

Effect of Competency-Based Education on Maternity Nurses' Performance and Quality of Care regarding Management of First Stage of Labor

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Abstract

The inadequate quality of care provided to mothers and newborns is the primary cause of the high rates of maternal and neonatal mortality, likely due to healthcare providers lacking skills in managing the initial stage of labor. In order to guarantee high-quality nursing care, competencies fill the gap between education and practice. **The aim** of this research was to evaluate the effect of competency-based education on maternity nurses' performance and quality of care regarding management of first stage of labor. **Design:** A quasi-experimental research design (One-Group, Time series quasi-experimental design). **Setting:** The research was conducted at obstetrics and gynecological emergency department (labour unit) at Benha University hospitals in Qaliubya governorate, Egypt. **Sample:** A convenient sample of 53 maternity nurses. **Data collection tools:** Four tools were used to collect data: A structured interviewing questionnaire (Personal characteristics of maternity nurses and Maternity nurses' knowledge questionnaire), Observational Practical Checklists, Nurse competency scale and Quality of Nursing Care Scale. **Results:** There was a statistical significant improvement in maternity nurses' total knowledge, total practices, total competency and total quality of care regarding management of the first stage of labour at immediately post-intervention and follow up phases compared to pre-intervention phase. It was revealed that total mean scores of studied nurses' knowledge, practices, competency and quality of care were higher at immediately post-intervention and follow up phases compared to pre-intervention phase. **Conclusion:** The implementation of competency based education was effective in improving maternity nurses' total knowledge score, total practices score and total quality of care regarding management of the first stage of labour. **Recommendation:** It was recommended that ongoing competency-based education is essential for maternity nurses to improve their knowledge, practices, competency and quality of care regarding management of labour.

Keywords: competency-based education, knowledge, practices, nurses' performance, quality of care, first stage of labor

Introduction

Labour process is a significant incident in a woman's life. The emotional and mental experience of childbirth for a woman is recognized as having a great impact on her postpartum psychological and physical state and on her initial interactions with baby. A positive childbirth experience can enhance the overall maternal well-being and foster a strong bond between mother and infant, conversely a negative experience can result in psychological distress and increase the risk of severe ailments like postpartum depression or post-traumatic stress symptoms, and often correlated with the perceived level of pain during labor. These conditions inevitably have long-term

consequences on the mother-child relationship, as well as the wellbeing and development of the child (Sun et al., 2023).

Labour is categorized into four stages. The first stage commences from when the mother perceives regular, painful uterine contractions until the cervix is completely dilated. This stage is the longest and is marked by the expulsion of a small amount of mucus mixed with blood, known as show, from the vagina. The duration of the first stage of labour may differ depending on the number of previous pregnancies; multipara women generally experience a shorter first stage compared to primipara women. Three sub-phases comprise the first stage, namely;

latent, active and transition phases (**Pillitteri, 2020**).

The low quality of care given to mothers and infants, particularly during labor, is a significant factor in maternal and neonatal mortality. This is likely due to the inadequate skills of healthcare providers. In 2015, Nearly 303,000 women died in 2015 due to complications arising from pregnancy, childbirth, and postpartum. Every day, 830 mothers die from preventable birth-related complications, with 99 percent of these deaths occurring in developing nations. Iran and Afghanistan, in 2017, reported maternal mortality rates of 23.3 and 299.1 per 100,000 live births respectively (**Hakimi et al., 2019**).

Promoting the quality of obstetric care is crucial in reducing maternal and neonatal death. To achieve this, there is a need for training midwives and gynecologists. Conventional methods of education, lack the necessary durability; it highlights the importance of incorporating contemporary teaching methods for midwifery education. The Competency-based educational approach is a dynamic and student-centered method that enhances skill performance through practice and repetition (**Hajiesmaello et al., 2022**).

The dynamic system of life itself is comprised of three key elements: knowledge, attitude, and practice. Knowledge refers to the acquisition of information, leading to understanding and awareness of various subjects or situations. Attitude involves one's mindset or approach towards a specific situation. Practice encompasses the application of rules and knowledge, resulting in action. Therefore, possessing accurate knowledge, maintaining a positive attitude, and engaging in effective practice are essential in effectively guiding and serving patients (**Wang et al., 2020**).

In real-world settings the knowledge-practices gap can lead to low-quality healthcare services. In order to assist upcoming nurses in meeting the requirements of the workplace and their profession, as well as enhancing the quality of care during childbirth, it is imperative for

student nurses to attain sufficient knowledge and skills (**Malakooti et al., 2018**).

Competence refers to the capacity of midwives to independently and effectively function based on the knowledge and skills they have acquired through their training. Professional competencies are the measurable outcomes that indicate what someone is capable of doing. To reliably measure someone's ability, there needs to be clearly defined and widely accessible standards in place. These standards serve as the basis for assessing and accrediting one's performance. "Core competencies in nursing" is a set of standards "domains" that must be demonstrated to enter professional practice. In most competency-based definitions, the concept of competency includes the three dimensions of "knowledge, attitude, and skill". This type of education not only focuses on acquiring knowledge, but also emphasizes how to effectively learn and demonstrate achieved performance. (**Abouzaj, 2019**).

Competencies are essential for nurses in order to deliver patient care effectively. The proficiency and skills exhibited by nurses in clinical settings are significant challenges faced by both providers and purchasers of nursing care. Additionally, it is crucial that nurses demonstrate their ability to deliver high-quality care to patients (**Rykkje et al., 2022**).

Competency-based education was first introduced by McGahie in 1978 (**McGahie, 1978**). In recent times, this method has become increasingly popular in various educational systems globally, especially in the area of medical education. Competency-based education starts by identifying the specific skills that learners need to acquire, and subsequently, the educational program is structured and implemented accordingly. This type of education is centered on outcome-based learning and emphasizes the design, execution, evaluation, and assessment of the curriculum. CBE places significant emphasis on learners' performance and their ability to attain the desired learning outcomes. Research suggests that this approach is both effective and cost-efficient (**Tan et al., 2018; Bisgaard et al., 2018**).

The objective of midwifery education is to produce graduates who have essential competencies necessary to effectively manage the health requirements of mothers and newborns. Well-trained midwives with a strong foundation in core competencies play a critical role in decreasing the rates of maternal and neonatal mortality. The International Confederation of Midwives has established compulsory competencies to direct the content of midwifery education programs and ensure that graduates possess essential qualities (Ngcobo et al., 2021).

The laboring and birthing process is a transformative experience for many women. Nurses must approach all women with respect, accessibility, encouragement, support, and professionalism. The nursing management during labor and birth includes evaluating the situation, providing comfort, offering emotional assistance, providing information and guidance, advocating for the woman, and supporting her spouse. The quality and effectiveness of maternity care depend on nurses valuing the experience of childbirth and acknowledging it as a transformative event for women and families; Nurses need technical skills and caring behavior. They must provide care that protects and improves childbirth. They should offer evidence-based care and be aware of health disparities and cultural diversity to enhance the childbirth experience. This applies to all women, regardless of the period, setting, or profession (Viera-Martinez, 2023).

Justification of the research:

Maternal mortality represents the most significant health disparity globally, with a majority of fatalities occurring during childbirth, delivery, and the postpartum phase. Ensuring the provision of safe maternity care is primarily dependent on achieving the standards for maternity competency (Chirwa et al., 2023).

