

Effect of Pelvic Floor Muscle Exercise Training Protocol For Pregnant Woman during 3rd Trimester on Labor Duration

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Abstract

Background: Pelvic floor muscles training during pregnancy can produce strong and well controlled muscles that will facilitate labor progress and outcomes. The aim of this quasi-experimental non equivalent control study was to assess the effect of pelvic floor muscle exercise training protocol for pregnant woman during 3rd trimester on labor duration. **Sample:** A total of 100 pregnant women in 3rd trimester were recruited for this study. **Research design:** A convenience sample was used & divided into two groups (study & control groups) 50 each; the study group who received pelvic floor muscle training exercise and control group who received standard routine care at El-Manial University Hospital, Cairo University, Egypt. Each group was assigned randomly to the line of management. **Tools:** Structured interviewing tool, pelvic floor muscles strength assessment, antenatal follow up checklist, partograph. **Results:** a statistically significantly difference between the study and control groups in relation to duration of 1st, 2nd and 3rd stage of labor. **Conclusion:** pelvic floor muscle training exercise can be useful to decrease duration of labor. **Recommendation:** Pelvic floor muscle training exercise should be an essential part of prenatal care. The nurse should be an educator and counselor for mothers during prenatal care.

Keywords: pelvic floor muscle training exercise, 3rd trimester of pregnancy, labor duration

1. Introduction

Pregnancy more than childbirth appears to contribute to altered long term pelvic floor function in later life due to the hormones of pregnancy. This hormone has been associated with relaxation and structural effects on the connective tissue of the pelvic floor during the third trimester and childbirth. These effects reduce the strength of the pelvic floor to help ease the birthing process. Evidence also shows that some obstetric factors may cause partial damage to the pelvic floor nerves in some women particular the pudendal nerve that can cause weakness of the pelvic floor muscles and relaxation of the external urethral sphincter, resulting in urinary incontinence. Strengthening the pelvic floor muscles (PFM) can play a fundamental role in maintaining continence and integrity of the pelvic floor. (Meddelton, 2009)

PFM consist of urethral sphincter, levator ani muscle, anal sphincter, and other muscles, which support the pelvic organs like a hammock to keep them stable. Pregnancy and vaginal delivery may cause weakness of the pelvic floor muscles (Gameiro, Sousa ,Gameiro, Muchailh and, Padovani etal ,2011). The mechanism between PFMT in gestation and the reduced first and second stage of labor is not completely clear. Generally, regular PFMT has been shown to increase PFM strength (Morkved , Schei and Salvesen ,2003) Antenatal pelvic floor muscle training exercise (PFME) results in improved muscle control and strong flexible muscles which may contribute to the descent or rotational movements of the fetal head (Salvesen and Morkve,2004) . Thus, antenatal (PFME) shortens the first and second stage of labor. It may also help the primigravida to form a positive attitude towards childbirth, which is conducive to spontaneous labour.

Lixu, Yihui, Du., Ding, L., Wang, Y., and Wang, Z., (2015) reported that women who apply pelvic floor muscle training exercise during pregnancy had a lower rate of prolonged second stage of labor and incidence of episiotomy. In the same context, (Bø, K., Fleten and Nystad, 2009), examined the effect of antenatal pelvic floor muscle training on labor, the study findings found that, women who performed pelvic floor muscle training only once per week, 7.2 % sustained a third degree or fourth degree laceration compared to 6.3% of women who performed pelvic floor training at least 3 times per week. A similar pattern was present for rates of episiotomy (29.1% compared to 24.9%), vacuum, forceps delivery (15.9% compared to 15%) and rate of CS. (9.5% compared to 7.5% respectively).

Strengthening pelvic floor muscles during pregnancy can help the muscles control well during labor and delivery. Toning all of these muscles will also minimize two common problems during pregnancy: bladder control and hemorrhoids. Pelvic floor training exercises are also recommended after pregnancy to promote perineal healing, regain bladder control, and strengthen pelvic floor muscles (Bø, K., Fleten, C., and Nystad, c., (2009).

