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Influence of Educational Intervention on Nurses' Knowledge Regarding the Fundamental Requirements of the Universal Health Insurance System in Primary Health Care Settings

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ABSTRACT

Background: Nurses serve as frontline healthcare professionals and play a crucial role in the successful implementation of the Universal Health Insurance System (UHIS) in Primary Health care (PHC) centers. **Objectives:** This research aimed to implement an educational program for nurses in PHC facilities regarding prerequisites of UHIS. **Methods:** A quasi-experimental design was conducted at PHC centers in the El-Badari health district, Assiut Governorate, Egypt, on a convenient sample of 40 nurses receiving the educational program. Data was collected using three tools: Tool (1): A structured questionnaire, including Part (1): personal data sheet, and Part (2): self-assessment of the PHC provisional accreditation requirement. Tool (II) consisted of a service availability and readiness assessment questionnaire, while Tool (III) was a program evaluation sheet that included Part (1) for assessing nurses' knowledge and Part (2) for gathering nurses' opinions. **Results:** Pre-intervention findings showed that nurses had an unsatisfactory knowledge level about prerequisites of UHIS, but they had a satisfactory knowledge level in the post- and follow-up phases (90% and 77.5%), respectively. There were statistically significant differences in nurses' knowledge regarding the self-assessment of PHC provisional accreditation requirements ($p \leq 0.05$) across the different phases of the program. Over 50% of PHC centers are ready for implementation of UHIS. **Conclusions:** The educational program improved nurses' knowledge about prerequisites for implementation of UHIS. **Recommendation:** Continuous professional development and structured training should be integrated into national health reform strategies to sustain improvements in knowledge and readiness for UHIS implementation.

Keywords: Health Insurance; Prerequisites; Primary Health Care; Universal

INTRODUCTION

Universal Health Coverage (UHC) is defined as everyone having access to the entire spectrum of high-quality health services they require, when and where they need them, without financial suffering. UHC provides the entire spectrum of vital health services, from health promotion to prevention, treatment, rehabilitation, and palliative care throughout the life course (WHO, 2025). Over the past decade, many countries have reformed their health systems to achieve UHC and the Sustainable Development Goals (SDGs). In Egypt, the UHIS was launched in 2018, after multiple health reform attempts since the 1960s. A key milestone includes adopting the UHC policy and passing the Universal Health Insurance Law in 2018. The Universal Health Insurance Law created three authorities, the Universal Health Insurance Authority, the Egypt Healthcare Authority, and the General Authority for Healthcare Accreditation and Regulation (GAHAR), to enhance access and quality. Implementation began in 2019 with a phased rollout across six regions, targeting full national coverage by 2032 (Hammad *et al.*, 2025).

The health workforce is the foundation of an effective healthcare system. A beneficial, well-equipped, and motivated human resource is essential to achieve UHC (Alawode *et al.*, 2025). The international effort to accomplish the SDGs depends mainly on nurses. They play a key role in achieving national and international goals pertaining to various health priorities, such as patient safety, universal health coverage, and the provision of integrated, people-centered care (WHO, 2020).

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A lack of formal training on health insurance leaves many professionals with knowledge gaps about its roles, limits, forms of health insurance, and the appropriate management of individuals without insurance. Educating them helps providers guide patients, explain financial implications, constraints, and advantages of the medical decisions they make, and strengthen patient-provider relationships, leading to more holistic, patient-centered care (Barr *et al*., 2024).

Adult learning theories are widely used as frameworks to guide and assess educational interventions, especially in adult and professional learning contexts. This theory emphasizes self-directed, relevant, and practical learning experiences. Adult learning theories are essential in the design and implementation of education programs, including healthcare professional programs (Mukhalalati & Taylor, 2019).

To achieve UHC and the SDGs by 2030, it is essential to provide quality healthcare services through efficient PHC systems. This requires strong PHC systems with robust infrastructure, trained professionals, and essential medicine and supplies (Sampson *et al*., 2024). PHC is a comprehensive strategy that includes health promotion, disease prevention, treatment, rehabilitation, and chronic disease management. Its goal is to ensure that everyone has access to high-quality healthcare (Qin & Tong, 2025).

Within Egypt's new UHIS framework, the GAHAR oversees quality assessment and accreditation of facilities under the new UHIS. Provisional accreditation requirements are the minimum standards for quality, safety, and compliance that any primary healthcare facility must meet in order to join the UHIS. These include basic requirements, national patient safety requirements, essential quality requirements, and an operating manual (GAHAR, 2021).

