the term "*purposeful sampling*" (p. 169). Sandelowski (2000) asserted that any purposeful sampling technique may be used effectively in qualitative descriptive studies. Sampling would continue until I achieve "informational redundancy" or "theoretical saturation" (Patton, 1990; Sandelowski, 1995).

Participants will be recruited from those nurses who belong to the Association of Radiologic and Imaging Nurses (ARIN). Initial recruitment will involve contacting nurses during the fall symposium of ARIN in Las Vegas and additional recruitment will be through the local southern California chapter of ARIN.

There are several gate keepers to gain approval from prior to entry into any of the settings. I have received permission from the ARIN board of directors to recruit participants from those nurses attending the ARIN fall symposium. Copy of the email is

appendix A. I will contact the local southern California ARIN chapter president for permission to recruit within the local chapter. Prior to any data collection, I will seek IRB approval from USD. I will also have letters of support from the various gate keepers prior to seeking IRB approval. Informed consent will be obtained from all participants. The anonymity of the participants will be assured by the use of pseudonyms.

Participants

The intended participants for this study are nurses currently working in Interventional Radiology. Any nurse that self-identifies as an Interventional Radiology Nurse will be included. While there are no fixed rules for sample size in qualitative research studies, most suggest a sample range of 4 to 40 participants, higher on the range for studies other than phenomenology (Bernard & Ryan, 2010; Holloway & Wheeler, 2002; Sandelowski, 1995). Prior studies utilizing qualitative description method had sample sizes of 12 to 30 participants; greater than 30 for studies that utilized focus groups (Geller & Holtzman, 1995; Granger, Sandelowski, Tahshjain, Swedberg & Ekman, 2009; Julion, Gross, Barclay-Mclaughlin, Fogg, 2007; Smeltzer, 1994; Stubblefield & Murray, 2001; Van Hulle Vincent & Gaddy, 2009). Therefore, I plan to recruit on a voluntary basis, 20 to 30 participants; the final number of whom will be influenced by time, availability, resources and informational redundancy.

Recruitment will be through a booth at the ARIN fall symposium, or through a flyer/recruitment letter emailed to participants of the conference prior to the symposium. At the booth, I will make initial contact with participants and set up an appointment to meet for the interview or for a telephone interview at a later date. Should I need to

continue to recruit participants, then I will recruit through the local chapter of ARIN and arrange for interviews. To recruit those participants, I will email my flyer/recruitment letter to the local chapter president of ARIN to be sent to the local members.

To show gratitude and respect for the participants, I will provide a \$10 gift card at each interview session whether or not the interview is completed.

Data collection

Data will be collected through interviewing of participants. Interviews are the standard method of data collection for qualitative descriptive studies (Sandelowski, 2000, 2010). Semi-structured in-depth interviews will be utilized to allow the participant's perspective on the phenomenon of concern to unfold as the participant views it (Kvale & Brinkmann, 2009).

Interviews will be conducted in various areas depending on the setting. In the setting of the ARIN symposium, a conference room at the conference center will be used or a location of the participant's choosing. If not convenient for a participant to be interviewed during the conference then I can arrange a telephonic interview with the participant at a later date. In the setting of the local southern California branch of ARIN, a coffee shop will be utilized. Every effort will be made to accommodate the participant's preference for the location of the interview, including an opportunity for a telephonic interview if requested.

All participants will be provided a consent form to sign after discussion of the study and the opportunity for them to ask questions. They will be provided a copy of the consent. See Appendix B for a copy of the consent form. The participants will be

assured that they can drop out of the study at any time with no consequence; they also are assured that they may decline to answer any question for any reason. If a participant agrees to a follow up interview, their contact information will be verified at the end of the interview.

All information acquired and identifying records will remain confidential and secured in a locked file and digital files (including voice recordings) in a password-protected computer file in my office for a minimum of five years. Confidentiality will be provided to the full extent possible. Code numbers will appear on the transcription and the participant's names will be stored in a separate location from the transcription (locked file). The participants contact information will be added to the file of the participant names with assigned number codes. I will be the only one who has access to the file identifying the participant names with the assigned number codes and possible contact information.

Interviews will last approximately 60 to 90 minutes and will be digitally voice recorded with the recorder visually apparent. So as not to disturb the participant, background notes will be written prior to the interview and field notes written immediately after the interview. The background notes will include how the participant was contacted for the interview and the setting for the interview. Field notes will include the behavior of the participant during the interview, my thoughts on how the interview went and any personal notes on the interview in general. Some notes will be taken during the interview as long as it is not distracting to the interview process. In addition, analytical, methodological and personal in-process memos will be written after the conclusion of the interview.

The participant will be able to end the interview at any time but conceivably the interview will end when the participant feels the description is complete or exhausted. Privacy will be maintained by conducting the interview in a private setting, utilizing code numbers (ex. RN#1, etc.) for participants. Each participant will be interviewed at least once with the option to have a second interview via telephone, to explore their perspective of phenomena that may have emerged from the interview process and to allow for clarification.

The questions I plan to ask cover these main topics; general work trajectory, inquiry about their typical day of work, individual descriptions of what they do and how they came to work in IR. The interview guide will consist of 3-4 basic questions with several probing questions. Demographics will be collected prior to the start of the interview and are included in the interview guide. See Appendix C for the draft interview guide. Field notes will be taken during the interviews including analytic, method and personal in-process memos. Field notes and in-process memos are an account of the field experience and document the reflective and reflexive process. This renders the research process visible and enhances the rigor of the study (Caelli, Ray & Mill, 2003; Davies & Dodd, 2002; Sandelowski, 1986, 1993).

Data Management and Analysis

The field notes will be transcribed immediately after the conclusion of each interview. In-process memos will be written to start tracking the reflexive and analysis process (Holloway & Wheeler, 2002; Lofland, Snow, Anderson & Lofland, 2006). The interviews will be transcribed verbatim either manually by myself or by a transcription

service. The field notes, in-process memos and interview transcriptions will be considered data.

Sandelowski (2000) recommends the use of content analysis for data analysis in qualitative description research studies. Several authors have written about content analysis, and describe it as an approach to interpreting meaning from textual data (Altheide, 1987; Graneheim & Lundman, 2004; Hesse-Biber & Leavy, 2011; Hsieh & Shannon, 2005; Morgan, 1993; Sandelowski, 2000). The textual data can be documents, transcribed interviews and field notes of observations.

Hsieh and Shannon (2005) describe 3 approaches to content analysis; “directed”, “summative”, or “conventional”. Directed approach is used when there is existing theory or prior research about a phenomenon and further description would further the theory. A more structured approach is used and existing theory drives the initial coding (Hsieh & Shannon, 2005). Summative approach begins with quantifying certain words to understand the contextual usage of the words. Research that analyzes documents such as manuscripts or textbooks has utilized this approach (Hsieh & Shannon, 2005). The third approach, conventional content analysis, will be utilized in this study.

Hsieh and Shannon (2005) assert that “conventional” content analysis is used when there is limited theory or research on a phenomenon and the aim of the study is description. Hsieh and Shannon (2005) contend that “the advantage of the conventional approach to content analysis is gaining direct information from the study participants without imposing preconceived categories or theoretical perspectives” (p.1279). Content analysis involves no a priori codes and researchers should avoid using preconceived categories (Hsieh & Shannon, 2005). Researchers immerse themselves in the data and

allow the codes to come from the data. The codes become categories and then researchers reexamine the data with the new code categories and allow themes to emerge (Altheide, 1987; Graneheim & Lundman, 2004; Hesse-Biber & Leavy, 2011; Hsieh & Shannon, 2005; Morgan, 1993; Sandelowski, 2000).

As proposed by Hsieh and Shannon (2005), I will read and reread the transcripts of the interviews to gain a sense of the data as a whole. Then read it word for word to develop codes which would include drawing attention to exact words that represent crucial feelings or perceptions. I will make careful notes of my impressions and thoughts of this analysis as I progress. Hsieh and Shannon (2005) explain that "...labels for codes emerge that are reflective of more than one key thought...and then become the initial coding scheme" (p.1279). Codes then can be sorted into categories built on the basis of how they are related. Hsieh and Shannon (2005) recommend combining categories into groupings that are broad enough to capture the codes. Definitions for each category, subcategory and code are built. To report the findings, Hsieh and Shannon (2005) recommend identifying "exemplars" from the codes and categories.

Several studies have been conducted utilizing qualitative description and content analysis methods (Geller & Holtzman, 1995; Granger et al., 2009; Julion, Gross, Barclay-McLaughlin, Fogg, 2007; Smeltzer, 1994; Stubblefield & Murray, 2001; Van Hulle Vincent & Gaddy, 2009). The end product of these findings was a description of the participants' concerns, perceptions and experiences, and therefore a description of the phenomenon of interest; not an advancement of a theory.

Qualitative analysis software may be utilized to manage the data. If utilized, a complete list of codes, categories and the data would be entered into this qualitative

software management system. The codes, categories, themes and data will be discussed with the dissertation committee Chair and adapted as recommended.

Strengths and Limitations of Method

The overall strength of qualitative description is the naturalistic inquiry and the ability to describe the phenomenon through the genuine voice of the ones experiencing it. Mays and Pope (2000) discuss some questions to address when assessing the quality of qualitative research, three of them are: is there reflexivity, is the setting adequately described so the reader can relate the findings to other settings, did the sample include the full range of possible cases so that conceptual generalizations could be made?

Sandelowski (1993) asserts “that rigor is less about adherence to the letter of rules and procedures than it is about fidelity to the spirit of qualitative work” (p.2). She describes strategies to achieve rigor in qualitative studies that include “auditability”, “credibility and fittingness” (Sandelowski, 1986). To attempt to follow these strategies, I will make transparent my methods and journey by an audit trail through in-process memos and field notes. In addition, using my memos throughout the data gathering and analysis process will increase the opportunity for researcher bias and blind spots to be revealed. Through this reflexivity and reflectivity, I will attempt to remain true to my aim of describing the work of nurses in IR and therefore increase the rigor of this study.