Significance of the Study

Maintains of good pelvic floor muscles function is one of the factors that can improve maternal co- morbidity rate. So it is important for maternity nurses to be aware about the impact of poor pelvic floor muscle on labor and birth outcomes. Also, findings of this study will help the health care provider to apply pelvic floor exercise as a routine antenatal care for pregnant woman to facilitate and improve labor progress and outcomes.

Although various studies have confirmed the efficiency of (PFME) in the treatment of urinary incontinence, reports regarding (PFME) for the pelvic floor muscles during pregnancy and the puerperal periods are scarce. Therefore, the aim of the present study was to evaluate the effects of the (PFME) during pregnancy on labor duration. The researcher in this study believed that the decrease the duration of labor will decrease the complications that may occur to maternal and fetus such as laceration, bleeding and fetal distress, which will decrease morbidity rate and costs that will treated the previous complications.

2. Holonic Manufacturing System (HMS)

Aim of the study

The aim of the present study was to assess the effect of pelvic floor muscle exercise training protocol for pregnant woman during 3rd trimester on labor duration.

Research Hypothesis

Pregnant women who will follow the structured pelvic floor muscle training exercise protocol will have shorter duration of labor compared to those who followed the routine care.

Subjects and Methods

A Quasi experimental nonequivalent post-test only research design was used in this study. A convenience sample was utilized, a total of 100 pregnant women were recruited in this study according to the following inclusion criteria: pregnant in 3rd trimester period (28- 32) weeks of gestation, their age from 20- 35 years old, gravida 2, can read and write, singleton pregnancy, fetal in vertex presentation. The setting of data collection was the antenatal outpatient clinic, labor and delivery department at El Manial Maternity Hospital, El Kaser El Ainy educational hospital, in Egypt. The researcher divided the sample into two groups, the study group constituted (50) women, who received pelvic floor training exercise and the control group constituted (50) women who received the standard routine antenatal care. The researcher dedicated the 1st 4 months to control group while the next 8 months were dedicated to experimental one. Six tools were used for collect data pertinent to the study: structured interviewing tool, pelvic floor muscle strength assessment tool, pelvic floor muscles exercise training protocol booklet, antenatal follow up sheet, pelvic floor muscles exercise checklist, and partograph.

Procedure

After taking the approval of the ethical committee of research in the Faculty of Nursing, Cairo University, an official permission was obtained from the director of antenatal clinic at the teaching hospital and director of labor & delivery department to carry out the study. The researcher introduced herself to the subjects and explained the purpose of the study in order to obtain their written acceptance to be recruited in this study as well as to gain their cooperation. Data were collected through a period of one year from first of April 2013 to the end of March 2014. The researcher dedicated the 1st 4 months to control group while the next 8 months were dedicated to experimental one. Throughout the whole year, the researched attended the labour and antenatal units 3 days per week to recruit cases.

The current study was carried out on five phases: preparatory phase, interviewing phase, physical and assessment phase; implementation phase and evaluation phase.

1- Preparatory phase: The researcher contacted the medical and nursing directors of the antenatal clinic and labor ward to explained the purpose of the study, risks and benefits to mothers, fetus and then obtained a written approval to conduct the study ,also during this phase the researcher design the tools as well as preparation of educational sessions . The researcher was trained how to assess pelvic floor muscles for a period of three weeks before implementing the research by training sessions at the Obstetrics Department in the Faculty of Physiotherapy to master the technique.

2. Interviewing Phase

The researcher collected data from pregnant woman in both groups (study and control) through interview and physical assessment. During the initial visit, the researcher met the pregnant women recruited for the study group for the first time at antenatal clinic at teaching hospital, while; met pregnant women recruited for control group for first time at reception room at labor unit. Women, who met the eligibility criteria were identified, recruited, and a written informed consent to participate in the study was obtained from them. On admission, women were interviewed to collect data after the researcher introduced herself and explained the purpose of the research. In the interviewing phase, all pregnant women in both group were interviewed individually to collect data related

to socio-demographic status, present obstetrical history, as well as history of previous pregnancies and deliveries utilizing the structured interviewing schedule. Personal interview was done at the antenatal clinic for the study group while, done at labor unit reception for the control group. The researcher faced the mother, and asked questions in Arabic and recorded the answers in the special sheet. The interview took around 15 minutes to be completed for each participant.

