

# Effect of Intrapartum Clinical Pathway Application on Maternity Nurses' Performance and Women Satisfaction

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## Abstract

A clinical pathway is a multidisciplinary management tool based on evidence-based practice in which the different tasks "interventions" by the professionals involved in the patient care are defined, optimized. It can be utilized in education and facilitate access to care and providing improved outcomes for patients and increasing women and staff satisfaction. **Aim:** The study aimed to evaluate the effect of clinical pathway application on maternity nurses' performance of intrapartum care and women's satisfaction. **Design:** A quasi-experimental design was used. **Settings:** This study was applied in gynecology and obstetrics departments affiliated with Tanta University Hospital. **Sample:** A purposive sample of 60 maternity nurses and 120 intrapartum women were recruited in this study. Six tools were used for Data Collection: a structured interviewing questionnaire for the nurses, a structured interviewing questionnaire for the intrapartum women and clinical pathway checklist for maternity nurses, an observational checklist for women, a Numeric Pain Intensity Scale, and maternal satisfaction with hospital-based intrapartum care scale. **Results:** Statistically significant differences were found between pre and post-implementation of the clinical pathway reflected by higher knowledge and performance score for nurses' improvement in the maternity nurses' knowledge regarding all items of the postpartum clinical pathway after the intervention than before the intervention. The majority of nurses adequately done all items of newborn care; assessment of newborn, suctioning, Apgar score, cord care, eye care, measurements, body temperature, vitamin K administration, and identification. Also, only (8%) of the intrapartum women suffered from severe pain in a clinical pathway group compared to 38% routine care group. In addition, intrapartum women's satisfaction in the study group has improved. **Conclusion:** using of clinical pathway had a positive effect in improving the maternity nurses' performance and women satisfaction of intrapartum care post clinical pathway application than pre-intervention. **Recommendations:** Training programs should be implemented for maternity nurses about intrapartum care based on the clinical pathway to improve nurses' performance.

**Keywords:** Clinical pathway application, nurses' performance, intrapartum care, women satisfaction

## Introduction:

Intrapartum nursing care is the care given by maternity nurses for mothers during labor and delivery. Even though the primary target of the United Nations' Sustainable Development Goal (SDG3) is to reduce the global maternal mortality rate to less than 70 per 100,000 live births, the quality of intrapartum care in most low- and middle-

income countries was chronically poor, and this had been identified as one of the precursors to the unacceptably high maternal mortality rate in low- and middle-income countries (**United Nations, 2018**).

The World Health Organization reported that approximately more than eight hundred fifty women die from preventable causes related to childbirth every day, with 99% of all these maternal deaths occurring in

low- and middle-income countries. Currently, available evidence indicates that a major portion of childbirth-related maternal deaths is eminently avoidable through the implementation of common place and affordable interventions including applications of clinical pathways (**Hogan et al., 2010**). Clinical pathways (CPWs) are widely regarded as providing valuable knowledge about specific types of patients and their care, as well as providing direct guidance in clinical practice (**World Health Organization, 2019**).

Clinical pathways are tools used to guide evidence-based healthcare. They aim to translate clinical practice guideline recommendations into clinical processes of care within the unique culture and environment of a healthcare institution. A clinical pathway is a structured multidisciplinary care plan with the following characteristics: it is used to translate guidelines or evidence into local structures; it details the steps in a course of treatment or care in a plan, and it aims to standardize care for a specific clinical problem, procedure or episode of healthcare in a specific population (**Busse et al., 2019**).

Clinical pathways (CPWs) decrease the length of hospital stay, mortality, and hospital costs while providing improved outcomes for patients and increasing staff satisfaction. In addition, they enhance collaboration between services and place all team members, including the patient and family, on the same page for planning and discussion (**Lockhart, 2015**). A review of the Cochrane Collaboration including 27 studies involving 11 398 participants showed reductions in length of stay and hospital costs for the CPWs group(s) compared with usual care. Meta-analysis showed that CPWs are associated with reduced in-hospital complications and two studies reported improved professional documentation (**Busse et al., 2019**).

Clinical pathways can be utilized to educate patients and facilitate access to care. They may also drive nursing and ancillary staff education. These pathways can be used

when setting organizational benchmarks-quality outcomes that are measurable and directly influenced by care mapping and best practice guidelines (**Daly et al., 2018**).

Clinical pathways are increasing women's satisfaction (**Lockhart, 2015**). Women's satisfaction with intrapartum care is very important to improve the labor care quality and rates of health-seeking behaviors among women. Women's satisfaction with intrapartum nursing care measures the ability of services to meet women's expectations, and it is an important determinant of the choice of health facility and its future utilization for labor and delivery services (**Lewis et al., 2016**).

Women's satisfaction with intrapartum care is specifically about giving birth in a manner that suits the need of the women. Determinants of women's satisfaction include all dimensions of care which are the structure (such as physical environment), process (interpersonal care, communication, and supports), and outcome (health status of mother and newborn) (**Srivastava et al., 2019**).

Among all three domains, interpersonal care (IPC) appeared to be the most satisfying domain, followed by physical birth environment (PBE) and the information and decision-making (IDM) domain. Healthcare providers with good interpersonal skills would be the key to this satisfaction. Physical birth environment satisfaction is a significant predictor of overall satisfaction in healthcare settings and this includes factors such as space, light, noise, and privacy (**Foureur et al., 2017**).

Clinical pathways support continuity of care between care providers by promoting consistencies in assessment and documentation, thereby reducing the variation in practice. It provides the nurse, caring for the mother and newborn with evidence-based knowledge and references related to expected normal assessment findings and care practices. Variances from the expected normal serve as key decision

points for the nurse related to care options and interventions (**Abd El-Razek, 2018**).

Clinical pathways are more used for high-risk care for improvement of maternal as well as neonatal outcomes. A United States maternal and newborn clinical pathway improved inter-professional collaborative processes for reviewing care, but did not alter length of stay or reduce costs. Clinical pathways-also known as Critical pathways, multidisciplinary pathways, collaborative paths, or care maps to use evidence-based practice and apply it to structured care tracts to provide guidelines for protocols and best practice. Clinical pathways are widely regarded as providing valuable knowledge about specific types of patients and their care, as well as providing direct guidance in clinical practice. These pathways give caregivers guidance when developing a patient's care plan and assist in determining length of stay and outcomes. It was reported that clinical pathways had been implemented in more than 80% of hospitals (**Kinsman et al., 2017**).

Implementation of clinical pathway helps nurses as a tool for socialization and evaluation of treatment processes (**Wijayanti et al, 2016**). Nursing staff should be included in the development, implementation, and continual evaluation of any pathway. The nurses need to understand their roles and be sure that best practices and good patient care are incorporated into clinical pathways. Nurses have a key role in all aspects of the clinical pathway participating in the development of the pathway is the first step. Nurses are also responsible for initiating the pathway on appropriate patients and ensuring that the various events occur as planned (**Evans et al., 2014**).

#### **Significance of the study:**

Clinical pathways implementation aims to align clinical practice with guideline recommendations to provide high-quality care within an institution. Clinical pathways serve as useful tools to reduce variations in clinical practice, thereby maximizing patient outcomes and clinical efficiency. They can

promote safe, evidence-based care by providing locally-oriented recommendations for the management of a specific condition (**Busse et al., 2019**). The staff nurse is a key factor in the success of the implementation of clinical care pathways; however best strategies for organizing and carrying out clinical pathway can improve the quality of nursing care through improving nurses' knowledge, enhancing their practice with the specific team regarding patients' management (**Abd El-Hay, 2019**).