The most recent data released by the yearly report of the WHO reveals that global maternal mortality has declined since 2010 by 56%. Despite this progress, approximately 7000 women in Africa still lose their lives each year due to pregnancy- and childbirth-related

avoidable causes. In North Africa alone, 2000 women die annually, with 80% of them not experiencing serious pregnancy or delivery complications. It is concerning to note that the WHO report attributes a significant portion of these deaths to the lack of professional skills among nurses, as 66% of nurses involved in these cases were not knowledgeable about maternity competency standards. Additionally, 54% of these nurses did not adhere to these competency standards in real-life scenarios (Atittallah and Shehata, 2018).

The World Health Organization has provided strategies to decrease maternal mortality rate. Enhancing midwives' expertise, knowledge, and abilities and hiring capable and competent midwives is a suggested approach to enhance the quality of maternal care services. The importance of midwives in providing maternal care is significant. Research shows that 87% of the required health services for women and their children are provided by qualified midwives, thereby indicating that 82% of maternal mortality cases could be avoided by ensuring quality midwifery care. (WHO, 2020; Afghanistan, 2017). The limited professional competence of health-care providers is primarily caused by the knowledge-practice gap. Therefore, this study aimed to evaluate the effect of competency-based education on maternity nurses' performance and quality of care regarding management of first stage of labor.

Aim of the research:

This research aimed to evaluate the effect of competency-based education on maternity nurses' performance and quality of care regarding management of first stage of labor.

Research hypotheses:

H1: Maternity nurses will exhibit higher knowledge score regarding management of first stage of labor after receiving competency-based education program.

H2: Maternity nurses will exhibit higher practices score regarding management of first

stage of labor after receiving competency-based education program.

H3: Maternity nurses will exhibit better competency level regarding management of first stage of labor after receiving competency-based education program.

H4: Maternity nurses will exhibit higher quality of care regarding management of first stage of labor after receiving competency-based education program.

Subjects and Method:

Research design:

A quasi-experimental research design (One-Group, Time series quasi-experimental design) was used to accomplish the aim this research. This design is commonly employed and involves pretesting a single group of participants and subsequently providing them with a treatment or manipulation of an independent variable, followed by post-testing. The independent variable can be accused if there is a significant difference between the pretest and posttest results (*Oxford University, 2023*).

Setting:

The research took place in the labor unit of the obstetrics and gynecological emergency department at Benha University hospitals in Qaliubya governorate, Egypt. This specific location was selected as it is the primary hospital that offers medical services for women from diverse social backgrounds and serves a large geographic region including Benha city and Qaliubya Governorate.

Sampling:

Sample type and size: A convenient sample of maternity nurses was chosen from the preceding study environments. The final sample size was (53 maternity nurses) out of (61 maternity nurses) because 5 nurses declined to take part in the research. Then, throughout the research, 3 nurses were drop out due to absent of some sessions.

Tools of data collection:

Data was gathered using four instruments:

Tool I: A structured self-administered questionnaire: Researchers created it after

reading through relevant literature. It included three parts:

Part (1): Personal characteristics of maternity nurses: It was made up of five items which were (age, residence, qualifications, years of experience and training course related to competency based-education).

Part (2): Maternity nurses' knowledge questionnaire:

Researchers created it after reading through relevant literature (*Sayed et al., 2023; Caughey et al., 2020; Abd-Elzaher et al., 2021; Nattah et al., 2019*). It was established to measure maternity nurses' knowledge regarding first stage of labor. It comprised of 2 major sections; each section consisted of questions with total of 18-multiple-choice questions. Each question has three options (one right answer and two wrong answers. These sections were: **Knowledge regarding 1st stage of labor** "11 question " (definition of normal labour, definition of first stage of labor, duration of 1st stage in primipara, duration of 1st stage in multipara, phases of 1st stage, duration of latent phase, duration of active phase, duration of transitional phase, cervical dilatation in latent phase, cervical dilatation in active phase and cervical dilatation in transitional phase), **Knowledge regarding uterine contraction** "7 questions" (definition of uterine contraction, importance, characteristics, definition of frequency, duration, intensity and interval)

Scoring system:

The knowledge questions were assessed based on the options provided for each question (multiple-choice questions). For a correct response, one point is awarded, while no points were given for an incorrect answer. The total score was obtained by adding up the scores for all the questions. The mean of all the questions' answers was calculated to get the average knowledge score. The potential score range is from 0 to 18, with a higher score proving a greater level of knowledge. Additionally, the total level of intellectual knowledge was classified in the following manner:

- Adequate: if the total scores ($\geq 75\%$ - 100%) = (Score from 14 to 18)
- Inadequate: if the total scores ($< 75\%$) = (Score from 0 to 13)

Tool II: Observational Practical Checklists:

It was adapted from (*Artal-Mittelmark, 2022; Agrawal et al., 2023*) to assess maternity nurses' practices regarding management of 1st stage of labor from admission to entrance to delivery room. It comprised 9 major parts with 42 items; each part included items as following: admission protocol (9 items), history taking (6 items), apply measures of infection control (5 items), maternal & fetal assessment (5 items), ensure performing routine investigation (2 items), determine sure signs of labor (1 items), assessment of uterine contractions (4 items), active management of 1st stage of labor (7 items) and documentation and reporting (3 items).

Scoring system:

Each item was evaluated using a Likert scale consisting of three options. An item received a score of "2" if it was fully completed, a score of "1" if it was partially completed, and a score of "0" if it was not done at all. The overall score for each section was determined by adding up the scores for each individual item. The range of scores was between "0 to 84", with higher scores proving more effective practices. Based on the performance of the maternity nurses, the total practices were classified as follows:

- Satisfactory if the total scores $\geq 75\%$ = (Score from 63 to 84).
- Unsatisfactory if the total scores $< 75\%$ = (Score from 0 to 62).

Tool III: Nurse competency scale:

It was adapted from (*Meretoja et al., 2004*) to assess maternity nurse competency level regarding nursing care for woman in first stage of labor. It was modified by researcher to fit the study's objectives such as addition of some items and exclusion of other steps not applicable; it includes 7 domains with (36 items) as follow: helping role (3 items), teaching coaching (5 items), diagnostic function (4 items), managing situation (6 items), ensuring quality (6 items), therapeutic interventions (4 items) and work role competencies (8 items).

Scoring system:

Each item was assessed using a Likert scale continuum consisting of three points. If an item was rarely used, it received a score of (2), occasionally used received a score of (1), and often used received a score of (0). The overall competency score was determined by adding up the individual scores for each item. The possible

scores ranged from "0 to 72", with higher scores proving greater competency. **Total competency score was classified into two levels:**

- Competent: if the total scores ($\geq 80\%$ - 100%) = (Score from 58 to 72)
- Incompetent: if the total scores ($< 80\%$) = (Score from 0 to 57).

Tool IV: Quality of Nursing Care Scale:

It was adapted from (*Koy et al., 2015*) to assess quality of nursing care provided to women in 1st stage of labor and modified by the researcher to better fit the nature of the current study, such as excluding certain steps that were not applicable. The tool consisted of 23 statements, which were divided into 7 main domains. These domains include: nurse's competent performance (7 statements), meeting nursing care needs (3 statements), positive experiences of care (3 statements), good leadership (4 statements), physical environment (2 statements), progress of nursing process (2 statements), and cooperation with relatives (2 statements).

