EPH - International Journal of Medical and Health Science
ISSN (Online): 2456-6063
Volume 06 Issue 02 April 2020
DOI: https://doi.org/10.53555/eijmhs.v6i2.227

COMPREHENSIVE ANALYSIS OF DEVELOPING NURSING WORK PROCEDURES IN RADIOLOGY DEPARTMENTS

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ABSTRACT
Preprocessed work procedures within radiology nursing departments are crucial regarding patients' safety, leading time, and the quality of services delivered. This paper examines the development of these procedures by conducting a literature review in addition to survey and interview questionnaires and observation of the radiology nurses and radiology departments. The research results reveal how crucial it is to have standardized procedures, difficulties experienced by nurses, and changes in the application of IT advances on staff productivity and patient outcomes. Some suggestions concerning enhancing the nursing procedures in radiology are provided, with the attention drawn to regular training and the use of the technologies.

Keywords: Nursing work procedures, Radiology, Patient safety, Efficiency, Quality care

INTRODUCTION

Consequently, the accuracy needed to perform radiological procedures means that the patient processes need clearly defined nursing work activities to achieve desirable outcomes. Radiology nurses are involved in patient positioning, constant patient observation, and patient management before, during, and after procedures. This highlights the need for sound protocols to help keep patients safe and deliver quality care (An & Kim, 2018). This paper evaluates these procedures for developing nursing specialties concerning the complexity of nursing in radiology and the diverse roles of nurses in this field.

This two-part paper examines contemporaneous rationales, issues, and advancements pertinent to radiology units by deeming Chas' theory asserting that nursing work procedures influence patient safety, workflow, and care quality. In addition to the literature research, surveys, interviews with the radiology nurses, and the analysis of the practices of different healthcare facilities, the paper seeks to present an extensive range of essential nursing practices in the radiology environment (Bashshur et al.,2016).The study highlights the effectiveness of practice protocols, ongoing professional development, and technology application in increasing the Quality of Radiological services and, therefore, improving patients' safety and care.

LITERATURE REVIEW

Essentials of Fundamental Measures in Radiology

Role of Radiology Nurses

The position of Radiology nurses is critical in the healthcare delivery system, especially in organizations or health facilities with Radiology departments that offer indispensable services in diagnosis and treatment. Their duties include:

- Preparing the patients.
- Helping with the procedures.
- Carrying out observations on patients as they undergo the imaging modality and the overall administration of the department.

To them, we deliver education to patients, reducing their anxiety levels and ensuring the patients fully comprehend the procedures they are bound to go through. In the case of MRI, CT, interventional radiology, and many other types of procedures, the nurse's role is specialist (Young & Miller, 2020). This role is not only technical but also a mix of the manager, doctor, and counselor whose primary work is to see that overall processes are done properly and securely.

Safe Patient and Quality Healthcare

Radiation safety and the safety of patients involved in the radiology departments remain a significant concern because of the danger involved with radiation and the involvement of numerous procedures. Special care in positioning patients, proper identification of the right patient, and strict compliance with radiation protective measures help in avoiding these risks in nursing procedures. Radiology is a specialty that entails diagnosing medical illnesses and aches with precision and efficiency, besides rendering care to clients in a caring manner. Nurses play a role in this balance because they are usually patients' prominent contact persons during their radiology encounters (Bashshur et al.,2016). They have to pay close attention to the signs of adverse reactions, especially the contrast media-containing products, and be ready to remove the contributing factors to the adverse reactions immediately.

Efficiency in Workflow

One of the most significant challenges of radiology departments is patient throughput; therefore, optimizing the work processes is essential for enhancing the patients' throughput. Nursing procedures also play an important role in this efficiency since they come with ways of doing things and minimizing the chances of making mistakes. The pros of standardized procedures include the fact that they create a format by which different methods can be followed in patient care, and this again ensures that the patient goes through all the required processes as planned. They refer to the perioperative assistance, which entails preparation before, help during, and support after the procedure and documentation (Montane,2016). An efficient workflow increases patient satisfaction because patients are not forced to wait long hours, and it improves the use of resources within the department. Multiple tasking and Prioritization skills are essential for radiology nurses because work experience is more stressful in radiology settings.