Adhering to the methodological tradition of qualitative research will help with the rigor of my study. Conducting the study in a practice setting where I can be the researcher and not a known entity or co-worker may help assuage any a priori judgment I may have about the IR setting.

One major limitation historically for all qualitative studies has been in a perceived lack of generalizability. While generalizability is not a goal of qualitative research, recruiting participants from various parts of the country may assist with acquiring a range of possible cases. This range of possible cases could assist with conceptual generalization (Mays & Pope, 2000).

Additional limitations of this study are that I am a novice researcher and as such may not ask appropriate or sufficiently insightful questions. There may be important probing questions that I may neglect to ask. My prior experiences in IR may bias data collection or data analysis. To minimize this, my dissertation committee will assist with my interview guide and with the data analysis. A limitation of the study in general would be that it is based on the information of one member of the IR team. Future studies could include interviews of the other team members of IR, (i.e. Radiologic Technologists and Radiologists) to enrich and inform the data analysis.

The remaining chapters of this dissertation will include the results of the study and discussion.

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Manuscript I: Work Domain of Nurses in Interventional Radiology

Abstract

Work practices of nurses have long interested nurse scientists and these practices have been studied in a variety of settings. One practice area that has not been studied is Interventional Radiology (IR). The purpose of this paper is to situate nursing within a broader context of the work domain of nurses in Interventional Radiology and provide the background that is important for nurse scientists interested in designing and implementing research studies on the work of IR nurses today. In doing so, this research may shed light on a previously under examined domain of nursing practice and could contribute to nursing scholarship which would be useful to nurse educators, health practice experts, and patient advocacy organizations.

Keywords: Work domain, Interventional Radiology nurses, historical background

Introduction

Nurse social scientists have long been interested in the work practices of nurses and these practices have been studied in several settings (Allen, 1997; Melosh, 1982; Mueller, 2001; Street, 1992). One practice area that has not been studied is Interventional Radiology (IR). The purpose of this paper is to situate nursing within a broader context of the work domain of nurses in Interventional Radiology and provide the background that is important for nurse scientists interested in designing and implementing research studies on the work of IR nurses today.

Interventional Radiology is a rapidly advancing field in medicine and a subspecialty of the general field of Radiology. Interventional Radiologists utilize various imaging techniques (i.e., CT scanners, MRI scanners, ultrasound, fluoroscopy) to guide small instruments through blood vessels and organs to diagnose and treat diseases. These minimally invasive procedures offer less risk, less pain and a shorter recovery time than traditional surgical approaches. Interventional procedures have been replacing surgical procedures as imaging technology has advanced. Procedures performed in the interventional radiology setting are likely to result in a shortened length of stay in the hospital or no stay at all, as most can be done on an outpatient basis (SIR, 2011). In the US in 2008, nearly 22,000 interventional radiology procedures were performed per 1 million persons and it was predicted that in 2010, nearly 30,000 interventional procedures would be performed (Baerlocher, Owen, Poole & Giroux, 2008).

The medical field of radiology evolved after the discovery of x-rays in 1895 but the specialty of radiology nursing did not really solidify until 1981 with the advent of the professional organization, the Association of Radiologic and Imaging Nurses (formerly

the American Radiological Nurses Association). Nursing came into the “radiology” picture well after radiologic technologists entered the field (ANA, 2007; ASRT, n.d.). History of occupations and professions demonstrate that as new fields of work arise, develop and complexify, new occupational workers emerge to accomplish work practices (Hughes, 1994). Such is the case with Interventional Radiology. Nurses, physicians, technologists, and others, together, support the work of Interventional Radiology. Interventional radiology (IR) nursing has become an emerging subspecialty of radiology nursing.

Interventional radiology nurses are responsible for the care of patients who are increasingly more acutely ill and undergoing procedures that are increasingly more complex (Clark & McClain, 2004). Anecdotal reports suggest that IR nurses are similar to ICU nurses in that they have to balance care in a highly technical, fast paced arena (Clark & McClain, 2004). This approach to nursing differs from more traditional forms of practice which has been characterized as “high touch” and patient contact intensive (Kenner, Guzzetta & Dossey, 1985). But, as nursing leader Henderson (1980) argues, the “essence” of nursing needs to be sustained in the face of such technologic advances. Morse (1992) asserts that nursing care can indeed be “high touch” in a “high tech” environment as she found in her study of ER nurses. What do we know about the work of nurses in IR? How did they come to be involved in this field of medical practice?

Sociological Perspective

To be sure, questions of work, occupations and professions have long interested social scientists. Sociologists, in particular, have developed a theoretical and

conceptually rich approach to the study of occupational workers and professions and to the study of actual work practices (Abbott, 1988; Freidson, 1988; Hughes, 1994; Starr, 1982; Strauss, Fagerhaugh, Suczek & Wiener, 1985). For example, Everett C. Hughes' seminal writings on professions and division of labor gave rise to Andrew Abbott's theoretical perspectives on how professional groups establish their authority over jurisdictions of work practice as well as how the boundaries over jurisdictions of work are contested by other occupational workers (Abbott, 1988). Nurse sociologists, such as Allen, Melosh, Mueller and Street continued the tradition of studying occupations and professions with their work on nursing practice and professional development (Allen, 1997; Melosh, 1982; Mueller, 2001; Street, 1992). Such sociological insights and concepts can provide the backdrop for nursing research studies of the work practices of nurses in Interventional Radiology.

Anecdotally, we know there are some ambiguities in the nurse's role in IR and some ambivalence on their part concerning their roles. These nurses work in a male dominated, practice environment in which the majority of their coworkers are technologists, not RNs. The work of nurses in this arena of practice is not well described and as such leads to a lack of understanding of nursing's involvement in these high tech, low touch areas. It is important for research to accurately describe the work of nurses in IR to contribute to the larger body of literature on nursing's work and professional development. In doing so, research may shed light on a previously under examined domain of nursing practice. It might also contribute to nursing scholarship which would be useful to nurse educators, health practice experts, and patient advocacy organizations.

This practice specialty of nursing grew out of a subspecialty of medicine, Radiology. How did this come about? In order to understand the circumstance of how nurses came to be involved in IR, we need to review the work of social scientists concerning the development of new fields of work and occupations.

Social scientists trace the development of new fields of work and occupations, including how these develop, emerge and are defined. They also study the historical trajectories, jurisdictions of practices, and division of labor within new and extant professional and occupational workers. There are a variety of catalysts that lead to the development of new occupations.

A few of these social scientists interested in the field of work and occupations were Everett C. Hughes, Andrew Abbott and Eliot Freidson. They describe professions and professionalization. They agree in principle that professionalization follows a certain path or trajectory; such as the creation of theory, formal training at a university, establishment of and jurisdictional control over domains of work, code of ethics, and licensure (Abbott, 1988; Freidson, 1988; Hughes, 1994). What these three scientists have in common is the assertion that in the health care field, medicine is a profession and that nursing is a “paraprofession” subordinate to medicine.

The field of medicine is an area that has been studied by social scientists (Abbott, 1988; Freidson, 1988; Hughes, 1994; Starr, 1982; Strauss et al., 1985). Some of the seminal work on the development of medicine as a profession was conducted by Everett C. Hughes. His work concerned the study of the development of occupations and professions within divisions of labor that were prototypical medicine. His work also

involves discussions of the professional license and mandate of occupations; how an occupation becomes a profession and what defines a profession (Hughes, 1994).

Hughes (1994) claims that as a new field opens up the group defines the field, has control over the field, and then over time practice becomes routine and practice subsequently devolves to other occupations. He posits that nursing as an occupation came about through the devolution of duties from medicine. Nursing has a role in the division of labor but is subordinate to the physician, while physicians endeavor to maintain their authority in this division of labor. Division of labor in medicine is a rigid hierarchy but technology can drive role changes (Hughes, 1994).

The field of nursing has also been studied by social scientists. Hughes, Hughes and Deutsher (1958) reported on research studies that were conducted between 1952 and 1957 commissioned by the American Nurses Association. These studies were part of a five-year program of research on nursing functions and were financed by nursing associations. There were twenty projects in seventeen states. All of these studies were based on the assumption that some particular knowledge is basic to nursing. As a result of the study, Hughes, et al. (1958) predicts that the division of labor in medicine will continue to enlarge and healthcare institutions will be increasingly complex and this will necessitate a variety of workers. Hughes et al. (1958) also predicts that physicians will need to reorganize their work and delegate to others, especially nurses. Hughes et al. (1958) sums up the quandary for physicians, stating:

“the physician’s work will become more and more difficult and demanding; he will ask for help and will get it—and probably have to pay for it in changes of behavior and

position which he will not especially like. There will be more work for nurses to do, and more and more kinds of nurses will be required to do it.” (p. 8).

This work by Hughes et al. (1958) sets the ground work for the professionalization of nursing and the specialization of nursing. In particular, this statement by Hughes et al., appears to be prophetic 50 years later. The emergence of specialty nurse’s professions would seem to come forward in the devolution of duties from physicians. This is typically seen in social dynamics of work especially medical work. As technology advances, work is delegated along the hierarchy of professions from higher status to lower status workers (Abbott, 1988; Freidson, 1988; Hughes, 1994).

Woods (1980) described how expanding technology in Radiology led hospitals to realize that they needed dedicated skilled nurses in this area. This is similar to the emergence of post anesthesia care unit (PACU) nursing that followed the evolution of anesthesia care medicine (Barone, Pablo & Barone, 2003). Nursing begins as a broad generalist field and then subspecialty areas emerge. This leads to that nursing subspecialty developing its own organization, creating its own journal, conducting annual meetings, local chapters and certifications, and specialty programs. This all signals a jurisdiction of practice and a path to professionalization as described by social scientists (Abbott, 1988; Freidson, 1988; Hughes, 1994).

A literature review reveals that the evolution of nursing practice in Interventional Radiology has yet to be empirically studied by social scientists or nurse scholars. Utilizing anecdotal reports that have been published, the historical trajectory of Radiology, IR and nursing practice within these fields of medicine is sketched out.