Significance of the Study

Egypt has committed to social justice in healthcare and achieving UHC, with the UHIS as a key pillar of its Vision 2030 strategy (Anwar, 2018). However, nursing staff show major knowledge gaps about the newly introduced UHIS, which is proposed to be implemented in the selected PHC centers. No formal training has been provided for nursing staff. A needs assessment of 40 nurses confirmed these baseline deficiencies before the intervention.

Additionally, several international research studies highlight gaps in nurses' knowledge of UHC and demonstrate that educational programs can improve their knowledge levels. For example, Tung *et al*. (2016) investigated nurses' knowledge of UHC and revealed a significant gap in knowledge. Koon *et al*. (2017) assesses nurses' perceptions of UHC and its implications and highlights notable gaps in nurses' knowledge and perceptions of UHC. Similarly, Govender and Mahomed (2020) clarified that healthcare workers' knowledge, attitudes, and perceptions of national health insurance play a critical role in the success of such interventions. Finally, Barr *et al*. (2024) found that educational programs significantly improved healthcare students' knowledge of health insurance. At the national level, these studies did not receive the same attention.

So, the present study addresses the need for a well-structured educational program on the prerequisites of UHIS to prepare nurses at PHC centers in Egypt with the knowledge, skills, and competencies necessary to effectively navigate new policies and procedures. In addition, it examines the degree of readiness of PHC centers for the implementation of the UHIS.

Aim of the Study

The study aimed to implement an educational program about the prerequisites of UHIS for nurses in primary health care centers.

Research Hypothesis

H1: Nurses had an unsatisfactory knowledge level regarding the provisional accreditation requirements for implementation of UHIS before implementation of the program.

H2: Less than 75% of primary health care centers meet readiness criteria for UHIS implementation.

H3: The educational program will significantly improve nurses' knowledge regarding the prerequisites for UHIS implementation in primary health care centers.

METHODOLOGY

Research design: One-group pretest-post-test quasi-experimental design with follow-up.

Setting of the study: The study was carried out in ten primary health care centers affiliated with the Ministry of Health and Population at El-Badari Health District in Assiut Governorate, Egypt.

Study subjects: A convenience sample of 40 nurses was selected from 10 Primary Health Care Centers, with four nurses from each center. The population of the study includes the available participants, represented by nurses in leadership and supervisory positions, including nurse managers, head nurses, nurses responsible for quality healthcare, and nurses responsible for training. These participants were included as they were available and directly involved in administrative and technical roles related to UHIS implementation during the data collection period, which enabled them to lead nursing teams, ensure service quality, and support ongoing staff development.

Tools of the study: Data for this study was collected by using three tools.

Tool I: Self-administered questionnaire sheet, which consists of two parts: **Part (1):** A personal data sheet that gathered data about age, gender, educational qualification, marital status, and years of experience. **Part (2):** Self-assessment tool for PHC centers' provisional accreditation requirement (registration requirement), which was developed by GAHAR (2021) to assess nurses' knowledge regarding the PHC centers' provisional accreditation requirements, which contain three categories: basic requirements, national safety requirements, and essential quality requirements.

Scoring system and analysis: Each item was scored on a 4-point Likert scale ranging from (3) for met, (2) for partially met, (1) for not met, and (0) for not applicable (N/A). The sum of correct answers was totaled, and if it ≥60%, this means a satisfactory knowledge level, but if the score is <60%, this means that participants had an unsatisfactory knowledge level.

Tool (II): Service Availability and Readiness Assessment Questionnaire (SARA), developed by the World Health Organization (WHO, 2015) and modified by the researcher based on the current literature to measure service availability and readiness from the perspective of nurses in PHC centers. It consisted of three categories, distributed as follows: 1) service availability, which consists of two dimensions: availability of health professionals and service utilization. 2) General service readiness, which consists of six dimensions: basic amenities, basic equipment, standard precautions for infection prevention, laboratory capacity, supervision, and essential medicine. 3) Service-specific readiness, which consists of 4 categories: 1) Family planning services. 2) Ante natal care services. 3) Childhood vaccination services. 4) Child health services. PHC facilities are ready to implement the UHI system if they receive 75% or more. PHC centers are not ready to implement the UHI system if they receive less than 75% (Abazinab *et al*., 2016).

Scoring System: Items of each dimension were scored; each item was scored on 3 points. Likert scale ranging from (2) for met, (1) for partially met, and (0) for not met.