3-Physical and Obstetric Assessment

In this phase, the researcher started physical examination of pregnant women which included height, weight and after that calculated the body mass index (BMI) through divide the new weight in kg, by height in meters squared (wt/ Ht^2m). If the BMI > 30 kg/m pregnant woman is exclude. After that, the initial assessment was performed for each woman to obtain the baseline data on admission such as vital signs, abdominal palpation for determination of fundal level, lie, presentation, attitude of fetus and fetal heart sound auscultation. Also the researcher assessed the strength of pelvic floor muscle by using pelvic floor muscle strength utilizing pelvic floor muscles strength assessment tool. This assessment repeated for the study group in the subsequent visits except assessment of the strength of pelvic floor muscle. Follow up visits for pregnant women in the study group done every week for four weeks at antenatal clinic at the Teaching Maternal Hospital and from fifth week of protocol the follow up done weekly through telephone by the researcher till delivery.

4) Implementation phase (for the study group only):

The researcher provided the instructions to woman about Kegels exercise through four weeks; **first week**, which start immediately after assessment and contain two educational sessions, each session take about 30 minutes and there are 15 minutes break between two sessions; in the first educational session, The researcher discuss with pregnant women what are the pelvic floor muscles, it is functions, the advantages of pelvic floor muscle training as it increasing strength and elasticity of pelvic floor muscles, so facilitates easy passage of the fetus during second stage of labor and prevent the occurrence stress incontinence and prolapsed after delivery and how to detect the right muscle group for applying Kegel's exercise, by the researcher instructs pregnant women to enter the bath room to make urination, and at the middle of urination, told the woman to try to stop the flow of urine when she is sitting on toilet, she should experience a feeling of squeezing and lifting at the same time. If she can do this, she is using the right muscles. After finish 1st session all woman take break for 15 min to eat some snacks and drink juice.

2nd educational session, After break the researcher started 2nd session by instructs pregnant women in the study group about how to apply Kegel's exercise during pregnancy accurately and safely by using Kegel's training exercise checklist. At first the researcher provide instructions to pregnant woman such as breathe normally during the exercises; and not to move her leg, buttock, or abdominal muscles during the exercises. Also the researcher instructed the pregnant woman to relax for a period equal to the period of holding the contraction and increases the number of contractions and the duration of holding gradually from week to another. After that, the researcher taught her to contract the muscles as she is trying to stop the flow of urine for count of three (3 seconds) and relax for another three seconds. Contract and relax 5 times, repeat this 5 times per day (25 contractions each day) for next week. The researcher told the pregnant woman that she can apply this procedure at any position she likes, such as watching TV, sitting with her children, sitting on toilet, lying on bed.

Second week: This week included two sections; in the first section the researcher assessed the health condition of pregnant woman such as vital signs, weight, and performed abdominal examination. In the second section the researcher assessed the accuracy of application Kegel's training exercises for the last week by using follow up checklist tool. After that the researcher provided the new instruction for the pregnant woman to increase the number of contractions and the duration of holding to 6 seconds, increase number of contractions and relaxations to 10 times, and repeat that 5 times per day (50 contractions each day).

Third week: The same correction as 2nd week. After that the researcher provide the new instruction for the pregnant woman to increase the number of contractions and the duration of holding to 9 seconds, increase number of contractions and relaxations to 15 times, and repeat that 5 times per day (75 contractions each day).

Fourth week: The same correction as 2nd week. After that the researcher provide the new instruction for the pregnant woman to increase the number of contractions and the duration of holding to 12 seconds, increase number of contractions and relaxations to 20 times, and repeat that 5 times per day (100 contractions each day). These numbers of contractions and relaxation followed till delivery.

Pregnant women in the study group also received booklet about Kegel's exercise to remember them with exercises procedure at home. The researcher was met pregnant women in the study group for four weeks to ensure their compliance (check how to apply Kegel's exercise and take feedback) by using follow up checklist. After that the researcher followed pregnant women weekly by phone to check the compliance of them, each assessment take about 15 min for each pregnant woman.

