IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e- ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 7, Issue 3 Ver. III (May-June .2018), PP 43-53
www.iosrjournals.org

Comparison of the Effects of Prenatal Perineal Massage Versus Kegel Exercise on Labor Outcome

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Abstract
Background: *Today, the fundamental approach related to pregnancy and childbirth is that they are physiological processes and requires minimum level of medical intervention. The* ***aim*** *of the present study was to compare the effects of prenatal perineal massage versus kegel exercise on labor outcome.* ***Design:*** *Randomized controlled clinical trial was utilized.* ***Setting:*** *The study was conducted at a private clinic of Obstetrics and Gynecology, at the city of Mit Ghamr, Dakahleya Governate, Egypt.* ***Subjects:*** *118 pregnant women divided into (37 pregnant women in perineal massage group, 38 in kegel exercise group and 43 in the control group).* ***Tools:*** *Five tools were used: Socio-demographic characteristics and previous obstetric history sheet, first stage of labor sheet, second stage of labor sheet, neonatal outcome sheet and post natal sheet 15 days postpartum.* ***The results*** *of the present study revealed that a highly statistically significant reduction in the duration of the second stage of labor of parturient women in the perineal massage group and kegel exercise group compared to those in control group. 27.0% & 23.7% respectively of parturient women in the perineal massage and kegel exercise groups had perineal tears of the first degree type. On the other hand, 14.0% of parturient women in the control group had perineal tears of the second degree type. The mean REEDA scale 15 days postpartum in the three groups was 1.7 ± 1.3 &2.7 ± 1.6 VS. 4.3 ± 0.8 respectively with a high statistically significant difference (P= 0.000). In* ***conclusion****, prenatal perineal massage and kegel exercise after 30 weeks gestation are safe non invasive methods of perineal muscle strengthening and pelvic floor muscle training. These methods contributed to a highly statistically significant shortening of the duration of the second stage of labor and reducing the likelihood of episiotomy and degree of perineal tears. Postnatal, they resulted in a highly statistically significant acceleration of perineal wound healing and reduction of perineal pain 15 days postpartum.* ***Recommendations:*** *Heath professionals working in the field of Obstetrics (nurses and physicians) should make perineal massage and kegel exercise training essential components of prenatal care with emphasis on their safety, intra natal and postnatal benefits.*

Key Words: *Prenatal, Perineal Massage, Kegel Exercise, Labor Outcome.*

Date of Submission: 03-05-2018 Date of acceptance: 18-05-2018

I. Introduction

[1] defined antenatal perineal massage or birth canal widening as the massage of a pregnant woman's perineum around the opening to the vagina, performed 4 to 6 weeks before childbirth and usually on 4-6 separate occasions. The practice aims to more gently mimic the massaging action of a baby's head on the opening of the birth canal prior to birth, which enables some of the hard work of labor to be done before the start of labor.

[2] combined the results from four randomized controlled trials that enrolled 2,497 pregnant women and found that women who were randomly assigned to do perineal massage had a 10% decrease in the risk of tears that required stitches and a 16% decrease in the risk of episiotomy but these findings were only true for first-time moms. Perineal massage is contraindicated in the following situations: prior to 34 weeks of pregnancy, if the pregnant woman is experiencing cervical shortening and placenta praevia or any other condition where there is bleeding from the vagina during the second half of pregnancy. It is also contraindicated if pre-term labor has now settled, severe blood pressure problems in pregnancy (including pre-eclampsia) and vaginal herpes, thrush or any other vaginal infection as massage could spread the infection and worsen the condition [3] **.**

According to [4] kegel exercise is a kind of conservative intervention, defined as a program of repeated voluntary pelvic floor muscle contractions and relaxations taught and supervised by a health care professional and it was first proposed by dr. Arnold Kegel in 1940 who discovered the squeeze and hold vaginal exercises known as Kegel's which were specifically designed to target pelvic floor strengthening.