Tool III: Program evaluation sheet, which consisted of two parts:

Part 1: Nurse's knowledge assessment (pre-, post-, and follow-up tests): It was developed by the researcher to assess nurses' knowledge regarding the prerequisites for implementation of the UHI system. The test was administered to participants before and after the implementation of the program and followed up after three months. The nurse's responses were measured, and correct answers were given 2 marks, incomplete correct answers were given 1 mark, and incorrect answers were given 0 marks.

Scoring system: The sum of correct answers was totaled, and if the score was ≥60%, it means satisfactory knowledge level, but if it <60%, this means that participants had an unsatisfactory knowledge level.

Part 2: Nurse opinionnaire sheet: This opinionnaire was created based on the relevant literature to evaluate the whole program from the participant's perspective. It covers questions related to program objectives, the program content, teaching methods, the use of audiovisual aids, the skills of the trainers, and the implementation of the training program. Additionally, there were three essay questions related to the advantages of the program, main obstacles, and suggestions for improvement. Scoring system: Each statement

was rated on a Likert scale, the scores ranging from the value (4) excellent, (3) very satisfactory, (2) satisfactory, and (1) fair.

Validity of the Tools

Face validity was used to ensure accurate comprehension of the study tools. The instruments were evaluated by a panel of five experts from nursing administration and community health nursing staff. Revisions and modifications were made based on their feedback.

A Pilot Study

A total 10% of the study subjects (4 nurses) tested the feasibility, clarity, practicability, and objectivity of the study tool. To ensure data integrity, nurses included in the pilot study were excluded from the total study sample.

Reliability

Data collected from the pilot study were analyzed using Cronbach's Alpha Coefficient test: $\alpha = 0.81$ for tool I, $\alpha = 0.92$ for tool II, and $\alpha = 0.863$ for tool III.

Data Collection Procedure

An official letter was obtained from the dean of the nursing faculty at Assiut University for approval to conduct the study and then sent to the undersecretary of the Ministry of Health. Additionally, the director of the El-Badari health district subsequently distributed the letter to the managers of PHC centers. The study was conducted in five sequential phases. In the preparatory phase (February to August 2023), the researcher reviewed relevant literature and Arabic translations of the study tools.

Table 1: Summary of the Educational Program Content

Day	Topic	Specific Objectives	Teaching Methods
Day 1	Introduction to UHIS	Define UHIS, its objectives, benefits, and stages	Lectures, group discussion, brainstorming
	UHIS Principles and Structure	Identify UHIS principles, levels of care, and responsible bodies	Lectures, discussion Power Point Presentation (PPT)
	Registration and Implementation Requirements	Describe registration steps, advantages, and challenges of UHIS	Lectures, flip charts, group feedback
	Quality in Healthcare	Define quality, list characteristics, and discuss its impact.	Group discussion, practical examples
	Accreditation and Patient-Centered Care	Identify accreditation standards, benefits, and patient-centered care principles	Lectures, group discussion, brainstorming
Day 2	Provisional accreditation requirements for PHC Centers	List of essential requirements for PHC accreditation	Lectures, discussion, PPT
	Patient Safety Standards	Understand national safety policies	Demonstration, video, discussion
	Medication Safety	Explain labelling, high-risk drugs, and safe medication practices	Lectures, demo, groupdiscussion
Day 3	Environmental and Facility Safety	Describe safety programs (radiation, fire, waste, equipment)	Lectures, PPT, groupdiscussion
	Essential Quality Requirements and Accreditation Barriers	Discuss implementation strategies and challenges	Brainstorming, discussion
	Program Summary and Evaluation	Evaluate knowledge gained and collect participant feedback	Post-test, questionnaire, discussion

In the assessment phase (September–early October 2023), nurses' learning needs were identified by measuring gaps between their current and desired knowledge. A baseline knowledge test (Tool III) assessed nurses' knowledge regarding the prerequisites of UHIS, while Tool I assessed their knowledge of PHC centers' provisional accreditation requirements. These pre-test data informed program development and were later compared with immediate post-program and three-month follow-up results. In the planning phase (October

2023 to January 2024), the educational program was developed based on the assessment results, including the preparation of objectives, teaching strategies, session plans, a timeline, and an educational booklet, which was used as a handout for the study subject. The implementation phase lasted for two weeks, during which the researcher delivered the program to two separate groups of 20 nurses each. Each group received 9 sessions totaling 18 hours, 3 sessions every day scheduled within regular working hours. The booklet was distributed to the study subject at the end of the first training day. Finally, in the evaluation phase, the program's outcomes were assessed immediately and after three months post-intervention using the same pretest tool, and the participant's opinion and reaction regarding all items of the program were evaluated. Certificates were distributed to participants after the educational program was completed (Table 1).