5) Evaluation phase

The researcher attended the labor unit and the delivery room to follow up the women in both groups in relation to duration of second stage of labor. The researcher instructed the pregnant women in the study group to call her

to attend her labor. If the researcher didn't attend labor, pregnant woman was excluded from the study. Pelvic floor muscle training exercise was carried out for women in the study group whereas routine care was given to the control group. A trusting relationship between the researcher and the laboring women was established through providing emotional support and responding to their questions.

Labor process was assessed, the researcher started to plot the Partograph immediately after admission of mother for labor, the researcher assessed the following fetal head descent (station), cervical dilatation and effacement, uterine contraction progress, duration of first and second stage of labor. This assessment was repeated according to the phase of the first stage of labor, it was done every 30 minutes in active acceleration phase (cervical dilatation 4-7 cm) and every 15 minutes in the active deceleration phase (cervical dilatation 8-10 cm). Vaginal examination was done every hour to identify cervical dilatation, effacement, descent of fetal head and condition of membranes by the physician at labor unit. Before any examination procedure the researcher explained it and its aim to the labored woman.

Protocol for the control group

Firstly, the researcher introduced herself to the subjects and explained the nature of the study to them. The researcher informed the subjects that they will have routine intranatal care. Mothers who agreed to participate were approached as the control group and the research obtained the same data as the study group.

The researcher started to fill in the partograph immediately after woman's admission to the labor unit. Each uterine contraction was assessed by placing the fingertips on the woman's abdomen (on the fundus in the right cornu) to assess its frequency, duration and intensity; then these data were recorded.

The assessment was repeated throughout the first stage of labor and it was done thereafter every 30 minutes for 10 minutes in order to assess the uterine contraction characteristics. The uterine contraction assessment was completed and correlated by vaginal examination. The vaginal examination was carried out by an on duty physician every one hour (it was a protocol for assessment of a labored woman) to identify cervical dilatation, effacement, descent of fetal head and condition of membranes. The researcher explained any examination procedure and its aim to the laboring woman. Findings were reported in order to reassure the woman; then this information was recorded in the partograph (Appendix, E). Labor duration was assessed through first stage: started from the 4cm cervical dilatation to full cervical dilatation (active phase) and the duration was recorded in hours (Appendix, E).

3. Workforce Sizing Plan (WOZIP)

Results

The result will be discussed within the following two sections.

Section 1: Description of the Sample

This section included three parts: a) demographic characteristics of mothers which contained: Age, level of education, occupation, type of work. b) Obstetrical profile and c) description of mothers in study group during antenatal period.

A. Demographic characteristics of the sample:

1) Age: A total of 100 pregnant mothers were recruited for the study . Their age ranged from 20-34 years with a mean age of 25.40 ± 3.974 for study group and was 24.36 ± 3.932 for the control group. No statistically significant differences was found between the two groups ($t=-1.315$, $P=0.191$). (table 1)

2) Educational level: thirty six percent of the study group were able to read and write compared to 34% among the control group. Thirty percent in study group had preparatory education vs. 24 % in the control group. Highly educated mothers were 14 % among study group compared to 12% in control groups with no statistically significant difference was found ($\chi^2 = 2.800$, $p = 0.542$). (table 1)

3) Occupation: regarding occupation, 84% of mothers in the study group were housewives compared to 90% in the control group on the other hand, 16% of mothers in the study group were working (10% as written work, 6% as manual work) compared to 10% of the mothers in control group (8% as written work and 2% as professional work). No statistically significant difference was found between both groups ($\chi^2 = 0.796$, $p= 0.372$). Statistically analysis denotes homogeneity between the study and control groups in relation to socio-demographic characteristics. (Figure 1 and figure 2)

Table (1) Description of Mothers Among the Study and the Control Groups

Items	Study group (n=50)		Control group (n=50)	
	χ^2	SD	χ^2	SD
Age	25.092	1.2023	24.926	1.4917
Total	χ^2 24.88	SD	3.968	
$t = -1.315, P = 0.191$				
Education level	n=50	%	n=50	%
1. Can't read& write	0	0	0	0
2. Read & Write	18	36	17	34
3. Primary School	5	10	4	8
4. Preparatory School	15	30	12	24
5. Secondary School	5	10	11	22
6. University	7	14	6	12
Total	50	100.0	50	100.0
$\chi^2 = 2.800$		$P = 0.592$		

Figure (1) Description of Mothers Occupation Among the Study and the Control Groups.