Kegel exercise is indicated to strengthen the pelvic floor muscles which play a fundamental role in maintaining continence and integrity of the pelvic floor; as pregnancy more than childbirth appears to contribute

to altered long term pelvic floor function in later life due to the hormones of pregnancy. These hormones have been associated with relaxation and structural effects on the connective tissue of the pelvic floor during the third trimester and childbirth. Evidence also shows that some obstetric factors may cause partial damage to the pelvic floor nerves particularly the pudendal nerve that can cause weakness of the pelvic floor muscles and relaxation of the external urethral sphincter, resulting in urinary incontinence **[5].**

A randomized controlled trial conducted by [6] demonstrated that pelvic floor muscle training (PFMT) produces flexible, well-controlled muscles that can facilitate labor and reduce the need for instrumental delivery

1.1.Significance of the study:

Episiotomy is practiced during 50% - 90% of childbirths **[7]** , and perineal tearing is a common occurrence among women who have vaginal birth. In studies where the use of episiotomies was restricted, the rate of spontaneous tearing was recorded to be anywhere from 44-79% **[8].** Perineal trauma either spontaneously or because of episiotomy affects women's physical, psychological, and social well-being in the immediate postnatal period as well as in the longer term. Thus, at 8 weeks after birth, 22% of new mothers reported continued perineal pain, and for some women, pain may persist for a year or longer. The likelihood of perineal pain and sexual problems in the postpartum period is the least for women whose perineum remains intact **[9].** So this study was conducted to determine to what extent can prenatal perineal massage and kegel exercise control these problems.

1.2.Aim of the study

The aim of the present study was to compare the effects of prenatal perineal massage versus kegel exercise on labor outcome.

1.3.Objectives:

1- Determine the effect of prenatal perineal massage and kegel exercise on the duration of the first, second stages of labor and the onset of labor.
2- Examine the perineal condition whether intact, episiotomy or perineal tears in the perineal massage, kegel exercise versus the control group.
3- Identify the effect of prenatal perineal massage and kegel exercise on the newborn APGAR score.
4- Assess perineal pain and perineal wound healing 15 days postpartum in the perineal massage, kegel exercise versus the control group

II. Subjects And Methods

2.1.Research design:

Randomized controlled clinical trial was utilized to achieve the aim of the study.

2.2.Study Setting: The current study was conducted at a private clinic of obstetrics and gynecology at the city of Mit Ghamr, Dakahleya Governate, Egypt.

2.3.Study Subjects:

The sample size was calculated by effect size between different group was 35.5% **[10]** . So the sample size was 43 at each group with power 80%, confidence level 95% but after withdrawal of some participants, the study sample were consisted of 118 pregnant women divided into (37 pregnant women in perineal massage group, 38 pregnant women in kegel exercise group and 43 pregnant women in the control group).

The pregnant women were eligible for recruitment in the study if they met the following inclusion criteria:

- Age from 20 to 35 years.
- Gestational age ≥ 30 weeks.
- Only nulliparous and primarous pregnant women with singleton fetus.
- Compliant to attend antenatal visits two times weekly.
- The intervention groups were compliant to have perineal massage done by the researcher and to exercise their pelvic floor muscles as ordered.
- No indications for cesarean section.
- Only secondary and university educated women were included to promote compliance.

The pregnant women were divided into three groups:

1- **Perineal massage group (n= 37):**

Perineal massage was performed by the researcher according to the following steps:

- During the first visit, the researcher explained the benefits of perineal massage to the pregnant woman to gain cooperation.
- Hands were washed, surgical gloves were put on and privacy was maintained.
- The pregnant woman was asked to empty her bladder and lay in the lithotomy position.
- Water-soluble lubricant (gel) was applied on the index and middle finger and the perineum.
- The index and middle finger were placed just inside the vagina to a depth of three to five centimeters.
- Gentle pressure downward towards the rectum and to the sides of the vagina to stretch the opening was applied until a very slight burning, stinging, or tingling sensation was felt by the woman.
- The lubricant was worked slowly and gently, maintaining the pressure and pulling the perineum forward a little and sweeping the fingers from side to side of the vagina in a "U" shaped motion from 3 o'clock to 9 o'clock for approximately two minutes.
- Relax and repeat once.
- Pressure was avoided at the top of the vaginal opening. Gentle massage was performed as forceful massage could cause bruising or swelling. Massage was ceased with any pain or discomfort.
- Perineal massage wasn't done if the pregnant woman were suffering from vaginal herpes, thrush or any other vaginal infection, as massage could spread the infection and worsen the condition.
- Thus the pregnant woman was instructed to attend to the clinic twice weekly for perineal massage.
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2- Kegel exercise group (n= 38):

This exercise was taught by the researcher and practiced by the pregnant woman according to the following steps:

- During the first visit: The researcher discussed with the pregnant woman what are the pelvic floor muscles, their function and the advantages of pelvic floor muscle training.
- The researcher also taught the pregnant woman how to detect the right muscle group for applying kegel exercise, the researcher instructed the pregnant woman to enter the bath room to make urination and at the middle of urination, try to stop the flow of urine when she was sitting on toilet, she should experience a feeling of squeezing and lifting at the same time without contracting the muscles of the buttocks and thighs. If she could do this, she was using the right muscles. The pregnant woman performed this exercise once next to the researcher.
- At home, the pregnant woman was instructed to perform pelvic floor muscle training consisted of four sets of ten pelvic floor muscle contractions sustained for six seconds when inspiring and relax for six seconds when expiring. Three additional fast contractions (1 second) were performed at the end of the ten repetitions. A 30-second rest interval was defined between each set. These sets were performed twice daily before getting out of bed and at night before sleeping.
- Thus the pregnant women were instructed to attend to the clinic twice weekly for practicing kegel exercise next to the researcher and they were asked about the number of exercising within the weak.