The literature relating to clinical pathways in maternity care is limited, consisting mainly of opinion-based articles and descriptive literature of pathway implementation with few primary research studies (**Abd El-Razek, 2018**). Despite the importance of clinical pathways application during the intrapartum period, limited studies have been done regarding the effect of clinical pathway application on nurses' performance and women satisfaction during the intrapartum period. Therefore, the researchers reported conducting this study to evaluate the effect of clinical pathway application on nurses' performance of intrapartum care and women's satisfaction.

#### **Definitions:**

**A clinical pathway was theoretically** defined as complicated involvements that include the best available evidence and guidelines for a particular situation, including many elements. Meanwhile, it is a multidisciplinary care plan that outlines the sequence and timing of actions required to achieve the desired patient outcomes and organizational goals related to quality, cost, patient satisfaction, and efficiency (**Lin et al., 2019**).

**A clinical pathway was operationally** defined as a care plan in which an intervention which based on best practice took place (detailed instruction of the best practice of intrapartum nursing intervention given to the maternity nurses; assessment of women and her fetus, application of nursing procedure and providing education) with monitoring outcomes (**De Bleser, 2016**).

### **Aim of the Study:**

The study aimed to evaluate the effect of clinical pathway application on nurses' performance of intrapartum care and women satisfaction

### **Study Hypotheses:**

- Maternity nurses will have a satisfactory level of knowledge regarding the intrapartum clinical pathway after intervention than before.
- Maternity nurses will have an adequate performance of intrapartum care using clinical pathway after the intervention than before.
- Intrapartum women who will receive intrapartum care based on the clinical pathway will have a higher satisfaction level than those who will receive routine care.

### **Patient and Methods**

#### **Study Design:**

A quasi-experimental research design (pre-posttest for maternity nurses and case-control for women) was utilized in this study.

#### **Study Settings:**

This study was conducted at gynecology and obstetrics departments affiliated with Tanta University Hospital. These settings were selected because of the high prevalence of pregnant women in the selected settings and also, it serves the biggest region of the population from all areas.

#### **Sample:**

A purposive sample of 60 maternity nurses worked in the previous settings and 120 intrapartum women were recruited in the current study. Intrapartum women were divided into two equal groups, one group (study group) received intrapartum clinical pathway (60 women) and the other group (control group) exposed to only routine hospital care (60 women), with the following inclusion criteria:

- Women with normal vaginal labor.

- Prim gravida with fetal gestational age from 38 to 42 weeks
- Free from any maternal and fetal complications.
- Agree to participate in the study

#### **Sample size**

The sample size was obtained using the two-proportion formula using the power of 80% and significance level  $\alpha$  at 0.05 with 95% confidence interval. The calculated minimum sample size needed considering the 30% non-response rate was 60 nurses and 120 women. Using the formula: Sampling fraction =  $n / N = 120$ , hence, systematic sampling with the ratio of 1:2 was used to select samples for this study.

#### **Data collection tools:**

Data were collected using the following tools:

**Tool (1): A structured interviewing questionnaire** for maternity nurses was developed by the researchers after reviewing related literature; it was divided into two parts:

**Part 1:** It contained personal data of the study participants such as age, education, and years of experience.

**Part 2: Likert scale** to assess the knowledge level of the maternity nurses regarding intrapartum clinical pathway. It contained questions about the intrapartum clinical pathway, such as definition, importance, components of the clinical pathway, and nurses' role in the intrapartum clinical pathway application.

#### **Scoring system:**

Score	Maternity nurses' knowledge regarding intrapartum clinical pathway
1	Correct answers
0	Incorrect answers

The level of knowledge was determined as satisfactory if knowledge score  $\geq 60\%$ , and unsatisfactory if knowledge score  $< 60\%$ .

**Tool II: Clinical pathway checklist for maternity nurses, (WHO, 2017),** it included two parts:

**Part 1: Likert scale to assess** the maternity nurses' performance of intrapartum women care before and after clinical pathway application. It consisted of twenty-four items which included (1) communication, (2) support (3) Care in the first stage of labor such as assessment (observation), pain relief, measuring fetal heart rate, discuss with the women information about normal labor and care, mobilization, diet, and hygienic measures (5) Care of the second stage of labor such as assessment of the woman, pain relief, measuring fetal heart rate, uterotonic drug administration and woman's position and pushing; (6) Care of the third stage of labor such as assessment, active and physiological management, (7) Care of the fourth stage of labor as observation, and mother and baby bonding.

**Scoring system**

Score	Nurses' performance regarding intrapartum maternal care before and after clinical pathway application
2	Adequately done
1	Inadequately done
0	Not done

The performance was considered adequate if the percentage score was 60% or more and inadequate if less than 60%.

**Part 2: Likert scale to assess** maternity nurses' performance toward intrapartum newborn care before and after clinical pathway application. It consisted of an assessment of newborn, immediate newborn care as suctioning, cord care, eye care, measurements Apgar score, body temperature, vitamin k administration, and identification.

**Scoring system**

Score	Nurses' performance regarding intrapartum newborn care before and after clinical pathway application
2	Adequate done
1	Inadequate done
0	Not done

The performance was considered adequate if the percentage score was 60% or more and inadequate if less than 60%.

**Tool (III): A structured interviewing questionnaire related to the women:**

Was developed by the researcher after reviewing related literature. It was divided into two parts:

**Part I: Socio-demographic data:** it included data about the age of the women, education level, and residence.

**Part 2:** Assessment of the effect of intrapartum clinical pathway application on the women's knowledge regarding diet during labor, activity (walking), and pain relief measures

**Scoring system:**

Score	Women's knowledge regarding diet, activity, and pain relief measures.
1	Correct answers
0	Incorrect answers

The level of knowledge was determined as satisfactory ( $\geq 60\%$ ), and unsatisfactory ( $< 60\%$ ).

**Tool (IV): An observational checklist for women.** It was developed by the researchers after reviewing related literature and consists of two parts:

**Part I: Likert scale to assess** women's practice of pain relief measures as breathing technique, pushing technique, and positioning.

**Scoring system:**

Score	Women practice
2	Adequately done
1	Inadequately done
0	Not done

The practice was considered adequate if the percentage score was 60% or more and inadequate if less than 60%.

**Part 2: Likert scale to assess** mother and newborn degree of bonding, it was done through observation of mothers' behavior that indicated positive bonding as touching, holding, cuddling, and kissing

and also through observation of mothers' behavior that indicated negative bonding as refusing to look at the newborn, refusing to touch or hold the newborn, refusing to name the infant and negative comments about the infant.

**Tool (V):** Numeric Pain Intensity Scale. This 0 to 10 pain scale is commonly and successfully used to assess the degree and severity of pain. The values of the pain scale correspond to pain levels as follows: 1 – 3 = mild pain, 4 – 6 = moderate pain, and 7 – 10 = severe pain (**National Institutes of Health, 2003**).