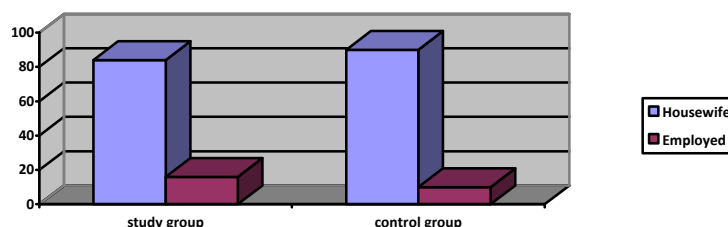
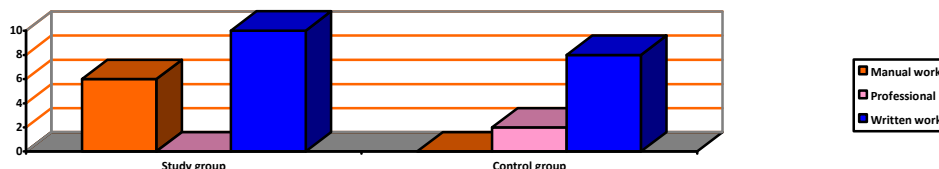


Figure (2) Description of Work Types Among the Study and the Control Groups



b) Obstetrical profile:

This part describes mothers in both groups in relation to gestational age, complications occurred in previous pregnancy, and previous labor duration.

Regarding gestational age at time of previous delivery, the results indicated that the range of the sample at the time of previous delivery was 34-39 weeks of gestation with the mean gestational age 37.51 ± 2.15 in the study group as compared with 35- 40 weeks of gestational age with mean 37.88 ± 2.27 in the control group. There were no statistically significant difference between both groups related to gestational age ($t = -0.52, p = 0.60$). (Table 2)

Related to previous pregnancy complications, 58% of study group had vaginal infection vs. 64 % in control group, while 22% of study group had vaginal tears compared with 18% in control group. The result indicated also 8% of study group had premature rupture of membrane compared with 16% for mothers in control group. The total means 12.75 ± 11.4 . Chi- square indicated no statistically significant difference was found between the two groups ($\chi^2 = 4.000$ & $p = 0.092$). (Table 2)

Table (2) Obstetric Characteristics of Mothers in First Contact Among the Study and the Control Groups.

Items	Study group (n=50)		Control group (n=50)	
	Mean	SD	Mean	SD
Gestational Age in previous labor	37.51	2.15	37.88	2.27
	t	-0.52	P value	0.60
Complications in previous pregnancy	N	%	n	%
1. Preterm labor	6	12	1	2
2. Vaginal tear	11	22	9	18
3. PROM	4	8	8	16
4. Vaginal infection	29	58	32	64
Total	Mean	12.50	SD	11.04
	$\chi^2 = 3.754$		P = 0.289	

Section II: Effect of PFME protocol on maternal outcomes

This section describes mothers condition in both study and control groups a) on admission to labor unit; b) progress during labor (1st, 2ed and third stage of labor)

A- Maternal assessment on admission: This part describes all mothers in the study and control groups on admission to labor unit regarding gestational age at time of delivery, vital signs, cause of admission to labor unit, condition of membrane, vaginal assessment and pattern of uterine contraction.

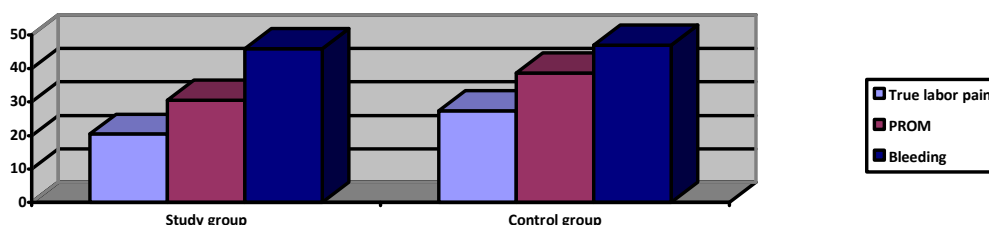
1- Vital signs: All mothers in both groups their vital signs were within normal range on admission to labor unit with no statistical significant differences was found in relation to vital signs on admission of the laboring woman, systolic blood pressure (t= -0.267 P=0.790), diastolic blood pressure (t= 0.186 P=0.853), temperature (t=-0.477, P=0.656), pulse (t=-1.001, p=0.320), respiration (t=-1.248, p= 0.215) and Regarding to the fetal heart rate, the mean of FHR was 136.44 ± 7.638 in the study group, while the mean of FHR was 136.86 ± 6.866 in the control group with no statistically significant differences between both groups (t= 0.289, p=0.773). (Table 3)