Historical Perspective of Radiology and Interventional Radiology

As previously mentioned, Radiology as a specialty in medicine developed after the discovery of x-rays in 1895. The first society of this new specialty, the American Roentgen Ray Society, was founded in 1900. This society was established as a “forum for progress in radiology...is dedicated to the goal of the advancement of medicine through the science of radiology and its allied sciences” (ARRS, n.d.).

With the advent of angiography, Interventional Radiology became a subspecialty of Radiology. Charles Dotter, MD was credited with the birth of Interventional Radiology. Rosch, Keller and Kaufman (2003) stated that “Interventional Radiology was born January 16, 1964, when Dotter percutaneously dilated a tight, localized stenosis of the superficial femoral artery in an 82-year-old woman with painful leg ischemia and gangrene who refused leg amputation” (p.841). The American Medical Association formally recognized Interventional Radiology as a medical specialty in 1992 (Clark & McClain, 2004).

Literature on the history of Interventional Radiology seems to focus on the technology advancements that drove the practice. Although other professions clearly have developed out of this expansion of medicine, there was no discussion about the development of other professions with them, i.e. Radiologic Technologists or Radiology Nurses. One has to explore the specific organizational societies to find any information about the history of those professions.

In Radiology, the work began with physicians, then opened up opportunities for other occupations, such as technologists and nurses as described by Abbott (1988). These occupations moved in under the authority and control of physicians. By the 1910s,

physicians purchased x-ray equipment for their offices and specialized as Radiologists. As technology advanced with the mechanics of the x-ray equipment, they found that they did not have the time to do both the mechanics and the patient care. Physicians delegated the mechanics of the x-ray equipment to others, beginning with the secretaries in their offices, then nurses in the hospitals, who functioned as x-ray technicians. The radiologic technologist occupation developed and then assumed that role from nursing. The radiologic technologist had jurisdiction then over the equipment and image acquisition. Radiologists took control of the interpretations of the images but the images were obtained by technologists (ASRT, n.d.).

Radiologic Technologist

Radiology technology evolved into an occupation separate from nursing with its own licensure and assuming control of the radiation and equipment. Eddy Jerman is credited with bringing education and organization to the x-ray technician. In 1920, the first national technicians society was established, The American Association of Radiological Technicians. The name was changed to American Society of X-Ray Technicians in 1932. By the 1950's the organization established formal education standards for the profession. The current name of the organization, American Society of Radiologic Technologists, was adopted in 1964 (ASRT, n.d.).

Interestingly, the early x-ray technologists were nurses and predominantly female. Today, Interventional Radiology is a male dominated field and Radiologic Technologists outnumber nurses in the setting. While the exact number of technologists working in

Radiology is unknown, as of 2010, ASRT data lists 137,746 active members (ASRT, 2010).

Radiology Nurses

It would appear that years after the emergence of technologists, designated nurses became involved in Radiology to administer contrast material, monitor patients and give sedation for invasive procedures (Woods, 1980). In addition nurses were “recruited” in the field to provide continuity of care for radiology patients of various acuity levels (Woods, 1980). An American Nurses Association publication, dated 2007, notes that a Joint Commission on Accreditation of Health Care Organization’s mandate (that patients in procedural areas receive care on par with those in inpatient settings) led to the increase in the number of nurses and the elevation of nursing practice in Radiologic units (ANA, 2007). Urbanowicz (2011) maintains that nursing practice in the IR setting is very dynamic and rapidly changing. The role of the nurse in radiology was expanded by advances in technology and changes in organizations (ANA, 2007). How and why nurses came to inhabit this field of practice is unclear and to date the literature on nurses in IR appears more anecdotal than empirical. Empirical research is needed to uncover the historical, technological and occupational factors that led to the specialty practice of radiologic nursing. In the absence of such empirical research, however, it is clear that some nurses have claimed radiologic nursing as a subspecialty of nursing practice.

There is limited information in the literature about the history of the development of the specialty of Radiology nursing except for the founding of their professional society. There is some documentation that dedicated radiology nurses were present in

Radiology departments well before the Association was established, as early as the 1970s (Goodhart & Page, 2007; Wright, 1987). While the exact number of nurses working in radiology is unknown, ARIN data lists 2,018 active members with 22 local chapters (ARIN, 2010).

To date, schools of nursing do not offer formal degree-granting programs in Radiology Nursing. However, nurses interested in pursuing advanced knowledge of the specialty practice can access the *Core Curriculum for Radiological Nursing*, which was first published in 1999 (ANA, 2007). In addition, since 1998, nurses have been able to seek radiologic nursing certification from the Radiologic Nursing Certification Board (RNCB) by taking the certification examination (ANA, 2007).

Little is written about when Radiology nurses specialized into Interventional Radiology. The anecdotal articles in professional journals that have been published provide the background for this paper. The authors of some of these articles describe the need for nurses to provide sedation during invasive procedures. These authors illustrate the evolution of the administration of sedation in procedural areas and the standards of practice driven by the Joint Commission of Accredited Healthcare Organizations and the American Society of Anesthesiologists (Epstein, 2003; Holzman, Cullen, Eichhorn & Philip, 1994; Odom-Forren, 2005). Odom-Forren (2005) specifically mentions ARIN as one of the nursing specialty organizations involved in authoring the first national nursing position statement on the administration and monitoring of conscious sedation in 1991.

Two studies, conducted by radiologists in the US and Europe, did survey Interventional Radiologists about their practice. They included questions about the presence of dedicated radiology nurses and the level of nursing care. Interestingly, 87%

of surveyed Interventional Radiologists in the US and 83% of those surveyed in Europe stated they had dedicated radiology nurses in their practice (Haslam, Yap, Mueller & Lee, 2000; Mueller, Wittenberg, Kaufman & Lee, 1997).

There has been no formal specialty training for nurses in Interventional Radiology. How do nurses learn the work of IR? Nurses are trained “on the job” with preceptors when they begin working in Radiology. ARIN has written guidelines for nurses in IR but the rapid advancement of technology and procedures can make it difficult for organizations to maintain current and up to date guidelines (Clark & McClain, 2004). Clark & McClain (2004) conducted a study to evaluate the current orientation practices in IR. They surveyed IR nurses at an ARIN conference and found there was limited research in the area of IR nursing. One interesting finding generated from the comments elicited on the survey; was that the IR nurses perceived that other nursing specialties and nursing administration had a lack of knowledge of IR nursing (Clark & McClain, 2004). This would seem to validate the need for a study to describe the work of IR nurses.

Conclusion

There are benefits to examining this social science research and the broader history of medicine, nursing and historical trajectory of occupations and work. Borrowing social science approaches to situate a nursing study within the greater social science work on occupations can contribute to nursing development. Social scientists and nurse scientists have not studied Interventional Radiology nursing and there is a need

to describe the work of nursing in IR and thereby contribute to the growing body of scholarship on nursing work.

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Manuscript II: Procedural Work of Nurses in Interventional Radiology

Abstract

Nurses practice in a variety of settings and specialties. Most common of these are medical surgical, critical care, surgical services and maternal child health. One practice area that is not as well known is radiology and interventional radiology (IR) nursing. Interventional radiology is an emerging specialty and an expanding health care field. The work of nurses in this area is complex and multifaceted. Little research has been conducted in this area and thus this work domain of nurses is under examined. A qualitative descriptive research study was conducted to explore the work of nurses in the setting of IR. One of the research questions posed by this study was: what are the day to day work practices of nurses in IR? Nurses recruited from the Association of Radiologic and Imaging Nurses were interviewed and the work practices were explored. The nurses in this study all generally describe the same basic practice that has a temporal component and is structured around the trajectory of the patients. There are pre-procedure, intra-procedure and post-procedure components to their day. Patient advocacy and patient safety were concerns that transcended the temporal components of their day. Some of the activities that these nurses engaged in were in variance to the guidelines and standards that govern practice in IR. Many nurses described a sense of distress when circumstances in their environment required them to operate outside these guidelines. The findings from this study has implications for nursing administrators and radiologists in that they need to have an environment that supports the known practice standards of IR nurses. There may be broader implications for facilities that do not foster such an environment.

Keywords: interventional radiology nursing, procedural work, qualitative descriptive research

Introduction/Background

Nurses work in a variety of settings and specialties. The settings can be hospitals, ambulatory care, military, public health, long-term care, etc. Practice areas include intensive care unit (ICU), medical/surgical, maternal health, psychiatrics, pediatrics, emergency department, home health, surgical services and school health, to name a few (Bureau of Labor Statistics, 2010-2011). Stereotypical views of nursing in society cast nurses in the role of a bedside nurse on “wards” or in the ICU, the general public most often thinks of a nurse being at the bedside of a hospitalized patient (Darbyshire & Gordon, 2005). There are nurses who work in areas outside of these practice settings; nurses who care for patients inside a procedure room, for example, radiology. Similar to operating room nurses and cardiovascular laboratory nurses, radiology nurses take their patients behind a door that is closed off to the general public. A door that usually says “Authorized Personnel Only”. The Honor Society of Nursing, Sigma Theta Tau International, only lists 24 specialties in the organization’s demographics and uses “other” to capture all the other specialties. Procedural nursing specialties such as radiology nursing are not listed (Sigma Theta Tau International, 2011).

Radiology is a field of medicine that has been around since the late 1800’s. The historical growth of occupations and professions indicate that as new fields of work emerge, develop and evolve, new workers surface to carry out work practices (Hughes, 1994). An example in the evolution of the anesthesia medical field is the emergence of post-anesthesia care nursing (Barone, Pablo & Barone, 2003). Likewise, hospitals have seen the need for dedicated nurses in radiology due to the expanding use of technology in

the discipline (Woods, 1980). Radiology nursing emerged as a sub-specialty of nursing heralded by the advent of the organization, the Association of Radiologic and Imaging Nurses (ARIN) in 1981 (ANA, 2007).

