Effect of Implementing Clinical Pathway to Improve Child-Birth and Neonatal Outcomes

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Abstract Background: A clinical pathway is a multidisciplinary management tool based on evidence-based practice for a specific group of patients with a predictable clinical course, in which the different tasks "interventions" by the professionals involved in the patient care are defined, optimized and sequenced either by hour, day or visit. The aim of the present study was to examine the effect of implementing clinical Pathway to improve birth and neonatal outcomes. Design: Quasi-experimental study was used. Settings: this study was conducted at Maternal and child health center and labor unit of El-Basher Hospital /Amman Jordon. Subjects: The simple random sample of 150 mothers were selected and divided into equal group; intervention group (75 mothers who received clinical pathway during third trimester of pregnancy and/or labor) and control group 75 mothers who not received clinical pathway. Pregnant mothers were selected between 28-36 week antenatal visit, observed, and followed during labor for the use of pathway. Results of the study: revealed that there was significance difference between intervention and control groups concerning implementation of clinical pathway through application of "counting fetal movement and implementation of comfort measures", throughout the third trimester of pregnancy, labor process, that affect the progress and effect in reducing the severity of labor pain. There were significant differences among two studied group regarding pain intensity in relation to cervical dilatation CX 3-4 cm (11.570, 0.054* respectively), CX 5-7cm (13.348, 0.013* respectively) and CX 8-10 cm (12.671, 0.015* respectively). The duration of labor during all stages of labor were significant difference among studied groups ($p < 0.05$, $p < 0.001$ respectively) for total hours. The results shows that, the mean of APGAR score at 5th minute and at 10th minute in intervention group were significant higher (6.9±1.1 and 8.8±1.3) than in control group (4.8±0.8 and 7.03±1.5). Conclusions: - The use of clinical care pathways: "counting fetal movement and implementation of comfort measures" for optimizing prenatal care had a positive influence on child birth process and neonatal outcomes in obstetric practice. Recommendations: 1. Application of clinical pathway for pregnant mothers is essential for improving maternal status, reducing complication and reducing the duration of hospital stay and better neonatal outcome. 2. Ongoing in-service training programs should be designed and implemented at delivery room to improve nurses' practices on the basis of nurse's actual needs.

Keywords: clinical pathway, child birth, neonatal outcomes

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1. Introduction

Pregnancy and childbirth were placed within a lifecycle approach that acknowledged as normal, but necessary risk in reproduction may occur. Consultation between physician, nurses, the pregnant woman, family members and hospital staff allowed planning for births. Antenatal care was formalized by the adoption of standardized protocols. Maternity care practice was also shaped by biomedical values that sought to classify women according to obstetric risk [1].

Maternal mortality is a measure of a woman's risk of dying during pregnancy, in childbirth or during the 42 days following delivery [2]. In 2013, the number of maternal deaths worldwide was estimated at 292,982 [1]. In addition, there are nearly 6 million perinatal deaths (stillbirths and early neonatal deaths) that occur each year worldwide. It is in the poor countries of Africa and Asia that the risk of these deaths is highest [3].

The causes of maternal deaths which were generally known by Kassebaum, et al., as Antepartum and post-partum hemorrhage, obstructed labor, severe pre-eclampsia or eclampsia, complications related to abortion, uterine rupture and postpartum sepsis are the direct obstetric complications that account for more than 80% of maternal deaths [2]. Complications from preterm births, intrapartum-related disorders or birth asphyxia, and

infections are the main causes of perinatal deaths in several sub-Saharan African countries [4,5].

The rates of maternal and neonatal mortality and morbidity decreased as a consequence of the adoption of modern obstetric practices, especially during labor and delivery. However, obstetrical interventions continued to increase, particularly the rate of Caesarean sections. Active management is based on the assumption that the preventive management of events that may potentially result in adverse effects in the mother or the fetus reduces the morbidity rates of both. The labor and delivery experience is one of the most significant events in women's life, and can have strong physical, emotional, and psychological effects [6].

A survey of obstetricians and midwives in Australia and New Zealand showed wide variation in clinical practice regarding the management of decreased fetal movements. Monitoring fetal activity by asking women about fetal movements was considered an important part of routine antenatal care, but the definition of alarm limits, levels of clinical assessment and follow- up of women presenting with decreased fetal movements widely varied [7].

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 [8]. 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 in the USA [9]. In Australia, the use of care pathways has occurred with minimal professional nursing debate as to their benefits in practice. Comments supporting the introduction of pathways into clinical practice have focused on assistance to decision making, facilitation of clinical judgments about care, assistance in improving practice and utility as educational tools, particularly for new staff, new graduates and casual employees [10].