Scoring algorithm:

Each item was judged based on a 4-option Likert scale (never, rarely, sometimes and most of time) ranging 0: never (worst quality) to 3: most of time (best quality). The total score range, which showed the lowest to highest level of nursing care, was 0 to 69. The number of items determined the range for each subscale. By dividing the total number of answered items by the sum of the answered item scores, the average score for each domain was determined. Higher scores indicate better quality of nursing care. **Total Quality of Nursing Care score was classified into three levels:**

- High quality: if the total scores ($\geq 75\%$) = (Score from 52 to 69)
- Moderate quality: if the total score (60% - $< 75\%$) = (Score from 42 to 51)
- Low quality: if the total score ($< 60\%$) = (Score from 0 to 41)

Administrative approval:

The dean of the nursing faculty officially granted permission in writing and forwarded it to the director of the Benha University Hospital. Subsequently, the director of the department of Obstetrics and Gynecology was approached and

provided consent for conducting the study after being briefed about its objective.

Tools validity:

The questionnaires were evaluated by a panel of three Benha University obstetrics and gynecological nursing experts to ensure their accuracy, significance, inclusiveness, and utility. Only slight adjustments were needed in the sentence structure. According to the experts, the tools were deemed valid.

Tools reliability:

An assessment of the tools' reliability was carried out using the Cronbach's Alpha coefficient test, revealing the degree of internal consistency for every tool as follows:

Tool	Cronbach's alpha value
Tool I "part 2": Maternity nurses' knowledge questionnaire.	($\alpha=0.88$).
Tool II: Observational Practical Checklists.	($\alpha=0.92$).
Tool III: Nurse competency scale.	($\alpha=0.72$).
Tool IV: Quality of Nursing Care Scale.	($\alpha=0.73$).

Ethical Considerations:

Ethical considerations were taken into account prior to commencing the study in the following ways: The Benha University Faculty of Nursing's scientific research ethics committee gave the study approval. Approval was granted from the designated research locations. The researchers explained the purpose and significance of the study to secure the assurance and belief of the maternity nurses. Oral consent was obtained from the maternity nurses, ensuring confidentiality. The study posed no physical, social, or psychological risks to the maternity nurses. Following statistical analysis, all data collection instruments were destroyed in order to preserve participant confidentiality. The study tools did not contain any immoral statements and upheld human rights. The maternity nurses were free to leave the research at any moment.

Pilot study:

The clarity, objectivity, feasibility, and suitability of the instruments were tested in a

pilot study conducted on 10% of the total sample size, which consisted of 6 maternity nurses. The pilot study was designed to find any barriers or problems that the researcher might encounter during data collection, particularly in relation to the sequence of questions and clarity of the statements. The pilot study also made it possible for the researcher to calculate how long it would take to gather data. There were no changes made, and the pilot sample remained part of the study sample.

Field work:

The study took six months to complete, starting in early August 2023 and ending at the end of January 2024. The study was carried out by the researchers twice a week (on Sundays and Thursdays) from 9:00 a.m. to 3:00 p.m. in the previously mentioned location until the predetermined sample size was completed. The maternity nurses were interviewed by the researchers in small groups in rotatory manner to implement the educational program based on competency regarding management of first stage of labour.

To accomplish the purpose of this research, the researchers followed the subsequent phases.

Preparatory phase:

The researchers carried out a comprehensive analysis of the literature on the research problem in both local and foreign publications before starting their study. This helped them create the required data collection tools and helped them comprehend the scope and importance of the issue. To assess the suitability, comprehensiveness, clarity, importance, and applicability of the tools, they were given to three professionals at the Benha University faculty who specialize in obstetrics and gynecological nursing. The outcomes of the experts' assessment were acquired.

Interviewing and assessment phase:

The researchers welcomed the maternity nurses and gave their introductions to each nurse who was involved in the study before the interview began. The researchers further elucidated the aim of the research, furnished all pertinent particulars concerning the research, and acquired verbal authorization from the nurses to participate in the research. **Tool (I): A structured self-administered questionnaire** was disseminated to each nurse to assess personal characteristics of

maternity nurses and their knowledge regarding management of first stage of labour. The questionnaires took an average of twenty to thirty minutes to complete. Then, the researchers used **Tool (II): Observational Practical Checklists** to assess maternity nurses' performance while caring of parturient women in 1st stage of labour. After that, the researchers used **Tool (III): Nurse competency scale** followed by **Tool (IV): Quality of Nursing Care Scale** to assess maternity nurses' competency and quality of care provided to parturient women in 1st stage of labour. The information collected in this stage acted as a starting point for future comparisons to evaluate the influence of competency-based education.

Planning phase:

Considering the results of assessment phase, the competency based educational program regarding management of 1st stage of labour was developed as a printed lecture (handout) by the researchers and downloaded videos demonstrating competent and standard management of 1st stage of labour which then delivered to all nurses from the first session. A specialized educational program has been developed for maternity nurses using plain Arabic language in order to cater to their level of understanding. The program includes specified sessions with pre-determined content, various teaching methods, and instructional media. Objectives have been formulated to be achieved upon completion of the competency-based educational program. The general objective was: following the completion of the competency based educational program sessions, each maternity nurses will be able to gain essential knowledge, competent performance and high quality of nursing care regarding management of 1st stage of labour.

Implementation phase:

The researcher created the competency based educational program to evaluate knowledge, practices, competency and quality of nursing care regarding management of 1st stage of labour. Maternity nurses participated in the study were divided into 6 groups (9 nurses in 5 groups and the last group composed of 8 nurses). This program was implemented through four scheduled sessions for each group over two consecutive weeks. Immediately after the assessment phase, the lecture took place in a

room at the obstetrics and gynecological department in Benha University hospital. Depending on the level of development and feedback obtained, the length of each session varied from forty to fifty minutes. Prior to the first session, the maternity nurses were given an introduction to the program's content. Subsequent sessions started with a recap of the last session and an explanation of the objectives for the new session. Towards the end of each session, a five-minute period was allocated for maternity nurses to ask any questions, clarify any doubts, or correct any misunderstandings regarding the session's content. Each maternity nurse was informed of the schedule for the upcoming sessions.

A variety of teaching methods were used including lectures, brainstorming sessions, group projects, critical thinking exercises, and video viewing. In order to accomplish the study's goals, instructional media were given to all nurses who were recruited, including printed lectures and handouts. Additionally, downloaded videos were shown on a data show device in the lecture hall.

Competency-Based Education revolves around the learners and aims to enhance their skills and abilities. Its primary focus is on the acquisition and exhibition of mastery in various competencies. In comparison to the conventional approach, Competency-Based Education takes a more comprehensive stance towards education. It is built upon the exhibition of expertise in specific competencies, encompassing knowledge, skills, attitudes, and values. So, each session in the four scheduled sessions was divided into two parts "theoretical and practical" to attain the required integration between knowledge and skills. The practical part either showed in videos or performed on doll (manikin) or practiced on actual cases. This was achieved through taking into consideration the basic principles of CBE as follow:

- Instead of focusing on the structure and process of education, the main attention is shifted towards the desired outcomes for learners. (Backward design).
- A collection of anticipations that, when grouped together, showcase the abilities of learners based on their knowledge.
- Illustration in every sphere of caring and within numerous contexts.

- Learners, employers, and the public should be clearly informed about the expectations.
- Achieved through consistent (planned and repeated) practice.
- Visibly demonstrated and assessed over time by multiple methods and multiple assessors.