Minimally invasive, interventional procedures expand the diagnostic and treatment options available to patients and provide shorter recovery time, thus a shorter length of stay. The procedures performed in the interventional radiology setting offer less risk and less pain for patients (SIR, 2011). Interventional radiology has become an emerging sub-specialty of radiology and an expanding health care field. A variety of occupational workers support the work in interventional radiology, each with their own jurisdiction of practice. The teams working in IR are comprised of nurses, physicians, technologists, and others.

Nurses working in interventional radiology (IR) are part of a larger department of radiology or imaging services. The work of nurses in interventional radiology is not clearly understood and has not been well-described in the literature. Their work is complex and multifaceted with a central part of the work of IR nurses being the procedural work. It involves the processes of defining boundaries and legitimizing practice.

Jurisdiction/Boundaries of Practice and Nursing Work

To properly set the context in which IR nurses practice, it is helpful to review the work of social scientists regarding the development of professions, jurisdictions of practice and study of the work itself. Abbott (1988) describes how boundaries around work get defined and the strategies professionals use to lay claim to jurisdiction; ex. code of conduct, licensing, nurse practice act. Abbott (1988) describes jurisdiction as the “link

between a profession and its work” (p.20). Simply put, jurisdiction is an assertion to control certain types of work. He posits that trying to control “work” can bring professions into conflict (Abbott, 1988). He continues:

To analyze professional development is to analyze how this link is created in work, how it is anchored by formal and informal social structure, and how the interplay of jurisdictional links between professions determines the history of the individual professions themselves (p. 20).

The interventional radiology team is comprised of individuals from various professions, i.e. physicians, radiologic technologists, nurses and others. Boundaries are set to establish the work of nurses in an area of medicine historically controlled by physicians and technologists. There is interdependence with these other professions but nursing is trying to define the boundaries of the jurisdiction that is nursing.

Abbott (1988) posits that in the division of labor there are professional boundaries, such as those delineated in job descriptions, which may not be as clear in reality but are distinct rules of “professional jurisdiction”. Professions are interdependent systems. A change in one profession affects the other. Jurisdictional claims are a means of overcoming jurisdictional disputes by professions (Abbott, 1988).

Other social scientists focus on “work” itself. Strauss, Fagerhaugh, Suczek and Wiener (1985) contend that traditional writing on the sociology of work begins with the division of labor, work roles, etc., rather than focusing on the analysis of “work” itself. These social scientists conducted research in seven San Francisco Bay area hospitals between 1977 and 1982. They analyzed the several kinds of work and relationships that make up “medical-nursing” work and describe several types of work; “comfort work”,

“composure work”, “clinical safety work”, “kin work”, “machine work”, “biographical work”, “psychological or sentimental work”, “body work”, and the “total arc of work”. They stress that it is important to remember that “work” must be linked with the work place. The work place is interactional and changing.

Strauss et al. (1985) followed the trajectory of chronic illness and recognized that the diagnosis and treatment of illness contribute to the development of drugs and the increasing number and variety of machinery. New occupations develop to maintain and utilize the equipment, such as radiology technologists. Specialization in medical fields leads to technology advances and that in turn requires new skilled personnel. Strauss et al. (1985) do caution, “the ideologies and conceptions of workers (especially powerful or influential workers) constituted conditions that affect definition of the work and its associated tasks” (p.276).

Nurse sociologists have also been interested in studies of nursing work. Allen (2004) conducted a meta-analysis of field studies on nursing work published between 1993 and 2003 and found a mismatch between what the profession’s ideals for practice are and what the actual work entails. Eight “inter-related bundles” of nursing actions were identified; “managing multiple agenda”, “circulating patients”, “bringing the individual into the organisation”, “managing the work of others”, “mediating occupational boundaries”, “obtaining, fabricating, interpreting and communicating information”, “maintaining a record”, and “prioritising care and rationing resources” (Allen, 2004). Several of these “bundles” are seen in the procedural work of nurses in interventional radiology.

Work of Nurses

While there are multiple practice settings for nurses, there are basic tenets of nursing practice. The American Nurses Association (2012a) describes the nursing process as the commonality that binds nurses across various practice settings. The nursing process includes assessment, nursing diagnosis, outcomes, planning, interventions and evaluation (ANA, 2012a). ANA (2012b) also delineates the responsibilities of the nurse as: completing physical assessment and obtaining health histories; giving patient education; dispensing medications and providing necessary individual interventions, understanding patient needs and acting critically; organizing and synchronizing care with other disciplines.

There are regulatory standards that govern practice of nurses in hospital settings. Most hospitals in the United States are accredited by the Joint Commission to care for patients. To maintain accreditation, hospitals must abide by The Joint Commission standards. Included in the standards are requirements that outline the provision of care and include: assessment and reassessment of patients; assessment and management of patient's pain; provision of patient education; a plan for and monitoring of high-risk procedures with moderate sedation before, during and after the procedure; a plan and process for patient's care at discharge and education for patient at discharge (The Joint Commission, 2012a).

Radiology organizations also publish guidelines for medical and nursing practice in radiology and interventional radiology. These organizations include the American College of Radiology (ACR), the Society of Interventional Radiology (SIR), the Society of Neuro-interventional Surgery (SNIS) for medical practice and the Association of Radiologic and Imaging Nurses (ARIN) for nursing practice. Guidelines are also

published for practice of moderate sedation by the American Society of Anesthesiology (ASA, 2002).

One study was conducted by the Center for Nursing Education and Testing and the Radiologic Nursing Certification Board (2010) to analyze the practice of radiology nursing. They defined nine areas of practice: “assess patient and plan care; administer, monitor, and evaluate therapeutic interventions; teach patient and family; provide a supportive and safe environment; manage emergency situations; participate in quality assurance/continuous quality improvement activities; participate in interdisciplinary activities; and participate in professional practice activities” (p. 110).

Little is known about the work of nurses in Interventional Radiology, including how the ANA standards and the Joint Commission standards are realized. This gap in knowledge led to a qualitative descriptive research study being conducted to explore and describe the work of nurses in Interventional Radiology. The review of social scientists’ study of “work” provided the context for this study. As the main work of nurses in this area is framed around procedures, this paper will focus on the procedural work of these nurses. This work has temporal components and will be presented as pre-procedure work, intra-procedure work and post-procedure work.

Method and Data Collection

Qualitative research in general is used to explore and understand the meaning people ascribe to the social reality in their lives. Qualitative research is used when there is little known about a phenomenon and focuses on the emic perspective. The foundation of qualitative research is interpretation. The interpretation of data may create new

theoretical beliefs, alter existing theories or reveal the core of the phenomena (Holloway & Wheeler, 2002).

There are several methods typically used in qualitative research, i.e. ethnography, phenomenology and grounded theory. One method that is overlooked in this list of qualitative research is qualitative description (Sandelowski, 2000, 2010). Sandelowski (2000) contends that qualitative description is a method that is frequently employed but not well described. She asserts that qualitative description presents the phenomenon in everyday terms and in its natural state based on the general premises of naturalistic inquiry. When thick description of a phenomenon is desired then qualitative description is the method of choice (Sandelowski, 2000, 2010). As the work practices of nurses in IR are neither well known nor described empirically, this researcher chose qualitative description method to begin to describe the core phenomena.

Based on the study's purpose and significance and the researcher's desire to obtain information-rich data, a purposeful sampling method was used (Patton, 1990). Permission to conduct the study was obtained through the Investigational Review Board at the University of San Diego. As the targeted population was nurses who work in IR, recruitment was through the ARIN organization. Approval to recruit members was obtained from the Board of Directors of ARIN. Nurses were recruited at an ARIN national conference. As data were collected through semi-structured, open ended interviews, participants were given an opportunity to be interviewed at the conference or contacted at a later date for a telephone interview. An informed consent process included either a signed consent or telephone consent. If the participant was interviewed over the phone then telephone consent was obtained and a copy of the consent was sent to the

respondent. All respondents received a \$10 gift card from either Target or Starbuck's as a token of appreciation. The respondents agreed to have the interviews recorded and each interview lasted between 60 to 90 minutes. All respondents were questioned about the work that they do, work histories, and any formal education and training. Memos were written with each interview, including personal, methodological and analytical memos.

Bias of Researcher

This research was conducted by an advanced practice nurse currently working in an imaging setting and who has experience working with IR nurses, radiologic technologists and interventional radiologists. Care was taken to follow the research method including analytic memos and adhering to the methodological tradition of qualitative research helps with the rigor of this study. Conducting the study in a practice setting where this researcher was not a known entity or co-worker helps assuage any a priori judgment this researcher may have about the IR setting.

Sample Characteristics

Interviews with 22 nurses, who self-identified as interventional radiology nurses, were conducted; data presented here are derived from 21 of the 22 interviews. One of the interviews is not included in the analysis due to the actual work of the respondent being outside the purview of the study. Respondents were from across the United States and ethnically diverse, including Filipino Americans, Pacific Islanders and Caucasians. On average, the nurse participants had worked in an IR role for 8.7 years, ranging from just 5 months to 30 years. All but one of the respondents was female. All but three had at least

a bachelor's degree and six had a master's degree. Forty eight % are certified in radiology nursing (CRN). Most were employed in a hospital setting; a few were employed in free standing imaging centers or clinics.

Data Analysis

Data were analyzed using conventional content analysis techniques (Hsieh & Shannon, 2005). The analysis began with the first interviews and continued with each subsequent transcription. The interviews were transcribed verbatim by transcriptionists and then validated for accuracy by the researcher. Each transcription was edited so the participant's identity was protected. Each transcript was read like a novel then read and reread line by line to get a sense of the whole. Codes were developed that included drawing attention to exact words that portrayed crucial feelings or perceptions. Codes were then sorted into categories built on the basis of how they were related. As recommended by Hsieh and Shannon (2005), the findings are presented with exemplars that were identified from the codes and categories.

Findings

IR nurses are part of the greater department of radiology and are involved in all aspects of patient care in radiology. Hospital work has to be organized in some manner. Nurses interviewed described a flow or structure to their day. All stated that their day is organized around a schedule of procedures and a variety of inpatients and outpatients.