#### Scoring system

Scoring system	Intensity of pain
1 – 3	Mild pain
4 – 6	Moderate pain
7 – 10	Severe pain

#### **Tool (VI): Maternal Satisfaction with Hospital-based Intrapartum Care Scale**

It is composed of 14-items of Maternal Satisfaction with Hospital-based Intrapartum Care Scale that was sub-scaled into three domains, measuring maternal satisfaction towards intrapartum care. This scale was developed and validated from the Jordan study and had been used previously in several studies. It was five points Likert scale questionnaire from one, which was strongly disagreed to five, which was strongly agree (**Bitew et al., 2015**). The first domain measured women's satisfaction with five items related to interpersonal care (IPC) by the health care providers with a possible score from 5 to 25. The second domain was related to the information and decision-making (IDM) process (four items) with a possible score from 4 to 20. However, three items in the IDM domain were reverse scored. The third domain was related to the physical birth environment (PBE) (five items) with a possible score from 5 to 25. The possible total maternal satisfaction score ranges from 14 to 70. The Cronbach's alpha value for total maternal satisfaction was 0.793 and the reliability coefficients for each subscale were 0.795 (IPC), 0.674 (IDM), and 0.774 (PBE).

#### **Validity & Reliability:**

The tools (from I- to IV) were reviewed and tested for content validity by 5 experts in obstetrical nursing, modifications were done accordingly to ascertain relevance and completeness. Test-retest reliability was used. The internal consistency of the tools was calculated using Cronbach's alpha coefficients. Study tools revealed reliability at Cronbach's alpha 0.753 for tool (I), 0.801 for tool (II), 0.745 for tool (III), at 0.713 for tool (IV).

#### **Administrative design:**

An official letter requesting permission to conduct the study was obtained before conducting the study from the Dean of the Faculty of Nursing, Tanta University to the Director of the study setting. This letter was included the aim of the study to get permission and help for the collection of data.

#### **Ethical considerations:**

According to the Faculty of Nursing Ethical Research Committee, the researchers got the maternity nurse's and women's consent before conducting the study. Assured them about confidentiality, safety, and privacy of data obtained. The study was voluntary, they were allowed to refuse to participate and they had the right to withdraw from the study at any time, without giving any reason.

#### **A pilot study:**

The pilot study was conducted on 10% (6 nurses and 12 intrapartum women) of the total sample to ensure the clarity, applicability of the tools, and the time needed to be completed. According to the results obtained from the pilot study, the required modifications were performed. This pilot study sample was excluded from total study sample.

#### **Field Work:**

After reviewing the current local and international related literature to be more knowledgeable about the problem, the researchers start to design the study tools.

The actual fieldwork was carried out from the beginning of July 2019 till the end of December 2019. The researchers have attended the study settings three days/week, at the morning shift from 9.00 Am to 1.00 Pm. The researchers introduced themselves to the medical and nursing staff members in the previously mentioned settings. The researchers explained the purpose of the study and asked them for cooperation.

### **The researchers apply the study through the following Phases.**

#### **Assessment phase:**

- The researchers met each maternity nurse collected their socio-demographic data and assessed their knowledge level and performance of intrapartum clinical pathway steps before the intervention.
- The researchers met each intrapartum woman individually, introduced themselves to the women, and obtained their consent to be recruited in the study after explaining the purpose of the study and collected their socio-demographic data.

#### **Planning phase:**

- The researchers prepared educational material about intrapartum clinical pathways included: definition, importance, components, and nurse role.
- The researchers developed a clinical pathway design covering the phases of intrapartum care introduced to the maternity nurses.

#### **Intrapartum Clinical Pathway included:**

- **Women care:** It included physical and psychological assessment, application of Intrapartum nursing care, e.g. pain relief measures, perineal care, fetal monitoring, pushing technique, positioning, placental examination, and drug administration, education e.g. (walking, nutrition during labor, pain relief measures, positioning, pushing technique, Mother-newborn bonding) and discharge plan.

- **Newborn care,** which included newborn assessment and immediate newborn care as Apgar score, cord care, eye care, measurements, temperature, identification and encourage mother-baby bonding: instruct women to have skin-to-skin contact with their babies as soon as possible after the birth.

#### **Implementation phase:**

- The researchers provided one educational session that took about 45-60 minutes about the clinical pathway for maternity nurses using a booklet and PowerPoint presentation which included: definition, importance, components, and nursing role.
- The researchers explained the intrapartum clinical pathway step by step assisted by using educational videos as teaching methods via 2 sessions in 12 groups; each group included 5 maternity nurses as those responsible for providing care to the women during the intrapartum period. Each session lasted 45-60 minutes.
- The researchers applied the intrapartum clinical pathway on 20 intrapartum women in front of maternity nurses; 3 maternity nurses for each woman after taking women's consent (these women were excluded from the women sample).

*The researchers applied intrapartum clinical pathway based on intrapartum care pathway guidelines of the National Institute for health and care excellence (NICE) (NICE, 2020) and World health organization (WHO) recommendations for intrapartum care,(WHO,2018) which included:*

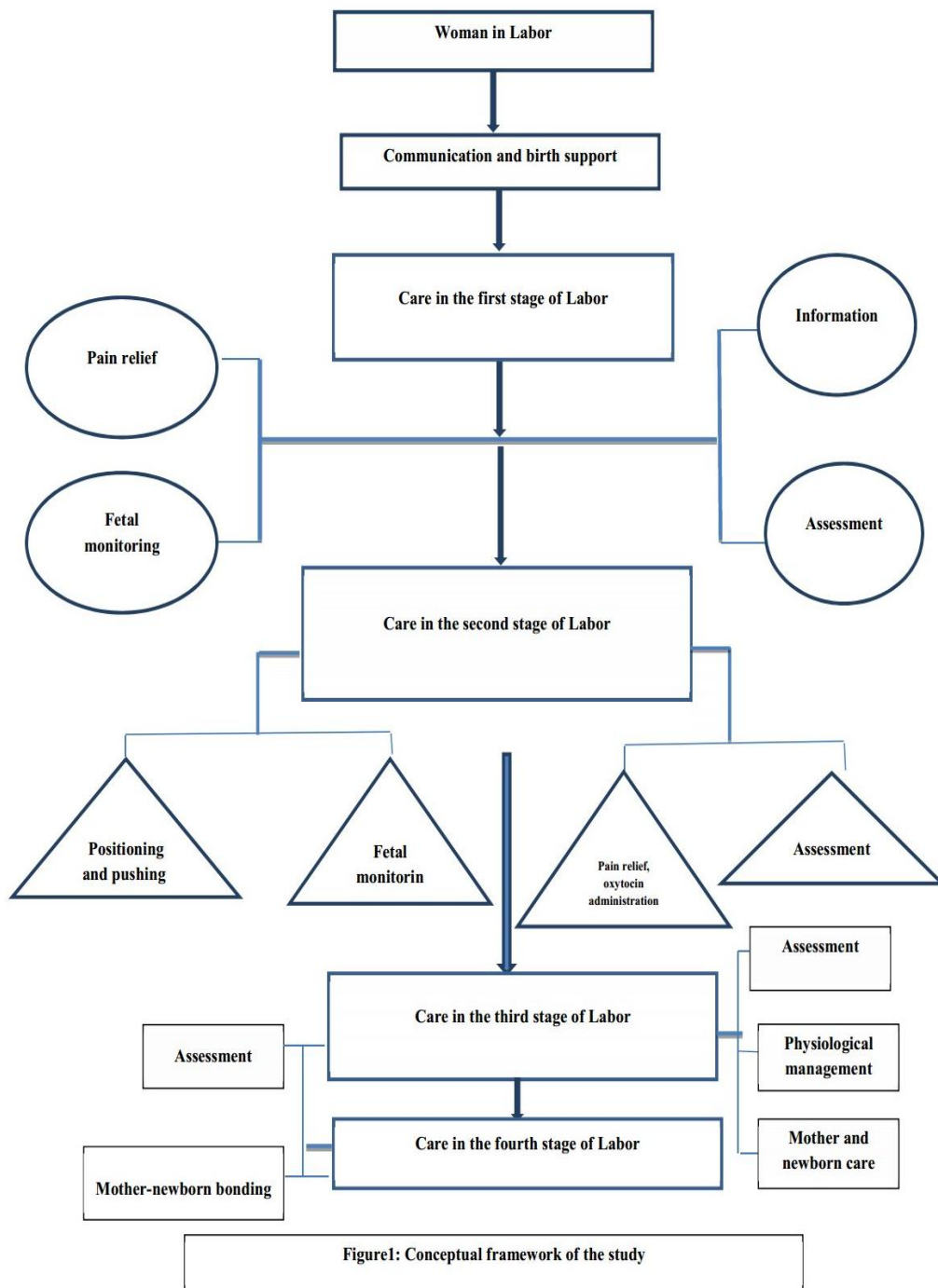
- Assessment of women's physical and psychological conditions and assessment of fetus condition, providing adequate communication and support.
- Application of intrapartum nursing care including care during the first, second, third, and fourth stage of labor:
  - **The first stage of labor care included:** *Provide supportive care and information:* provide the woman with supportive one-to-