3- Control group (n=43): Included pregnant women who received routine prenatal care.

2.4.Tools of data collection:

I- **Socio-demographic characteristics and previous obstetric history sheet:** which included data about age, education, number of parity and number of previous abortions.

II- **First stage of labor sheet:** which included data about gestational age at the onset of the present labor, onset of labor whether spontaneous or induced, duration of the first stage of labor and augmentation of labor.

III- **Second stage of labor sheet:** which included data about duration of the second stage of labor, perineal condition after delivery of the fetus (intact, episiotomy or tear), location of tear (perineal, para- urethral, labial, vaginal or combined) and degree of perineal tear (first, second, third or fourth).

IV- **Neonatal outcome sheet:** which included data about APGAR score at the 1^{st} minute and the 5^{th} minute and neonatal birth weight.

V- **Post natal sheet after 15 days:** which included data about

- perineal pain as perceived by the woman (slight, moderate or severe).
- Perineal wound healing assed by (REEDA) scale developed by [11] . The REEDA (Redness, Odema, Ecchymosis, Discharge and Approximation) scale is a total that assesses the inflammatory process and tissue healing in the perineal trauma; through the evaluation of these five items of healing. For each assessed item a score ranging from 0 to 3 can be assigned by healthcare provider. A higher score indicates a greater level of tissue trauma. The maximum value of 15 indicates the worst perineal healing outcome.

Points	Redness	Oedema	Ecchymosis	Discharge	Approximation
0	None	None	None	None	Closed
1	Within 0.25 cm of the incision bilaterally	Perineal, less than 1 cm from incision	Within 0.25 cm bilaterally or 0.5 cm unilaterall	Serum	Skin separation 3 mm or less
2	Within 0.5 cm of the incision bilaterally	Perineal and/or between 1 to 2 cm from the incision	Between 0.25 cm to 1 cm bilaterally or between 0.5 to 2 cm unilaterally	Serosan-guinous	Skin and subcutaneous fat separation
3	Beyond 0.5 cm of the incision bilaterally	Perineal and/or vulvar, greater than 2 cm from incision	Greater than 1 cm bilaterally or 2 cm unilaterally	Bloody, purulent	Skin, subcutaneous fat and fascial layer separation Score
Score					
Total					

2.5.Field work:

Data collection took a period of 9 months from September 2015 to May 2016. The researcher interviewed the pregnant women and explained the purpose of the study, and obtained their verbal consent. The researcher started to collect data through the following three phases:

1) Initial assessment phase:

All pregnant women in the three groups were interviewed by the researcher at the initial visit using the structured interview. The researcher collected data related to woman's socio-demographic characteristics and obstetric profile. The pregnant women who fulfilled the inclusion criteria were allocated to either the first perineal massage group, the second kegel exercise group or the third control group. Afterwards, the benefits of perineal massage and kegel exercise on strengthening pelvic floor muscles were discussed with each group. Then perineal massage was performed by the researcher to the pregnant women in the first group and kegel exercise was taught to the pregnant women in the second group and they were instructed to do it next to the researcher and to do it twice daily at home.

2) Follow up phase:

The studied pregnant women in the three groups were followed up twice weekly until delivery and regular assessment of the maternal and fetal condition was done. Perineal massage was performed to the pregnant women in the first group and pregnant women in kegel exercise group were asked whether they exercise their pelvic floor muscles twice daily.

The delivery was conducted at the private clinic. Duration of the first stage, second stage, occurance of episiotomy or perineal tears and neonatal outcome were recorded. The parturient women were instructed to come back to the clinic after 15 days for assessment of perineal wound healing using REEDA scale.

2.6.Pilot Study:

A pilot study was conducted on 15 pregnant women who fulfilled the inclusion criteria (five in each group) and they were not included in the total sample size to assess the clarity and applicability of data collection tools, arrangements of items, the feasibility of the study and acceptance to be involved in the study and necessary modifications were undertaken.