Patients enter the system for IR as part of a referral from their primary physician. In some cases, the patient's first encounter with the interventional radiologist is the day

of the procedure. This is different from surgical procedures in that those patients have been consulted and seen by the surgeon prior to the procedure. There is a trajectory that patients follow that was consistently reported by all respondents. The patients have a path that they follow through the organizations, from scheduling to admission/check in to procedure room to discharge. These patients may enter this environment as outpatients or inpatients. The IR nurse's interaction with patients seems to follow the path of the patient through their organization, from scheduling to admission/check in to procedure room to discharge.

In addition to this flow or trajectory, there appears to be a temporal component to the procedural work of nurses in IR. There is work that is occurring pre-procedure, intra-procedure and post-procedure. These nurses have put structures in place to help with the flow. A few of the structures that are put in place to help with flow are having a charge nurse or coordinator over the flow of procedures; a schedule "board" for patients; nurse assignments and checklists. The "board" keeps track of the scheduled patients and is organized around staff assignments and procedure room assignments. Nurses are assigned to a role for the day but that tends to be fluid depending on the day and the procedures scheduled. The nurses describe situations that interfere with the flow of their day when they are required to also cover any emergency or patient care needs in the greater radiology department. These nurses also described situations that were ambiguous for them and made them uncomfortable. How this day progresses for these nurses is outlined as follows by the temporal components of pre-procedure, intra-procedure and post-procedure and the various areas of ambiguity.

Pre-Procedure

While for some respondents there is a defined process or protocol to follow for pre-procedure work, for others it was not so clear. Most all agree that pre-procedure work starts with a patient being scheduled for a procedure. This is done by a scheduling department. The IR nurse's first contact with an outpatient is through a pre-procedure phone call. In an article describing the foundation of perioperative nursing, this contact is similar to the process in the surgery department. Collette (2000) describes that phone call as the start to the nurse/patient relationship and the information gathered helps to plan that patient's care. Inpatients were also contacted by phone through their nurse but the patient contact did not occur until the patient was in their department. Through this initial contact, information is gathered about the patient. Further information is obtained through an electronic medical record of some fashion. All the respondents describe this as getting a picture of the patient so they can safely move forward with the procedure. Allen (2004) describes this as an area of nursing practice, "bringing the individual into the organization". The ideal nurse's role is to individualize patient care but in reality nurses have to manage patient flow through routines and standard procedures (Allen, 2004).

As these patients are referred to the interventional radiologists and not previously known to them, there seems to be a process to ensuring that the patient can safely have the procedure. Some of this falls on the nurse. Some nurses had a protocol or standard procedure to follow and for others this was not as clear. The nurses talked about knowing the patient and knowing the patient can safely have the procedure. One nurse described this as, "...to me that means that I'm going to know your past medical history, I'm going to know what you need to get for your procedure or treatment. I'm going to

know what needs to be done to make sure that you are happy and comfortable and safe, and that when you walk out of there, you're going to think that was the best thing that ever happened to you".

One of the respondents stated that "making sure the patient can have the procedure falls on the nurse". This is in contradiction to what ACR-SIR-SNIS (2009) state in the guidelines for practice in the interventional setting, "the ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the physician...in light of all the circumstances presented" (p.1). Most respondents describe a conversation with the IR physician for moving forward with the procedures and that ensuring all the required elements are in place, i.e. history and physical and consent for the procedure etc. Allen (2004) describes this as "circulating patients", managing the throughput of patients and getting assessments done as quickly as possible to move on to the next patient. She posits that the ideal nursing practice is focused on individuals but in real practice the focus is the population and processing patients through the organization (Allen, 2004).

Once it is deemed that the patient can safely have the procedure, they enter the system, either as an outpatient or an inpatient. All respondents describe basically the same process for each patient: obtaining the past medical history including allergies and medications, taking vital signs, conducting a physical assessment, obtaining lab work, starting intravenous therapy (these are done by these nurses or someone in a prep area), reviewing the procedure with the patient, telling the patient what they can expect during the procedure and after the procedure (which they describe as patient education), ensuring a recent history and physical is on the chart, and a consent is signed for the

procedure. Part of the pre-procedure work has to do with preparing the area to care for patients; checking emergency equipment, and checking availability of supplies, etc. The respondents all describe this as a way to keep the patient safe.

This pre-procedure work is consistent with what is written as guidelines from ACR, SIR and ARIN. ACR-SIR (2010) published a practice guideline for sedation practices in Imaging. They advocate following the practice as outlined by the Joint Commission and the American Society of Anesthesiologists (ASA). The guideline outlines the patient preparation, assessment needed prior to sedation, and management of the patient during and after the sedation. This would include vital signs, focused history and physical, and a pre-sedation assessment (ACR-SIR, 2010). ARIN (2009a) published a position statement on the role of the nurse for patients receiving sedation and it is congruent with the ACR-SIR guideline.

Ambiguities from pre-procedure work.

The informed consent process for patients about to undergo an IR procedure was not consistent amongst the respondents. The only consistency was that it was the IR nurse who ensures the placement of the consent on the chart prior to the procedure. All respondents state they require a patient's written consent for procedure, but how that gets accomplished differs from setting to setting. The Joint Commission (2012a) standards state that informed consent is the physician responsibility. In practice getting the consent form signed by the patient can fall on the nurse and be a gray area for these nurses.

Some of the respondents describe "making" the physician see the patient pre-procedure. That appears to be part of defining boundaries between what the physician does and what the nurse does. One respondent sums this up, "I ask them [the patient],

‘are you comfortable signing the consent? Has the doctor answered all of your questions, do you understand the risks and benefits?’ ...If someone says no, no doctor’s talked to me about this, then I call the radiologist and say, ‘you have to come’, and they do it. They used to protest, not anymore... I maintain that obtaining the consent for the procedure that the physician is gonna do is a medical act”. Another respondent states:

some of the doctors get annoyed when I make them come over and talk to the patient...you know what I mean, it’s like ‘you’re the only person who makes me do this’ and I was like you don’t understand, the patients love it when the doctor comes over and explains the procedure to the patient and tells them what we’re going to do and what to expect and talks to the family and it’s just you know what I mean, it’s just makes sense

ACR-SIR (2011) practice guidelines for informed consent state that the final responsibility of the informed consent process, including the risk and benefit discussion and answering all the patient’s questions and concerns rests on the physician. ARIN (2009b) describes the process in how the physician obtains the informed consent and what the process should be; again it rests with the physician.

Most respondents describe pre-procedure work delineated between the responsibility of the MD and responsibility of the nurse. The nurse knows that some of this is within the boundary of the physician but ends up assuming this to get the day going. Abbott (1988) stated that “boundaries between professional jurisdictions therefore tend to disappear in worksites, particularly in overworked worksites” (p.65). This seems to be true in this area, most of the nurses affirm they do whatever needs to be done to

keep the day going. There seems to be blurring of the boundaries in pre-procedure work especially with informed consent.

ACR-SIR-SNIS (2009) guidelines delineate some duties for the “clinical team”; interventional radiologist, non-physician practitioner, nurses, registered radiologist assistant and radiologic technologist. They describe the nursing duties as “adjunctive care” to include obtaining portions of a history, labs, vital signs, and follow up with patients, patient education and speaking with families. They do state that “registered nurses play a critical role during interventional procedures...” (p. 2).

Intra-Procedure

Once the pre-procedure work is completed then the trajectory for the patient involves moving the patient into a procedure room of some type and placing the patient on an exam table of some sort. Most of the respondents describe the intra-procedure work as being safety practices. The first safety practice as the patient is placed on the table is the use of some type of safety belt as the table is narrow. They also describe processes for the staff, as far as attire for staff in the room, surgical attire and lead aprons, to protect the staff from radiation exposure (as the basis for all imaging in IR is radiation equipment, like fluoroscopy). Included in preparation of the patient for the procedure is skin preparation and protection, monitoring equipment and other safety measures. They also describe the emergency equipment (some type of crash cart) that is needed in this area. For most, the intra-procedure work revolves around sedation practices. Most of the respondents describe these sedation practices (only one respondent stated that they rarely sedate patients). This monitoring and need for emergency equipment is supported by the ARIN (2009a), ACR-SIR (2010) and the ASA (2002) in practice guidelines for sedation.

Most respondents talked about the pride they take in sedating the patients. Many equated their role to that of a “bartender”: One nurse stated, “I’m a good bartender and I don’t like people complaining about my bartending”. Another nurse stated, “Basically, we’re the medical bartenders, we help the patients not realize that they’ve been tortured by the doctor.” Another nurse stated when talking about good sedation, “nicely chilled means you know, they have had their chemical cocktail already, it’s noon somewhere.”

One nurse stated, “I’ve developed a relationship with this patient and told them that I’m going to be in the room with them. I usually tell them I’m going to be sedating them, I’m going to be watching out for them... I also tell them I’m the bartender too, because I’ll be making a little cocktail to make them relax and they usually like that, so I have a relationship with them at that moment and I have to make sure that they know that I’m there, if they are hurting, let me know.”

All respondents discussed the monitoring that is done during the procedure including: patient facial expressions, cardiac rhythm, blood pressure, pulse oximetry and a few said they were monitoring capnography. There were several nurses that seemed almost apologetic that they were not monitoring capnography. One respondent stated: “we don’t use capnography yet, even though that should be done, we don’t use that yet”. These nurses talked about regulations, standards and policies when talking about their day. If there is a standard they should be following, they want to do that. Capnography is a new standard recommended by the American Society of Anesthesiologist (ASA) for monitoring ventilation in sedated patients (ASA, 2010). These nurses voiced an understanding of and an interest in following these recommendations.

All respondents describe being in the room and keeping the patient safe by monitoring them and part of the monitoring is watching the patient's face for their response. One nurse described that as, "I walk around a lot during the procedure, because I like to get up in the patient's face, and make sure that they really are awake and document their pain score for real".

Ambiguities for intra-procedure work.

The nurses are responsible for monitoring the patient during sedation. During the interviews, some of the respondents hesitated or seemed to apologize for situations where they are asked to do duties in the procedure room in addition to their sedation practices. The nurses describe ambivalence between what they know they should be doing and what they are asked to do at times.