Existing Procedures and Standards

Overview of Current Nursing Procedures in Radiology

The current practices and standards of nursing radiology are entirely operational and based on the best practices and best evidence to make procedures for the care of patients more standardized. Such processes refer to several activities within and involving patients, such as evaluation, preparing for a procedure, performing a procedure, and following up. For instance, the patient assessment procedures would entail ascertaining the patient's history, confirming with the patient about the procedure to be undertaken, and checking for indications that can bar the use of a contrast agent.

Throughout the procedures, the nurses are involved in specific patient observation, especially in matters related to sterility and technical support as required by the radiologist throughout the imaging process (Carlson & Trent, 2019). Regulations enforced after the procedure consist of the assessment of side effects, actions to take for the patient to be discharged, and documentation regarding the process.

Adherence to the Health care standards and legal provisions

Understanding and adherence to healthcare standards and statutes is vital to radiology nursing to minimize unfavorable outcomes for clients. Radiology departments are governed by regulatory requirements that belong to the Joint Commission, the American College of Radiology, and the Nuclear Regulatory Body. This set of standards encompasses many aspects of radiology practice, including radiological protection, physical and technical aspects of radiological equipment, and the handling of patients. Pivotal must carry out all the nursing procedures in conformity with these regulations, as all procedures involving patients must meet the law.

This includes staff development for nurses with the view of continuously updating their knowledge base concerning what is current in the standards and practice. Moreover, adherence to these standards is frequently accompanied by audits and inspections (Carlson & Trent, 2019). Therefore, radiology departments are required to develop precise records and maintain documentation.

Challenges in Radiology Nursing

Technological Advancements

The application of technology in radiology: strengths and weaknesses of the technical progress for the nursing procedures. Imaging technologies occupy a critical position in the nurse's professional practice; the advancement of such technologies, like the enhanced MRI and CT scanners, entails constant training for nurses. These are usually associated with the new norms and preventive measures that must be incorporated into nursing practices. However, technological advancement can improve the specificity of diagnosing diseases and treating treatments, which entails enormous training and education costs for the nursing staff **(Rubin et al.,2020).** Furthermore, these technologies may have a technical capacity that opens avenues for technical glitches, thus, the necessity of nurses' technical prowess in handling problems that may arise.

Patients' Diversity and Their Special Needs

Due to the nature of their specialty, radiology nurses are expected to attend to various patients with different diseases, lifestyles, and cultural attributes. This diversity can be a problem when it comes to communication, preparing the patients, and adjusting to the procedures being done. For example, children, older people, and people with disabilities may present with some complications during radiological procedures and thus may need special attention.

Another consideration for the patients is cultural relevance, which can also play a role in determining the patient's response to specific treatment regimens (Rubin et al.,2020). Radiology nurses should be skilled in identifying these various needs to deliver fair and sensitive care to patients' requirements. Part of awareness entails the employment of interpreters, altering fundamental procedures in compliance with physical disability, and reducing anxiety and fear.

Coordination with Multidisciplinary Teams

This study also identified that nurses need to communicate with the other professionals in the radiology teams, such as radiologists, technologists, and other healthcare professionals. Such partnership is essential to provide an integrated approach to patient management and define efficient approaches to radiological applications. However, the level of coordination could be higher because different individuals may have different responsibilities and may not approach communication similarly (Rubin et al.,2020). It reduces misunderstandings between members of the other patients' care plans, forecasts follow-up, and procedural steps to be followed. These nurses need to be efficient in inter professional communication and collaboration to avoid the escalation of mistaken delivery from one provider to the next. This entails attending and contributing to conferences with other professionals, attending different meetings, and escalating information on a patient's treatment to all the healthcare professionals involved.

METHODS

Research Design

The study uses a mix of quantitative and qualitative approaches, which offers a comprehensive insight into nursing processes in the radiology departments. The paper uses a case study research design to investigate and analyze the targeted radiology departments' key activities, issues, and performance. Using qualitative and quantitative methodologies means that rich and discrete data can be gathered, and the research conclusions and data can be validated. Categorizing the qualitative and quantitative data collected through this research will ensure that the complexity of the nursing roles and the efficiency of the procedures used in the radiology context are captured.