Table (3): Mean Vital Signs of Mothers and Fetus Among the Study and the Control Groups during labor process.

Vital Signs on Admission	Study Group n=50)		Control Group (n=50)		t	P value
	Mean	SD	Mean	SD		
Systolic BP (mmHg)	117.20	76.29	116.18	7.677	-0.267	0.790
Diastolic BP (mmHg)	75.10	5.571	75.30	5.571	0.186	0.853
Temperature (C)	37	0.28	37	0.014	-0.447	0.656
Pulse (b/min.)	75.90	6.358	75.90	6.358	-1.001	0.320
Respiration	20.04	2.033	19.50	2.013	-1.248	0.215
FHR	136.44	7.638	136.86	6.866	0.289	0.773

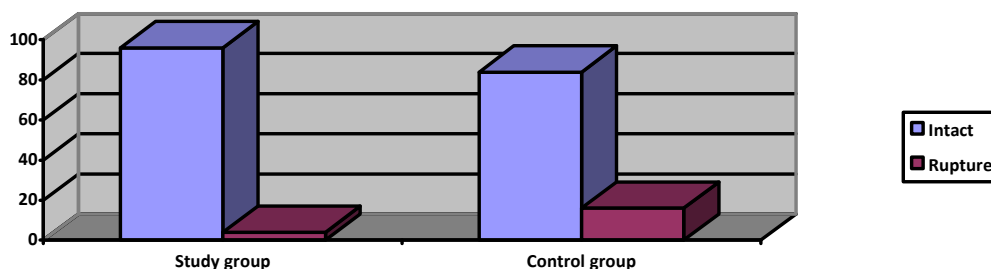
2) Cause of admission to labor unit: All woman in the study group (100%) was admitted to labor unit as result of true labor pain (TLP) compared to 88% in the control group. While 6% of control group were admitted to labor unit as result of premature rupture of membrane or bleeding. This finding was found a statistically significant difference between both groups. ($\chi^2 = 6.383$, p= 0.046). (Figure 3)

Figure (3) Cause of Admission to Labor Unit Among the Study and the Control Groups during labor process.



3) Condition of membrane: Ninety six percent of the study had intact membrane on admission at the delivery unit compared to 84% among the control group and 16 % of control group their membrane was ruptured compared to 8% among the study group with a significant statistically differences between both groups respectively ($\chi^2 = 4.000$, p= 0.046). (figure 4)

Figure (4) Condition of Membrane on Admission to labor unit Among the Study and the Control Groups during labor process.



4) Regarding gestational age on admission to labor unit, the results indicated that the range of the sample at the time of delivery was 36- 40 weeks of gestation with the mean gestational age 38.32 ± 0.913 in the study group as compared with 36- 42 weeks of gestational age with mean 38.22 ± 0.954 in the control group. There were no statistically significant difference between both groups related to gestational age ($t = -0.535, p = 0.594$). (Table 3)

5) Vaginal assessment on admission:

Cervical dilatation: The mean cervical dilatation among the study group was 2.78 ± 0.679 compared to 2.40 ± 0.833 of the control group with a highly statistically significant difference ($t = -2.501, p = 0.014$). (table 4)

Effacement: The mean cervical effacement among the study group was 20.60 ± 7.66 vs. 15.54 ± 9.29 in control group. This finding was found a statistically a highly significant difference between both ($t = -2.967, p = 0.004$). (table 4)

Station: the mean of station in study group was -0.88 ± 0.754 , as compared with -1.18 ± 0.800 in control group. The result found that, there was no a statistically significant difference between both groups ($t = -1.935, p = 0.056$). (table 4)

6) Pattern of uterine contraction on admission (duration and frequency).