2.7.Administrative and ethical considerations:

The researcher discussed the aim of the present study with the physician who was so cooperative and promised to follow perineal massage and kegel exercise as a routine prenatal care if they revealed positive results in decreasing perineal trauma. All ethical issues were taken into consideration during all phases of the study. The aim of the study was explained to every woman before participation, which was totally voluntary. Women were assured that the study maneuver will cause no actual or potential harm on them and professional help was provided whenever needed. Women were notified that they can withdraw at any stage of the research; also they assured that the information obtained during the study will be confidential and used for the research purpose only.

2.8.Statistical analysis:

Data collected throughout history and basic clinical examination. The outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) for analysis. According to the type of data qualitative represent as number and percentage, quantitative continues group represent by mean ± SD. The following tests were used to test differences for significance; differences between frequencies (qualitative variables) and percentages in groups were compared by Chi-square test. Differences between parametric quantitative independent groups by t test

correlation by Pearson's correlation. P value was set at <0.05 for significant results & <0.001 for high significant result.

2.9.Limitations of the study:

In public and university hospitals, episiotomy is performed routinely for all nulliparous women and it is difficult to follow up pregnant women till delivery then postpartum. Furthermore, perineal tears are greatly affected by malpractice and low experience of different physicians. So the present study was conducted at a private clinic to overcome these challenges.

III. Results

Table 1 demonstrates that there were no statistically significant difference between the study subjects in the three groups regarding age, education, parity and previous abortion. As regards age, the mean age of the total study subjects was 23.9 ± 2.6 years. This table also shows that 65.3% of the total study subjects were secondary educated, while 34.7% of them were university educated. It is obvious from this table that 72.0% of the total study subjects were nullipara, while nearly 28.0% of them were primipara and 11.0% had previous abortion.

Table 2 illustrates insignificant difference between the three study subjects regarding gestational age (GA) at the onset of labor, labor onset and labor augmentation. As for GA, the total study subjects in the three groups delivered at full term between 37 and 40 weeks with a mean GA 38.3 ± 1.2 and 79.7% of women had spontaneous onset of labor while 20.3% their labor was induced. In addition, labor was augmented in 56.8% of the study subjects in the three groups compared to 43.2% without augmentation.

Table 3 reveals that neither perineal massage nor kegel exercise affected the duration of the first stage of labor and the mean 1st stage duration in the total number of women in the three groups was 8.3± 1.0. While it shows reduction in the duration of the second stage of labor of parturient women in the perineal massage group and kegel exercise group compared to those in control group with a mean duration (21.1 ± 6.3 & 23.02 ± 7.5 VS. 27.9 ± 6.7 minutes respectively) with a high statistically significant difference (P= 0.000).

In **figure 1**, the dream of having intact perineum was achieved in 24.3% of parturient women in the perineal massage group and 18.4% of those in the kegel exercise group compared to none in the control group. This figure also shows that parturient women in the perineal massage and kegel exercise groups were less likely to have episiotomy compared to those in the control group (48.6% & 57.9% VS. 86.0% respectively). Nearly one fourth of parturient women in the perineal massage and kegel exercise groups (27.0 & 23.7% respectively) had perineal tears of the first degree type. On the other hand, 14.0% of parturient women in the control group had perineal tears of the second degree type. All the differences observed among the three studied groups regarding intact perineum, episiotomy, and perineal tears were statistically significant (P= 0.003).

Table 4 shows that perineal, para urethral and vaginal tears complicated (9.3%, 5.1% & 6.8% respectively) of the total study subjects in the three groups. It is also obvious from this table that 27.0% & 23.7% of women in the perineal massage and kegel exercise groups had tears of the first degree, while the 2nd degree perineal tears complicated 14.0% of parturient women in the control group compared to none in the perineal massage and kegel exercise groups, and the difference observed was highly statistically significant (P= 0.000).

Table 5 illustrates that the APGAR score at the 1st and 5th minute in the three studied groups was within the normal range and the mean neonatal weight of the total studied women was 2911.0 ± 348.3 grams, with no statistically significant difference among the three studied groups regarding APGAR score and neonatal weight.

Concerning assessment of perineal wound healing 15 days postpartum using REEDA scale **table 6** reveals proper perineal wound healing in women in perineal massage group and kegel exercise group than those in the control group, with a mean REEDA scale (1.7 ± 1.3 &2.7 ± 1.6 VS. 4.3 ± 0.8 respectively) with a high statistically significant difference (P= 0.000).

Figure 2 shows that a higher percentage of women in the control group experienced severe peineal pain 15 days postpartum compared to those in kegel exercise group and perineal massage group (27.9% vs. 7.9% & 0.0% respectively), with a high statistically significant difference (P= 0.000).