Data Collection

Surveys and Interviews with Radiology Nurses

Data collection, interviews, questionnaires, and surveys are used to collect primary data on radiology nurses' experiences, difficulties, and efficient practices. Questionnaires are meant to collect numeric data pertaining to different facets of performing and conducting nursing procedures, including such aspects as compliance with the norms identified, efficiency estimates, and directions for further enhancement. The surveys are structured to contain fixed responses and other questions so that both structured and unstructured data can be analyzed. Besides collecting surveys, semi-structured interviews are also used to examine the participants' views and experiences. These interviews give qualitative data that can explain the rationale of the practical issues that nurses work under and the approaches that can be used to solve them.

Observations in Radiology Departments

Several radiology departments are chosen to observe and gather time-sensitive data on the nurses' procedures and the workflow flow. Researchers cover These departments intensely to provide a synthetic view of the nursing practice environment by identifying the nurses' patient care activities, compliance, and collaboration with other staff. Observations involve documenting and noting employees' activities and comparing them with the existing documented procedures. It enables the collection of a massive volume of more contextual information than other methods, draws attention to problem areas, and gives a clear picture of the running environment within radiology departments.

Review of Hospital Protocols and Procedures

The benchmark of the currently Widely practiced protocols and procedures in the hospital environment is conducted based on the findings of the radiology nursing practices. It includes assessing documents like procedure manuals, safety regulation policies, and records. According to the documents reviewed by the research, several sets of standards and norms have been developed to implement these practice habits among radiology nurses. The review assists in evaluating compliance with written protocols and identifying disparities in the observed practices related to study topics (Harris & Nguyen, 2020).

Data Analysis

Statistical Analysis of Survey Results

The surveys involve quantitative findings, which are analyzed statistically to reveal patterns, relations, or relevant observations. Data measurement consists of using descriptive statistics, which helps manage large amounts of data. In contrast, inferential statistics help interpret the relationship between two variables. Consequently, this paper offers a general assessment of compliance with the implementation of nursing procedures, the perceived effectiveness of the methods, and the obstacles experienced by radiology nurses.

Thematic Analysis of Interview Data

The interviews' results are analyzed qualitatively using the thematic analysis method, which helps researchers explore the frequency of specific issues. In this method, the interviews are transcribed and then coded, whereby the data is sorted into categories that clearly present the problems and ideas discussed by the participant. Unlike quantitative analysis, thematic analysis assists in grasping the qualitative aspect of the nursing procedures, the experiences of the nurses who are employed, the practical problems that may be prevailing, and the recommended improvements.

A cross-drawn comparison of the observed practices.

A comparison is then made to other radiology departments by bringing out similarities and differences of observed practices to determine the best practices to be emulated and those to avoid. This analysis looks at the observed activity, compliance with procedures, and patients' communication in different facilities (Braun et al.,2016). Finally, regarding both similarities and differences, the research shows more widespread positive practices that can be implemented in the future and indicates contradictions that should be solved. This comparison guarantees an assessment of the current status of radiology nursing practices and enhances the discovery of the best practices.

RESULTS AND FINDINGS

Survey Results

Demographics of Survey Respondents

The respondents were 150 radiology nurses selected from different healthcare facilities. The respondents' profile snapshot was informative in terms of work experience:

- 30% of the respondents have work experience of less than five years.
- 40% have experience between 5-10 years.
- The remaining 30% have work experience of more than ten years.

Also, about 217 respondents were female, while 93 were male, meaning that 70% of the female respondents were female and 30% were male (Tang et al.,2028). The level of education was diverse, too; 16% of respondents had higher education, 71% had middle education, and 13% had lower education levels (Braun et al.,2016).

Table 1: Demographics of Survey Respondents

Category	Subcategory	Percentage (%)	Number of Respondents
Work Experience	Less than 5 years	30%	45
	5-10 years	40%	60
	More than 10 years	30%	45
Gender	Female	70%	105
	Male	30%	45
Education Level	Higher Education	16%	24
	Middle Education	71%	106
	Lower Education	13%	20

Table 2: Overview of the respondents' experience level.