The result revealed that the mean duration of uterine contraction among the study group was 33.88 ± 9.05 compared to control group 30.91 ± 8.23 with no statistical significant difference between them ($t = 1.69, p = .093$). (table 4)

Regarding to frequency of uterine contraction per 10 minutes, the results revealed that the mean frequency of uterine contractions among the study group was 3.068 ± 0.372 compared to the mean frequency of control group 2.35 ± 0.597 with a significant statistically difference between two groups respectively ($t = 7.07, p = 0.000$). (table 4)

Table (4): Mean Labor Progress among the Study and the Control Groups on Admission

Labor progress On Admission	Study Group (n=50)		Control Group (n=50)		t	P value
	Mean	SD	Mean	SD		
GA on admission to labor unit	38.32	0.913	38.22	0.954	-0.535	0.594
Total	Mean	38.20	SD	0.930		
Vaginal assessment	Mean	SD	Mean	SD	t	P value
Cervical dilatation	2.78	0.679	2.40	0.833	-2.501	0.014
Effacement	20.60	7.66	15.54	9.29	-2.967	0.004
Station	- 0.88	0.754	-1.18	0.800	-1.935	0.056
Pattern of uterine contraction						
Frequency of uterine contractions in 10 minutes	3.068	0.372	2.35	0.597	7.07	0.000
Duration of uterine/sec.	33.88	9.05	30.91	8.23	1.69	0.093

B- Effect of PFME protocol on Maternal outcome during labor

This part describes mothers in both groups regarding labor progress, and duration of labor .

1- Labor progress of the laboring woman in first stage of labor, the results revealed that they were within normal range of labor progress throughout the first stage of labor. The mean of cervical dilatation was 4.88 ± 0.688 in the study group while, the mean of control group was 4.79 ± 0.607 . The result found that there was no statistically significant difference between the two groups related to the progress in the cervical dilatation ($t = -0.744, p = 0.459$). The mean of effacement was 0.497 ± 0.631 in the study group as compared with 0.452 ± 0.642

in control group. A statistically significant difference was found between the two groups related to the progress in the effacement ($t=3.582$, $p= 0.001$), and the mean of station in study group was 0.179 ± 0.358 , compared with control group mean of station 0.011 ± 0.4001 . A statistically significant difference was found between the two groups related to the progress in the station ($t=-2.141$, $p= 0.035$). (table 5)

Regarding to uterine contractions throughout the first stage of labor, the mean frequency of uterine contractions throughout the first stage of labor was 3.98 ± 0.491 in the study group as compared with 3.47 ± 0.58 in the control group with statistically significant difference found between the two groups ($t=4.65$, $p=0.000$). The mean duration of uterine contraction was 49.86 ± 6.78 in study group vs. 48.21 ± 5.37 in the control group, there clinical not statistical difference was found between the two groups ($t=1.30$, $p= 0.193$). As far, intensity of uterine contractions, it was 2.86 ± 0.022 in the study group as compared with 2.82 ± 0.027 in the control group throughout the first stage of labor with no statistically significant difference found between the two groups ($t= 0.652$, $p=0.516$). (Table 5)

Table (5): Mean labor progress through first stage of labor among the study and the control groups

Labor progress through first stage of labor	Study Group (n=50)		Control Group (n=50)		t	P value
	Mean	SD	Mean	SD		
Cervical dilatation	4.88	0.688	4.79	0.607	-0.744	0.459
Effacement	0.497	0.631	0.452	0.0642	-3.582	0.001
Station	0.179	0.3858	0.011	0.4001	-2.141	0.035
Frequency of uterine contractions in 10 minutes	3.98	0.491	3.47	0.58	4.65	0.000
Duration of uterine/sec.	49.86	6.78	48.21	5.37	1.30	0.193
Total	50	100	50	100		

2- Duration of Labor: Table (6) showed that the mean duration of the first stage of labor was 6.272 ± 1.214 hours for mothers in the study group as compared to 8.255 ± 1.096 hours among the control group respectively. Mean duration of second stage of labor was 16.60 ± 3.320 minutes and 33.96 ± 6.546 minutes for mothers in the control group. Moreover, the mean duration of third stage of labor was 4.62 ± 0.818 minutes and 8.10 ± 2.823 for the mothers in control group respectively. Study indicated that a highly significant statistically difference between the two groups in relation to first, second and third stages of labor. (table 6)

Table (6): Mean Duration of Labor throughout the Three Stages Among the Study and the Control Groups.