Statistical Design

Data entry and analysis were conducted using SPSS version 22. Descriptive statistics were reported as frequencies, percentages, and mean deviations. For inferential analysis, the paired sample t-test was applied to assess differences in nurses' knowledge levels between pre-and post-intervention phases. Chi-square and Fisher's exact tests were used to analyze associations between categorical variables, while Pearson correlation was employed to examine relationships between continuous variables. A p-value of <0.05 was considered statistically significant. Although p-values were reported, future analyses will aim to include additional statistical indicators such as effect sizes (e.g., Cohen's d for paired comparisons) and 95% confidence intervals to provide a more comprehensive understanding of the magnitude and precision of observed effects.

Ethical Consideration

The ethical approval was obtained from the Faculty of Nursing's Research Ethics Committee at Assiut University, Egypt, with reference number 1120230583 on 26th February, 2023.

Informed consent was obtained in accordance with standard ethical guidelines for clinical research. Each nurse was informed that they had the right to refuse to participate or withdraw from the study without any rationale at any time, and confidentiality and anonymity were assured. Furthermore, participants were told that all obtained data would be used only for the purpose of research.

RESULTS

Table 2: Distribution of Nurses Personal Data at Primary Health Care Centers (n= 40)

Personal Data	No. (40)	%
Age: (years)		
≤35	19	47.5%
>35	21	52.5%
Mean ± SD (Range)	38.53 ± 8.51 (26.0-55.0)	
Occupation:		
Nurse manager	10	25.0%
Head nurse	10	25.0%
Staff Nurse	20	50.0%
Sex:		
Female	40	100.0%
Male	0	0.0%
Marital status:		
Married	40	100.0%
Un married	0	0.0%
Qualifications:		
Bachelor's degree	15	37.5%
Diploma degree	25	62.5%
Years of experience:		
≤20	21	52.5%
>20	19	47.5%
Mean ± SD (Range)	18.10 ± 9.80 (4.0-35.0)	

Data expressed as mean (SD), frequency (percentage)

Table 2 shows that 100% of the study subjects are females and married, 62.5% of them have a diploma

degree, 50.0% of them are staff nurses, and 52.5% are over 35, and their years of experience are ≤20 years. Their mean age was 38.53 years old. Overall, the table indicates a predominantly experienced, married, and diploma-qualified female nursing workforce in the surveyed primary health care centers.

Table 3: Nurse's Knowledge Level Regarding Self-Assessment of PHC Provisional Accreditation Requirements Throughout the Program Phases (n= 40)

Primary Health Care Provisional Accreditation Requirement	Pre-test (n= 40)		Post-test (n= 40)		Follow-up (n= 40)		*P*-value 1	*P*-value 2
	No.	%	No.	%	No.	%		
Un satisfactory level	40	100.0	15	37.5	18	45.0	0.000*	0.000*
Satisfactory level	0	0.0	25	62.5	22	55.0		

*Chi-square test / Fisher exact test; * p-value ≤ 0.05 is considered statistically significant; P1: Pre-test vs Post-test, P2: Pre-test vs Follow-up*

Table 3 indicates that 100% of nurses demonstrated an unsatisfactory level of knowledge regarding the self-assessment of PHC provisional accreditation requirements in the pre-program phase. In contrast, a satisfactory knowledge level was observed among 62.5% and 55.0% of nurses in the post-program and follow-up phases, respectively. Additionally, there was a statistically significant difference at $p \leq 0.05$ value between the program's pre-, post-, and follow-up phases.

Table 4: Comparison between Mean Scores of Nurses' Knowledge Regarding Self-Assessment of PHC Provisional Accreditation Requirement Throughout the Program Phases (n = 40)

Primary Health Care Provisional Accreditation Requirement	Pre-test (n= 40)	Post-test (n= 40)	Follow-up (n= 40)	*P*-value 1	*P*-value 2
	Mean ± SD	Mean ± SD	Mean ± SD		
I. Basic requirements	0.84 ± 0.08	1.37 ± 0.20	1.48 ± 0.16	0.000*	0.000*
II. National safety requirements	1.43 ± 0.26	2.16 ± 0.07	2.11 ± 0.11	0.000*	0.000*
General patient safety	1.54 ± 0.29	2.61 ± 0.10	2.48 ± 0.17	0.000*	0.000*
Surgery and invasive procedures safety	1.54 ± 0.41	2.11 ± 0.09	2.07 ± 0.11	0.000*	0.000*
Medication management and safety	1.58 ± 0.31	2.22 ± 0.10	2.16 ± 0.18	0.000*	0.000*
Environmental and facility safety	1.04 ± 0.09	1.70 ± 0.13	1.74 ± 0.16	0.000*	0.000*
III. Essential quality requirement	1.20 ± 0.14	1.59 ± 0.24	1.55 ± 0.25	0.000*	0.000*
Total Self-assessment score	1.16 ± 0.12	1.71 ± 0.16	1.71 ± 0.13	0.000*	0.000*