one care, inform women about the length of the first stage of labor, inform the woman that she may drink during labor and that isotonic drinks may be more beneficial than water. **Observation:** Apply apartogram following World Health Organization recommendation with a recording of the following observations: half-hourly documentation of frequency of contractions, hourly pulse, 4-hourly temperature, and blood pressure, frequency of passing urine, vaginal examination 4 hourly if allowed. **Pain relief measures:** educate women about breathing, relaxation techniques, and distraction technique and providing the message. **Fetal Monitoring:** Perform intermittent auscultation of the fetal heart rate to women which are done immediately after a contraction for at least 1 minute, at least every 15 minutes.

- **The second stage of labor care including** providing information to a woman about the second stage of labor. **Observation:** assessment of woman's emotional and psychological condition. **Fetal monitoring:** Perform intermittent auscultation of the fetal heart rate which is done immediately after a contraction for at least 1 minute, at least every 5 minutes with palpating the woman's pulse every 15 minutes to differentiate between the two heartbeats. **Woman's position and pushing.** Instruct a woman to adopt any other position that she finds most comfortable and avoid a lying position (WHO, 2018). Educate the woman that in the second stage she should be guided by her urge to push. If pushing is ineffective, educate women regarding adequate pushing techniques (Koyucu, et al, 2017).
- **The third stage of labor care including** providing information to a woman about the Third stage of labor. Support. **Observation:** assess a woman in the third stage of labor: her general physical condition; her color, respiration, pulse, blood pressure, and vaginal blood loss. **Providing care:** perform cord clamping, administer the uterotonic drug, provide perineal care, placenta examination, examine mother for any tear, Assist in perineal repair.

- **Application of Intrapartum newborn care** including newborn assessment and immediate newborn care; suctioning, Apgar score, cord care, eye care, measurements, temperature, identification and encourage mother-baby bonding: instruct women to have skin-to-skin contact with their babies as soon as possible after the birth.
- **The fourth stage of labor care** included providing information to a woman about the fourth stage of labor. Observation of the woman after birth: Record her temperature, pulse, and blood pressure. Uterine contraction and lochia assessment. Assessment of the woman's emotional and psychological condition in response to labor, assessment of perineum. Educate women regarding the importance of voiding of the bladder, Mother -Newborn bonding: instruct the mother of initiation of breast feeding as soon as possible after the birth, ideally within 1 hour and avoid separation of a woman and her baby within the first hour of the birth.
- As a part of clinical pathway application, the researchers provided education to 20 women about pain relieving measures during labor, nutrition, positioning, pushing technique, maternal and newborn bonding.
- After that, the maternity nurses applied all steps of a clinical pathway for the study group of intrapartum women and their newborns with a range of one maternity nurse for one woman and her newborn, and researchers observed them using the guided checklist.
- Each mother received a brochure with the information needed to facilitate the learning and its application to improve mothers' knowledge and practice.
- Maternity nurses documented all nursing interventions done to the intrapartum women ensured adequacy of the environment (as light, privacy) and women involved in the decision-making process.
- Regarding the intrapartum women in the control group, they received only routine hospital care.





**Evaluation phase:**

- The researchers evaluated the level of maternity nurses' knowledge and practice and women's satisfaction post clinical pathway application.
- The researchers evaluated the outcomes of the clinical pathway on the study group (intrapartum clinical pathway group) and compared them with the control group (routine care group) who received routine hospital care.

**Statistical analysis**

The collected data were organized, reviewed, coded, tabulated, analyzed, and presented using descriptive statistics in the form of frequencies and percentages for qualitative variables. Test of significance was used for comparison between two groups. Where:  $P > 0.05$ , no statistically significant difference,  $P < 0.05$ , statistically significant difference,  $P < 0.01$ , highly statistically significant difference, and  $P < 0.001$ , very highly statistically significant difference.

**Results**

**Table (1)** represented the distribution of the maternity nurses regarding their demographic characteristics. As observed from the table, 50% of the maternity nurses aged 20-29 years and 46.7% had a bachelor's degree in nursing education. Regarding their years of experience, 36.7% of them had 5- <10 years of experience.

**Table (2)** portrayed an improvement in the maternity nurses' knowledge regarding all items of the postpartum clinical pathway (definition, importance, components, nursing role) after the intervention than before the intervention which is statistically significant ( $p = .000$ ). As observed from the table higher percentages of nurses answered correctly all items post-intervention (88.3%, 93.3%, 91.6% & 93.3% respectively).

**Figure (2)** displayed an increase in the total score of maternity nurses' knowledge regarding intrapartum clinical pathway after the intervention than before the intervention

as 91.30% of the maternity nurses had a satisfactory level of knowledge after the intervention compared to 16.50% before the intervention.

**Table (3)** revealed a statistically significant improvement in the nurses' practice regarding all items of intrapartum women care about clinical pathway application than before application **except** for uterotonic drug administration and women positioning during the second stage of labor ( $P > 0.05$ ).

**Table (4)** represented a statistically significant improvement in the nurses' practice regarding all items of intrapartum newborn care after clinical pathway application than before application ( $P = .000$ ). The majority of nurses adequately done all items of newborn care; assessment of newborn, suctioning, Apgar score, cord care, eye care, measurements, body temperature, vitamin K administration, identification with percentage of 85%, 100%, 66.7%, 100%, 88.3%, 86.7%, 96.7%, 98.3% and 88.3% respectively post clinical pathway application compared to 11.7%, 80%, 6.7%, 85%, 13.3%, 8.3%, 28.3%, 71.7% and 13.3% respectively pre-clinical pathway application.