Labor Duration	Study Group (n= 50)		Control Group (n= 50)		t	P value
	Mean	±SD	Mean	±SD		
First stage of labor (hrs.)	6.272	1.214	8.255	1.096	8.568	0.000
Second stage of Labor (min.)	16.60	3.320	33.96	6.546	16.724	0.000
Third stage of Labor (min.)	4.62	0.818	8.10	2.823	8.372	0.000

4. Discussion

Findings of this research found that pelvic floor muscles training exercise during pregnancy found that statistically significant difference between the two groups related to cervical dilatation cm/ hour ($p= 0.004$), and better labor progress in relation effacement and station. ($p= 0.001$, $p= 0.035$).

Moreover, uterine contractions throughout the first stage of labor became more frequent to the mothers in the study group than those in the control group. There was statistically significant difference found between the two groups ($P=0.000$). In spite no statistically significant difference was found between the two groups related to duration of uterine contraction ($P= 0.093$). There is lack of research concerning effect of floor training exercise during pregnancy on cervical dilatation, effacement, station and uterine contraction, so this relationship needs to be investigated by the researchers.

The findings of this research indicated that mothers in the study group revealed better labor progress than those in the control group as related to labor duration. The findings showed that the mean duration of the first, second and third stages of labor were shorter in the study group as compared with the control group. There was statistically significant difference was found between two groups ($P= <0.05$,). Similar results were reported by Lixu, et al., (2015), they reported that antenatal PFMT might lead to shortening the duration of first and second stages of labor. Moreover, the findings of this research are to some extent in accordance with those of the study of Salvesen and Makved, (2006), who stated that woman who had a lower rate of prolonged 2nd stage labor than woman allocated to no training, while other study also agreed that pelvic floor training exercise throughout pregnancy can reduce the length and pain of labor (Bell & Dooleg, 2006).

In accordance, the finding of this research agreed with those of Gavard and Artal, (2008) who suggested that pelvic floor muscle training exercise for low risk woman during pregnancy lead to good outcome for the

mother and fetus and improve overall maternal fitness and well being. Also Mohamed, (2012) found that the application of antenatal (PFME) significantly lowered the duration of 2nd stage of labor, and also application of (PFME) may facilitate labor and decrease labor pain.

Also, this findings are in accordance with the study of Morkved and Salvesen, (2006), who indicated that applying of pelvic floor training exercise during pregnancy may shorten the duration of the second stage of labor, but not agree with the study result in decrease of first stage of labor. This study was not statistically significant ($p=0.3$). Also Xin Wing, (2014) was agree with the finding of the current study that applying (PFME) during pregnancy helped to shorten the second stage of labour .

On the other hand, these findings were not in accordance with those of Letcia, et al., (2011) who studied the effect pelvic floor muscle training exercise through randomized controlled trial, which showed that, there was no difference between the training group and control group regarding to the duration of second stage of labor or the total length of labor.

The finding of this study disagreed with May, (2012) and Agur, (2008) who exploring the relationship between antenatal pelvic floor muscle training exercise and labor outcomes. The study finding revealed that, there was no significant difference in the duration of second stage of labour between the two groups or in the need for instrumental delivery, as well as PFME does not appear to facilitate or obstruct labor. The difference may be because of cultural differences, age or even the sample itself

5. Conclusion

Pelvic floor muscle training resulted in a significant increase in pelvic floor muscle strength during pregnancy. A significant difference was found between pelvic floor muscle training exercise and decrease the duration of labor.

6. Recommendations

- 1- Pelvic floor muscle training exercise should be an essential part of prenatal care.
- 2- The nurse should be an educator and counselor for mothers during prenatal care .

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