

Effectiveness of Educational Program about Implementing PDCA Process of Quality on Head Nurses Practice regarding Patient Safety Goals

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Abstract

Background: Quality of care is one of the most frequently quoted principles of health policy, and it is currently high up on the agenda of policy-makers at national and international levels. Patient safety is often considered a component of quality thus; practices improving patient safety lead to improvement the overall quality of care. **Aim:** to investigate the effectiveness of educational program about implementing PDCA process of quality on head nurses practice regarding patient safety goals. **Research design:** Quasi-experimental research design was utilized in this study. **Setting:** The study was conducted at Minia Liver University Hospital, Minia Urology and Renal University Hospital and Minia Emergency University Hospital. **Subjects:** All head nurses available which constitute (50), who worked at Minia university hospitals during the time of data collection. **Tools:** two tools as follow; tool (I), first part was socio demographic data, and second part was head nurses' knowledge about PDCA process of quality and patient safety goals questionnaire. Tool (II) was head nurse practice of PDCA process related to patient safety goals questionnaire. **Results:** the highest percentage of head nurses had low level of knowledge about PDCA process of quality and patient safety goals pre implementation of the program with (66.0%) and (74.0%) respectively, while the highest percentage of them had high level of knowledge about PDCA process of quality and patient safety goals immediately after implementation of the program with (90%) & (92%) respectively. Also, The highest percentage of head nurses had low level of practice of PDCA process related to patient safety goals pre implementation of the program with (84.0%), while (86.0%) of them have high level of practice immediately after implementation of the program, **Conclusion:** there was moderate association between total head nurses knowledge and their practice regarding PDCA process of quality and patient safety goals post implementation of the educational program. **Recommendation:** Continuous training programs and development activities about the international patient safety goals and quality improvement models should be applied to all head nurses in the study setting and should be extended to other similar settings.

Key words: Head Nurses, Patient, PDCA, Quality, Safety.

Introduction

Quality of care is received increasing attention in the context of the Sustainable Development Goals (SDGs), as the SDGs include the imperative to “achieve universal health coverage, including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all”. This is reflected in two World Health Organization (WHO) reports published in 2018, a handbook for national quality policies and strategies and a guide aiming to facilitate the global understanding of quality as part of universal health coverage aspirations (Ruiz-Vanoye, et al., 2024; González et al., 2020, WHO, 2018).

Patient safety is one of the most prominent healthcare challenges worldwide. For improving healthcare, it is important to share the responsibility for patient safety between patients, healthcare providers and those researching the area. Healthcare professionals have to manage these risks using their knowledge and skills in complex systems, and also whilst maintaining a safe level of patient care (Järvisalo et al., 2024, Vanhaecht, et al., 2022; Rangachari & Woods, 2020).

Patient safety goals as a condition to be applied in all hospitals are accredited by the Commission on Accreditation of

Hospitals. Joint Commission International (JCI, 2011) published international patient safety goals consisting of six key items which include; "identify patients correctly, improve effective communication, improve the safety of high-alert medications, ensure correct-site, correct-procedure, and correct-patient surgery, reduce the risk of health care-associated infections and reduce the risk of patient harm resulting from falls" (Agbar, et al., 2023; Kalsoom, et al., 2023).

Head nurses are at the first level of nursing management system. They are working closely with staff nurses as well as carry out day-to-day operations. They are also involved in some long-term planning and in establishing unit policies. Their major roles include dealing with issues related to the delivery of care, staffing shortages, and behaviors of workers in order to maintain and promote quality of care. They should put the safety policy into practice through careful planning of the safety activities. Planning means determination of the safety objective, priorities, indicator and preparation of working program to achieve the goals. Each ward can have different objectives and priorities according to the patient safety goals (Albaalharith, & A'aqoulah, 2023; Abduh Saaid, Abdullah & Abo Elmagd, 2021; Seliem, Shazly & Mostafa, 2018).

Furthermore, head nurses must have the competency to design, communicate, and apply patient safety goals to all nurses and other healthcare providers under their supervision. In order to apply patient safety goals in the unit, head nurses need a tool/method to guide the effective implementation of these goals. The Plan-Do-Check-Act (PDCA) process is an effective quality management tool in improving patients' outcomes and augmenting the efficiency of the organization to the maximum (Albaalharith & A'aqoulah, 2023; Abduh Saaid, Abdullah & Abo Elmagd, 2021; Tamher, Rachmawaty & Erika, 2021).