*Paired samples t-test, (*) p-value ≤ 0.05*Significant at 95% Confidence Level; P1: Pre versus Post, P2: Pre versus Follow-up*

Table 4 shows the highest mean score of PHC provisional accreditation requirements in favor of the national safety requirements category in the immediate post- and follow-up phases (2.16 ± 0.07 and 2.11 ± 0.11), respectively. Additionally, there was a statistically significant difference (p=0.000*) between the program's pre-, post-, and follow-up phases.

Table 5: Mean Scores of Service Availability and Readiness Dimensions as Perceived by Nurses in Primary Health Care Centers (n = 40)

Service Availability and Readiness Dimensions	Mean ± SD
I. Service availability	1.22 ± 0.09
Staffing	1.79 ± 0.11
Service utilization	0.66 ± 0.13
II. General service readiness	1.28 ± 0.28
Basic amenities	1.21 ± 0.19
Basic equipment	1.55 ± 0.42
Standard precautions for infection prevention	1.41 ± 0.31
laboratory capacity	0.98 ± 0.27
Supervision	1.50 ± 0.44
Essential medicine	1.05 ± 0.42
III Service specific readiness	1.55 ± 0.25
Family planning service	1.64 ± 0.24
Antenatal care services	1.29 ± 0.40
Childhood vaccination services	1.87 ± 0.15
Child health services	1.40 ± 0.34
Total Service availability and readiness score	1.35 ± 0.24

Data expressed as mean (SD)

Table 5 stated that childhood immunization services, staffing, and family planning services had the highest mean scores for service availability and readiness (1.87 ± 0.15, 1.79 ± 0.11, and 1.64 ± 0.24, respectively). Furthermore, service utilization, laboratory capacity, essential medicine, and basic amenities had the lowest average scores for service availability and readiness (0.66 ± 0.13, 0.98 ± 0.27, 1.05 ± 0.42, & 1.21 ± 0.19), respectively.

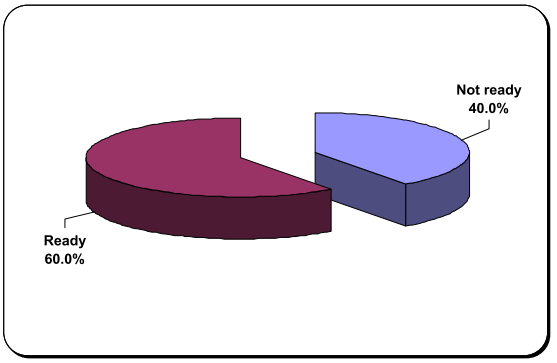

Figure 1: Distribution of Service Availability and Readiness Level of PHC Centers Regarding Implementation of the Universal Health Insurance System (n = 40)

Figure 1 reveals that more than half (60.0%) of PHC facilities is ready to implement the universal health insurance system, while 40.0% are not yet ready.

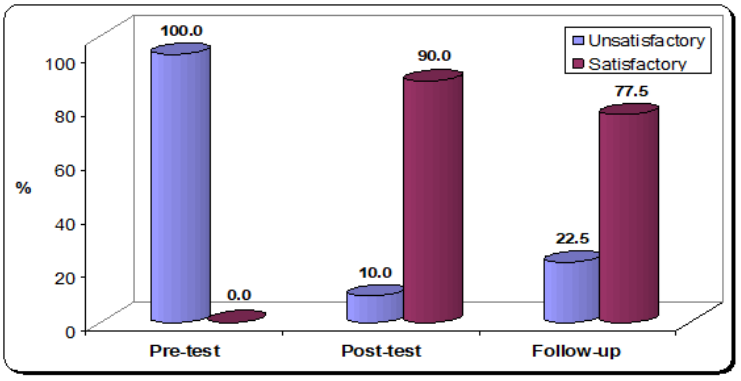

Figure 2: Nurse's Knowledge Levels Regarding Prerequisite of Universal Health Insurance System throughout the Program Phases (n = 40)

Figure 2 demonstrates that 100% of nurses had an unsatisfactory knowledge level about the prerequisites of UHIS during the pre-program assessment. However, the majority of them (90%) had a satisfactory knowledge level immediately post-program. While this level declined to be 77.5% during the follow-up phase, it remained significantly higher than the baseline assessment.