IV. Discussion

The present study findings revealed that there were no statistically significant difference between subjects in the three studied groups (perineal massage, kegel exercise and control) regarding age, education, parity and previous abortion. As regards age, the mean age of the total study subjects was 23.9 ± 2.6 years. As for education, almost two thirds of the total study subjects were secondary educated, while almost one third of them were university educated. In relation to parity, nearly three fourth of the total study subjects were nullipara, while nearly one third of them were primipara and 11.0% had previous abortion.

Donmez & Kavlak **(10)** in their study "effects of prenatal perineal massage and kegel exercises on the integrity of postnatal perine" in Turkey were in agreement with the present study findings. As regards age, the mean age of the subjects in the three studied groups was 26.90 ± 4.64, 28.03 ± 4.15 & 24.25 ± 4.15 respectively).In addition, the subjects in the three studied groups showed higher percentage of university education 66.3% compared to 33.7% primary and secondary education which is considered a strength point that enhance compliance of the pregnant women in the intervention groups. In relation to parity, the total study subjects were delivering their first infant and this may be explained as nulliparous women are the most common groups that are more liable to perineal trauma, and 14.1% had previous abortion. The differences observed didn't reach the statistically significant difference.

In the present study, the total subjects in the three studied groups delivered at full term between 37 and 40 weeks and there were no statistically significant difference regarding the mean GA at the onset of labor. This is in coherence with the findings of the Israelian study "perineal massage during pregnancy: a prospective controlled trial" conducted by ***Mei-dan, et al*** **(12)** which reported that the mean gestational age at delivery in the massage and the control group was (39.3±1.3 & 38.9±1.5 respectively), with no statistically significant difference. In the same line, the randomized controlled trial "Effect of pelvic floor muscle training on labor and newborn outcomes" conducted in Brazil by ***Dias et al*** **(13)** mentioned that the mean gestational age at delivery in kegel exercise group was 39.5 ± 1.71 compared to 39.3 ± 1.22 in the control group with no statistically significant difference. This similarity may be due to these studies included only healthy pregnant women with no medical or obstetric disorders that indicate preterm labor.

The present study demonstrated that 21.6%, 13.2% & 25.6% respectively of the subjects in the three studied groups had experienced induction of labor, but the difference wasn't statistically significant. In partial agreement with these findings, ***Ali*** **(14)** in Kafr Elsheikh, Egypt studied the effects of prenatal perineal massage and kegel exercise on the episiotomy rate and reported that very low percentages of induction of labor among the subjects in the three studied groups (0.0%, 1.7% & 2.8% respectively), but also with no statistically significant difference.

Donmez & Kavlak **(10)** were also on the contrary of the present study findings concerning induction of labor; as their study revealed statistically insignificant higher percentages of labor induction among the three study groups (30.0%, 50.0% & 53.8% respectively).

In the present study, neither perineal massage nor kegel exercise affected the mean duration of the 1st stage of labor of the subjects in the three studied groups. In contrast to the present study findings, the study of ***Goda et al*** **(15)** in Egypt about the effect of pelvic floor muscle exercise training protocol for pregnant woman during 3rd trimester on labor duration, revealed a highly statistically significant reduction in the mean duration of the first stage of labor in kegel exercise group compared to control group (6.272± 1.214 Vs 8.255 ±1.096 respectively), P=(0.000).

In addition, the Chinese study "pelvic floor muscle training as a persistent nursing intervention: effect on delivery outcome and pelvic floor myodynamia" conducted by ***Wang et al*** **(16)** also revealed that pelvic floor muscle training significantly reduced the mean duration of the first stage of labor in minutes rather than the control group (453.0±156.0 Vs 520.2 ± 136.2 respectively).

According to the present study findings, perineal massage and kegel exercise produced a highly statistically significant reduction in the mean duration of the second stage of labor compared to the control group. In the same line ***Goda et al*** **(15)** mentioned that the mean duration in minutes of the second stage of labor was shorter in the pelvic floor muscle training group than control group (16.60 ± 3.320 Vs 33.96 ± 6.546 respectively), and the difference observed was highly statistically significant (P= 0.000).

On the contrary of the present study findings, ***Donmez & Kavlak*** **(10)** found that perineal massage and kegel exercise had no effect on the mean duration of the second stage of labor and even longer than the control group (285.66 ± 169.05 & 293.90 ± 255.00 Vs 232.43 ± 198.63 respectively), and the difference wasn't statistically significant. In addition, **Agur et al** **(6)** in the United Kingdom conducted a randomized controlled trial "Does antenatal pelvic floor muscle training affect the outcome of labor? " and found no statistically significant difference in the mean duration of the second stage of labor between the pelvic floor muscle training group and the control group (89.82 ± 33.5 Vs 89.64 ± 37.67 respectively).