Clinical pathways have grown in popularity within UK health care. They are primarily used to enhance quality of care within the National Health Service, rather than managing the cost of care as in the United States. The key features of clinical pathways are: 1) a combined individual record of care with a decision-making protocol; 2) an emphasis on coordination of services and multidisciplinary working; 3) specification of each stage in the care process; and 4) minimal documentation, unless there is deviation from the norm [11].

Clinical pathways can be defined by **the National Assembly for Wales,** [12], as: "A documented sequence of clinical interventions, placed in an appropriate timeframe, written and agreed by a multidisciplinary team, helping a patient with a specific condition or diagnosis move progressively through a clinical experience to a desired outcome". Also Clinical pathways referred to as "critical pathways" and "integrated care pathways," represent "ideal" patient journeys. They state the specific sequence of care and document the care given. Recording is usually "by exception" (i.e., only if care deviates significantly from the pathway) [10,13].

The literature relating to clinical pathways in maternity care is limited, consisting mainly of opinion-based articles [5,14] and descriptive accounts of pathway implementation [16,17] with few primary research studies [18]. Maternity care pathways may focus on specific perinatal episodes such as postnatal care, or total care from admission to discharge [19].

Critical 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. Process improvement teams use critical pathways to track expected and goal centered outcomes, as well see Figure 1 [20].
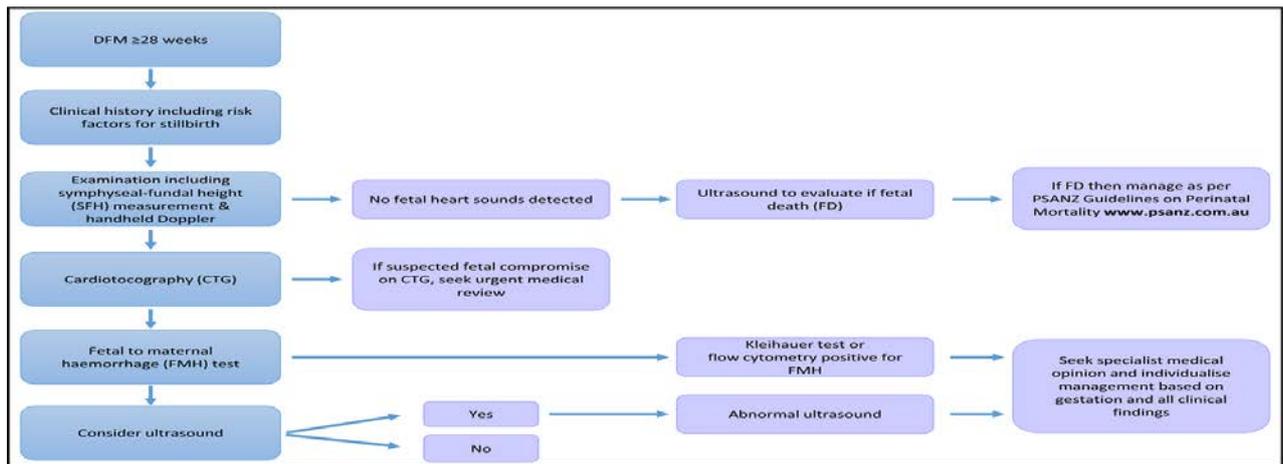
Critical pathways decrease length of stay, mortality, and hospital costs while providing improved outcomes for patients and increasing patient and staff satisfaction. In addition, they enhance collaboration between services and place all team members, including the patient and family, on the same page for planning and discussion [21].

Women mostly presented to the clinic only when established labor and were then admitted to the attached birth unit. When women presented to the hospital in established labor, active childbirth was encouraged, with many women walking around. When labor intensified, observation of the progress of labor, the woman continued to squat during the contractions, until birth occurs [22].

Definitions

Clinical Pathway Theoretically defined as:- as 'Schedules of medical and nursing procedures, including diagnostic tests, medications and consultations designed to effect an efficient, coordinated program of treatment' [23]. Or **Clinical Pathway Theoretically defined as:-** a multidisciplinary management tool based on evidence-based practice for a specific group of patients with a predictable clinical course, in which the different tasks (interventions) by the professionals involved in the patient care, which are defined, optimized and sequenced and Outcomes are tied to specific interventions. Clinical pathways can range in scope from simple medication utilization to a comprehensive treatment plan. A clinical pathway is a method for the patient-care management of a well-defined group of patients during a well-defined period of time; Outcomes [24].

A clinical pathway was operationally defined as:- a care plans, in which the intervention take place (detailed instruction of the best practice of how the pregnant mother count the fetal movement and apply the comfort measures and facilitating the progress, monitoring and evaluating the necessary outcomes [25].

Figure 1. Care pathway and clinical practice points for women presenting with decreased fetal movements from 28 weeks' gestation (**Adopted from**; [20]**)**

2. Aim of the Study

The aim of this study was to examine the effect of implementing clinical pathway to improve birth process and neonatal outcomes.