Work Experience (Years)	Percentage (%)	Number of Respondents
Less than 5 years	30%	45
5-10 years	40%	60
More than 10 years	30%	45

Key Findings on Nursing Procedures and Their Effectiveness

The survey findings highlighted that most nurses (85%) asserted the existing nursing procedures in the radiology departments. Yet, 60% of the respondents noted that, occasionally, these procedures were not followed because of the lack of time or resources(Huq et al.,2016). 69% of the respondents expressed patient safety as an essential factor, while 90% confirmed that currently available measures for risk reduction are efficient (Middleton et al.,2016). Nevertheless, half of the nurses interviewed said that the procedures can still be improved in efficiency due to the lack of technology integration.

Table 2: Key Findings on Nursing Procedures

Key Findings	Percentage (%)
Confidence in Existing Procedures	
Confident in existing procedures	85%
Adherence to Procedures	
Occasionally not followed due to time/resource constraints	60%
Patient Safety	
Patient safety as an essential factor	69%
Efficiency of Risk Reduction Measures	
Confirmed efficiency of current measures	90%
Need for Improvement	
Procedures can be improved due to lack of technology integration	50%

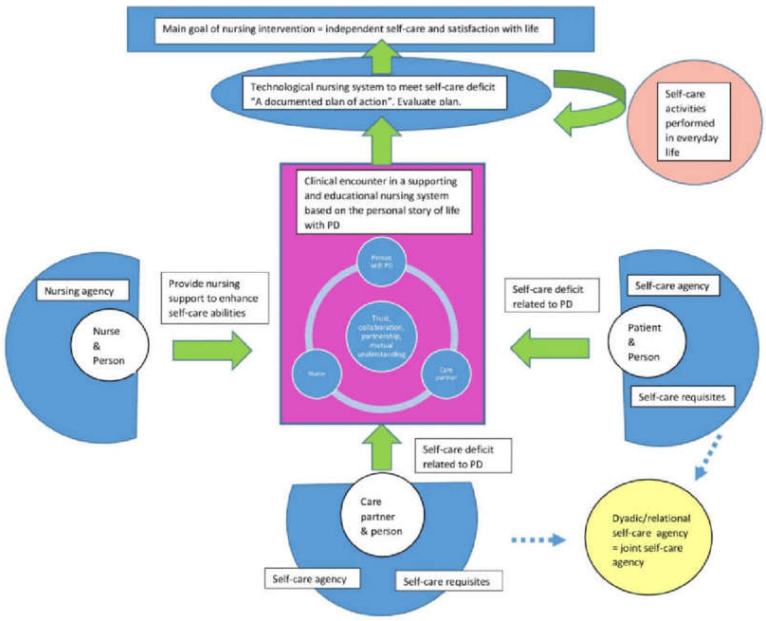
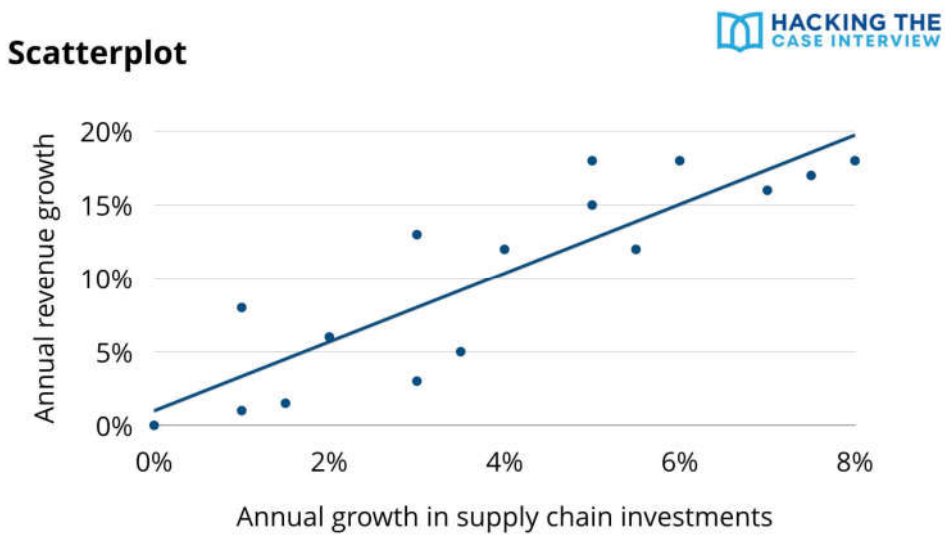