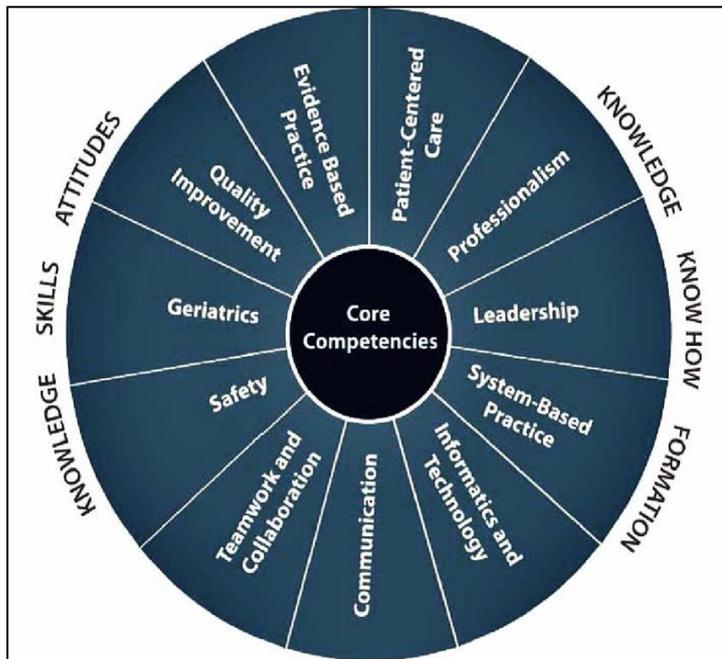


Figure (1): Core competencies that help building skills (Juraschka, 2021)

The **first session** "theoretical and practical" was about general knowledge about 1st stage of labor (definition of normal labour, definition of first stage of labor, duration of 1st stage in Primipara, duration of 1st stage in multipara, phases of 1st stage, duration of latent phase, duration of active phase, duration of transitional phase, cervical dilatation in latent phase, cervical dilatation in active phase and cervical dilatation in transitional phase) and about assessment of uterine contraction (definition of uterine contraction, importance, characteristics, definition of frequency, duration, intensity and interval)

The **second session** "theoretical and practical" was about admission protocol, history taking and applying measures of infection control.

The **third session** "theoretical and practical" was about determining sure signs of labor, maternal & fetal assessment and performing routine investigation.

The **fourth session** "theoretical and practical" was about active management of 1st stage of labor (nutrition & hydration, rest (pain relief), posture of woman, care of bladder & bowel, observe signs of fetal & maternal distress, observe for complication) and documentation and reporting.

Evaluation phase:

The researchers evaluated the competency-based educational program's efficacy using the same set of instruments that were used for the assessment phase (Tool I "part 2" Tool II, Tool III & Tool VI). The researchers evaluated the maternity nurses twice throughout the research; the first immediately after implementation of program and the second after one month as a follow up.

Statistical analysis:

The data was verified before being entered into the computer. The gathered information will be labeled, digitalized, arranged, and examined using the proper statistical tests and procedures. Version 22.0 of the Statistical Package for Social Sciences (SPSS) was used. Standard deviations, means, and frequencies and percentages were all part of descriptive statistics. Inferential statistics like the paired t-test and Chi-square test were used to test the study hypothesis. The correlation coefficient was used to look at the relationship between the total scores of the study variables. A p-value of $P \leq 0.001$ indicated a statistically significant difference; a p-value less than or equal to 0.05 indicated a statistically significant difference; and a p-value greater than 0.05 indicated no statistically significant difference.

Limitations

On some days, there might be an increase in the number of births, which caused increased work pressures on the nursing staff, and thus some sessions were postponed for some nurses or they were included in other groups to complete the missing sessions. This is the nature of work in the Obstetrics and Gynecology Emergency Department.

Results

Table (1): shows that (47.2%) of studied nurses were in age group >25-30 years old with a mean age of 30.28 ± 4.27 years. Concerning the residence, (62.3%) of them lived in rural areas. Furthermore, (50.9%) of them graduated from

nursing technical institute. Additionally, (60.9%) of them had 5-10 years of experience. Moreover; (73.6%) of them didn't receive any training course related to competency based-education.

Table (2): illustrates that there was highly statistically significant difference among total mean scores of all domains of studied nurses' knowledge about first stage of labor at pre-intervention, immediately post-intervention and follow up phases with (p- value<0.001). It was revealed that total mean score of studied nurses was raised from 14.71±2.06 at pre-intervention phase to 15.88±1.77 and 16.22±1.39 at immediately post-intervention and follow up phases respectively.

Figure (1): shows that, (62.3%), (77.4%) and (83.0%) of studied nurses had adequate knowledge regarding first stage of labor at pre-intervention, immediately post-intervention and follow up phases respectively.

Table (3): indicates that, there was a highly statistically significant difference among mean scores of studied nurses' practices regarding management of first stage of labor at pre-intervention, immediately post-intervention and follow up phases with (p- value<0.001). The total mean score of studied nurses' practices was raised from 66.15±4.64 to 70.28±3.90 and 72.47±5.66 throughout program phases respectively.

Figure (2): shows that, (71.7%), (84.9%) and (88.7%) of studied nurses had satisfactory level of practices regarding management first stage of labor at pre-intervention, immediately post-intervention and follow up phases respectively.

Table (4): demonstrates that, there was a highly statistically significant difference among mean scores of studied nurses' competency regarding management of first stage of labor at pre-intervention, immediately post-intervention and follow up phases with (p- value<0.001)..The total mean score of studied nurses' competency was raised from 61.90±3.62 to 64.6±3.29 and 66.26±2.36 throughout program phases respectively.

Figure (3): shows that, (67.9%), (81.1%) and (88.7%) of studied nurses showed competent performance regarding management first stage of labor at pre-intervention, immediately post-intervention and follow up phases respectively.

Table (5): demonstrates that, there was a highly statistically significant difference among mean scores of studied nurses' quality of nursing care regarding management of first stage of labor at pre-intervention, immediately post-intervention and follow up phases with (p- value<0.001). The total mean score of studied nurses' competency was raised from 55.71±5.12 to 60.18±3.28 and 61.00±5.25 throughout program phases respectively.

Figure (3): shows that, (35.8%), (56.6%) and (62.3%) of studied nurses showed high quality of nursing care regarding management first stage of labor at pre-intervention, immediately post-intervention and follow up phases respectively.

Table (6): demonstrates that there was a significant and positive correlation between the scores of total knowledge and total practices of the nurses who were studied in relation to the management of the first stage of labor. This correlation was observed at the pre-intervention, immediately post-intervention, and follow up phases, with a p-value of less than 0.001.

Table (7): reveals that; there was a highly significant statistical positive correlation between total practices score and total scores of (nurse competency and quality of nursing care) of the studied nurses regarding management of first stage of labor. This correlation was observed both before the intervention, immediately after the intervention, and during the follow-up phases. The statistical significance of this correlation was found to be p<0.001.

Table (8): clarifies that; there was a highly significant statistical positive correlation between total nurse competency and total quality of nursing care scores of the studied nurses regarding management of first stage of labor at pre-intervention, immediately post-intervention and follow up phases with (p- value<0.001).

Table (1): Distribution of the studied nurses according to their personal characteristics (n=53).