Research Hypothesis:

1. Pregnant mother who will participate in implementing clinical pathway are more likely to be improved in counting the fetal movement than those who does participate in implementing clinical pathway.

2. Pregnant mother who will participate in implementing clinical pathway are more likely to be improved in implementing comfort measures than those who do not implement clinical pathway .

3. Pregnant mother who will participate in implementing clinical pathway are more likely to be improved in birth process and less in labor pain intensity among Clinical Pathway intervention than those who do not implement clinical pathway .

4. Pregnant mother who will participate in implementing clinical pathway are more likely to have better

neonatal outcomes (APGAR score) among Clinical Pathway intervention than control groups

3. Subjects and Method

Design: Quasi-experimental study was used.

Setting: this study was conducted at Maternal Child Health Center and labor unit of El-Basher Hospital /Amman Jordon.

Subjects: A simple random sample of one hundred and fifty pregnant mothers was selected between 28 -38 weeks of gestation.

Calculation of Sample Size: In order to calculate the required sample size, the researcher used the Epi statistical program from the Open Source Statistics for Public Health. The assumptions were: a two sided confidence level of 95% = (1- α); a power (1- β) or (% chance of detecting) of 80%; ratio of sample size, unexposed (control)/ exposed (study group) = 1% of unexposed with outcome (awareness) = 5%. Pregnant mothers were selected according to the following criteria:-

Inclusion criteria:

- Nulliparous mothers between (28-38 weeks of gestation).
- Pregnant mothers with a living fetus at the routine ultrasound scan.
- Single, cephalic presentation; no evidence of cephalic-pelvic disproportion or fetal distress.
- Who have not involved in similar structured program.

Exclusion criteria:

- fetal malformation;
- maternal disease and/
- Indication for elective Caesarean section.

They were divided into equal group; intervention group "seventy-five mothers" who received clinical pathway and control group seventy-five mothers who not received clinical pathway.

Tools /or Instruments for data collections:-

I. An interviewing questionnaire was developed by the researcher based on the review of relevant literature; pregnant mothers were interviewed about the use of clinical pathway and its components.

Part 1: Addressed information related to general characteristics data such as age, occupation, level of education.

Part 2: Assessed mother's obstetrical histories.

Part 3: Assessed mother's knowledge and practice about care before and during delivery applying clinical pathway: counting fetal movements, comfort measures which includes; back massage, breathing exercise, relaxation, teaching technique of bearing down. **Scoring system for mother's practice in** counting fetal movement

Score	Mother's practice in counting fetal movement
1	Correct answers
0	Incorrect answers

Part four: Assessed mother's implementation of comfort measures.

Scoring system for mother's knowledge about comfort measures:

Score	Mother's knowledge about comfort measures
1	**Correct**
0	**In correct**

Scoring system for mother's implementation of comfort measures

Score	implementation of comfort measures
1	**Correct**
0	**In correct**

II. Likert Scale for Labor outcomes: This tool was developed by the researcher after extensive review of the relevant literature. It consisted of the following parts:-

- The outcomes included duration of first stage of labor; amniotomy in relation to the time of hospital admission and cervical dilation; color of amniotic fluid; use of oxytocin in relation to cervical dilation; time of analgesia in relation to cervical dilation and time of admission to hospital; presence of functional dystocia and changes in fetal wellbeing; length of the second stage; time between hospital admission and delivery.
- **Scoring system for** mother's intensity of labor pain among Clinical Pathway intervention

Scoring system	Intensity of labor pain
0	Mild pain
1	Moderate pain
2	Sever pain

- Scoring system for mother's duration of labor during all stages of labor among Clinical Pathway intervention and control groups by cervical dilatation

Scoring system	Duration of labor during all stages of labor
0	First stage
1	Second stage
2	Third stage

- **Neonatal outcomes were:** Apgar score at 1 and 5 minutes, birth weight, admission to the neonatal intensive care unit (NICU), and immediate mother infant contact following delivery. Variables regarding breastfeeding were: the ability of the infant to take the breast and suckling in the delivery room and in the 12 hours following delivery,
- **Scoring system for Neonatal outcomes** among Clinical Pathway intervention and control groups

Scoring system	Neonatal outcomes
	• APGAR score at 5th minute
1	≥6
2	6-8
3	≥8
	• APGAR score at 10th minute
1	≥6
2	6-8
3	≥8

4. Method

- **Study Period:** The data was collected through a period of 14 months started from January 2017 to February 2018.
- **Approval:** An official letter was sent from the Dean of the Faculty of Nursing in Philadelphia University to the directors of Maternal and child health center and labor unit of El-Basher Hospital /Amman Jordon for explaining the aim of the study and the time of data collection seeking his permission for data collection. An official permission through written letters was obtained from the directors of El-Basher Hospital as an approval for data collection.