Significance of the Study

Nurses comprise the largest group of professionals within the healthcare workforce and provide majority of the care received by patients in hospital settings. There is an increasing demand for healthcare and nursing services due to population growth and more significantly, due to the increasing proportion of people over the age of 65. At the same time, the supply of nurses is diminishing. This shortage would have a negative impact on patient safety. Enhancing head nurses' competencies in leading their teams towards application of patient safety goals through a systematic methodology as PDCA process may help to overcome this negative impact (Buerhaus, 2021; Gurková et al., 2020).

Internationally, study done by Ma, Cao & Li, (2022) about Application of PDCA Process Management in Day Operation Ward and the Influence of Nursing Quality and Safety who found that, application of PDCA management can effectively enhance the nursing quality and safety of the day operation ward, further facilitate the quality of hospital nursing work, and improve patient satisfaction.

In Egypt, study done by Seliem, Shazly & Moustafa (2019) about Implementation of (Plan-Do-Check-Act) Process of Quality and Measuring its Effect on Nurses' Practice of Patient Safety Goals, who found that significant improvement in application of patient safety goals after implementation of PDCA process.

From the researcher point of view, Patient safety is not only the task of individual nurses but it is also the responsibility of the head nurse as a leader in their ward. The head nurses perform as a manager in the ward and have a duty toward improving patient safety. Leadership and management are the organizational components to enhance patient safety. Meanwhile, in some cases, nurses occasionally make mistakes because systems, tasks, processes are poorly designed and lack of supervision.

So, there is need to investigate the effectiveness of educational program about implementing PDCA Process of quality on head nurses practice regarding patient safety goals.

Aim of the Study

The present study aimed to investigate the effectiveness of educational program about implementing PDCA process of quality on head nurses practice regarding patient safety goals.

Research hypothesis. It's expected that;

1. The head nurses knowledge regarding PDCA process and patient safety goals will increase after the implementation of educational program.
2. There will be an improvement on head nurses' practice of patient safety goals after implementation of PDCA process of quality

3. There will be significant relationship between head nurses knowledge and their practice regarding implementation of PDCA process for patient safety goals.

Subjects & Method

Research design:

Quasi-experimental research design was utilized in this study.

Setting:

The study was conducted at Minia Liver University Hospital, Minia Urology and Renal University Hospital and Minia Emergency University Hospital.

Subjects:

All head nurses available which constitute (50), who worked at Minia university hospitals during the time of data collection.

| Hospital | N0. of Head Nurses |
|---|--------------------|
| Minia Liver university hospital | 15 |
| Minia urology and Renal University Hospital | 15 |
| Minia Emergency University Hospital | 20 |
| Total | 50 |

Data collection tools

Data was collected by using two tools as follows:

Tool (I): divided into two parts:

Part (1): Socio- Demographic Data: It was used to collect data about head nurses items such as age, gender, residence, qualification, years of experience, hospital name and hospital department.

Part (2): Head nurses knowledge about PDCA process of quality and patient safety goals questionnaire:

This tool was developed by the researcher. It was used to assess head nurses' knowledge of PDCA process of quality and patient safety goals.

It divided into two parts:

- **Part I: head nurses knowledge about PDCA process of quality**
 - ❖ It consists of 22 items about PDCA process of Quality and was measured by using (True (1) & False (0) response).
- **Part II: head nurses knowledge about patient safety goals.**

It consists of 22 items about patient safety goals and was measured by using (True (1) & False (0) response).

The scoring system ranged from 0 – 22.

- Low level of knowledge (0 – 7)
- Moderate level of knowledge (8 – 15)
- High level of knowledge (16- 22)

Tool (II): Head nurse practice of PDCA process related to patient safety goals questionnaire:

This tool was developed by Yuswardi et al., (2015); seliem, et al., (2018) and modified by the researcher. It was used to assess head nurses' practice of patient safety goals by using PDCA process of quality.

It consists of 67 items and was measured by using 3 points Likert scale (Always (2), Sometimes (1), Never (0) response). It was divided into 6 dimensions by using "Plan, Do, Check and Act phases".

The total scoring system ranged from 0 – 134.

Low level of practice (0 - 44)
 Moderate level of practice (45 – 89)
 High level of practice (90 - 134)

Validity and Reliability of Tools

Validity:

The tools were tested for the content validity by a jury of 7 experts’ in the field of nursing administration and necessary modifications were done. The jury committee composed of (2) professors and (5) assistant professors; (1) professor of nursing administration - faculty of nursing - Assuit university, (1) professor and (4) assistant professors of nursing administration - faculty of nursing - Minia university, (1) assistant professors of nursing administration - faculty of nursing - Benha university. The tools face, coverage, clarity, wording, length, format and overall appearance were asked to be evaluated by the expert panel. The content validity of the tools was 90%.