Personal characteristics	No	%
Age (in years):		
18-25	15	28.3
>25-30	25	47.2
>30	13	24.5
Mean ± SD = 28.26± 6.345		
Residence:		
Rural	33	62.3
Urban	20	37.7
Qualifications:		
Secondary Nursing Diploma	8	15.1
Nursing Technical Institute	27	50.9
Bachelor of Nursing	11	20.8
Postgraduate Studies	7	13.2
Years of experience:		
≤ 5 years	11	20.8
5 - 10 years	29	54.7
> 10 years	13	24.5
Receiving any training course related to competency based-education:		
Yes	14	26.4
No	39	73.6

Table (2): Mean scores of studied nurses' knowledge regarding first stage of labor throughout program phases (n=53).

Knowledge domain	Min./Max. score	Pre-intervention	Immediately post-intervention	Follow up	ANOVA	
		Mean ± SD	Mean ± SD	Mean ± SD	F	p-value
Knowledge regarding 1 st stage of labor	0/11	9.51±1.64	10.28±1.16	10.36±1.21	6.33	0.002*
Knowledge regarding uterine contraction	0/7	5.21±1.11	5.60±1.21	5.87±1.14	4.36	0.014*
Total score	0/18	14.71±2.06	15.88±1.77	16.22±1.39	10.63	0.000**

*A Statistical significant $p \leq 0.05$ **A Highly Statistical significant $p \leq 0.001$

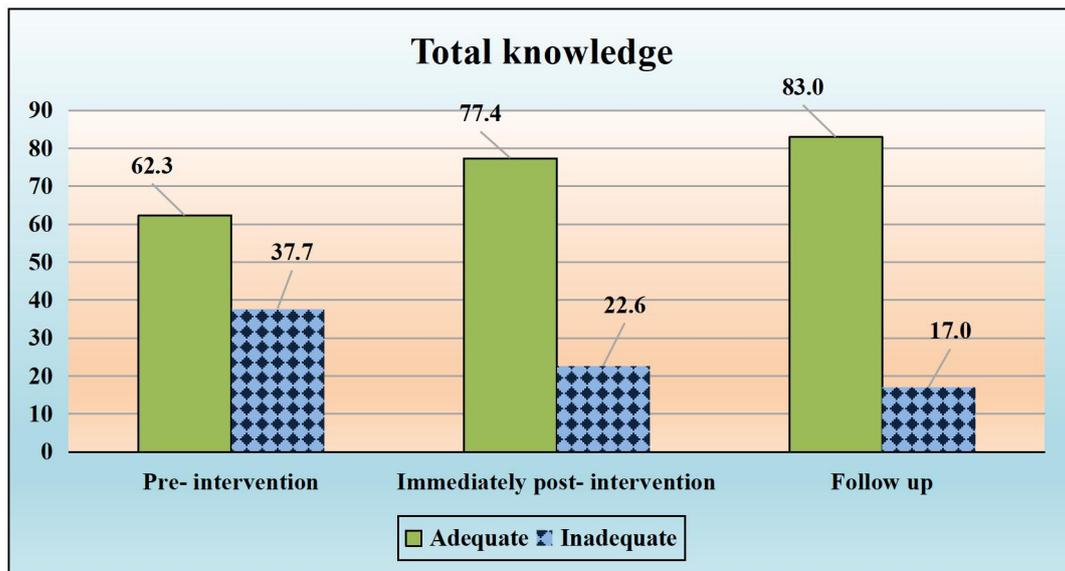


Figure (1): Percentage distribution of studied nurses regarding their total knowledge regarding first stage of labor throughout program phases (n=53).

Table (3): Mean scores of studied nurses' practices regarding management of first stage of labor throughout program phases (n=53).

Procedure	Min./Max. score	Pre-intervention	Immediately post-intervention	Follow up	ANOVA	
		Mean \pm SD	Mean \pm SD	Mean \pm SD	F	p-value
Admission protocol	0/18	14.04 \pm 2.56	15.06 \pm 2.32	15.32 \pm 2.81	3.66	0.028*
History taking	0/12	8.04 \pm 1.99	8.42 \pm 2.08	9.04 \pm 2.03	3.26	0.041*
Apply measures of infection control	0/10	8.42 \pm 0.96	8.83 \pm 1.15	9.06 \pm 1.11	4.77	0.010*
Maternal & fetal Assessment	0/10	7.13 \pm 1.30	7.49 \pm 1.36	8.06 \pm 1.72	5.28	0.006*
Ensure performing routine investigation	0/4	3.43 \pm 0.69	3.66 \pm 0.58	3.79 \pm 0.53	4.71	0.010*
Determine sure signs of labour	0/2	1.70 \pm 0.46	1.89 \pm 0.32	1.92 \pm 0.26	6.02	0.003*
Assessment of Uterine contractions	0/8	6.32 \pm 1.05	6.89 \pm 1.17	7.08 \pm 1.28	5.94	0.003*
Active management of 1st stage of labor	0/14	11.96 \pm 1.51	12.58 \pm 1.33	12.62 \pm 1.67	3.16	0.045*
Documentation and reporting	0/6	5.11 \pm 0.77	5.47 \pm 0.79	5.58 \pm 0.63	5.87	0.003*
Total score	0/84	66.15\pm4.64	70.28\pm3.90	72.47\pm5.66	23.77	0.000**

*A Statistical significant $p \leq 0.05$

**A Highly Statistical significant $p \leq 0.001$

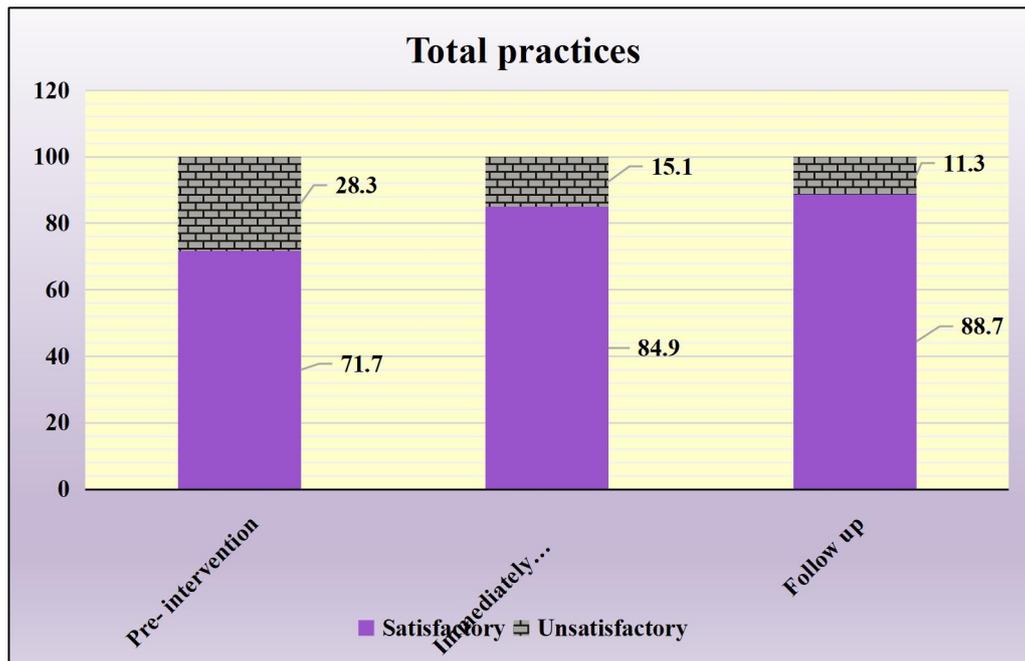


Figure (2): Percentage distribution of studied nurses regarding their total practices regarding management of first stage of labor throughout program phases (n=53).