**Figure (3)** showed that 93.70% of the maternity nurses adequately practice intrapartum women care about clinical pathway application compared to 35.4% before clinical pathway application and 90% of the maternity nurses adequately practice intrapartum newborn care after clinical pathway application compared to 34% before clinical pathway application.

**Table (5)** showed that there was no statistically significant difference between the clinical pathway group and routine care group concerning demographic characteristics except for residence ( $P = .023$ ).

**Table (6)** displayed that, the higher percentages of women in the clinical pathway group had satisfactory knowledge regarding diet during labor, pain relief measures, and activity (walking) with the percentage of 66.7%, 70% & 88.3% compared to 23.3%, 28.3%

& 25% respectively of women in routine care group, which indicated statistically significant difference was found ( $p=.000$ ).

**Table (7)** represented statistically significant differences regarding women's practice of pain relief measures, pushing technique, and positioning technique among intrapartum clinical pathway and routine care groups. It revealed that 94.4%, 70%, and 100% respectively of women adequately practice pain relief measures, pushing technique, and positioning technique in the clinical pathway group compared to 23.8%, 25%, and 96.7% respectively of women in the routine care group. In addition, the same table revealed no statistically significant difference between the clinical pathway group and routine care group regarding mother-newborn bonding ( $P=.817$ ).

**Figure (4)** illustrated the pain intensity among intrapartum clinical pathway and routine care groups. As regards the intensity of pain, it was observed that 65% of the intrapartum women suffered from moderate

pain in a clinical pathway group compared to 43% of women in the routine care group. Also, only (8%) of the intrapartum women suffered from severe pain in a clinical pathway group compared to 38% routine care group.

**Table (8):** portrayed maternal satisfaction towards intrapartum care in routine care group, only 37% of women were satisfied with the interpersonal care domain. Regarding the information and decision-making domain, only 28% of women were satisfied, whereby, for the physical birth environment domain, 35% were satisfied with the care given. Meanwhile, in the clinical pathway group, 67% of women were satisfied with the interpersonal care domain. Regarding the information and decision-making domain, 73% of women were satisfied, whereby, for the physical birth environment domain, 59% were satisfied with the care given and this difference was statistically significant ( $p=.000$ ).

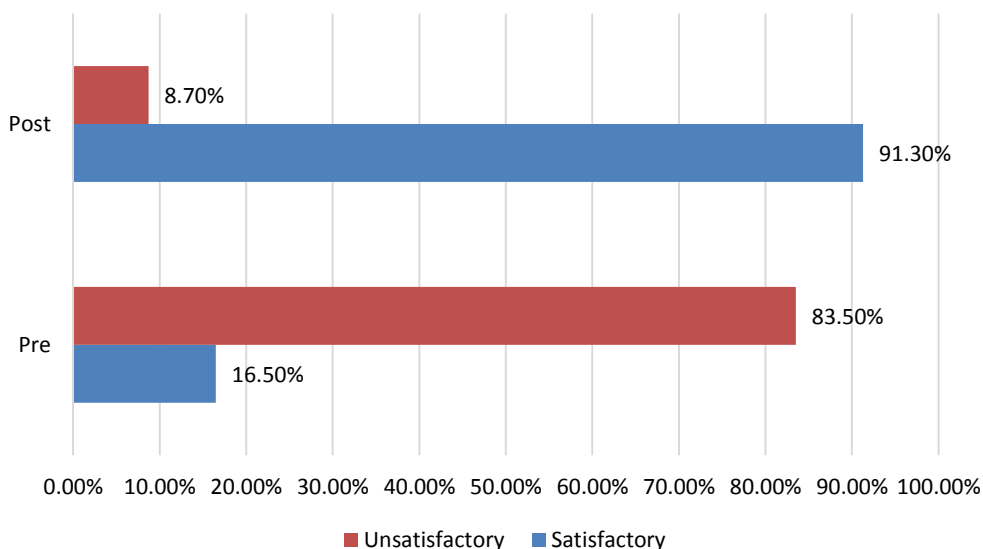
### Part I: Studied nurses

**Table 1:** Distribution of maternity nurses regarding their demographic characteristics (n= 60)

Items	The study group (n= 60)	
	No.	%
<b>Age / years</b>		
-20 – 29	30	50
-30 – 39	22	36.7
-40 – 49	6	10
-50 – 60	2	3.3
<b>Educational level</b>		
- Secondary school (diploma).	20	33.3
-Technical Institute of Nursing.	10	16.7
- Bachelor's degree.	28	46.7
- Master's Degree.	2	3.3
- Doctorate Degree.	0	0
<b>Years of Experience</b>		
-<5	18	30
-5-<10	22	36.7
- 10-15	14	23.3
-More than 15 -	6	10

**Table (2):** Maternity Nurses' knowledge about intrapartum clinical pathway pre and post-intervention (N= 60)

Items	The study group (n= 60)				$\chi^2$	P value
	Pre (n=60)		Post (n=60)			
	No.	%	No.	%		
<b>Definition of intrapartum clinical pathway</b> <ul style="list-style-type: none"> <li>• Correct</li> <li>• Incorrect</li> <li>• Don't know</li> </ul>	4	6.7	53	88.3	94.07	.000
	1	1.7	5	8.3		
	55	91.6	2	3.4		
<b>Importance of intrapartum clinical pathway in women and newborn care</b> <ul style="list-style-type: none"> <li>• Correct</li> <li>• Incorrect</li> <li>• Don't know</li> </ul>	4	6.7	56	93.3	98.21	.000
	3	5.0	4	6.7		
	53	88.3	0	0.0		
<b>Components of intrapartum clinical pathway</b> <ul style="list-style-type: none"> <li>• Correct</li> <li>• Incorrect</li> <li>• Don't know</li> </ul>	2	3.3	55	91.6	106.94	.000
	2	3.3	4	6.7		
	56	93.4	1	1.7		
<b>Nurses' role in intrapartum clinical pathway application</b> <ul style="list-style-type: none"> <li>Correct</li> <li>Incorrect</li> <li>Don't know</li> </ul>	9	15.0	56	93.3	76.54	.000
	14	23.3	4	6.7		
	37	61.7	0	0.0		



**Figure (2):** The Difference between total knowledge scores on the pretest and posttest regarding intrapartum clinical pathway among the studied nurses

**Table (3):** Maternity nurses' performance regarding the intrapartum women care before and after clinical pathway application