In the present study, the dream of having intact perineum was significantly achieved in almost one fourth of parturient women in the perineal massage group and nearly one fifth of those in the kegel exercise group compared to none in the control group. On the contrary, ***Mei-dan et al*** **(12)** found that lower percentage of parturient women in the massage group had intact perineum compared to the control group (29.8% Vs 40.0% respectively), but the difference didn't reach statistical significance.

As for episiotomy, the present study revealed that the parturient women in perineal massage and kegel exercise groups were significantly less likely to have episiotomy compared to those in the control group. In this respect, the cochrane database systematic review conducted by ***Beckman & Stock*** **(1)** on antenatal perineal massage for reducing perineal trauma in Australia mentioned that women practicing perineal massage were less

likely to have an episiotomy (four trials, 2480 women, RR 0.84 (95% CI 0.74 to 0.95), number needed to treat to benefit NNTB 21 (12 to 75). These findings were significant for women without previous vaginal birth.

In contrast to the present study findings, ***Du et al*** **(17)** conducted a systematic review with meta analysis in China on the effect of antenatal pelvic floor muscle training (PFMT) on labor and delivery outcomes. A fixed-effect model was used because there was no significant heterogeneity between the seven studies (I2=36.5 %, P= 0.150). The overall result showed that the association between antenatal PFMT and the risk of episiotomy was not statistically significant (OR=0.75, 95 % CI: 0.54 to 1.02).

As regards perineal tears, the present study findings showed that the parturient women in the perineal massage and kegel exercise groups significantly had the least degree of perineal tears than those in the control group and none of the study subjects in the three groups experienced 3rd or 4th degree perineal tears.

The study of ***Donmez & Kavlak*** **(10)** were in agreement with the present study findings. It revealed that the 2nd degree perineal tears highly significantly complicated a higher percentage of parturient women in the control group compared to kegel exercise and massage groups (38.5% Vs 15.6% & 3.3% respectively). The same highly significant difference was observed regarding 3rd degree perineal tears (25.7% Vs 6.2% & 6.7% respectively). The 4th degree perineal tears complicated 5.1% of the control group compared to none in the massage and kegel exercise groups (P= 0.000). This study followed the same line in sample size, inclusion criteria and methodology as the present study, and this may explain similarity in the results.

In the present study, there were no statistically significant difference among the subjects in the three studied groups regarding APGAR score at the first and fifth minute and neonatal weight. Similarly ***Dias et al*** **(13)** also found that the mean 1st minute APGAR score in the pelvic floor muscle training group and the control group was (8.3±2.1 Vs 8.1± 1.4 respectively) and the mean neonatal weight was (3178.3 ± 532.6 Vs 3309.0 ± 524.1 respectively), and all the differences observed didn't reach the statistical significance.

In addition, the findings of ***Donmez & Kavlak*** **(10)** revealed that the mean 1st minute APGAR score in the three studied groups was (7.90 ± 1.15, 7.59 ± 1.18 &7.48 ± 2.15 respectively) and the mean 5th minute APGAR score in the three studied groups was (9.23 ± 0.97, 9.12 ± 0.97 & 8.79 ± 1.96 respectively). As for the mean neonatal weight in the three studied groups, it was (3038 ± 300.24, 3213.43 ± 430.84 &3175.25 ± 583.37 respectively), and all the differences observed didn't reach the statistical significance.

The present study findings stated that a higher percentage of women in the control group experienced severe peineal pain 15 days postpartum compared to those in kegel exercise group and none in the perineal massage group, with a high statistically significant difference. Similarly, ***Eogan et al*** **(18)** who conducted a prospective observational study on the effect of regular antenatal perineal massage on postnatal pain and anal sphincter injury in Ireland and found that postnatal perineal pain was significantly reduced in the massage group compared with the control group (p = 0.029).

Concerning assessment of perineal wound healing 15 days postpartum using REEDA scale, the present study results revealed proper perineal wound healing in women in perineal massage group and kegel exercise group than those in the control group, with a high statistically significant difference. The same finding was detected by ***Ali*** **(14)** who mentioned that the lower the REEDA scale, the better the perineal wound healing and found that the mean REEDA scale 15 days postpartum was lower in the massage and kegel exercise groups than the control group (1.93 ± 1.15, 2.35 ± 1.55 VS. 3.40 ± 1.80 respectively) with a high statistically significant difference (P< 0.001).