Table 6: Correlation Matrix between Nurses' Knowledge score, Self-Assessment of PHC Provisional Accreditation Requirement Score, and Service Availability and Readiness score (n= 40)

Variables	Knowledge Score	Service Availability and Readiness Score	Self-Assessment Score
Knowledge score	—	$r = 0.022$	
$p = 0.893$	$r = 0.079$		
$p = 0.628$			
Service availability and readiness score	—	—	$r = 0.774$
$p < 0.001^{*}$			
Self-assessment score	—	—	—

Data expressed as mean (SD)

Table 6 indicates that there is a significant positive correlation between the self-assessment score of PHC provisional accreditation requirements and the service availability and readiness score ($p = 0.000$, $p \leq 0.05$). However, no statistically significant correlations were found between nurses' knowledge scores and self-assessment scores or the service availability and readiness scores ($p \geq 0.05$).

Table 7: Distribution of Nurses' Opinions Regarding Educational Program at Primary Health Care Centers (n = 40)

Items	Fair		Good		Very good		Excellent	
	No.	%	No.	%	No.	%	No.	%
Program Objectives								
Realistic goals	0	0.0	0	0.0	5	12.5	35	87.5
Cover all target objectives	0	0.0	0	0.0	3	7.5	37	92.5
Balancing theoretical and practical goals	0	0.0	4	10.0	4	10.0	32	80.0
Program Content								
Comprehensive content	0	0.0	0	0.0	1	2.5	39	97.5
Covering educational needs	0	0.0	0	0.0	4	10.0	36	90.0
Scientific material is organized	0	0.0	3	7.5	2	5.0	35	87.5
New topics increase your experience	0	0.0	0	0.0	2	5.0	38	95.0
Benefit from scientific material	0	0.0	0	0.0	2	5.0	38	95.0
Attractiveness of scientific material	0	0.0	3	7.5	5	12.5	32	80.0
Topics are appropriate to the level of participants	0	0.0	1	2.5	6	15.0	33	82.5
Trainer Skills								
Explain the content clearly	0	0.0	0	0.0	1	2.5	39	97.5
Given enough time for active activities	0	0.0	1	2.5	3	7.5	36	90.0
Give an opportunity to discuss issues and questions	0	0.0	0	0.0	3	7.5	37	92.5
He answered the questions	0	0.0	0	0.0	2	5.0	38	95.0
The trainer repeats the explanation if the trainees do not understand	0	0.0	0	0.0	3	7.5	37	92.5
Ensures trainees' understanding	0	0.0	0	0.0	5	12.5	35	87.5
Provide an atmosphere of confidence and positivity	0	0.0	2	5.0	2	5.0	36	90.0
Lecturer's discipline in terms of appointments	0	0.0	0	0.0	1	2.5	39	97.5

In Table 7 the majority of nurses' opinions are excellent regarding "comprehensive content", "new topics increase your experience", "benefit from scientific material", "cover all target objectives", and "cover educational needs" (97.5%, 95.0%, 95.0%, 92.5%, and 90.0%, respectively). As regards trainer skills, the majority of nurses' opinions are excellent regarding "explaining the content clearly, providing an opportunity to discuss issues and questions, repeating the explanation if the trainees do not understand, giving enough time for active activities, and providing an atmosphere of confidence and positivity" (97.5%, 92.5%, 92.5%, 90.0%, and 90.0%, respectively).

DISCUSSION

Demographic Data from Study Subjects

The study showed that all participants were female and married, which aligns with the culturally rooted perception of nursing as a predominantly female profession in Egypt, and 52.5% were over 35 years old, with a mean age of 38.53 years; most of them had ≤20 years of experience, likely due to the lower transfer rates from PHC centers compared to hospitals. Additionally, 62.5% held diploma degrees, as diploma nurses are more common in PHC settings, while bachelor's degree nurses typically work in hospitals, with some recently assigned to PHC centers to improve quality of care (Table 2).

This is supported by Ayyad *et al.* (2024), who found that most of the participants were married women with a mean age of 38 years, an average of 15 years of experience in their current position, and more than half of them holding a diploma degree. In addition, more than one-third of them had a bachelor's degree. Furthermore, this result disagrees with Tung *et al.* (2016), who detected that most of the participants in the study were young (aged 35 or below), baccalaureate prepared and employed in a clinical setting.