Reliability:

To ensure consistency, tools dependability were tested by using Cronbach’ alpha test to decide the degree to which the tools items measured the same idea and were correlated with one another.

| Items | Cronbach’ alpha test |
|-----------------------|----------------------|
| Total knowledge level | 0.971 |
| Total practice level | 0.991 |

Pilot Study:

A pilot study was carried out before starting data collection on 10% (5) of the studied sample, who working at Minia university hospitals. The aim of this pilot study was to test the clarity, comprehensiveness, accessibility, and applicability of the tools and to estimate the appropriate time required for filling the questionnaire. Tools did not need modification based on the findings of the pilot study. So, participants of the pilot study were included in the study sample.

Ethical Considerations:

- An official letter was granted from the Research Ethics Committee of the Faculty of Nursing, Minia University.
- Approval to conduct the study was obtained from the Executive Director (CEO) of Minia University Hospitals and Chief Nursing Officer.
- Before the conduction of the pilot study as well as the actual study, informed consent was obtained from the participants that are willing to participate in the study, after explaining the nature and purpose of the study. Study subject has the right to refuse to participate or withdraw from the study without any rational any time.
- Study subject privacy has been taken into consideration during collection of data. Participants were assured that all their data are highly confidential; anonymity was also assured through assigning a

number for each head nurse instead of names to protect their privacy.

Data collection procedure:

- The study was accomplished through five phases: preparatory, assessment, planning, implementation, and evaluation. It was lasted from the beginning of January 2023 to end of December 2023.

Preparatory phase:

- Written approval was taken from Ethical Committee in the Faculty of Nursing, Minia University.
- Approval to conduct the study was obtained from Dean of the Faculty of Nursing, Minia University.
- Approval to conduct the study was obtained from the Executive Director (CEO) of Minia University Hospitals and Chief Nursing Officer.
- A review of related literature and theoretical knowledge of various aspects of the study, using books, articles, internet periodicals, research papers and dissertations for construction and modification of the study tools.
- The tools were translated into Arabic language.
- Then, testing the validity of the tools from the jury committee and necessary modification were done.
- After testing the validity of the tools, the pilot study was done and tools of the study were tested for reliability and stability of the internal consistency.

Assessment phase:

- The researcher assured the voluntary participation and confidentiality to each subject who agreed to participate.
- Informed consents were obtained from the study head nurses.
- Pretest was done for head nurses by using:
 - **Assessment of head nurses knowledge:** the study questionnaires were distributed to the head nurses to assess their knowledge regarding PDCA process of quality and patient safety goals, and the researcher was present for any explanation of the sheet items.
 - **Assessment of head nurses practice:** the study questionnaires were used by the researchers to assess head nurses practice regarding implementation of patient safety goals by using PDCA process of quality through using observation method, meeting with head nurses, and asking staff nurses about head nurses implementation of patient safety goals.

C- Planning phase:

Based on the result of pre-test, the study subjects learning needs were identified. Accordingly, the objectives of the program were stated and the content was designed.

- Review of related literature which conveys various aspects of the topics, using different books, journals, and websites to get information about research.
- The researchers developed the program handout about "PDCA process of quality and patient safety goals" from January 2023 to April 2023.
- The researcher prepared time table of the program.

The program contents divided into two parts:

The first part; booklet includes the following;

First dimension; related to PDCA process of quality which includes "quality definitions, quality principles, quality approaches, purpose of quality improvement, quality improvement methods, explanation of PDCA process of quality.

Second dimension; related to patient safety goals which includes "concept of patient safety, types of patient safety issues, patients at risk for safety hazards, factors affecting patient safety, international patient safety goals(identifying patients correctly, improving effective communication, maintaining the safety of high alert medications, ensuring correct procedure, reducing the risk of healthcare associated infections, and reducing the risk from fall), and application of PDCA process of quality for patient safety goals. This booklet printed and distributed for all head nurse at all hospitals

The second part of the program component includes; preparation of portfolio by the researcher which includes data about polices related to application of patient safety goals at hospitals such as " how to identify patient correctly, SBAR assessment sheet, list of high alert medications (HAM), look alike and sound alike medications, surgical safety checklist, hand washing technique, Morse fall scale assessment sheet. This portfolio prepared in Arabic language and distributed for each unit at all hospitals.