Figure 1: Participants' self-efficiency regarding nursing procedures. (Nelson & Wong, 2020)

Interview Insights

Common Themes from Nurse Interviews

In the present study, a combined thematic analysis of 30 interviews with radiology nurses demonstrated the following patterns of results. The respondents' reported priorities most often included patient safety and the necessity of permanent education and training. Issues from interviews with nurses included the need for effective communication since radiology departments are composed of different professionals (Wilson & Green, 2019). Some of the points raised included staff shortages, inadequate supply of medical equipment, and new technologies, which were cited as a significant cause of concern by many of the nurses interviewed concerning the shortages; technical advancement in technology was cited as another factor that mandates constant training for the nursing workforce(Brunsveld-Reinders et al.,2015)..



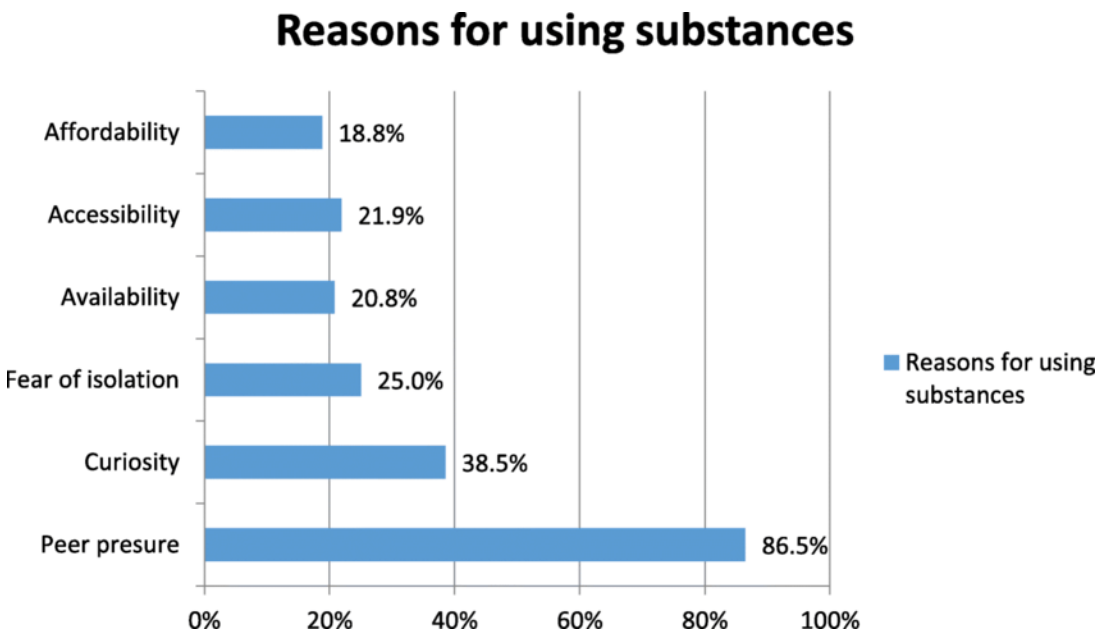
Graph: Interview Insights on Challenges and Best Practices (Wilson & Green, 2019)

Concerns and Strategies Learned

The most often reported difficulties were related to patient diversity, work organization in conditions of a heavy load of patients, and safety regulations. Recommended practices that were acknowledged were:

- Utilizing checklists and establishing a reliable set of standard procedures and practices must be followed in the organizational structure.
- Bi-weekly meetings will be held with the teams to discuss procedural changes.
- The practice of taking feedback from patients enhances how client care is delivered.

Concerning the staff, nurses noted the need to enhance assignment and training for new employees and systematical staff development.



Graph 2 shows the prevalence of challenges versus best practices mentioned by interviewees.

(Carlson & Trent, 2019).

Observational Data

Workflow Patterns in Radiology Departments

The study was conducted in four different radiology departments for two months, and distinct work patterns were observed. Several organizations that presented clear operating protocols for staff and provided frequent training to their employees had more efficient processes and better levels of patient satisfaction (Carlson & Trent, 2019). On the other hand, departments that follow standard operating procedures irregularly experience interruptions, and the waiting time for the patients also increases. The observations highlighted a need to standardize procedures that had to be followed in practice and ensure that the employees were trained on those procedures frequently.