V. Conclusion

In conclusion, prenatal perineal massage and kegel exercise after 30 weeks gestation are safe non invasive methods of perineal muscle strengthening and pelvic floor muscle training. These methods contributed to a highly statistically significant shortening of the duration of the second stage of labor and reducing the likelihood of episiotomy and degree of perineal tears. Postnatal, they resulted in a highly statistically significant acceleration of perineal wound healing and reduction of perineal pain 15 days postpartum.

Recommendations

On the basis of the most important findings of the current study, the following recommendations were suggested:

- Heath professionals working in the field of Obstetrics (nurses and physicians) should make perineal massage and kegel exercise training essential components of prenatal care with emphasis on their safety, intra natal and postnatal benefits.
- Furthermore, this study should be replicated with large sample size, different setting, and with different modalities of perineal muscle strengthening and pelvic floor muscle training techniques.

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Table (1) Distribution of the studied pregnant women according to socio- demographic characteristics and obstetric data (n= 118).

	group								**X^2**	**P**
	Control (n= 43)		**Massage (n= 37)**		**Kegel (n=38)**		**Total (n=118)**			
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**		
Age										
Range (median)	20.0 - 29.0		20.0 - 30.0		20.0 - 29.0		20.0 - 30.0 (23.5)		t=0.189	0.828
Mean ± SD	23.6 ± 2.5		23.9 ± 2.7		24.02±2.5		23.9 ± 2.6			
Education										
Secondary	32	74.4	25	67.6	20	52.6	77	65.3	4.35	0.11
University	11	25.6	12	32.4	18	47.4	41	34.7		
Parity										
0	29	67.4	29	78.4	27	71.1	85	72.0	1.2	0.54
1	14	32.6	8	21.6	11	28.9	33	28.0		
Abortion										
1	4	9.3	4	10.8	1	2.6	9	7.6	3.82	0.43
2	2	4.7	0	0.0	2	5.3	4	3.4		

Table (2) Distribution of the studied pregnant women according to labor onset and labor augmentation(n= 118).

	Group								X^2	P
	Control (n= 43)		Massage (n= 37)		Kegel (n=38)		Total (n=118)			
	N	%	N	%	N	%	N	%		
GA at the onset labor										
Range	37.0 - 40.0		37.0 - 40.0		37.0 - 40.0		37.0 - 40.0		t=1.297	0.277
Mean±SD	38.6 ± 1.1		38.4 ± 1.3		38.1 ± 1.1		38.3 ± 1.2			
Labor onset										
Spontaneous	32	74.4	29	78.4	33	86.8	94	79.7	1.97	0.37
Induced	11	25.6	8	21.6	5	13.2	24	20.3		
Labor augmentation										
Yes	28	65.1	21	56.8	18	47.4	67	56.8	2.58	0.27
No	15	34.9	16	43.2	20	52.6	51	43.2		

Table (3) Distribution of the studied pregnant women according to the duration of the first and the second stages of labor (n= 118) .

	Group								X^2	P
	Control (n= 43)		Massage (n= 37)		Kegel (n=38)		Total (n=118)			
	N	%	N	%	N	%	N	%		
1st stage duration in hours										
Range	7.0 - 10.0		7.0 - 10.0		7.0 - 10.0		7.0 - 10.0		t=0.198	0.821
Mean±SD	8.2 ± 1.1		8.2 ± 0.9		8.3 ± 0.9		8.3± 1.0			
2nd stage duration in minutes										
Range (median)	20.0 - 40.0		15.0 - 35.0		15.0 - 35.0		15.0- 40.0 (22.50)		t=10.59	0.000**
Mean±SD	27.9 ± 6.7		21.1 ± 6.3		23.02 ± 7.5		24.2 ± 7.4			