- **Ethical Considerations:**
  - For the purpose of protection of women's rights, a written informed consent was obtained from the participants after explaining the purposes of the study, which include: no harm was occurring to participant, do not contradict with the cultural, traditional and religious issues, human rights were reserved, and data was confidential and used mainly for the purpose of the research.

- **Tools Development:**
  - Validity; Instruments were reviewed and tested for validity by 5 experts in obstetrical nursing, modification were done accordingly to ascertain relevance and completeness.
  - Reliability: The internal consistency of the questionnaires was calculated using Cronbach's alpha coefficients. Test-retest was used. The Cronbach's alpha of the questionnaires was 0.91 indicate good reliability. Whereas, Cronbach's alpha of likert scale for labor outcomes was 0.89 indicate good reliability.
  - Pilot study, a pilot study was carried out on 10 pregnant mothers of sample to evaluate the developed tools before starting the actual data collection. The pilot sample was not included in the total sample of the research work to ensure stability of the answers. Based on the results of the pilot study, modifications, and rearrangement of some questions were done. It also helped to estimate the time needed to fill in the questionnaire.

  Procedure for Data Collection:
  - The researcher meets each pregnant mother individually, introduced herself to the mothers, and obtained their consent to be recruited in the study after explaining the aim of the study.
  - Then researcher completes with the pregnant mother tool one application.
  - Each pregnant mother of the intervention group was interviewed by the researcher and provided by theoretical and practical information about the clinical pathway that will be used.

The clinical pathway were explained in detailed in the form of: "how to count fetal movement and implementation of comfort measures that included back massage, breathing exercise, relaxation, teaching technique of bearing down. Beside discussion and lecture to improve mother knowledge, each mother would receive brochure with information, to facilitate the learning and its application.
  - The average time for filling each tool was about 25 minutes depending on the response of the mother

training results about comfort measures (back massage, breathing exercise, relaxation, teaching technique of bearing down, changing position, fluid intake, and immediate of breast feeding. It was consumed 1 hour.
- Then the researcher assesses mother correct practice and if needed re-demonstration of measures was repeated to be sure that the mother perfectly practices the comfort measures. A card was given to the mother including researcher phone number to be easily contacted with the researcher when admitted to labor unit in hospital**.**
- **For the Control Group:** Participants pregnant mothers in the control group were exposed to routine hospital care.
- **In labor unit** the researcher stay beside the mother while providing comfort measures to mother to be sure that she was conducted it perfectly; their performance was assessed by using Likert scale for Labor outcomes**.**
- Evaluation of labor progress was done for both groups intervention as well as control group.

5. Statistical Analysis

Up on completion of data collection, the data collected were coded, tabulated and statistically analyzed by personal computer and statistical package SPSS version 16. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and means and standard deviations for quantitative variables. Variables were compared using chi-square test. Correlation analysis was used for assessment of the inter-relationships among quantitative variables. Statistical significance was considered at p-value <0.05 and $P < 0.001$.

6. Results

Table 1: show that, mean age of women in intervention and control groups was 20.40 ± 3.37 and 26.32 ± 4.29 years, respectively. Also, there were no significant differences among the two groups in the study regarding age, educational level and occupation.

Figure 2: Bar chart show the difference of correct and incorrect answers before and after clinical pathway intervention classes regarding how to count fetal movements, where the incidence of correct answer 109 after clinical pathway intervention was higher than 57 before clinical pathway intervention. Meanwhile, statistical significance differences was found at 1% level of statistical significance, where P- value= <0.001.

Figure 3: Par chart show the difference of correct and incorrect answers before and after clinical pathway intervention regarding to what are the reasons for decreasing fetal movement, where the incidence of correct answer after clinical pathway intervention was 108 higher than before 38 clinical pathway intervention. Meanwhile, statistical significance differences was found differences at 1% level of statistical significance, where P- value= <0.001.

Figure 4: Par chart show the difference of correct and incorrect answers before and after clinical pathway intervention regarding to what is meant by the fetal tachycardia, where the incidence of correct answer after clinical pathway intervention was 98 higher than before 38 clinical pathway intervention. Meanwhile, statistical significance differences was found at 1% level of statistical significance, where P- value= <0.001.

Table 2: show the, distribution of Clinical Pathway intervention group according to their knowledge regarding definition and importance of comfort measures before and after Clinical Pathway Intervention classes. It was revealed that a highly statistical significance difference was found between correct and wrong knowledge before and after Clinical Pathway Intervention classes.

Table 3 illustrates the distribution according to knowledge regarding comfort measures among the intervention and control groups that, the intervention group had correct knowledge about definition of comfort measures and importance of comfort measures than control group. Also significant difference were observed between before and after antenatal classes ($p<0.001$).