Table (4): Mean scores of studied nurses' competency regarding management of first stage of labor throughout program phases (n=53).

Competency domains	Min./Max. score	Pre-intervention	Immediately post-intervention	Follow up	ANOVA	
		Mean \pm SD	Mean \pm SD	Mean \pm SD	F	p-value
Helping role	0/6	5.28 \pm 0.74	5.60 \pm 0.76	5.72 \pm 0.60	5.35	0.006*
Teaching coaching	0/10	8.72 \pm 1.11	8.98 \pm 0.82	9.28 \pm 0.66	5.41	0.005*
Diagnostic function	0/8	6.79 \pm 1.13	7.19 \pm 1.11	7.42 \pm 1.00	4.47	0.013*
Managing situation	0/12	10.72 \pm 0.90	11.00 \pm 0.96	11.23 \pm 0.91	4.01	0.20*
Therapeutic intervention	0/12	9.85 \pm 1.71	10.36 \pm 1.36	10.51 \pm 0.75	3.55	0.031*
Ensuring quality	0/8	6.79 \pm 0.98	7.11 \pm 0.95	7.34 \pm 0.93	4.34	0.015*
Work role competencies	0/16	13.75 \pm 1.84	14.43 \pm 1.82	14.77 \pm 1.77	4.32	0.015*
Total score	0/72	61.90\pm3.62	64.6\pm3.29	66.26\pm2.36	26.15	0.000**

*A Statistical significant $p \leq 0.05$

**A Highly Statistical significant $p \leq 0.001$

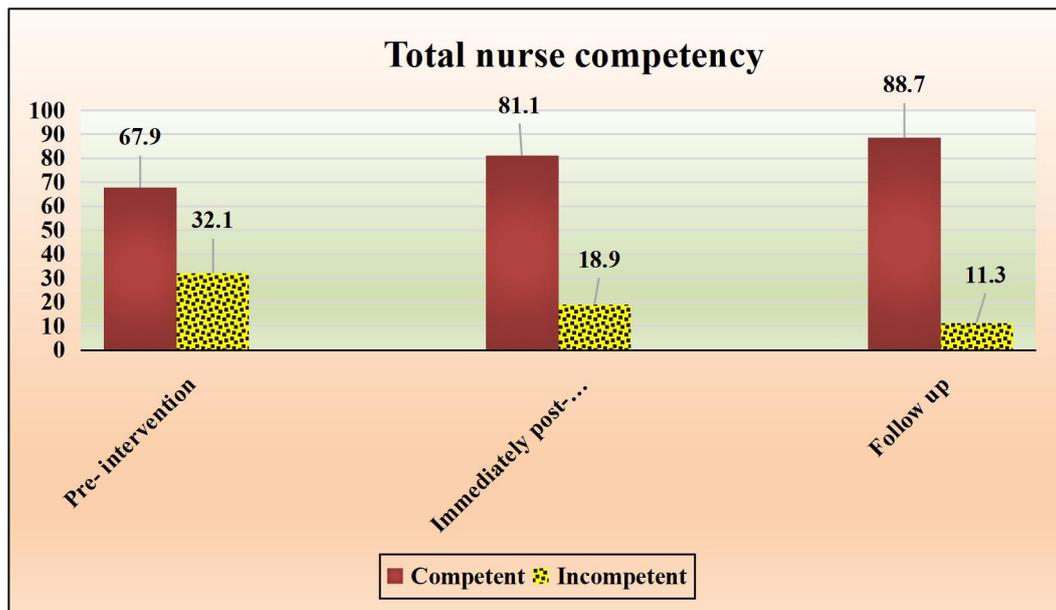


Figure (3): Percentage distribution of studied nurses regarding their total competency regarding management of first stage of labor throughout program phases (n=53).

Table (5): Mean scores of studied nurses' quality of nursing care regarding management of first stage of labor throughout program phases (n=53).

Quality of care domains	Min./Max. score	Pre-intervention	Immediately post-intervention	Follow up	ANOVA	
		Mean \pm SD	Mean \pm SD	Mean \pm SD	F	p-value
Nurse competent performance	0/21	18.02 \pm 2.22	19.15 \pm 1.70	19.08 \pm 1.79	5.75	0.004*
Met nursing care needs	0/9	6.79 \pm 1.48	7.19 \pm 1.55	7.74 \pm 1.40	5.40	0.005*
Good experience of care	0/9	7.42 \pm 1.40	8.13 \pm 1.25	8.23 \pm 1.06	6.66	0.002*
Good leadership	0/12	9.60 \pm 2.05	10.49 \pm 1.76	10.62 \pm 1.64	4.87	0.009*
Physical environment	0/6	4.66 \pm 0.93	5.15 \pm 0.84	5.19 \pm 1.00	5.32	0.006*
Progress of nursing process	0/6	4.36 \pm 0.96	4.83 \pm 1.08	4.87 \pm 1.12	3.79	0.025*
Cooperative with relative	0/6	4.87 \pm 0.87	5.25 \pm 0.85	5.28 \pm 0.88	3.67	0.028*
Total score	0/69	55.71\pm5.12	60.18\pm3.28	61.00\pm5.25	19.88	0.000**

*A Statistical significant $p \leq 0.05$

**A Highly Statistical significant $p \leq 0.001$

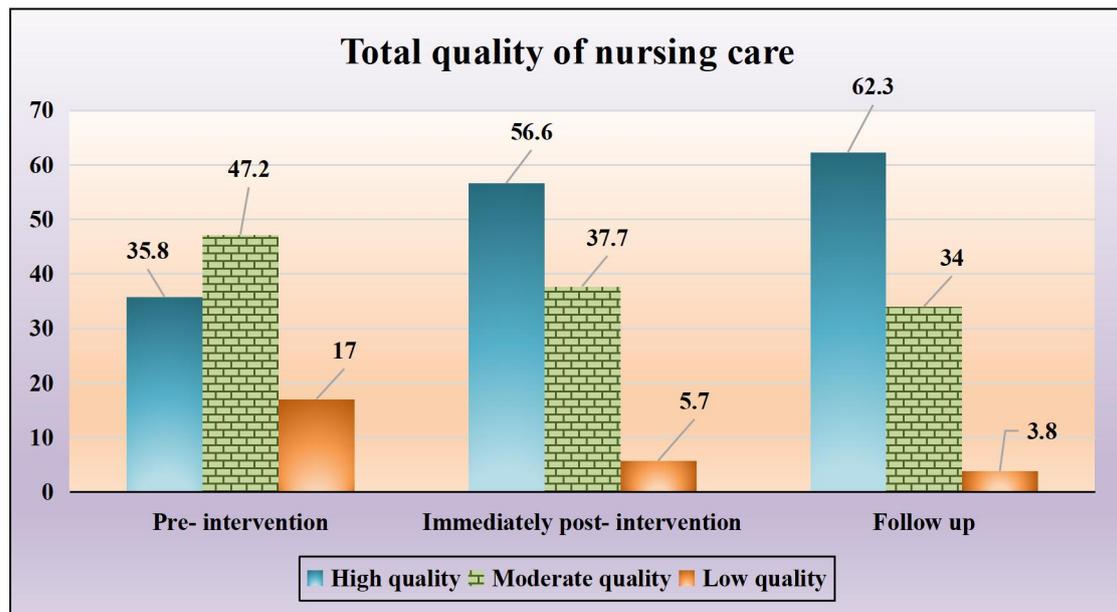


Figure (3): Percentage distribution of studied nurses regarding their total quality of nursing care regarding management of first stage of labor throughout program phases (n=53).