One RN stated, "the sedation of the patient and monitoring the response to sedation-the JCAHO standard. We're also circulating and doing other stuff that we actually doing, we shouldn't be doing." She went on to say, "It does make me feel a little bit uncomfortable when your role is stretched so thin that the patient might be compromised. Cause you're doing other stuff and not monitoring the patient closely because you have other duties and tasks while you're sedating patients. So no, I don't think that's cool." One RN stated when asked by the physician to give medications outside of policy, "I always get a baseline set of vitals, I don't care what the doctor says you know, if the patient is really nervous I'm not doing anything until I have a blood pressure".

It is made very clear in the ARIN (2009a) position statement on sedation that "the nurse assumes no other concurrent responsibilities during the procedure" (p.2).

These nurses seem to want to do what is right but describe having to survive in their environment. So they may at times operate outside these boundaries to keep the day going.

Nurses' experiential knowledge.

Experiential knowledge is described by the respondents as what they rely on during their cases. Most of the nurses had training in intensive care, post-anesthesia care or emergency nursing. The respondents talk about how the physicians rely on them and rely on their experience to keep patients safe. One respondent stated when taking care of vented patients, "Those are a little more tricky and she [the MD] relies on the fact because I've had ICU experience and I'm used to patients on vents and monitors... When I'm pacing around, she knows I'm nervous. Cause you know when they're laying flat and on a vent it's always a tricky situation on that table. She[the MD] relies on me a lot more." Another respondent stated when talking about sedation, "most of these guys have been working with us long enough to know that we're good at what we do and they've given us the professional latitude to use our judgment".

The nurses also talked about how important experiential knowledge was in general. It helped them to prepare for any emergencies that they would encounter and that it helped them be a patient advocate. One nurse described it as, "the more knowledge you have, the more apt in your ability you have to advocate for the patient". Another nurse stated the importance of experiential knowledge as:

Your patients need you to have that. When you're here up all night and you have a really sick trauma patient and it's you and 2 techs and a doc, who is busy doing what he needs to do, you're it, you've got to be able to say OK I've seen this

before, it does not look good what do I have to do to make this patient survive this case.

Post-Procedure

The work following the procedure has to do with “undoing” the process that was started to get the procedure going; waking the patient, unhooking the patient from the monitoring equipment or continuing the monitoring, removing the drape that was applied during the procedure, pulling the arterial sheath (if one in place), dressing the wound (if there is one) and then moving to an area for recovery. All the respondents describe these elements in some manner and that the patients move to another area for recovery. What is different between the respondents is where this area is and whether the IR nurse continues with the patient or a hand-off of care takes place. They also describe a process where there is an end to the procedure and that patient encounter; finishing documentation, finishing monitoring per policy, sending the patient home or to their room if an inpatient. They describe the monitoring requirements for the end of moderate sedation and ensuring the patient meets discharge criteria to go up to their room or home. This recovery and discharge criteria is supported by the ACR-SIR (2010) and ASA (2002) in practice guidelines for sedation.

That there is an end to the patient encounter is consistent with all the respondents. The encounter may continue with some respondents for some specific patients; phone calls to out-patients a day or two after the procedure (most felt this was important or part of policy but not able to be accomplished all the time); follow up on some inpatients but again that was inconsistent.

The nurses describe general complexities to procedural work. They described juggling multiple responsibilities and being pulled in multiple directions, for example running a code in cat scan. They say they do whatever needs to be done to get through the day. One nurse summed it up: “Well we adapt to our environments, we do what we need to. What needs to be done.” This also includes negotiation, one nurse described as: “Oh negotiating how are we going to meet everybody’s needs, how much more can we do, can we add on another procedure, and it feels like I’m always saying no at first and then finding a way and a time to do it.” Allen (2004) describes this as one of the bundles of nursing practice, “managing multiple agenda”.

Discussion

There were many commonalities in the work practices of the nurses in this study. This included that all nurses in this study regularly discussed the “standards”, “policies”, “regulations” that governed their practice. They expressed distress when asked to function outside a policy or standard and were apologetic when describing those times. The Joint Commission (2012b) publishes annual national patient safety goals that govern patient care in the hospital setting. The ones that specifically are attended to by the nurses in the Radiology setting include: “maintain and communicate accurate patient medication information” (p. 4); “implement evidence-based practices for preventing surgical site infections” (p. 8); “conduct a preprocedure verification process” (p. 11) and “a time-out is performed before the procedure” (p. 12).

A theme that transcends the temporal component of the work is patient safety and the nurse being a patient advocate. This is similar to what was found in a

phenomenologic study of operating room (OR) nurses (Chard, 2000). In this study, the researchers describe the work of OR nurses, included in that work was being responsible for their patients, acting as patient advocates and over all keeping patients comfortable (Chard, 2000).

These nurses are very knowledgeable about standards that govern their practice. Administrators and managers should pay attention to the situations that nurses find themselves in, in their daily work life. The environment the nurses work in should support their ability to follow the standards governing their practice. These nurses use these standards to maintain boundaries of the various professions they work with and legitimize their role. Abbott (1985) posits that “the moral foundations of jurisdiction” provides “the grounds of legitimacy for professional claims” (p. 144).

Limitations

A limitation of this study is that this researcher is a novice researcher and as such may not have asked appropriate or sufficiently insightful questions. There may have been important probing questions that were not posed to the interviewees. The researcher’s prior experiences in IR may have biased data collection or data analysis. Another limitation may be that the nurses in this study were all part of ARIN organization and may not be reflective of IR nurses who are not part of the organization. Additionally, only one member of an IR team was interviewed and therefore the results do not reflect other team members’ varying views should there be any.

Implications

An accurate description of the work of IR nurses will contribute to the larger body of literature on nursing's work and professional development. This description will shed light on a previously under-examined domain of nursing practice. To have a better understanding of the work in Interventional Radiology in general, all the occupations should be studied, i.e. Interventional Radiologists, Radiologic Technologists, among others. The blurring of boundaries between occupations in the work setting can cause conflicts as each are trying to maintain their jurisdiction to practice.

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Manuscript III: Learning the Work of Interventional Radiology Nursing

Abstract

Nurses graduating from nursing schools are trained and start practice as generalists. Nursing schools have expanded the clinical experiences of students over the years but nurses are rarely prepared for specialty practice. It is up to the organizations that employ nurses to prepare them to work in specialty areas. Research has been conducted on how nurses learn and progress on a continuum from novice to expert. Little research has been conducted in the practice area of interventional radiology (IR) nursing. A qualitative descriptive research study was conducted to explore the work of nurses in the setting of IR. One of the research questions posed in this study was how do nurses learn the work practices of IR. A purposive sample of 21 nurses, recruited from the Association of Radiologic and Imaging Nurses, were interviewed and data were analyzed utilizing a conventional content analysis method. The nurses in this study describe a varied orientation practice from little or no orientation to a several week orientation. Most of the respondents describe uneasiness with the orientation methods utilized in their organization and have subsequently built structures and have employed different orientation methods once in the role. As a result of these findings, nursing educators and administrators can consider a more policy/procedure based orientation method for nurses coming into IR.

Keywords: interventional radiology nursing, orientation, qualitative descriptive research,
ARIN

Introduction/Background

The American Association of Colleges of Nursing (n.d.) describes readying nurses to graduate as preparing “novice practitioners for general nursing practice” (p.31). During nursing school, clinical experiences are designed for students to engage in experiential learning with actual patients. These clinical experiences are across a health continuum and multiple settings, such as hospitals, community based clinics, etc. (AACN, n.d.). While the experience locations/settings have expanded over the years they rarely prepare nurses for specialty work. As such, for most nursing programs, the curriculum is intended for nurses to graduate as generalists and it is up to the organizations that hire them to prepare the nurse to work in specialty areas (Marzen-Groller, 2007). How does a nurse learn this work?

The seminal work of Patricia Benner demonstrates how nurses learn their work and in a manner of experiential learning along a continuum of novice to expert. Benner (2001) posits that typically career advancement for nurses was to leave the bedside for management or teaching. Her study demonstrates that skilled practice and ongoing clinical knowledge advances practice and has value. There is value in bedside nursing and there is advancement in practice as the nurse progresses along the continuum from novice to expert.

Nurses practice in a variety of settings and can change specialties throughout their careers. Practice areas can include critical care, medical/surgical, maternal child health, psychiatrics, pediatrics, emergency department, community health, and perioperative settings, to name a few (Bureau of Labor Statistics, 2010-2011). How then does a nurse

learn the work of the new practice area that they have hired into? There is no specific education curriculum in nursing schools for most specialty/procedural areas such as radiology nursing, perioperative nursing, emergency nursing, etc. Orientation programs must be tailored to meet the educational needs of the experienced nurse. There are unique challenges for experienced nurses transitioning to a new practice area. Dellasega, Gabbay, Durdock and Martinez-King (2009) posit that an experienced nurse is challenged during job changes in assuming a novice role again and the orientation program may not allow the nurse to be a novice. They state, “acknowledgement of novice status should not reflect abilities or professionalism, but rather a new circumstance in life” (p.312). Another challenge for this new nurse is that the experienced staff may not be trained to provide orientation to new staff (Johantgen, 2001).

There are reports and studies published that describe training for specialty areas such as critical care, emergency department, vascular, hemodialysis, diabetes case management, clinical trial coordination, and perioperative nursing (Berezuik, 2010; Dellasega, Gabbay, Durdock & Martinez-King, 2009; Duvall, 2009; Farnell & Dawson, 2006; Johantgen, 2001; Marzen-Groller, 2007; Mueller, 2001; Ross, 2006; Singer, 2006). They describe various training techniques, such as; “preceptorships”, mentoring, “shadowing”, teamwork education videos, unit based educators, a combination of classroom and clinical orientation, or some type of internship. These techniques are designed to train the experienced nurse in a new area of practice. They suggest that there is no perfect orientation method/technique and suggest that there are areas for

improvement. For instance, while describing the on the job training for clinical research nurses, Mueller (2001) states training may be comprehensive or a 'sink or swim' method.