D- Implementation phase

- The implementation of program was conducted in the available teaching rooms at the hospitals.
- The implementation of program was divided into 3 groups, in which each hospital was assigned as one group. The time of the program for each group 13 hours. The total time of the program for all groups 39 hour.
- The training program was implemented in three days for each group and consisted of 7 sessions. One introductory session, two sessions about quality and PDCA process, two sessions about international patient safety goals, one session about application of PDCA process for patient

Results:

Table (1): Distribution of socio-demographic data among the studied head nurses (n = 50).

| Socio-demographic data | The studied head nurses (n= 50) | |
|---|---------------------------------|-------|
| | No. | % |
| Age / year | | |
| • 25 - < 30 | 17 | 34.0 |
| • 30- < 35 | 19 | 38.0 |
| • 35 – 40 | 14 | 28.0 |
| • Mean ± SD | 32.2 ± 4.8 | |
| Educational qualification | | |
| • BSc | 50 | 100.0 |
| Years of experience | | |
| • 1- < 5 | 13 | 26.0 |
| • 5-< 10 | 22 | 44.0 |
| • 10- < 15 | 7 | 14.0 |
| • 15 – 20 | 8 | 16.0 |
| Mean ± SD | 8.0 ± 5.2 | |
| Hospital name | | |
| • Minia Urology &Renal University Hospital | 15 | 30.0 |
| • Minia Liver University Hospital | 15 | 30.0 |
| • Minia Emergency University Hospital | 20 | 40.0 |
| Hospital department | | |
| • Intensive Care Units | 18 | 36.0 |
| • Emergency Departments | 7 | 14.0 |
| • Operations Units | 6 | 12.0 |
| • Inpatient Units | 19 | 38.0 |
| Previous workshop attendance about PDCA & patient safety goals | | |
| • Yes | 15 | 30.0 |
| • No | 35 | 70.0 |

safety and one conclusion session. Some sessions take about 1.5 hour and another take about two hours.

- The training program was implemented in May, June & July 2023.
- The researchers used various teaching methods to attract head nurses and motivate them to participate. The teaching methods included lectures, group discussion, role-play, and brain storming.
- The teaching media included power point, white papers, hand book, and video presentation.
- At the beginning of the first session; an orientation of the program and its purpose was discussed. Each session was started by setting the objectives.

E- Evaluation phase:

- Before implementation of the educational program.
- Immediately after the implementation of educational program.
- Follow up after three months from the educational program.
- Evaluation was done using the two tools.

Statistical design:

The collected data were tabulated, analyzed, and computerized by using SPSS (statistical package for the social science version 28). Descriptive and inferential statistics was utilized to present study data. Descriptive data were expressed as numbers and percentages. Quantitative data were presented by mean and standard deviation. Quantitative continuous data were compared using (T- test, Mann-Whitney U test and Wilcoxon test) in case of comparison between two group. Chi square and Fisher exact test were used to test association between two qualitative variables or to detect difference between two groups. The level of significance was accepted at a p-value < 0.05.

Table (1): shows that mean age of studied head nurses is (32.2 ± 4.8). Regarding their educational qualification, all head nurses are BSc degree in nursing. About hospital name, the highest percentage is for Minia emergency university hospital with (40%). Concerning hospital department, the highest percentage is for inpatient units (38%). Regarding previous workshop attendance about PDCA & patient safety goals, above two thirds (70%) of head nurses did not attend workshops. Moreover, the highest percentage of head nurses have 5-10 years of experience at work

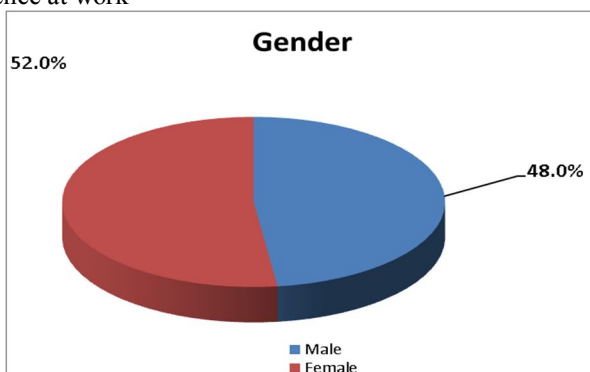


Figure (1): Distribution of the studied head nurses' according to their gender (n = 50).

Figure (1): explains that, more than half of studied head nurses are females with (52%).

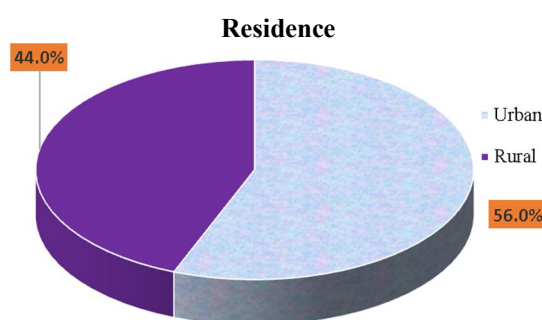


Figure (2): Distribution of the studied head nurses' according to their Residence (n = 50).