The study found that all participants were female PHC nurses, reflecting the local context but potentially limiting program delivery and generalizability. This aligns with Prosen (2022), who indicated that the impact of gender roles differs by geographic location, with certain regions maintaining more conventional perceptions of nursing as a "female" profession, and noted that gender roles vary by region, influencing recruitment,

retention, and the applicability of programs developed in more gender-progressive settings.

Nurses' Knowledge Regarding Self-Assessment of PHC's Provisional Accreditation Requirements Throughout the Program Phases

The study revealed that all nurses had unsatisfactory knowledge of PHC provisional accreditation requirements before the program, likely due to the lack of in-service training (Table 3). Similar findings were reported by El-Gendy *et al*. (2021), who found that nursing staff members were not well-informed on accreditation requirements. Kapurkar *et al*. (2015) also noted that staff nurses participating in preprograms had a deficiency in knowledge regarding national accreditation standards.

The study showed significant improvements ($p \leq 0.05$) in nurses' knowledge of PHC provisional accreditation requirements across program phases (Table 2). The study underscores the beneficial effects of educational interventions. This aligns with Mekhimr *et al*. (2024), who evaluated the impact of the nursing education program on accreditation standards for health centers and found nurses had an adequate level of knowledge about these standards after the implementation of the program.

The study found that nurses achieved the highest mean scores for PHC provisional accreditation requirements in the national safety category during the post-program and follow-up phases (Table 4). This aligns with Ali and Saad (2022), who examined nurses' knowledge of patient safety standards in Egyptian hospitals during the program phases and reported improved nurse knowledge of these standards after implementation of in-service training.

Service Availability and Readiness Dimensions as Perceived by Nurses in Primary Health Care Centers

The study indicated that the staffing category received the highest mean score among service availability dimensions (Table 5), likely due to participants perceiving adequate staff except for physicians, leading to underutilization of PHC services. This is consistent with Alzaied and Alshammari (2016), who found that physician shortages in primary health care discourage patients from choosing it as their first option.

The study found that service utilization had the lowest mean score for service availability (Table 5), mainly due to a shortage of physicians, low public awareness of PHC services, high costs, and limited trust in the system. This outcome is consistent with Shehata *et al.* (2017), who indicated that people visit PHC facilities mainly for immunizations. Customers are not well informed about the importance of preventive healthcare. They prefer low-cost private pharmacies and polyclinics for their healthcare needs because they consider these facilities more reliable and affordable.

Furthermore, these results concurred with Singh *et al*. (2020), who found a direct correlation between the consumption of maternal and child health services at PHC facilities and their cost. While subsidized fees encourage access, high out-of-pocket expenses are a major obstacle to service utilization. The study indicated that laboratory capacity, essential medications, and basic amenities had the lowest scores for general service readiness (Table 4), largely due to funding shortages, which cause delays in the implementation of high-quality services. Hussein (2023) similarly noted that financial barriers delay hiring qualified staff and acquiring equipment necessary to comply with accreditation requirements.

The study found that childhood vaccination and family planning had the highest service-specific readiness scores, reflecting women's appreciation of these services (Table 5). Unlike these results, Shehata *et al.* (2023) conducted an "assessment of the quality of PHC services in El-Beheira Governorate" and found that PHC centers had the highest mean score for service provision, particularly for childcare services and maternity care. The findings of the current study demonstrated that over half of PHC facilities are ready to implement UHIS (Figure 1). This result is inconsistent with a study by Oladimeji *et al.* (2017), which found that most respondents said that their hospital was not prepared to implement the national health insurance program because of a lack of human resources and inadequate infrastructure to support its full implementation. Furthermore, this finding is inconsistent with a study by Abazinab *et al.* (2016), who emphasized that public health facilities were not prepared for national health insurance implementation.

The Nurse's Knowledge Regarding the Prerequisite of A Universal Health Insurance System Throughout the Program Phases

The study indicated that all nurses had unsatisfactory knowledge of UHIS prerequisites before the program (Figure 2), likely due to insufficient training on UHIS requirements. The study found that nurses had a limited understanding of Universal Health Coverage and interpreted its policies inconsistently, which reflects a significant knowledge gap. Similarly, Schveitzer *et al*. (2016) highlighted that the challenges faced by nurses in implementing UHC are closely linked to deficiencies in education and training, poor working conditions, and the absence of a clearly defined role for nurses within PHC settings.

The findings of the present study demonstrated that the majority of nurses achieved a satisfactory level of knowledge regarding the prerequisites of the UHIS immediately after the implementation of the educational program (Figure 2). This result is consistent with Kaingu (2022), who emphasized that educating stakeholders, including nurses, is vital for successful UHC implementation, as their knowledge, practice, and attitude strongly influence outcomes.