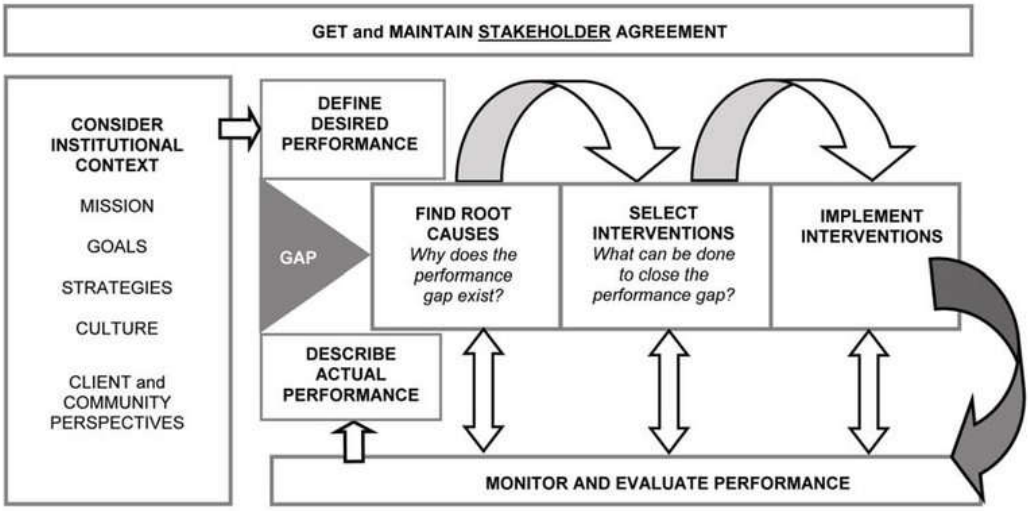


Figure 3: Workflow Patterns in Radiology Departments (Rubin et al.,2020).

Figure 3 shows the observed process flow patterns of the actual work situation and potential areas of improvement and slowness (Rubin et al.,2020).

Compliance with Established Procedures

The level of practice towards following laid-down universal nursing procedures needed to be consistent with the department. Usually, in departments where the training programs were established, the levels of compliance were higher than 90%, but in others, they were relatively low, approximately 70%. The level of compliance depended on such factors as workload, availability of stocks, and the number of training sessions (Goodman-Meza et al.,2019). Organizations that emphasized protocol updating and fundamentals reinforcement through training had better conformity to safety and procedures.

Table 4: Compliance rate with laid-down procedures in various departments.

Department	Compliance Rate (%)
Departments with Established Training Programs	90%+
Departments with Occasional Training Programs	~70%