Table 4: Show that, there were significant differences among two studies group regarding to implementation of comfort measures among intervention and control groups (x^2 23.570, 3.955, 4.167, 6.543, 12.74, 4.67 and 3.967 respectively) *statistically significant p <0.05, **Statistically highly significant p <0.001.

Table 5 shows that, most of mothers who were crying and screaming were lower (20%, 6.7% and 33.3, 46.7) in intervention group than control group respectively during degree of cervical dilatation. Meanwhile the rates of women calm were significant higher in intervention group than control group.

Table 6 show that, there were significant differences among two studies group regarding pain intensity in relation to cervical dilatation CX 3-4 cm (11.570, 0.054* respectively), CX 5-7 cm (13.348 , 0.013* respectively) and CX 8-10 cm (12.671, 0.015* respectively)

Table 7: Means distribution among mothers according to their duration of labor/ hours among intervention and control groups. It shows that the duration of labor during all stages of labor were significant difference among studied groups (p <0.05, p <0.001 respectively) for total hours.

Table 8 show that, the mean of APGAR score at 5th minute and at 10th minute in intervention group were significant higher (6.9±1.1 and 8.8±1.3) than in control group (4.8±0.8 and 7.03±1.5).

Table 1. Distribution of mothers according to their general characteristics among the Clinical Pathway intervention and control groups

Items	Clinical Pathway Intervention Group N= 75		Control group N= 75		x^2	*P* value
	No.	%	No.	%		
● Age/ year						
> 20	21	28%	15	20	3.83	>0.05
20 –	40	53.3	43	57.3		
30–	10	13.3	12	16		
40 & <	4	5.3	5	6.7		
● Educational level						
Preparatory	34	45.3	28	37.3	2.90	>0.05
Secondary	26	34.7	33	44		
University	15	20	14	18.7		
● Occupation						
House wife	50	66.7	55	73.3	1.35	>0.05
Working	25	33.3	20	26.7		

Answer Research Hypothesis Number one:

Pregnant mother who will participate in implementing clinical pathway are more likely to be improved in counting fetal movements than those who does participate in implementing clinical pathway.
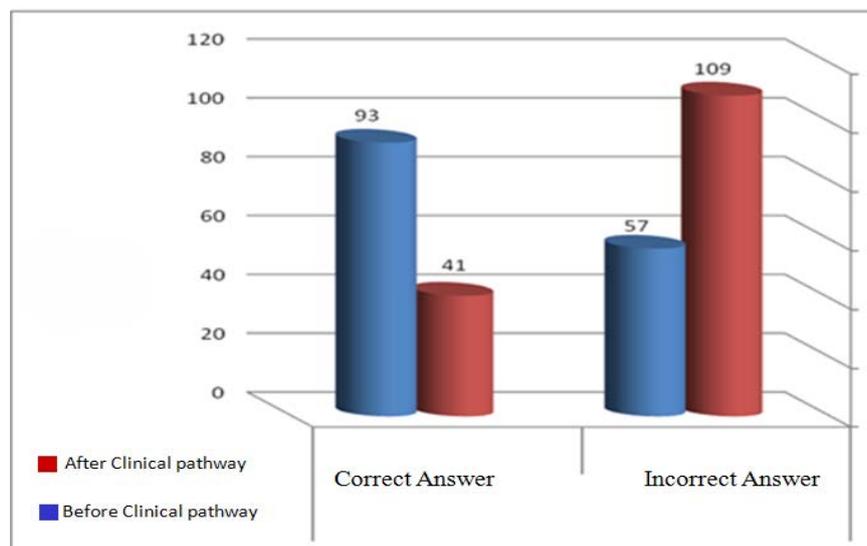