Moreover, the findings of the present study revealed nurses' knowledge declined to 77.5% at follow-up (Figure 2), likely due to limited refresher training, support, or incentives, which indicates a critical need for continuous training and regular follow-up to ensure the retention of knowledge over time. This finding is supported by Mamabolo and Fombad (2023), who stressed that strategies like policy reinforcement, awareness training and incentives, help professional nurses to engage in knowledge retention practices and enhance patient care.

Correlation Between Nurses' Knowledge Score, Self-Assessment of PHC Provisional Accreditation Requirement Score, And Service Availability and Readiness Score

The findings of the study revealed that there was a significant positive correlation between self-assessment and service readiness scores ($p = 0.000$, $p \leq 0.05$). However, no statistically significant correlations were found between nurses' knowledge, the self-assessment scores, and the service availability and readiness scores ($p \geq 0.05$) (Table 6). This suggests that well-equipped facilities may support adherence to PHC accreditation standards, while nurse knowledge has limited impact.

This result is concurred with Sampson *et al*. (2024), who evaluate PHC facilities' adherence to minimum quality standards. The study emphasizes the significance of strong infrastructure, highly qualified healthcare professionals, and the accessibility of necessary medications and supplies in fulfilling these requirements.

Nurses' Opinions Regarding Educational Programs

The study found that the majority of nurses had positive evaluations of the educational program's content, likely because it was need-based, comprehensive, up-to-date, presented new information and experience, and used effective teaching strategies (Table 7). These results were consistent with the findings of Liu *et al*. (2024), who used training needs analysis to improve the quality of PHC in China. They found that to effectively meet a variety of training needs, a comprehensive training program that incorporates new knowledge and experience, management skills, educational skills, and research methods should be designed and implemented.

The study found that most nurses had positive perceptions of the trainer's abilities, likely due to clear explanations, opportunities for discussion, ensuring understanding, and creating a supportive environment (Table 7). This result is consistent with Lanza *et al*. (2025), who stated that trainers need to demonstrate and instruct effective, sympathetic, and transparent communication, which is crucial for teamwork. It is essential for trainers to establish trusting relationships, offer constructive criticism, establish a secure learning environment, and engage in reflective dialogue to enhance teamwork and understanding of patient needs.

Limitations

The study limitations include a relatively small sample size and the use of self-reported data from nurses in selected PHC centers, which may restrict the applicability of the results. Additionally, the three-month follow-up period may not adequately capture long-term retention of knowledge. Limited involvement of key stakeholders, such as PHC leadership and Ministry of Health and Population Officials, along with funding

constraints that required the researcher to manage all program aspects independently.

CONCLUSION

The study found that nurses initially had poor knowledge of PHC provisional accreditation requirements and the prerequisites for implementing the UHIS, but the educational intervention significantly improved and sustained their knowledge. The statistically significant differences across program phases highlight the sustained impact of the training. Furthermore, the positive correlation between self-assessment scores and service availability and readiness indicates that enhanced nurse knowledge is associated with better organizational preparedness. In addition, over half of the assessed PHC centers demonstrated readiness for UHIS implementation, so health authorities should invest in continuous professional development and integrate structured training programs as part of national health reform strategies. Future research should explore the long-term impact of such training on practice and patient outcomes, examine applicability across broader geographic regions, and assess the role of stakeholder engagement in optimizing UHIS implementation efforts.

Recommendation

To support the effective implementation of the UHIS, regular training programs and workshops should be conducted for PHC managers, physicians, and nurses to strengthen their knowledge of UHIS prerequisites. On-site and online training components are recommended to improve accessibility and flexibility. Staffing schedules should be adjusted to allow nurses' participation without service disruption.

PHC directors should conduct regular self-assessments to guide improvement, enhance readiness for accreditation, and create strategies to close existing system gaps, such as shortages of physicians, basic amenities, and laboratory services. Staff participation should be supported and motivated through official recognition, workload adjustments, and administrative facilitation.

Public awareness of primary care benefits should be promoted through continuous health education. Nursing faculties are encouraged to integrate UHIS concepts and nurses' roles into their curricula to better prepare graduates. Future research should employ objective measurement tools, include larger and more diverse samples across healthcare settings, and adopt longitudinal designs (6–12 months) to assess sustained knowledge retention and behavior change for broader applicability of the intervention.

Conflict of Interest

The authors declare that they have no competing interests.

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