Table (6): Correlation between total knowledge and total practices scores of the studied nurses regarding management of first stage of labor throughout program phases (n=53).

Variables	Total knowledge					
	Pre- intervention		Immediately post-intervention		Follow up	
	r	P-value	r	P-value	r	P-value
Total practices	0.617	0.000**	0.543	0.000**	0.660	0.000**

**A Highly Statistical significant $p \leq 0.001$

Table (7): Correlation between studied nurses' total practices score, total competency score and total quality of care scores regarding management of first stage of labor throughout program phases (n=53).

Variables	Total practices					
	Pre- intervention		Immediately post-intervention		Follow up	
	r	P-value	r	P-value	r	P-value
Total competency nurse	0.456	0.000**	0.541	.000**	0.522	0.000**
Total quality of nursing care	0.523	0.000**	0.430	.000**	0.517	0.000**

**A Highly Statistical significant $p \leq 0.001$

Table (8): Correlation between total nurse competency and total quality of nursing care scores of the studied nurses regarding management of first stage of labor throughout program phases (n=53).

Variables	Total nurse competency					
	Pre- intervention		Immediately post-intervention		Follow up	
	r	P-value	r	P-value	r	P-value
Total quality of nursing care	0.453	0.000**	0.510	0.000**	0.448	0.000**

**A Highly Statistical significant $p \leq 0.001$

Discussion:

The poor quality of care provided to mothers and babies, particularly during the first stages of labor, can be attributed to the insufficient skills of healthcare providers, leading to a significant cause of maternal and neonatal mortality. Insufficient alignment between theoretical knowledge and practical training can negatively impact the quality of healthcare services in clinical settings. Improving the standard of obstetric care is crucial in reducing maternal and neonatal mortality rates. To accomplish this, both maternity nurses and gynecologists undergo training based on competency (**Hakimi et al., 2019**). The competency-based educational approach is a dynamic and Lerner-focused method that enhances skill proficiency through practice and repetition. The International Confederation of Midwives prioritizes the competency in obstetric care as a key professional capability (**Laghezza et al., 2019**).

The current research aimed to evaluate the effect of competency-based education on maternity nurses' performance and quality of care regarding management of first stage of labor.

In terms of personal traits, a recent study's results showed that, with an average age of 30.28 ± 4.27 years, less than half of the nurses under study were in the age group of 25 to 30 years old. In terms of where they resided, less than two thirds resided in rural areas. Moreover, over more than half of them obtained their degree from a nursing technical institute.

Furthermore, over three-quarters of them had five to ten years of experience. Moreover; less than three quarters of them didn't receive any training course related to competency based-education. The findings mentioned above matched with **Amasha et al., (2020)**, who revealed that fifty percent of nurses' age ranged between 26 - < 36 years. As for the educational level, 70 % of them had a nursing technical institute. In addition, the findings aligned with the research conducted by **Osman et al. (2019)**, where it was shown that the largest proportion of nurses (80.7%) in the sample were aged between 20 and less than 30 years, with an average age of 27.98 ± 4.05 . Furthermore, less than half of the women in the research (45.5%) possessed less than 10 years of experience.

A competent nurse's main responsibility is to give patients high-quality medical care. Nurses must therefore possess both strong professional knowledge and strong operational skills. Furthermore, it is crucial to consider their level of dedication and proficiency in clinical nursing. (**Kesten and Beebe, 2021**).

Concerning maternity nurses' knowledge regarding first stage of labour, the current results illustrated that, there was a significant difference among total mean scores of all domains of studied nurses' knowledge about first stage of labor at "pre-intervention, immediately post-intervention and follow up phases". It was discovered that the pre-intervention phase had a lower overall mean score for the knowledge of the nurses under study than the follow-up and immediate post-intervention phases. Furthermore, compared to over three-quarters of the nurses at the pre-intervention phase, the

results demonstrated that approximately four-fifths of the nurses under study had adequate knowledge about the first stage of labor at the immediate post-intervention and follow-up phases. According to the researchers, competency based education aims at developing the essential skills of nursing personnel. Customized training programs can enhance the competence of employees in a specific manner, encouraging nurses to actively engage in learning and subsequently influencing their behavior. Consequently, this approach leads to an overall improvement in knowledge and clinical nursing proficiency.

The results of the study were consistent with the research carried out by **Osman et al. (2023)**, which indicated that just over two-thirds of the participants had insufficient knowledge before competency-based education was introduced. However, the majority of them had sufficient knowledge during the follow-up evaluation. The researchers found a significant difference in the total knowledge scores of the studied sample before the intervention, immediately after, and during the follow-up period, with a P-value of less than 0.05. **Hoseini et al. (2018)** also discovered that the three groups had comparable underlying factors prior to the study's start. Nonetheless, there was a discernible difference between the nurses' pre- and post-training performance and knowledge in both intervention groups. On the other hand, there was no discernible variation in the knowledge and performance median scores for the control group. It's important to note that the competency-based education group outperformed the other groups in terms of performance, suggesting that this specific kind of education can positively impact nurses' clinical practice and performance.

The impact of competency-based training on the comprehensive knowledge level of nurses was examined in three randomized controlled trials (**Liu, 2021; Xiuyan, 2017; Yinyu et al., 2017**). Because of the high degree of heterogeneity in the study results ($I^2 = 86$ percent, $P < 0.001$), the random effects model was used in the meta-analysis. The combined findings showed that, in comparison to the traditional training group, the competency-based

training group had a noticeably higher level of comprehensive knowledge [$SMD = 1.20$, 95 percent CI (0.63~1.76), $P < 0.001$].

The results listed above validated the first study hypothesis, which claimed that maternity nurses will exhibit higher knowledge score regarding management of first stage of labor after receiving competency-based education program.

The current results regarding the management of the first stage of labor by maternity nurses showed that there was a highly significant difference in the mean scores of the nurses' practices that were studied at the pre-intervention, immediately post-intervention, and follow-up phases. It was discovered that, in comparison to the pre-intervention phase, the overall mean score of the investigated nurses' practices was higher in the follow-up and immediately post-intervention phases. In addition, the results showed that most of studied nurses had satisfactory level of practices regarding management first stage of labor at immediately post-intervention and follow up phases compared to less than three quarters of them at pre-intervention phase. Education has a clear impact on performance and enhances outcomes that are related to practice. It is widely recognized that knowledge is a factor that can be altered and has an indirect influence on how individuals conduct themselves. As a result, the educational intervention that has been developed encourages the integration of the most reliable evidence into practical applications.

The current study's results were compatible with **Gholamian et al., (2022)**, who clarified that, the pelvic examination skill scores in both the experimental and control groups were 37.01 ± 7.41 & 19.76 ± 7.82 , respectively, after the intervention. Similarly, the scores for Leopold maneuvers were 34.41 ± 6.18 & 22.11 ± 6.62 , and the scores of suturing were 30.71 ± 6.93 and 22.12 ± 9.58 , respectively. The results were statistically significant ($P < 0.050$). The ANCOVA test revealed that competency-based education had a strong impact on learning the pelvic examination skill (effect size: 0.893), suturing (effect size: 0.644), and Leopold maneuvers (effect size: 0.860). The current

study's results were corroborated by those of **Kadam et al. (2017)**, who showed that most of their participants had good practice following competency-based education. Practices improved in a highly significant way ($Z_{19}=3.96$, $p < 0.001$).