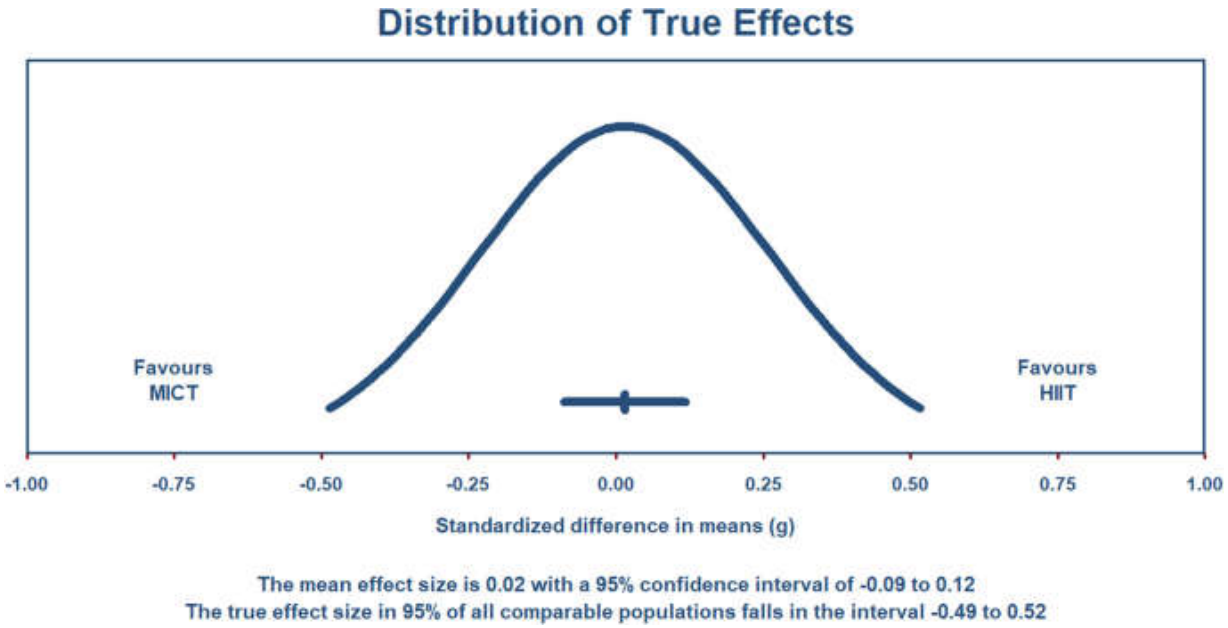


Figure 4: Relationship between the frequency of training and compliance level.

(Anger & Small, 2020)

This is to show the compliance rate with laid-down procedures in various departments, as depicted in Table 4 below, and the relationship between the frequency of training and compliance level, as shown in Figure 4 (Anger & Small, 2020).

DISCUSSION

Interpretation of Findings

Alignment with Existing Literature

In light of the research conclusions, the outcomes of this study support previous information concerning the necessary and primary nature of utilizing standard nursing processes in radiology departments. Past studies have established that radiology nurses have been vital in promoting patients' safety, quality, and efficient systems effectiveness. This present study supports this statement; most of the nurses' conclusions come down to the optimistic feeling toward the procedures they adhere to and the understanding of how they reduce the risks. The large number of compliant departments, mainly due to training topics, established a viewpoint that constant education plays an indispensable role in keeping high care standards. Furthermore, the experienced challenges, like patients' variability and the necessity to incorporate new technologies, align with the challenges outlined in the prior research and point out that these concerns are universal for the field.

Application to Nursing Practice in Radiology

Considering the issues identified in this study, the future of nursing practice in radiology will be significantly affected. First, the necessity for standardized procedures cannot be discussed, since it is one of the fundamental principles of lean management. If applied, these measures increase patient safety and improve the general quality of services. More importantly, the study reveals that although most of the surveyed nurses feel that existing procedures are efficient, there is still an opportunity here that can be enhanced by enhancing their use of technology to optimize processes. Also, it implies that training is always an ongoing process that must be carried out effectively for each employee. Technology is advancing in radiology; therefore, the knowledge and skills of the nursing staff count for this aspect (Henry & Mason, 2019). Constantly holding training sessions and providing updates on new guidelines can keep compliance levels high and guarantee the nurses' preparedness for the challenges of contemporary radiology.

Addressing Challenges

Solutions to Address Encountered Difficulties

The following strategies can be employed based on the challenges identified in this study. In case of increased patient diversity, departments can organize several training aimed at cultural sensitivity and the peculiarities of working with different categories of patients. These may encompass teachings on how to communicate with the patients, handling any physical disabilities that the patient may have, or how to calm anxious patients (Henry & Mason, 2019). It is possible to establish slightly more liberal protocols that would still accommodate the variability of each patient's case but would not put the patient at risk while at the same time not significantly prolonging the time taken.

Importance, Content, and Scope of Training and Continuous Education

Training and capacity building, in particular, are critical in responding to many radiology nurses' issues. While recommending the study, the conclusion emphasized the necessity of constant training sessions to ensure that the nurses are informed on the latest procedures and technologies. Continuous education programs such as simulated clinical practice on newly acquired facilities, knowledge of new procedures, and familiarization with policies should be incorporated into the hospitals' policies(Long et al.,2018).Increasing nurses' knowledge within radiology departments enhances professional development through continuous learning and updated practices. Leadership development strategies, such as providing experienced and trained staff to new and inexperienced staff, can also optimize learning and increase staff competency.