Items	Before						After						$\chi^2$	P-value
	Adequately Done		Inadequately Done		not done		Adequately Done		Inadequately Done		not done			
	No	%	No	%	No	%	No	%	No	%	No	%		
Communication	32	53.3	28	46.7	0	0.0	56	93.3	4	6.7	0	0.0	24.54	.000
Support	37	61.7	0	0.0	23	38.3	58	96.7	0	0.0	2	3.3	22.28	.000
<b>Care during the first stage of labor</b>														
Assessment	18	30.0	42	70.0	0	0.0	53	88.3	7	11.7	0	0.0	57.41	.000
Pain relief measures	4	6.7	6	10.0	50	83.3	52	86.7	8	13.3	0	0.0	91.42	.000
Fetal monitoring	4	6.7	8	13.3	48	80.0	55	91.7	4	6.7	1	1.6	89.14	.000
Mobilization and diet	20	33.3	0	0.0	40	66.7	59	98.4	0	0.0	1	1.6	56.61	.000
Hygienic measures	2	3.3	4	6.7	54	90.0	50	83.4	2	3.3	8	13.3	79.10	.000
<b>Care during the second stage of labor</b>														
Observation (Assessment)	6	10.0	54	90.0	0	0.0	58	96.7	2	3.3	0	0.0	90.53	.000
Uterotonic drug (Oxytocin) administration	57	95.0	3	5.0	0	0.0	60	100.0	0	0.0	0	0.0	3.077	.079
Pain relief measures	4	6.7	6	10.0	50	83.3	45	75.0	3	5.0	12	20.0	58.59	.000
Fetal monitoring	2	3.3	3	5.0	55	91.7	51	85.0	2	3.3	7	11.7	82.66	.000
Woman positioning	58	96.7	0	0.0	2	3.3	60	100.0	0	0.0	0	0.0	2.034	.154
Pushing technique	50	83.3	0	0.0	10	16.7	60	100.0	0	0.0	0	0.0	10.90	.001
<b>Care during the third stage of labor</b>														
Observation(assessment)	10	16.6	25	41.7	25	41.7	56	93.3	4	6.7	0	0.0	72.26	.000
Uterotonic drug administration	57	95.0	3	5.0	0	0.0	60	100.0	0	0.0	0	0.0	3.077	.079
Perineal care	7	11.7	53	88.3	0	0.0	50	83.3	10	16.7	0	0.0	61.78	.000
Placenta examination	12	20.0	36	60.0	12	20.0	51	85.0	2	3.3	7	11.7	55.88	.000
Initial assessment of perineum	3	5.0	2	3.3	55	91.7	47	78.4	10	16.6	3	5.0	90.67	.000
Assist in perineal repair.	55	91.7	5	8.3	0	0.0	60	100	0	0.0	0	0.0	5.217	.022
<b>Care during the fourth stage of labor</b>														
Vital signs	50	83.3	10	16.7	0	0.0	60	100.0	0	0.0	0	0.0	12.11	.001
Uterine contraction and lochia assessment	3	5.0	5	8.3	52	86.7	51	85.0	3	5.0	6	10.0	79.64	.000
woman's emotional and psychological condition assessment	6	10.0	0	0.0	54	90.0	50	83.3	0	0.0	10	16.7	64.82	.000
Perineum assessment	10	16.7	2	3.3	48	80.0	53	88.4	2	3.3	5	8.3	64.23	.000
Mother and baby bonding	6	10.0	0	0.0	54	90.0	51	85.0	0	0.0	9	15.0	67.66	.000

**Table (4):** Maternity nurses' performance toward intrapartum newborn care pre and post clinical pathway application

Items	Before						After						$\chi^2$	P-value
	Adequately Done		Inadequately Done		not done		Adequately Done		Inadequately Done		not done			
	No	%	No	%	No	%	No	%	No	%	No	%		
Assessment of newborn	7	11.7	53	88.3	0	0.0	51	85.0	9	15.0	0	0.0	64.60	.000
Suctioning	48	80.0	12	20.0	0	0.0	60	100.0	0	0.0	0	0.0	13.33	.000
Apgar score	4	6.7	20	33.3	36	60.0	40	66.7	9	15.0	11	18.3	44.66	.000
Cord care	51	85.0	9	15.0	0	0.0	60	100.0	0	0.0	0	0.0	9.73	.002
Eyecare	8	13.3	5	8.3	47	78.4	53	88.3	1	1.7	6	10.0	67.58	.000
Measurements	5	8.3	55	91.7	0	0.0	52	86.7	8	13.3	0	0.0	73.81	.000
Body temperature	17	28.3	3	5.0	40	66.7	58	96.7	2	3.3	0	0.0	62.61	.000
Vitamin k administration	43	71.7	17	28.3	0	0.0	59	98.3	1	1.7	0	0.0	16.73	.000
Identification	8	13.3	2	3.3	50	83.4	53	88.3	0	0.0	7	11.7	67.63	.000

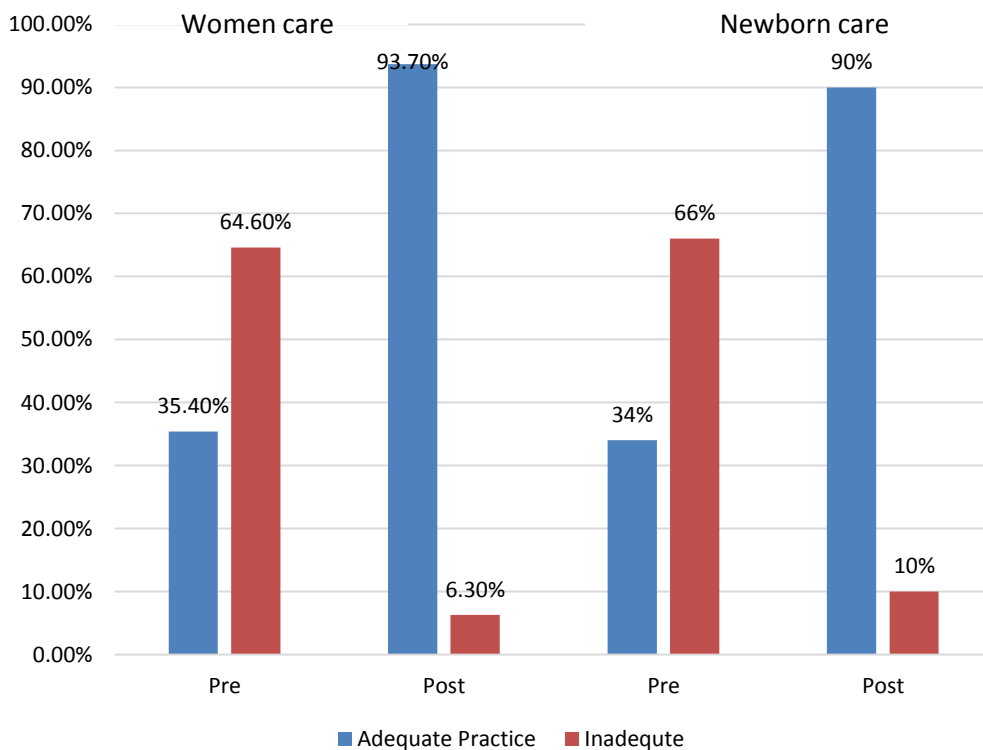


Figure (3): Total score of maternity nurses' practice regarding intrapartum women and newborn care.