Radiology nursing is an under examined field of nursing practice including Interventional Radiology (IR), a sub-specialty of Radiology nursing. Limited research has been conducted in IR nursing as it is a new specialty, so literature review focuses on studies of nursing orientation practices for experienced nurses in new roles. One study was conducted to understand the current orientation practices in IR (Clark & McClain, 2004). They describe a combination of on the job training, classroom training, and on-line training. Typically there is not even much of a clinical rotation in these areas during nursing school. New but experienced nurses come to work in IR with knowledge and skill and may have even been an expert in their prior area but are now a novice in the Interventional Radiology practice setting.

The complexity of patient care in Interventional Radiology requires nurses to have a greater understanding of specialty specific routines, procedures and machines/devices. Benner (2001) states, "experiential learning in high risk environments requires developing a sense of moral agency and responsibility. Experiential learning is enhanced in supportive learning communities and organizational climates" (p. xi). How are nurses trained and supported in Interventional Radiology?

Seminal research conducted by social scientists examines work practices and work itself. Strauss, Fagerhaugh, Suczek and Wiener (1985) find there are different types of work. One type of work that they focus on is "machine work". They find there is a difference between medicine, technicians and nurses in how they learn "machine work". For most physicians there is little focus on equipment in medical school with the

exception of radiology, which does focus on the equipment. Radiology technologists have specific training on equipment built into their programs with some additional training completed “on the job”. For most nursing areas, training on equipment is learned on the job (Strauss, et al., 1985). What is the “on the job” training for nurses entering IR?

This paper is drawing on data collected in a larger study on work practices of nursing in IR to discuss how IR nurses learn their work. The rest of this paper is organized in the following manner: brief discussion of the methods of the study, a thick description of the learning practices of nurses in IR and finally a discussion of issues that may be of interest to educators, managers, etc., involved in training of nurses to new settings.

Methods

To satisfy the gap in knowledge of the work of IR nurses, in general, a qualitative descriptive research study was conducted in the fall of 2011. The findings presented here are part of this larger study.

Qualitative studies are conducted when little is known of a phenomenon and focuses on the ‘emic’ perspective. There are several methods in the qualitative research tradition, i.e. ethnography, grounded theory and phenomenology to name a few. One method that is frequently used though not well described is qualitative description (Sandelowski, 2000, 2010). Qualitative description presents the phenomenon in everyday terms and in its natural state from the perspective of the individual experiencing the phenomenon. This research method is employed when a thick description of a

phenomenon is desired (Sandelowski, 2000, 2010). This researcher chose this method as the work practices of nurses in IR is not well known nor well described empirically.

Qualitative description research method employs interviews for data collection. An interview guide was developed for the study and one of the questions posed in this study was how do IR nurses learn the work of IR. The findings from that area of questioning are the topic of this paper. After Investigational Review Board approval was obtained from the University of San Diego, a purposive sampling method was employed to target nurses currently working in IR. Participants were recruited through the Association of Radiologic and Imaging Nurses (ARIN) organization at their national conference. Twenty two nurses agreed to participate in the study. Data were collected through semi-structured, open ended interviews lasting from 60 to 90 minutes. Consent was obtained from each participant and interviews were either conducted in person or telephonically and digitally recorded. As a token of appreciation each participant received a \$10 gift card. Interviews were transcribed verbatim and care was taken to protect the anonymity of the participant with the use of pseudonyms.

Extensive field notes and procedural memos were written with each interview and are considered data. Data were analyzed utilizing a conventional content analysis method which included reading and re-reading the transcripts, developing codes and categories of significance and the development of narratives. The findings will be presented in exemplars as suggested by Hsieh and Shannon (2005).

Sample

The findings presented here reflect the data analyzed from twenty one interviews. One of the participant's job roles was outside the purview of this study and that data was

excluded. The final sample included twenty females and one male and was an ethnically diverse group from across the United States, including Filipino Americans, Pacific Islanders and Caucasians. The participants' ages ranged from 25 to 60 with the median age of 49. The nurses had, on average, been in their IR role for 8.7 years, ranging from 5 months to 30 years. Nearly half of the participants are certified in Radiology Nursing (CRN) and all but three had at least a bachelor's degree while six had a master's degree. Although a few were employed in free standing imaging clinics or centers, most were employed in hospitals.

Findings

The focus of this paper is how nurses learn the work of IR so the findings presented here will focus on that learning process. In the interviews, participants were asked about how they learn the work of IR and also how ongoing education occurs. All of the participants except one had come into their current role with no prior experience in interventional radiology. The nurses are required to master skills specific to the radiology setting. Each nurse talked about learning their work through an orientation of some sort and how experiential knowledge can play a factor in the process. The majority of the participants stated that they had critical care, post-anesthesia care, or emergency nursing backgrounds prior to their work in IR and that their experiential knowledge served them well when they started in IR. Benner (2001) describes experience as "the refinement of preconceived notions and theory through encounters with many actual practical situations that add nuances or shades of differences to theory" (p.36).

The findings are presented in terms of orientation, semi-formal and informal; ongoing education; how orientation differs now and some of the struggles the nurses have gone through.

Learning the Work of IR

Interventional procedures entail multiple imaging modalities and an enormous variety of procedures. Center for Nursing Education and Testing and Radiologic Nursing Certification Board (2009) list 16 different types of imaging modalities and the Society of Interventional Radiology lists 25 of the most common procedures performed in IR on their website (SIR, 2012). The nurses have to learn not only what the various procedures entail but also what type of imaging is used, fluoroscopy, cat scan, ultrasound, etc. Most participants describe a “nurse shadow” several week orientation with a focus on all the different procedures, which ranged from 3 days to 8 weeks. They describe a semi-formal orientation with a combination of preceptorship, mentorship, and online training. Some also describe a ‘checklist’ of some sort that tracks their performance of new skills. Most of the participants describe the orientation to be procedure based, as there are so many procedures performed in IR. This is exemplified by one nurse in her statement:

We have a book that’s the orientation manual and we go through it. It’s sort of procedure based so, like when I first started they had me do things in the holding area that don’t require sedation or simple procedures like thyroid biopsies, just kind of doing recovery and prep like getting me oriented to the holding area, getting a comfort level at that and then they said I was going to do back door access cases...until we felt like I was able to do those independently and then we moved on from there sort of procedure wise.

This is similar to the findings of Clark and McClain (2004) in their study evaluating the current orientation practices in IR. They found that the orientation can last anywhere from a few days to 24 weeks. The training consisted of some classroom, on the job or clinical training and some computer based training. The on the job training was done with a preceptor (Clark & McClain, 2004). In the current study, most of the nurses describe the immense value of the mentorship in their successful transition to their new role.

Many of the nurses expressed how difficult it was to learn all the procedures and a general uneasiness with that learning process. They felt to really know what was happening to the patient they needed to really understand the procedures. Some stated it took them at least a year to feel comfortable with all the procedures. Studies suggest that nurses have a level of anxiety when entering a new practice area (Muldowney, 2011). These nurses maintain that their prior knowledge and experience 'saved' them in their new practice environment.

Several of the participants describe something lacking in their orientation, that they had received a better orientation in their previous position. However, if there was something lacking in their orientation, they did eventually learn it all. Some felt it could have been more policy based or more structured. One nurse stated:

I think there are some things left to be desired about the orientation method.

Where I came from it was very policy orientated so when you oriented, part of it was knowing the hospital policies and like being able to pull it up and repeat it verbatim. Here, it's more procedure based so while I feel I give good patient care,

and give safe patient care, there's probably some procedures that have a policy that I don't know.

Only a few participants described a situation where there was no orientation at all.

Most nurses were adamant about the appropriateness of learning the IR nursing role from nurses. Some of the nurses were hired into a department with either a current nurse leaving or a department with no nurse and therefore had limited ability to learn from experienced nurses. Those nurses had to have another avenue to learn their work. In some areas, that void was filled by the interventional radiologists and the technologists in their department. Some thought this training was invaluable and they had an expertise and perspective that was unique and valuable. In regards to the technologists, one nurse stated, "A lot of the time if I have questions, I go to them first because if the questions is about a procedure, they know like everything there is about how the procedures are run". These nurses depended on the prior skills they had built up as nurses to assist them in the transition. Another nurse also said they were the only nurse when they started and, "I got in and I learned from the techs, what they were doing, I learned the appropriate things that nurse should know, who worked in a diagnostic imaging area by asking questions and being you know involved in everything". One nurse summed it by saying, "Umm, well, I learned pretty much everything that I learned that has stuck with me has come from the doctors. Because they ultimately who has the final say so, I mean when I started it was a much smaller department and there wasn't that many nurses to learn from so I learned more from the physicians than I did anybody else".

These nurses all describe an ability to persevere in spite of a lack of nursing resources. It was also suggested that some of the responsibility is on the nurse, that you

have to want to learn. As one nurse puts it, “we have a lot of nurses and looking at the variety of personalities of the nurses, some don’t have the energy to care beyond their scope. It takes some energy and initiative to care and it takes a little hootzba to ask a neurosurgeon what they’re doing and why”.

Structures for future orientation.

There was a general feeling from these nurses that their orientation lacked structure and this led these nurses to develop a structure for themselves and for future staff. Literature suggests that orientation plans should be evaluated to assess if they are meeting the needs of the orientees (Blackhurst & Dowd, 2009; Duvall, 2009; Moore, 2008). While none of the nurses suggested a change in the preceptorship or mentorship aspect of the orientation, many suggested that structures could be put in place to enhance the orientation. Many stated that they had so many procedures to learn that they developed a book or procedure cards for orientation and to help them with their everyday work. Some said it saved their ‘sanity’ and there was a general sense that they persevered to get to the place they are today. That sense that they had to persevere drives them to make it better for the nurses that come after them both to improve orientation and improve the care of patients.