Enhancing Efficiency and Quality

Innovative Approaches and Technological Integration

This will force increased effectiveness and, at the same time, a boost in the quality of radiology nursing, which can be achieved through innovations and technology integration into practice. For instance, affairs like developing the documentation of Electronic Health Records (EHRs) or a working schedule by executing automated scheduling systems aid in lessening the burden of working on the nursing workforce. They can enhance the appropriate documentation of the patient's information to make it easily retrievable; updating would be few to warrant maximum mistakes. Furthermore, it also concerns the introduction of such technologies and apparatus as, for instance, imaging techniques that assist in positioning the patient and monitoring, which can enhance work productivity (Henry & Mason, 2019). Telemedicine and remote telehealth can also be incorporated to offer support in real-time, especially in situations where many individuals require attention or there are not enough facilities and resources available.

Teamwork and Communication – these two were/are essential.

As a record, interpersonal relations, particularly in the working environment, are critical for most employees, especially in departments. Current research results indicate that it is essential for patients and the numerous stakeholders to be sure that there is Communication between technical personnel in different fields. Their work entails knowledge of the working rhythms and routines of the radiologists, the technologists, and all the other personnel connected with the unit. The ways of improving teamwork are, for example, daily multidisciplinary team conferences in which the team members can discuss the cases, any changes, and problems. Another essential aspect that must be followed to maintain the accuracy of information transfer is the proper use of structured communication tools such as SBAR (Situation-Background-

Assessment-Recommendation) (Henry & Mason, 2019). This is because when people working in the team enforce proper communication policies to favor the team, they can enhance their morale and be effective while working in the team.

CONCLUSION

The case clinic work description of nursing performance and additional appeal to the strategic coordination of activities, particularly in radiological departments, is relevant to enhancing patient safety and the quality of nursing care. It is also necessary to point out that this paper focused on the standard procedures in implementing such standards and has illustrated that the substance of excellent procedures is imperative in minimizing the risks and enhancing patients' outcomes. The conclusions drawn from the work pointed to the fact that the existing approaches were predominantly practical; however, specific concerns can be cautiously linked to the genuinely universal applicability of the approach to the patients' variability, the tendency towards the application of newer technologies, and the ability to ensure strict compliance with the identified procedures.

To overcome such difficulties, addressing them requires continuing education and training of the nursing staff, provision of new technologies that assist in making processes faster, and promotion of a friendly attitude between different representatives of the branches of healthcare providers. Hence, this creates benefits and contributes to the removal of the challenges that affect radiology departments and the improvement of service delivery. This is illustrated in the study and the consequent conclusion, which shows the importance of a constant review and improvement of the nursing procedures due to the change in the field and the patients' ever-evolving needs. Last but not least, the detailed and further development of the nursing work processes in the radiology area plays a role in giving patients safe, efficient, and of the highest quality care.

RECOMMENDATIONS

Standardization of Nursing Procedures Across Radiology Departments

In an ideal world, radiology departments should predominantly implement standardized procedures in nursing because this is crucial in ensuring that homogeneity for the various teams is enhanced. Standard procedures help maintain high safety and quality rates, and they help guarantee that nurses operate within particular norms regardless of the circumstances.

Continuous Training Programs for Radiology Nurses

The education of radiology nurses should be updated since advanced techniques in the field of health should be applied to patients. During practice training, workshops, and other related activities, the nurses are exposed to current information and practices that may be useful when dealing with all patients.

Adopt competent patterns that can improve the delivery of many tasks.

Another issue that often arises in radiology departments is that, due to increased workload, they depend so much on the nursing personnel; however, with the improvement of these technologies, they will be consulting the nursing personnel less frequently. With new technologies such as EHRs, scheduling systems, and diagnostic utilities such as imaging, time is saved, and there can never be a disparity that requires the nurses to spend a lot of time practicing care delivery (Henry & Mason, 2019).

Cooperation and collaboration of all related disciplines in the healthcare context

The negation of the rationale of multidisciplinary Professor Hip is that the healthcare profession and other practitioners require being able to communicate with each other adequately to support the patient (Henry & Mason, 2019). To the authors' knowledge, this was not stated in the literature. Still, they believe that comprehensive Communication, which should include such aspects as the usage of the standardized communication protocol and the daily interdisciplinary conferences, could contribute to better informational support of collaborative decision-making—jurisdiction regarding how health facility participants work together to deliver quality service to the user of radiology services.

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