Figure (2) illustrates that, the highest percentage of studied head nurses is from urban area of residence with (56%)

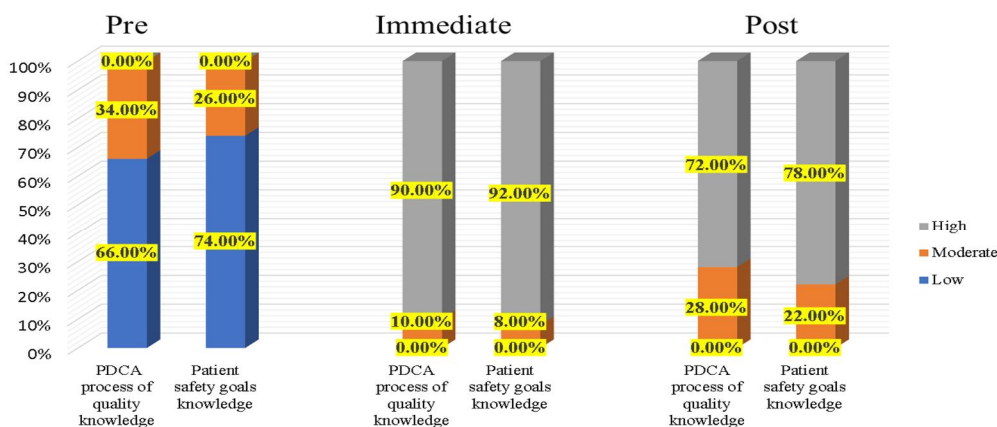


Figure (3): Differences in total head nurses' knowledge levels about PDCA process of quality and patient safety goals pre, immediate and post educational program implementation (n = 50).

Figure (3): indicates that, the highest percentage of head nurses have low level of knowledge about PDCA process of quality pre implementation of the program with (66.0%), while (90.0%) of them have high level of knowledge immediately after implementation of the program, and (72%) of them have high level of knowledge follow up after three months of implementation the program.

Regarding head nurses' knowledge about patient safety goals; it is explained that, the highest percentage of head nurses have low level of knowledge pre implementation of the program with (74.0%), while (92.0%) of them have high level of knowledge immediately after implementation of the program, and (78.0%) of them have high level of knowledge follow up after three months of implementation the program.

Furthermore, there is highly statistically significant difference between pre, immediate and follow up after three months phases of implementation of the program P- value (0.001**).

Table (2): Distribution of the studied head nurse's practice level of PDCA process related to patient safety goals and its domain pre, immediate and post educational program (n = 50).

| Items | Pre | | | | | | Immediate | | | | | | Post | | | | | | Test of significance | |
|---|-----------|-------------|----------|-------------|----------|------------|-----------|------------|----------|-------------|-----------|-------------|----------|------------|-----------|-------------|-----------|-------------|----------------------|-----------------|
| | Low | | Moderate | | High | | Low | | Moderate | | High | | Low | | Moderate | | High | | Cochran's Q test | P value |
| | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % | | |
| I - identify patient correctly | 43 | 86.0 | 7 | 14.0 | 0 | 0.0 | 0 | 0.0 | 7 | 14.0 | 43 | 86.0 | 0 | 0.0 | 14 | 28.0 | 36 | 72.0 | 83.062 | 0.001** |
| II - Improve effective communication | 43 | 86.0 | 7 | 14.0 | 0 | 0.0 | 0 | 0.0 | 6 | 12.0 | 44 | 88.0 | 0 | 0.0 | 10 | 20.0 | 40 | 80.0 | 95.137 | 0.001** |
| III - Maintain safety of high alert medication | 42 | 84.0 | 8 | 18.0 | 0 | 0.0 | 0 | 0.0 | 7 | 14.0 | 43 | 86.0 | 0 | 0.0 | 4 | 8.0 | 46 | 92.0 | 101.979 | 0.001** |
| IV - Ensure correct site, correct procedure, correct surgery | 42 | 84.0 | 8 | 18.0 | 0 | 0.0 | 0 | 0.0 | 5 | 10.0 | 45 | 90.0 | 0 | 0.0 | 30 | 60.0 | 20 | 40.0 | 63.312 | 0.001** |
| V - Reduce risk of health care associated infection | 40 | 80.0 | 10 | 20.0 | 0 | 0.0 | 0 | 0.0 | 8 | 16.0 | 42 | 84.0 | 0 | 0.0 | 2 | 4.0 | 48 | 96.0 | 109.420 | 0.001** |
| VI - Reduce patient harm result from fall | 40 | 80.0 | 10 | 20.0 | 0 | 0.0 | 0 | 0.0 | 5 | 10.0 | 45 | 90.0 | 0 | 0.0 | 21 | 42.0 | 29 | 58.0 | 77.631 | 0.001** |
| Total practice of PDCA process related to patient safety goals | 42 | 84.0 | 8 | 16.0 | 0 | 0.0 | 0 | 0.0 | 7 | 14.0 | 43 | 86.0 | 0 | 0.0 | 12 | 24.0 | 38 | 76.0 | 91.383 | 0.0001** |