They describe developing either “procedure cards”, a “book” or a “bible” of procedures to be used for orientation and for daily procedural work. One nurse spoke very passionately of the “bible” she built over the years. She described the situation and the development of her “bible” as:

When I came it was so disorganized up there. We didn’t even have airways in all the rooms, it was just shocking what was going on. There was really no nursing

leadership or consistency or expectation or standards. Everyone kind of did their own thing... There was absolutely no consistency or general consensus on, not only for what we were giving the patients for medication, but what we were doing nursing wise. That's when I came up with for my own sanity, I got so confused, and so often I would miss things. I would forget to ask the doctors should I have given antibiotics for that because they wouldn't remember to tell us. It was just substandard what we were doing so I started writing things down and getting, saying what are we suppose to be doing here and really from word of mouth and what I was told by physicians I started to create this procedure manual that has now become our working bible for this is how we do it. Now it's not necessarily evidence based because that's the way we're all going, but I wrote it down because it was as the physicians were explaining it to us, what was needed, what needed to be given, etc. To create some standards for different types of procedures... So, it's been a growing book over the last decade as we add procedures. Even the physicians refer to that book now, it's actually quite hilarious. Fellows come in and the first thing they're told is 'here's the book'. We've got one in the Fellows office and this is what you refer to when you're ordering things in the morning for patients, look in the book.

She started in her department years ago when nurses were just coming into the IR practice environment and her description of the impetus of her "bible" development is representative of the experiences of the nurses in this study. Generally, these "books", "procedure cards" and "bibles" are well received and found to be so helpful to the other staff.

A few of the nurses stated they wanted to put more of this in place and have not had a chance to. They say that the procedure cards or books help standardize practice and also give helpful hints for the various procedures. One nurse described what she would like her book to have, “What I really wish we had more than anything else is really good descriptions of procedures and pictures. We need pictures of the way it should look when you’re done. What dressings should look like, what the hook ups should be so there is no error”. Overwhelmingly, the nurses describe a situation where they want to improve the care of the patient and these tools would help them do that.

Most of the nurses said they would use the tools developed by ARIN to help with their orientation practices. ARIN has developed a Core Curriculum, an orientation manual, various position papers and online courses that are designed to help nursing practice in radiology settings (ARIN, 2012).

Ongoing Education

Sousa (2001) describes the rapid growth and change of the specialty of Radiology, mostly due to the explosion of technology/imaging capabilities. Nurses in these areas need to have expanded skill sets and training in new procedures. This is also similar to what was found amongst nurses in the operating room (OR). Bull and Fitzgerald (2006) describe how the OR nurse must continually “adapt their knowledge and skills to the new equipment and adjust to the changing values and expectations that accompany the equipment and associated advances in surgical ability and outcome” (p. 6).

As part of this study, participants were asked how ongoing education occurs, as in when new procedures or new products are introduced. Most participants were able to

articulate some type of ongoing education as it pertains specifically to IR. When new devices or procedures are introduced they receive education from the vendor representative of the device or an in-service by an educator/trainer. Some said they had the physician in-service them on the new procedure. Though most refer to an informal process to this ongoing education, one nurse described a fairly robust process of ongoing training for their department with structured staff meetings. She stated, “we have a staff meeting, or a educational meeting every Thursday from seven thirty to eight thirty. And some Tuesdays, so we’re going to do a new procedure, we’re going to do a new equipment, we’re going to have a policy change, it goes through those staff meetings”.

Only a few of the nurses describe having an educator type role in their department. This role was usually a generalist nurse educator who did not have experience in Radiology but was assigned to assist with their education needs. So developing curriculum for education needs is left up to staff or management.

Interestingly, while discussing the ongoing education, most participants described how isolated IR was from the general nursing community in their setting. When general education rolled out in their organization they may be left out. One nurse described it as, “We’re still pretty isolated, we’re not in the clutches of the whole hospital institution thing. We do our own thing, which is a good and bad thing, if you know what I mean...if we don’t have our ears to the ground it’s pretty easy to miss out on stuff that’s coming down the line, big changes happening nursing wise, etc.” Another nurse stated,

Basically, I somehow find out. I’m either in the right place when they’re going around...I aggravate education sometimes to find things out. That’s basically it. I mean it’s a small hospital but I usually find things out and then tell the other

nurse this is what they're doing and every once in a while they do include us in new things...No, um, education sometimes includes us in, you know, new products... but for the most part happen to be on the floor or something, and I see something and find out.

This was validated in the study conducted by Clark and McClain (2004). They find there is a lack of knowledge about IR nursing by other nurses in general and a lack of recognition of their specialty by administration. Only one respondent described their department as connected to the hospital as a whole with nurses on hospital committees and education rolling out in a routine manner to them.

Limitations

One of the limitations of this study is that the sample was almost exclusively members of the national organization, ARIN. As one participant put it, ARIN has the "cream of the crop". The perceptions of these nurses may not reflect the general community of radiology nurses. Another limitation is that the researcher is a novice and as such may have neglected to ask important probing questions. This researcher has prior knowledge of and experience in Interventional radiology and this may have led to a bias in data collection and analysis.

Discussion/Implications

Nurses may change practice areas during their career trajectory. How well prepared they are to embark on this new path depends on the orientation they are given.

Nurses are prepared in nursing school for experiential learning. As they embark on the path from novice to expert, experiential knowledge assists them in their endeavors.

What was clear from the participants of the study is that the orientation is very important to learning IR and a structure/policy based orientation was best. Most describe using the tools that are available in ARIN, like the orientation manual, the conferences and classes arranged through them. Nursing educators and administrators can learn from what was suggested as better orientation methods for nurses coming into interventional radiology. This is similar to the recommendations that Clark and McClain (2004) had at the conclusion of their study; of which incorporating ARIN guidelines into orientation and having preceptors available to train these new nurses were key. They also recommended having the written policies and procedures of the organization/department available as references.

More research and better understanding of realm of Interventional Radiology nursing could inform educators and incorporate this specialty into current nursing school and hospital-based curriculums. Both this study and the study by Clark and McClain (2004) suggest that nursing educators and hospital administrators need to understand all areas of nursing practice when advancing practice initiatives in the hospital setting.

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Appendix A

From: Linda McDonald [mailto:LMCDONAL@wpahs.org]
Sent: Monday, June 20, 2011 10:42 AM
To: Boone, Brenda; margaret.brownemcmanus@ucdmc.ucdavis.edu;
wickershambrenda@comcast.net; clee9@lsuhsc.edu; celweo1@aol.com;
emilytimmreck@gmail.com; Chris Cavanaugh; kduncan@unch.unc.edu
Cc: cheryl.jaglowskiho@duke.edu; 'Harriet R. McClung'
Subject: RE: ARIN fall symposium

Brenda,

We did have our board meeting last Monday and discussed your proposal. The board had no problems with allowing you to recruit participants during the Fall Symposium as long as you make it clear to them that this is not ARIN's study. Good luck and please submit an abstract regarding your study after you are done.

Linda
Linda McDonald, MSN, RN, CRN
Linda McDonald, MSN, RN, CRN
Supervisor Clinical Services
Allegheny General Hospital
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412-359-3478 - office
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Association for Radiologic & Imaging Nursing
President 2011-2012

Appendix B

University of San Diego
Institutional Review Board

RESEARCH PARTICIPANT CONSENT FORM

For the research study entitled:
A Qualitative Descriptive Study of the Work of Nurses in Interventional Radiology

I. Purpose of the research study

Brenda Boone, RN is a doctoral student in the Hahn School of Nursing and the University of San Diego. You are invited to participate in a research study she is conducting. The purpose of this research study is: explore and describe the work of nurses in Interventional radiology

II. What you will be asked to do

If you decide to be in this study, you will be asked to:

Participate in a private interview about the work you do as a nurse in Interventional Radiology. This interview will be conducted either face to face or by telephone. You will be asked questions about your age, education, race/ethnicity and about the work you do in Interventional Radiology. You will be audio taped during the interview. You may be asked for a follow up interview if there is a need for clarification.

Your participation in this study will take a total of 90 minutes.

III. Foreseeable risks or discomfort

This study involves no more risk than the risks you encounter in daily life.

IV. Benefits

While there may be no direct benefit to you from participating in this study, the indirect benefit of participating will be knowing that you helped researchers better understand the work of nurses in Interventional radiology.

V. Confidentiality

Any information provided and/or identifying records will remain confidential and kept in a locked file and/or password-protected computer file in the researcher's office for a minimum of five years. All data collected from you will be coded with a number of pseudonym (fake name). Your real name will not be used. The results of this research project may be made public and information quoted in professional journals and meetings, but information from the study will only be reported as a group, and not individually.

VI. Compensation

If you participate in the study, the research will give you a \$10 gift card for Starbucks or Target in the following way: either in person or via the mail.

You will receive this compensation even if you decide not to complete the entire interview session.

VII. Voluntary Nature of this Research

Participation in this study is entirely voluntary. You do not have to do this, and you can refuse to answer any question or quit at any time. Deciding not to participate or not answering any of the questions will have no effect on any benefits you're entitled to, like your health care, or your employment or grades. **You can withdraw from this study at any time without penalty.**

VIII. Contact Information

If you have any questions about this research, you may contact either:

- 1) Brenda Boone, MSN, RN
E-Mail: brenda.boone@cox.net
Phone: 760-419-1585

- 2) Mary Rose Mueller, PhD, RN
E-Mail: mmueller@sandiego.edu
Phone: 619-260-4562

I have read and understand this form, and consent to the research it describes to me. I have received a copy of this consent form for my records.

Signature of Participant

Date

Name of Participant (Printed)

Signature of Investigator

Date

Appendix C

Interview Guide for study of Interventional Radiology Nursing

1. What is your official title?
2. How long have you worked in this position?
3. Tell me about a typical shift, your typical work day
4. How did you learn your work practices?

Possible probes

1. You mentioned monitoring patients, tell me about that
2. Co-workers, who they interact with
3. tell me about work with patients
4. you mentioned machines tell me about that
5. you mentioned technology tell me about that

Demographics

1. Age
2. Sex
3. Race/Ethnicity
4. Education: highest degree obtained in nursing and other educational preparation
5. Professional organization
6. Certification