Part II: Studied women

Table (5): Distribution of women according to their demographic characteristics (n=120)

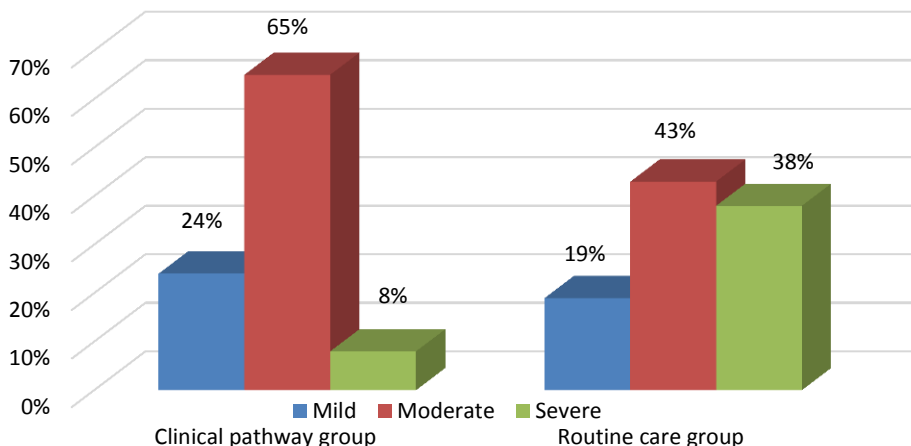
Items	Clinical Pathway group (N=60)		Routine Care group (N=60)		$\chi^2$	p-value
	No.	%	No.	%		
<b>Age / years</b>					3.61	.46
-20 – 25	26	43.3	19	31.7		
-25 – 30	16	26.7	23	38.3		
-30 – 35	12	20	14	23.3		
-35-40	5	8.3	4	6.7		
-40-45	1	1.7	0	0		
<b>Educational Level</b>					.548	.76
Read and write	11	18.3	13	21.7		
Secondary	31	51.7	27	45.0		
University	18	30.0	20	33.3		
<b>Residence</b>					5.16	.023
Urban	32	53.3	44	73.3		
Rural	28	46.7	16	26.7		

**Table (6):** Distribution of women knowledge regarding diet during labor, pain relief measures, and activity among intrapartum clinical pathway and routine care groups

Items	Clinical Pathway group (n=60)		Routine Care group (n=60)		$\chi^2$	p-value
	No	%	No	%		
<b>Diet during labor</b>					<b>22.88</b>	<b>.000</b>
• Satisfactory	40	66.7	14	23.3		
• Unsatisfactory	20	33.3	46	76.7		
<b>Pain relief measures</b>					<b>32.77</b>	<b>.000</b>
• Satisfactory	42	70.0	17	28.3		
• Unsatisfactory	18	30.0	43	71.7		
• Don't know						
<b>Activity (Walking)</b>					<b>57.33</b>	<b>.000</b>
• Correct	53	88.3	15	25.0		
• Incorrect	7	11.7	45	75.0		
• Don't know						

**Table 7:** Distribution of the women practice toward pain relief measures, pushing technique, positioning, and mother-newborn bonding among intrapartum clinical pathway and routine care groups

Items	Clinical Pathway group (n=60)		Routine Care group (n=60)		$\chi^2$	p-value
	No.	%	No.	%		
<b>Pain relief measures</b>					<b>7.519</b>	<b>.006</b>
Yes	36	60.0	21	35.0		
No	24	40.0	39	65.0		
<b>If Yes</b>					<b>36.56</b>	<b>.000</b>
Adequately done	34	94.4	5	23.8		
Inadequately done	2	5.6	16	76.2		
<b>Pushing technique</b>					-	-
Yes	100	100.0	100	100.0		
No	0	0.0	0	0.0		
<b>If yes</b>					24.36	.000
Adequately done	42	70.0	15	25.0		
Inadequately done	18	30.0	45	75.0		
<b>Positioning technique</b>					-	-
Yes	100	100.0	100	100.0		
No	0	0.0	0	0.0		
<b>If yes</b>					2.034	.154
Adequately done	60	100.0	58	96.7		
Inadequately done	0	0.0	2	3.3		
<b>Mother-newborn bonding</b>					-	-
Yes	100	100.0	100	100.0		
No	0	0.0	0	0.0		
<b>If Yes</b>					<b>.054</b>	<b>.817</b>
Positive	49	81.7	47	78.3		
Negative	11	18.3	13	21.7		



**Figure (4):** Pain intensity among intrapartum clinical pathway and routine care groups

**Table (8):** Maternal satisfaction towards intrapartum care based on each domain among intrapartum clinical pathway and routine care groups

Domain	Clinical pathway group (n=60)			A routine care group (n=60)			$\chi^2$	P-value
	Mean Standard	Satisfaction	Dissatisfaction	Mean Standard	Satisfaction	Dissatisfaction		
IPC	23.18 2.19	67%	33%	22.16 3.11	37%	63%	30.3	.000
IDM	16.20 3.31	73%	27%	15.21 3.31	28%	72%		
PBE	23.43 2.04	59%	41%	21.53 3.01	35%	65%		

IPC -interpersonal care, IDM -information and decision-making, PBE - physical birth environment

**Discussion:**

The creation of clinical pathways has become a popular response to concerns regarding the implementation of evidence-based practice. Clinical pathways could be a methodology for the mutual decision-making and organization of care for a well-defined group of patients during a well-defined period to enhance the quality of care by improving patient outcomes, promoting patient safety, increasing patient satisfaction, and optimizing the use of resources (Ismail, 2012). Therefore, this study was conducted to investigate the effect of clinical pathway application on nurses' performance of intrapartum care and women's satisfaction.

Concerning maternity nurse's demographic characteristics, the study findings revealed that most of the nurses aged 20-29, had experience from 5-10 years and were qualified as a bachelor (N) (50%) and significantly lesser of them had Diploma in nursing. This data proves that the age of the nurses is a factor considered in providing the care and education plays an unequivocal role in the healthy practices of nurses in their professional careers. These results were in the same line with Al-Taee (2016) who reported that the majority of nurses aged less than 35 years and had 5 years of experience.

The results of the present study indicated an improvement in the nurses' knowledge regarding all items of the intrapartum clinical pathway (definition, importance, components,



nursing role) after the intervention than before the intervention which is statistically significant ( $p=.000$ ). This lack of clinical pathway knowledge pre-intervention might be due to a lack of continuous education for these nurses, in addition to a lack of motivation to updating their knowledge. The improvement in maternity nurses' knowledge reflected the success of the researchers in teaching maternity nurses all items of the clinical pathway. These study findings are supported by **Devi, & Latha Venkatesan (2012)** who reported that the level of knowledge of nurses was high in the post-test in comparison to the pre-test and concluded that the level of knowledge will increase when the unknown concept was taught to improve knowledge and practice. Also, the study findings were congruent with the findings of a study conducted by **Abd El-Hay (2019)** who found a statistically significant enhancement in the total mean score of knowledge about clinical pathway after program implementation than before.

Regarding maternity nurses practice of intrapartum clinical pathway, the results of the present study indicated that there was an improvement in the nurses' practice regarding all items of the intrapartum clinical pathway after the intervention than before the intervention which is statistically significant ( $p=.000$ ) which revealed that intrapartum clinical pathway training sessions were effective in improving maternity nurses practice. These findings of the current study were in the same line with **Devi, & Latha Venkatesan (2012)** who reported that the practice scores of nurses were high after the clinical pathway administration ( $M= 232.8$ ,  $SD=7.88$ ) in comparison to the before clinical pathway administration. In addition, **Mahmoud& Abd-ElSadik (2013)** reported that nurses have a key role in all aspects of clinical pathway practice because they begin and end the chain of staff involved in the care of patients. Moreover, **Das,(2017)**revealed that a composite training package aimed at improving the childbirth-related skill set of the facility nurses led to significant improvements in the uptake of essential delivery-related practices and reduction in unnecessary/harmful practices.