Cochran's Q test used to find differences in matched sets of three or more frequencies.

Table (2): presents that, the highest percentage of head nurses have low level of practice of PDCA process related to patient safety goals pre implementation of the program with (84.0%), while (86.0%) of them have high level of practice immediately after implementation of the program, and (76%) of them have high level of practice follow up after three months of implementation the program. with highly statistically significant difference between pre, immediate and follow up after three months phases of implementation of the program P- value (0.001**).

Table (3): Correlation matrix between total head nurses' knowledge and practice about PDCA process of quality and patient safety goals pre educational program (n = 50).

| | | post educational program | | | | | | | | |
|------------------------------------|----------|--------------------------|--------------------|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | Total. know PDCA | Total. Know Safety | Total. Know PDCA& safety | Total. I.P | Total. II.P | Total. III.P | Total. IV.P | Total. V.P | Total. VI.P |
| Total knowledge of safety | R | 0.109 | | | | | | | | |
| | P- value | 0.450 | | | | | | | | |
| Total knowledge of safety & PDCA | R | 0.640** | 0.834 | | | | | | | |
| | P- value | 0.0001** | 0.0001** | | | | | | | |
| Total of dimension I of practice | R | 0.104- | 0.284* | 0.161 | | | | | | |
| | P- value | 0.471 | 0.046* | 0.263 | | | | | | |
| Total of dimension II of practice | R | 0.277- | 0.070- | -0.208- | 0.219 | | | | | |
| | P- value | 0.052 | 0.629 | 0.147 | 0.126 | | | | | |
| Total of dimension III of practice | R | 0.191- | 0.143 | 0.004 | 0.313* | 0.112 | | | | |
| | P- value | 0.183 | 0.322 | 0.978 | 0.027 | 0.437 | | | | |
| Total of dimension IV of practice | R | 0.050- | 0.256 | 0.170 | 0.116 | 0.195 | 0.116 | | | |
| | P- value | 0.729 | 0.073 | 0.239 | 0.424 | 0.174 | 0.424 | | | |
| Total of dimension V of practice | R | 0.093 | 0.072 | 0.107 | 0.099 | 0.067 | 0.411 | 0.359 | | |
| | P- value | 0.522 | 0.619 | 0.459 | 0.493 | 0.642 | 0.003** | 0.010* | | |
| Total of dimension VI of practice | R | 0.096- | 0.076- | 0.112- | 0.075 | 0.093 | 0.136 | 0.161 | 0.523 | |
| | P- value | 0.508 | 0.599 | 0.438 | 0.603 | 0.520 | 0.345 | 0.263 | 0.0001** | |
| Total level of Practice | R | 0.411 | 0.719 | 0.665 | 0.523 | 0.536 | 0.593 | 0.524 | 0.719 | 0.557 |
| | P- value | 0.003** | 0.0001** | 0.0001** | 0.0001** | 0.0001** | 0.0001** | 0.0001** | 0.0001** | 0.0001** |

* Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level

Table (3): shows that, association between total head nurses knowledge and their level of knowledge about patient safety goals and PDCA process of quality dimensions as ($r = 0.834, 0.640$ respectively). Regarding correlation between total level of practice with all domains of practice; it is observed that, there is association with all domain of practice as ($r = 0.523, 0.536, 0.593, 0.524, 0.719, 0.557$ respectively)

Moreover, there is moderate association between total head nurses knowledge and their practice regarding PDCA process of quality and patient safety goals follow up after three months of implementation the educational program as ($r = 0.665$).

Discussion:

Patient safety is a critical component of quality health care. It is a global challenge that requires knowledge and skills in multiple areas, including human factors and systems engineering. One of the main roles of head nurses in nursing administration is to achieve quality, particularly regarding patient safety. The Plan-Do-Check-Act (PDCA) model has been shown to be an effective quality management tool for improving patients' outcomes, augmenting the efficiency of organizations to the maximum, and is the most common method applied in health care to manage quality and safety. It is essential to continuously improve health care quality through the implementation of patient safety principles (Goenka, et al., 2024; Oweidat, et al., 2023; Bassuni, et al., 2021).