Figure 2. Shows the difference of correct and incorrect answers before and after clinical pathway about to how to count fetal movements.
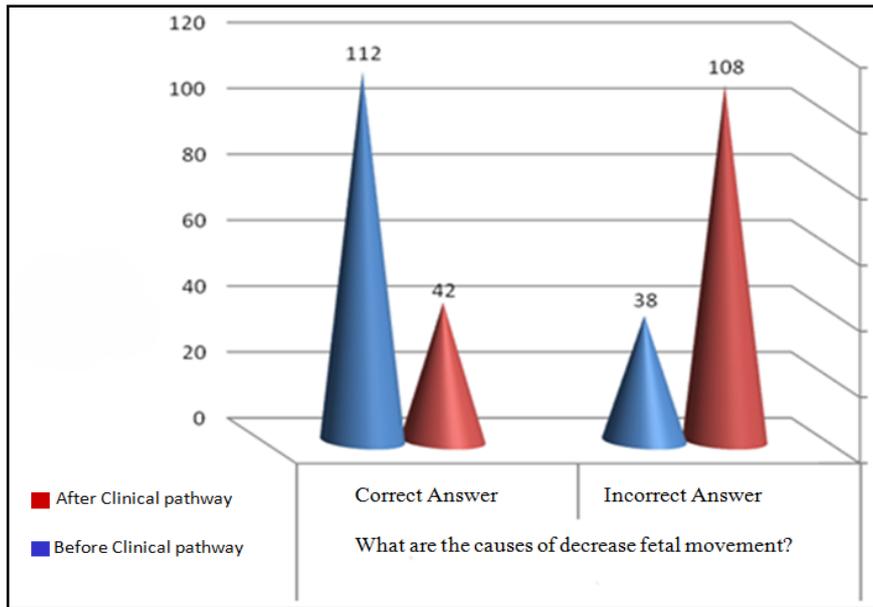
Figure 3. Shows the difference of correct and incorrect answers before and after regarding to what are the reasons for decreasing fetal movement
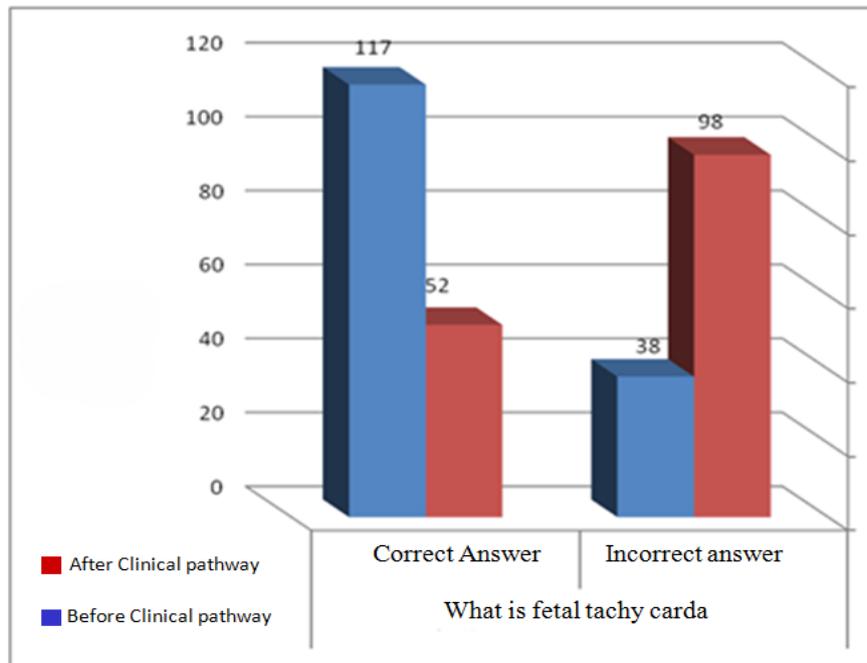
Figure 4. Show the difference of correct and incorrect answers before and after regarding to what is the fetal tachycardia

Answer Research Hypothesis Number two:

Pregnant mother who will participate in implementing clinical pathway are more likely to have improved in implementing comfort measures than those who do not implement clinical pathway.

Table 2. Distribution of Clinical Pathway intervention group according to their knowledge regarding Definition and Importance of comfort measures before and after Clinical Pathway Intervention classes

knowledge regarding comfort measures	Before Clinical Pathway Intervention Group (N= 75)		After Clinical Pathway Intervention Group (N= 75)		x^2	*P* value
	No.	%	No.	%		
Definition of comfort measures						
Correct	15	20	69	92	**17.45**	**0.001****
In correct	60	80	6	8 %		
Importance of comfort measures						
Correct	17	22.7	70	93.3	**18.57**	**0.001****
In correct	58	77.3	5	6.7		

**Statistical highly significant P<0.001.

Table 3. Distribution according to their knowledge regarding comfort measures among the clinical pathway intervention and control groups

knowledge regarding comfort measures	Clinical Pathway Intervention N=75		Control group N=75		x^2	*P* value
	No.	%	No.	%		
● knowledge of comfort measures						
Correct	69	92	20	26.7	23.35	0.001**
In correct	6	8	55	73.3		
● Importance of Application of comfort measures						
Correct	70	93.3	15	20	87.78	0.001**
In correct	5	6.7	60	80		

Table 4. Distribution regarding to implementation of comfort measures among clinical pathway intervention and control groups

Comfort measures	Clinical Pathway Intervention group N=75				Control group N=75				x^2	*P* value
	Correct		In correct		Correct		In correct			
	No.	%	No.	%	No.	%	No.	%		
Breathing exercise	69	92	6	8	10	13.3	65	86.7	**23.57**	**0.000****
Bearing down	74	98.7	1	1.3	38	50.7	37	49.3	**3.955**	**0.052***
Back massage	66	88	9	12	20	26.7	55	73.3	**4.167**	**0.054***
Change position	70	93.3	5	6.7	30	40	45	60	**6.543**	**0.012***
Fluid intake	65	86.7	10	13.3	10	13.3	65	86.7	**12.74**	**0.001***
Relaxation	59	78.7	16	21.3	50	66.7	25	33.3	**4.67**	**0.054***
Early attachment	70	93.3	5	6.7	45	60	30	40	**3.967**	**0.057***

*statistical significant *P* <0.05, **Statistical highly significant *P* <0.001.