The second study hypothesis, which said that, maternity nurses will exhibit higher practices score regarding management of first stage of labor after receiving competency-based education program was supported by the results listed above.

The current results regarding the competency of maternity nurses in managing the first stage of labor showed that there was a highly significant difference in the mean scores of the nurses' competency in managing the first stage of labor at the pre-intervention, immediately post-intervention, and follow-up phases. It was discovered that the overall mean score of the nurses under study had increased from the pre-intervention phase to the follow-up and immediately post-intervention phases. Furthermore, compared to over two thirds of the nurses studied during the pre-intervention phase, the results demonstrated that over four fifths of the nurses demonstrated competent performance regarding management of the first stage of labor during the immediate post-intervention and follow-up phases. The researchers believed that poor competency before intervention may be due to that nurses lack of resources and ongoing education for their competency development toward the management of the first stage of labour. Meanwhile the improvement of nurses' competence after the intervention may be because competency-based education often included interactive and engaging learning materials such as simulations, case studies, and practical experiments that attracted nurses' interest and motivation, making the learning experience more enjoyable and effective, which consequently resulted in improving their level of competence.

The results reported earlier align with the outcomes of a meta-analysis carried out by **Chen et al. (2022)**. This study proved that competency-based training is effective in boosting the competence of novice nurses. It not

only helps them gain knowledge and skills but also enhances their behavior, learning, and capabilities. Besides that, the outcomes of the present study correlated with those of **Mohammed et al. (2021)**, who stated that the average score for nurses' overall competency pre-program was 1295 ± 157 , and this score significantly improved to 2850 ± 174 post-program. Additionally, the findings of this enquiry aligned with those of **Hassankhani et al., (2018)**, who demonstrated that the emergency nurses' overall proficiency was at 73.21 ± 13.5 , indicating a respectable degree of perceived competence.

The third study hypothesis was supported by the aforementioned results which stated that maternity nurses will exhibit better competency level regarding management of first stage of labor after receiving competency-based education program.

The current results regarding the quality of care provided by maternity nurses showed that there was a statistically significant difference in the mean scores of the nurses' quality of care at the pre-intervention, immediate post-intervention, and follow-up phases. It was discovered that the overall mean score of the nurses under study for the quality of care was higher during the follow-up and immediately post-intervention phases than it was during the pre-intervention phase. Likewise, the results revealed that about three fifths of studied nurses showed quality of care regarding management first stage of labor at immediately post-intervention and follow up phases compared to more than one third of them at pre-intervention phase. The low quality of nursing care before intervention might be due to that less than two fifth and about one third of nurses had a poor level of knowledge and incompetent performance level at pre-program phase. The post-program increase in nurses' knowledge and competency level was responsible for the improvement in the quality of nursing care following the implementation of the program.

The outcomes of the present study aligned with **Koy et al., (2023)**, as the results exhibited significant improvements in competency, nursing care quality, patient safety, and the

reduction of unfinished care in the experimental group post intervention. Conversely, the control group demonstrated insignificant differences. Additionally, the present research results concurred with the findings of **Mohammed et al., (2021)**, who documented a considerable enhancement in the overall standard of nursing care provided by the participating nurses after the program was put into action. In particular, 94% of the nurses attained a high level of nursing care quality after the program, in contrast to just 56% who had a low level of nursing care quality before the program ($P < 0.000$). These findings were also in line with the recommendations of **WHO, (2020)**, which emphasizes the implementation of specific strategies aimed at reducing maternal mortality rates, including the enhancement of maternal care quality by improving the competence of midwives and employing qualified professionals.

The fourth study hypothesis was validated by the results mentioned above which stated that maternity nurses will exhibit higher quality of care regarding management of first stage of labor after receiving competency-based education program.

Concerning correlation between studied variables, the findings of this study have made it clear that there was a strong and significant positive correlation between the overall knowledge and practice scores of the nurses who were studied in terms of managing the first stage of labor. This correlation was observed both before the intervention, immediately after the intervention, and during the follow-up period. Additionally, there was a highly significant positive correlation between the overall competency and the overall quality of nursing care scores among the nurses who were studied in terms of managing the first stage of labor. This correlation was also evident before the intervention, immediately after the intervention, and during the follow-up period. This is highlighted by the actual fact that improving the level of clinical competency among nurses contributes to achieving the highest possible quality of nursing care.

The findings of the current investigation were consistent with those of **Osman et al.**

(2019), who identified a strong positive correlation ($r=0.67$, $P=0.000$) between nursing competency and the standard of patient care. Similarly, **Flinkman et al., (2017)**, also observed that higher levels of competence were associated with better quality of care. Another study conducted by **Nobahar, (2016)** further confirmed that possessing competence in nursing resulted in improved patient care quality, enhanced patient satisfaction, and advancements in the nursing profession, education, and clinical practice. Furthermore, **Nilsson et al., (2016)** endorsed the results of the current investigation by emphasizing the crucial role of professional competence in nursing for achieving high-quality care and positive patient outcomes.

The results of the present study demonstrated a strong and significant positive correlation between the overall practice scores and the scores of nurse competency and quality of nursing care in managing the first stage of labor. This correlation was observed both before the intervention, immediately after the intervention, and during the follow-up period. This finding suggests that regularly implementing competency domains in the clinical setting leads to an increase in the level of competency, enabling nurses to improve their clinical skill performance. As stated by **Hariyati et al. (2019)**, the caliber of clinical nursing practice and client outcomes are directly correlated with the core competencies of clinical nursing staff. Moreover, **Hassankhani et al., (2018)**, found a significant positive correlation ($r = 0.651$ and $P < 0.001$) between the competency level and the frequency of skills used in clinical practice.

Conclusions:

Considering the findings of the present study, it was determined that the research hypotheses were confirmed and the competence-focused educational program and training sessions had a beneficial impact on enhancing maternity nurses' total knowledge, total practices, total competency and total quality of care regarding management of the first stage of labour. Additionally, a statistically significant positive correlation was observed between the overall competency and nursing

care quality scores of the examined nurses with respect to managing the first stage of labor during the pre-intervention, immediate post-intervention, and follow-up phases. Furthermore, all nurses in the study who were involved in the management of the first stage of labor at the pre-intervention, immediately post-intervention, and follow-up phases showed a highly significant statistical positive correlation between their total practices score and their total scores (nurse competency and quality of nursing care).

Recommendation:

Recommendations derived from this research were as follows:

- Ongoing competency-based education is essential for maternity nurses to improve their knowledge, practices, competency and quality of care regarding management of labour.
- Continuous assessment of competence in clinical practice is necessary to identify specific learning needs for ongoing education.
- It is advisable to motivate nurses to participate in specialized meetings such as workshops and seminars, which are designed for competency based education. This will enable them to stay updated with the latest advancements and acquire new skills in their respective field

Further researches:

- To make the results more widely applicable, it is advised that the study be repeated on a sizable and representative sample.
- Additional studies are required to assess competencies in diverse settings, to contrast the perspectives of nurses, managers, and colleagues, and to assess the advancement of nurse competence

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