Head nurses have an important role in understanding and applying the six international patient safety goals to minimize hazards and errors. The goals highlight the problematic areas in health care and describe the evidence- and expert-based consensus solution to these problems (Elnady, Saad & Saad, 2023).

The aim of current study was to investigate the effectiveness of educational program about implementing PDCA process of quality on head nurses practice regarding patient safety goals

Regarding socio demographic data of studied group; It was shown that the mean age of the studied head nurses was (32.2 ± 4.8). Regarding their educational qualifications, all head nurses had a BSc degree in nursing. Concerning hospital departments, the highest percentage was for inpatient units. About hospital name, the highest percentage was for Minia emergency university hospital. Regarding previous workshop attendance about PDCA and patient safety goals, about three-quarters of head nurses did not attend workshops. Moreover, the highest percentage of head nurses had 5–10 years of experience at work. Also, more than half of the studied head nurses were female. Moreover, the highest percentage of studied head nurses were from urban areas of residence.

These results were agreed with **Abduh Saaid, Abdullah, & Abo Elmagd, (2021)** who studied "applying a training program for head nurses about international patient safety goals and its effect on patients' safety culture" and found that the majority of head nurses were females. Whereas, more than two-thirds of them were their age ranged from 25 to < 35 years old, and the highest percentage of them had a bachelor degree in nursing.

Also, **Hanifi et al., (2018)** who studied "the effect of implementing educational program about patient safety on nursing staff safety culture and patient safety indicators" and stated that all of the studied group were female and most of the age groups of the experimental groups were between 25 and 35 years. Moreover, **Abousallah, (2018)**, who studied "The effect of applying patient safety goals on patient safety culture, which was studied in private hospitals in the city of Amman" and revealed that the majority of the studied sample were female, their age was < 35 years old, most of

them had a bachelor degree in nursing, and their career's experience ranged from 6 to 10 years.

In regard to the head nurses' knowledge about the PDCA process of quality, it was observed that; the highest percentage of head nurses have a low level of knowledge about the PDCA process of quality pre-implementation of the program, while most of them have a high level of knowledge immediately after implementation of the program. Also, there was highly statistically significant difference between pre, immediate and follow up after three months phases of implementation of the program.

From a researcher's point of view, a lack of knowledge among head nurses about the PDCA process of quality pre-program implementation might be due to a lack of activation of quality assurance units at the hospital. Also, it might be due to the workload at hospitals, which leads to a lack of educational lectures about quality. The improvement of knowledge after the program might be due to a valuable and comprehensive educational program. Moreover, the quality team must provide continuous lectures about quality concepts and quality tools that can be applied in hospitals

These results were supported by **Seliem et al., (2019)**, who studied "implementing educational program for head nurses about the PDCA process of quality and measuring its effect on their practice of patient safety goals" and found that the percentages of head nurses with satisfactory knowledge improved from 0.0% for issues of the PDCA process of quality pre-implementation of the program to 90.0% after program implementation.

Concerning head nurses' knowledge about patient safety goals, the current study indicated that; there was an improvement in head nurses knowledge regarding patient safety goals after implementation of the program than before, and there was a highly statistically significant difference between the pre, immediate, and follow up after three months phases of implementation of the program.

According to the investigator's point of view, the low level of preprogram knowledge among head nurses might be due to a lack of continuous education at the hospital about patient safety goals. Also, there is a lack of policy implementation regarding the application of patient safety goals in hospitals. The improvement of head nurses knowledge after program implementation might be due to the teaching program and the content of the program. So, providing continuous education about patient safety goals is imperative for all health care institutions to improve health care providers' knowledge, increase patient recovery rates, and decrease complications.

This result was congruent with **Bassuni et al., (2021)**, who studied "the effect of implementing an educational program about the PDCA process of quality on head nurses knowledge about patient safety goals" and revealed that there were statistically significant differences between all knowledge dimensions regarding patient safety goals throughout the program phases ($p = <0.001$). Also, found that all head nurses had an unsatisfactory level of

knowledge before program implementation, while all head nurses had a satisfactory level after program implementation.

Also, this result was consistent with **Seliem et al., (2019)**, who found that there was a statistically significant increase in the percentage of head nurses having satisfactory knowledge regarding international patient safety goals after implementation of the study intervention.

Moreover, the result was in same line with **Joshi, & Saini, (2022)** who studied "awareness and compliance of healthcare personnel toward international patient safety goals at a tertiary care hospital in northern India" and revealed that the health care providers had a good awareness level towards patient safety goals.