Answer Research Hypothesis Number three:

Pregnant mother who will participate in implementing clinical pathway are more likely to be improved in birth process and less in labor pain intensity among Clinical Pathway intervention than those who do not implement clinical pathway.

Table 5. Distribution of mothers according to vocalization during their degree of cervical dilatation among clinical pathway intervention and control groups

Items	Clinical Pathway Intervention g. N=75		Control group N=75		x^2	*P* value
	No.	%	No.	%		
● Cervix 3-4 cm						
Crying	15	20	25	33.3	4.891	0.015*
Screaming	5	6.7	35	46.7	4.345	0.049*
Calm or silent	55	73.3	15	20	4.089	0.053*
● Cervix 5-7 cm						
Crying	10	13.3	25	33.3	3.456	0.056
Screaming	15	20	40	53.3	3.761	0.048*
Calm or silent	50	66.7	10	13.3	4.045	0.044*
● Cervix 8-10 cm						
Crying	12	16	40	53.3	4.248	0.045*
Screaming	20	26.7	30	40	4.296	0.045*
Calm or silent	43	57.3	5	6.7	4.950	0.038*

*statistically significant *p*<0.05.

Table 6. Distribution of mothers according to their intensity of labor pain among Clinical Pathway intervention and control groups by cervical dilatation

Intensity of labor pain/ By Cervical dilatation	Clinical Pathway Intervention group. N=75		Control group N=75		x^2	*P* value
	No.	%	No.	%		
● CX 3-4 cm						
Mild pain	66	88	25	33.3	11.570	0.054*
Moderate pain	5	6.7	35	46.7		
Sever pain	4	5.3	15	20		
● CX 5-7 cm						
Mild pain	30	40	10	13.3	13.348	0.013*
Moderate pain	40	53.3	40	53.3		
Sever pain	5	6.7	25	33.3		
● CX 8-10 cm						
Mild pain	10	13.3	5	6.7	12.671	0.015*
Moderate pain	55	73.3	20	26.7		
Sever pain	10	13.3	50	66.7		

*statistically significant *p*<0.05.

Table 7. Distribution of mothers according to their duration of labor/ hours among Clinical Pathway intervention and control groups

Stages duration /hours	Clinical Pathway Intervention group N=75	Control group N=75	t	P value
First stage	10.48±3.02	13.5± 2.6	5.14	0.05*
Second stage	0.99± 0.50	1.745± 0.42	7.4	0.001**
Third stage	0.12 ± 3.89	0.140± 8.538	5.6	0.05*
Total /hours	10.96 ± 2.13	20.34 ± 2.60	18.8	0.001**

*statistical significant *p*<0.05, **Statistical highly significant *P*<0.001.

Answer Research Hypothesis Number four:

Pregnant mother who will participate in implementing clinical pathway are more likely to have better neonatal outcome **"APGAR score"** among Clinical Pathway intervention than control groups**.**

Table 8. Distribution of Neonatal outcome "APGAR score" among Clinical Pathway intervention and control groups

Items	Clinical Pathway Intervention group N=75		Control group N=75		t	P value
	No.	%	No.	%		
• APGAR score at 1 min						
≥6	3	4	30	40		
6-8	45	60	35	46.7		
≥8	27	36	10	13.3	5.6	<0.05
Mean ±SD	6.9±1.1		4.8±0.8			
• APGAR score) at 5th min						
≥6	O	0	25	33.3		
6-8	25	33.3	35	46.7		
≥8	50	66.7	15	20	2.6	<0.05
Mean ±SD	8.8±1.3		7.03±1.5			

*statistical significant *p*<0.05.

7. Discussion

The creation of care pathways has become a popular response to concerns regarding the implementation of evidence-based practice. Care 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 with the aim to enhance the quality of care by improving patient outcomes, promoting patient safety, increasing patient satisfaction, and optimizing the use of resources [26]. They map the whole journey for a typical patient with a specific diagnosis and include the contribution of the multidisciplinary team. Documentation forms part or all of records of the patients' care. Care pathways could also be handy audit tools for clinical practice [27]. Many obstetric conditions are best managed in a standard way using well designed protocols. These tools could be used to enhance perinatal outcomes in most conditions. This is evident from results on the use of care pathways in critical care, surgery and anesthesia [28,29]. This study aimed to examine the effect of implementing clinical Pathway to improve child-birth and Neonatal outcomes.