The finding of the present study revealed a statistically significant difference regarding Apgar score among Clinical pathway intervention group and control groups. This result was in the line with **Abushaikha, & Oweis (2015)** that studied "Jordanian pregnant women's expectations of their first childbirth experience" and reported that, newborn babies were benefited from the support that the mothers were receiving in labor and babies are less admitted intensive care units. The present study also, found that the Clinical pathway intervention group applied early attachment as one of comfort measures during labor. This is supporting the new evidence from **Christianes & Bracke, (2017)** who studied "Assessment of social psychological determinants of satisfaction with childbirth" and mentioned for the importance of early contact as a good practice which is useful and should be encouraged in cases of low risk and normal birth.

The results of the present study revealed that the higher percentages of women applied the clinical pathway group was manifested by good knowledge regarding adequate diet during labor, pain relief measures, and activity compared to the group of women who received routine care which indicated that education was effective on the promotion of women's levels of knowledge regarding intrapartum care. These study findings were in the same line with **Valiani et al., (2014)** who showed that the knowledge means regarding childbirth care was statically significant in mothers after intervention than before the intervention.

Supporting the previous finding **El-Baz (2008)** ,and **El-Hadary (2009)**, reported that knowledge scores of the study group subjects who participated in the nursing clinical pathway were higher than that of the control group. This may be due to that education of patients and their relatives during the clinical pathway implementation appeared to have a positive influence on the patients' recovery with earlier discharge from hospital.

On the same line, **Abd-El-Rhman (2001)** found that there was an obvious improvement in quality of care and improvement in patient knowledge level post clinical pathway

implementation and added that educational booklet helps patients become aware of the expectations for each day of their hospitalization, thus reducing anxiety associated with illness and hospitalization.

Moreover, **Zachary et al., (2013)** who conducted a study about "Counseling about gestational weight gain and health lifestyle during pregnancy" stated that many pregnant women may lack vital information that could contribute to a healthy pregnancy such as counseling, physical activity and nutrition during pregnancy. Whereas, **Olagbuji et al., (2013)** who studied "Maternal understanding of fetal movement in third trimester: a means for fetal monitoring and reducing stillbirth" they reported that "Maternal educational level is an important factor in the early identification of abnormality of fetal movement. The unsatisfactory knowledge and poor perception behavior among respondents reflect the need for a guideline, particularly during antenatal care, on information and management of abnormal fetal movement to prevent avoidable stillbirth.

These results are supported by **Ranger et al., (2016)** who studied "Comparison of the maternal experience and duration of second stage of labor comparing two upright delivery position a randomized controlled trial". They stated that "antenatal preparation and classes include information about childbirth process, option for medication based on pain relief". Also this is supported by results of **Eriksson et al., (2016)** who studied "Content of childbirth related fear in Swedish women and men analysis of an open ended question". They reported that, the embodied knowledge of companion as a first educator and trustworthy source of information form a basic source of knowledge. Those finding may attributed to, that antenatal classes have a positive effect in improving presence of clinical pathway intervention knowledge.

**Howarth & Swain (2019)** demonstrated that a skills-based self-directed childbirth preparation program was able to increase childbirth self-efficacy in first-time mothers. **Howarth & Swain, (2019)** study findings were similar to current study findings which portrayed statistically significant differences

regarding women practice of pain relief measures, pushing technique and positioning among intrapartum clinical pathway and routine care groups which indicated that education was effective in the promotion of women's levels of practice regarding certain items concerning intrapartum care.

Supporting to this finding, **Patricia (2006)**, identified that, pathways embody practice guidelines, while at the same time allowing variations in the activity of the provider and in patient response.

The results of the present study clarified that the majority of the intrapartum women suffered from a moderate level of pain in a clinical pathway group compared to less than half of women in the routine care group and this difference was statistically significant ( $p=0.000$ ). This effective indicator reflects the effectiveness of clinical pathways for intrapartum women. This result was matching with **Firouzbakh et al., (2014)** who found that level of pain felt by the experimental group was meaningfully lower than that felt by the control group ( $p=0.03$ ). Moreover, **Derricott & Crean (2016)** stated that clinical pathways are tools used to guide evidence-based healthcare that has been implemented internationally, so that during the intrapartum period, it is very important that healthcare providers continually assess women for pain, taking into account the women acceptable pain levels.

This finding supported by several authors **Ministry of Health, (2019)** who reported that, breathing exercise increases relaxation and relaxation increase pain tolerance, reducing anxiety, decreased catecholamine response, increased uterine blood flow and decrease muscle tension.

They show that, there were significant differences among two studies group regarding to application of comfort measures among intervention and control groups. This finding supported and consistent with **Lai et al., (2019)** who reported that, breathing exercise increases relaxation and relaxation increase pain tolerance, reducing anxiety, decreased catecholamine response, increased uterine blood flow and decrease muscle tension.

There were significant differences among two studies group regarding pain intensity in relation to cervical dilatation. This result was in line with **World Health Organization, (2019)** which reported that, the women in the experimental group felt a more positive pushing experience than the women in the control group. As trained mother applied different supportive measures correctly for pain relief such as technique of bearing dawn

Concerning Maternal satisfaction towards intrapartum care, the results of the present study clarified that there was a statistically significant difference ( $p=.000$ ) between the routine care group and the clinical pathway group regarding satisfaction with intrapartum care this may be explained by the level of satisfaction depends on the practicing of care which showed the effectiveness of clinical pathway upon the level of satisfaction of the intrapartum women. this study finding was congruent with the findings of a study conducted by **Devi, & Latha Venkatesan (2012)** who found that level of satisfaction of mothers in the experimental group ( $M= 74.46$ ,  $SD=6.27$ ) is high when compared to the control group ( $M=67.5$ ,  $SD=10.73$ ). Similarly, the results of research conducted by **Huang, et al (2015)** showed the benefits of the implementation of the clinical pathway are to reduce the average length of stay and improve patient satisfaction. The current study findings were also supported by those studies conducted in other developing countries by **Atiya, (2016)** in Sulaimani teaching hospital entitled with "Maternal satisfaction regarding the quality of nursing care during labor and delivery" who found that mothers were satisfied with providers to care. In addition to, **Khammamy, et al., (2017)** studied "Delivery care satisfaction at government hospitals in Xiengkhuang Province under the maternal and child health strategy in Lao" and reported the same results.

The findings of the current study supported the study hypotheses and showed that there was a statistically significant improvement in nurses' knowledge and practice regarding all items for intrapartum clinical pathway care after the intervention. This improvement in care was

reflected in women's knowledge, practice, and satisfaction during the intrapartum period.

### **Conclusion:**

Based on the present study findings, it was concluded that using clinical pathways had a positive effect on enhancing the maternity nurses' knowledge of intrapartum care post clinical pathway application than pre-intervention. Also, there was an improvement in the maternity nurses' practice regarding intrapartum clinical pathway after the intervention than before the intervention which is statistically significant ( $p=.000$ ). The study findings also showed that there was a statistically significant difference regarding maternal satisfaction towards intrapartum care between the routine care group and clinical pathway group. These study findings proved the research hypotheses.

### **Recommendations:**

The following recommendations can be suggested based on the results and conclusion of the present study:

- Training programs should be implemented for maternity nurses about intrapartum care based on the clinical pathway to improve nurses' performance of intrapartum care
- The clinical pathway should be applied for women during the intrapartum period to improve their knowledge and practice. Also, to improve their satisfaction, reducing complications and reducing the duration of hospital stay.
- Further studies should be conducted on a larger population for the generalization of the results.

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