Regarding studied head nurses' practice of PDCA process related to patient safety goals, the result of the current study revealed that; the highest percentage of head nurses had a low level of practice of the PDCA process related to patient safety goals pre-implementation of the program, while most of them had a high level of practice immediately after implementation of the program and follow up after three months of implementation the program, with a highly statistically significant difference between the pre, immediate, and follow up after three months implementation phases of the program.

According to the investigator's point of view, this improvement could be attributed to one or more reasons, which include the comprehensive content of the training program, the written handout of the program, which serves as an ongoing reference, head nurses interest to know and change, interactive talk with the use of multimedia, and repetition of knowledge through a variety of materials. The study subjects were satisfied with the content of the program, and they strived to apply what they learned in PDCA and patient safety goals.

These results were supported by **Abdoh Saaid, Abdullah, & Abo Elmagd, (2021)** who found the total mean score of the head nurse's management regarding applying international patient safety goals using the PDCA model had improved post-program implementation and follow-up become a high management level, and there were highly statistically significant differences. Also, these findings were consistent with **Seliem et al., (2019)** who stated that there were statistically significant improvements in all areas of practice of PDCA related to patient safety goals among head nurses' after implementation of the intervention.

Also, this result was supported by **Huang et al., (2022)** who studied the "national study of patient safety goals and patient safety culture in Chinese hospitals" and found that the average positive response rate for the survey on the current practice of patient safety goals was 96.11%.

Moreover, these results were agreed with by **Sukesi, & Rohana, (2022)** who studied the "providing patient safety goals training program at Charlie Hospital" and found that the effect of the service activities carried out on the improvement of knowledge of health care providers had an impact on improving their behaviors toward patient safety and improving their practice of patient safety goals. Furthermore, this result was supported by **Elnady et al., (2023)**, who clarified the agreement about the implementation of patient safety goals among most of the studied head nurses.

While these results disagreed with **Gani, et al., (2023)**, who studied "factors affecting health worker compliance in implementing patient safety goals in Indonesia" and found that about two third of health workers had lack of

the compliance regarding patient safety and deficient in the implementation of patient safety goals in Indonesia.

Regarding the correlation between total head nurses' knowledge and their practice about the PDCA process of quality and patient safety goals pre- and post-educational program, the result of the current study showed that there was a moderate association between total head nurses' knowledge and their practice regarding the PDCA process of quality and patient safety goals follow up after three months of implementation of the educational program.

From the researcher's point of view, this correlation post-educational program might be due to a successful educational program. Also, head nurses have initiatives to change and improve the care provided for patients. Moreover, the Arabic portfolio that was distributed to all units at the studied hospital had an effect on improving head nurses' knowledge and practice regarding patient safety goals.

These results were supported by **Seliem et al., (2019)**, who found that there was no statistically significant correlation between head nurses' knowledge and their practice regarding the implementation of patient safety goals by using the PDCA cycle of quality before the intervention. However, after implementation of the intervention, there was a statistically significant moderate positive correlation between them ($r = 0.577$).

Also, the result was congruent with **Raghavendran et al., (2021)**, who studied "Analyze the gap between knowledge and practice of health care providers regarding patient safety goals and factors responsible for the gap at selected hospitals in Kanpur" and showed that there was a positive correlation between their knowledge and practice regarding patient safety goals ($r = 0.181$).

Conclusion

It can be concluded from the current study that patient safety is one of the most prominent healthcare challenges worldwide. For improving healthcare, it is important to share the responsibility for patient safety between patients, healthcare providers and those researching the area. Healthcare professionals have to manage these risks using their knowledge and skills in complex systems, and also whilst maintaining a safe level of patient care.

Also, from this study it can be concluded that, there was improvement in head nurses knowledge and practice regarding application of patient safety goals after implementation of educational program. Also, there was moderate association between total head nurses knowledge and their practice regarding PDCA process of quality and patient safety goals post three months of implementation the educational program.

Recommendations

The following recommendations are made based on the finding of this research;

- Conduct continuous training programs about the international patient safety goals and quality improvement models should be applied to all head nurses in the study setting and should be extended to other similar settings
- Include the concept of patient safety management and the PDCA model in nursing courses at the Faculty of Nursing for undergraduate students.

- Conduct periodical meeting to discuss barriers that inhibit implementation of patient safety goals, and solve any incident report related medical errors and set action plan to help the organization to improve patient safety practice.

Suggestions for further research:

- Replicate of the study on other health care settings is highly recommended which help to improve patient care.
- Study to determine factors that affect patient safety at health care settings

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