The present study hypothesized that pregnant mother who will participate in implementing clinical pathway are more likely to be improved in counting fetal movements than those who does participate in implementing clinical pathway. The results of the present study show the difference of correct and incorrect answers before and after regarding to how counting fetal movements, where the higher incidence of correct answer after was higher than before and also regarding to what are the reasons for decreasing fetal movement statistical significance differences was found differences at 1% level of statistical

significance, where P- value= <0.001. This result was consistent with Ahmed, who studied "The effect of counseling intervention on women's knowledge, practices and lifestyle of fetal well-being during prime gravida" [30], they reported that women's knowledge regarding health care during pregnancy most of women had inadequate knowledge; 93.3% about antenatal care during pregnancy, 94.0% about fetal movement, 91.3% about Ultrasonography before application of the intervention. And also most of them had inadequate practices regarding life style (94.6%) and health practices (83.2%) as compared with after application of the intervention [30]. Also the result of Ugwu, et al., who confirmed a similar to the present study results who reported that mothers have deficient knowledge on the normal physiologic change that occurs during pregnancy, most of women expressed that it is important to feel the fetal movements, because this is a sure signs that the fetus is alive, more over added that the significance of fetal movement as indication that the fetus is growing well which is not the accurate reason for perceiving fetal movement [31]. Moreover, Zachary, et al., stated that may pregnant women may lack vital information that could contribute to a healthy pregnancy such as counseling, physical activity and nutrition during pregnancy [32]. Whereas, Olagbuji, [33] 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.

The present study hypothesized that pregnant mother who will participate in implementing clinical pathway are more likely to be improved in implementing comfort measures than those who do not implement clinical pathway. The present study revealed that a significant improvement in intervention group knowledge regarding comfort measures before intervention and after intervention. These results are supported by Ranger, et al., [34] who studied "Comparison of the maternal experience and duration of second stage of labor comparing two upright delivery position a randomized controlled trial" [34]. 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, [35] 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.

The present study revealed that in the intervention group the majority of intervention group applied different clinical pathway "supportive measures" correctly for pain relief such as technique of bearing dawn, breathing exercise, changing position, relaxation these measures affect pain intensity and provide a sense of well-being, sense of control, decreased tension, enhanced mood and provides more oxygen for mother and fetus. It proved that, there were significant differences among two studies group regarding to application of comfort measures among intervention and control groups. This finding supported by several authors [36,37] 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.

The present study showed that the clinical pathway intervention group; the majority of presence of trained mother applied different clinical pathway of supportive measures correctly for pain relief such as technique of bearing dawn, breathing exercise, changing position, relaxation these measures affect pain intensity and provide a sense of wellbeing, sense of control, decreased tension, enhanced mood and provides more oxygen for mother and fetus. 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 by several authors [38] 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.

Regarding research hypothesis number three; pregnant mother who will participate in implementing clinical pathway are more likely to be improved in birth process and less in labor pain intensity among Clinical Pathway intervention than those who do not implement clinical pathway. The present study results shows that, most of mothers who were crying and screaming were lower in intervention group than control group respectively during degree of cervical dilatation. Meanwhile the rates of women calm were significant higher in intervention group than control group. Also show that, there were significant differences among two studies group regarding pain intensity in relation to cervical dilatation. This result was in line with [39,40] they 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, give a sense of control and confidence to parturient mothers that they were always pushing in the right way and right time and their bearing down efforts were helpful. This allowed them to be calmly and efficiently coordinate push strongly for as long as possible in every contraction.

To answer research hypothesis number four regarding pregnant mother who will participate in implementing clinical pathway is more likely to have better neonatal outcome APGAR score among Clinical Pathway intervention than control groups**.** 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 [41] who 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 WHO [39,42] 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 shows that continues care provided through a Clinical Pathway Intervention before and during labor and delivery had a positive effect with the birth process experience.

8. Conclusions

The use of clinical care pathways: "counting fetal movement and implementation of comfort measures" for pregnant mothers had improved in:-

- Counting the fetal movement than those who does participate in clinical pathway,
- Implementing comfort measures than those who do not implement clinical pathway .
- Birth process and less in labor pain intensity among Clinical Pathway intervention than control who do not implement clinical pathway .
- Better neonatal outcomes (APGAR score) among Clinical Pathway intervention than control groups

The implementation of clinical care pathways for optimizing prenatal care had a positive influence on child birth process and neonatal outcomes in obstetric practice.

9. Recommendations

1. Application of clinical pathway for pregnant mothers is essential for improving maternal status, reducing complication and reducing the duration of hospital stay and better neonatal outcome.

2. Ongoing in-service training programs should be designed and implemented at delivery room to improve nurses' practices on the basis of nurse's actual needs.

3. A standardized clinical pathway and guidelines should be available in each Maternity hospital.

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