** The Chi-square statistic is high significant at the 0.001 level.

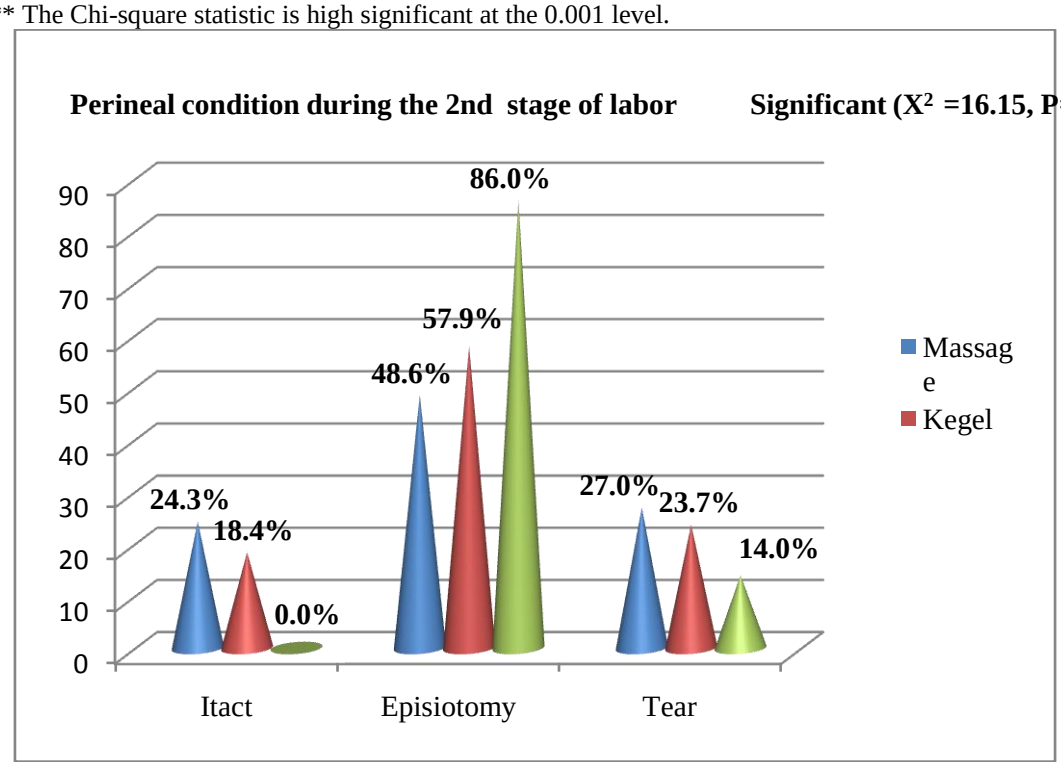

Figure 1: Distribution of the studied pregnant women according to perineal condition during the second stage of labor (n= 118).

Table (4) Distribution of the studied pregnant women according to site and degree of perineal tears (n=25).

	Group								X^2	P
	Control		Massage		Kegel		Total			
	N (n=6)	% (14.0)	N (n=10)	% (27.0)	N (n=9)	% (23.7)	N (n=25)	% (21.2)		
Site of tear										
Perineal	4	4.7	3	8.1	4	10.5	11	9.3		
Para urethral	0	0.0	4	10.8	2	5.3	6	5.1		
Vaginal	2	9.3	3	8.1	3	7.9	8	6.8	5.62	0.46
Degree of perineal tears										
1st degree	0	0.0	10	27.0	9	23.7	19	16.1		
2nd degree	6	14.0	0	0.0	0	0.0	6	5.1	21.96	0.000**

** The Chi-square statistic is high significant at the 0.001 level.

Table (5) Distribution of the studied pregnant women according to neonatal outcome (n= 118).

	Group								F test	P
	Control (n= 43)		Massage (n= 37)		Kegel (n=38)		Total (n=118)			
	N	%	N	%	N	%	N	%		
1st minute APGAR										
Range (median)	7.0 - 10.0		7.0 - 10.0		7.0 - 10.0		7.0 - 10.0(8.0)		t=0.408	0.666
Mean±SD	8.4 ± 0.7		8.6 ± 0.8		8.4 ± 0.7		8.5 ± 0.8			
5th minute APGAR										
Range (median)	8.0 - 10.0		8.0 - 10.0		8.0 - 10.0		8.0 - 10.0 (9.0)		t=3.268	0.052
Mean±SD	9.2 ± 0.7		9.3 ± 0.7		9.6 ± 0.4		9.3 ± 0.7			
Neonatal weight in grams										
Range (median)	2200.0 - 3500.0		2200.0 - 3500.0		2400.0 - 3500.0		2200.0 - 3500.0 (3000.0)		t=0.232	0.793
Mean±SD	2890.6 ± 360		2902.7 ± 320		2942 ± 367		2911.0 ± 348.3			

* The Chi-square statistic is significant at the 0.05 level.

Table (6) Distribution of the studied pregnant women according to assessment of perineal wound healing by REEDA scale 15 days postpartum (n= 102).

	Group								X^2	P
	Control		Massage		Kegel		Total			
	N	%	N	%	N	%	N	%		
Perineal trauma (episiotomy + tear	43	100.0	28	75.6	31	81.6	102	86.5		
REEDA scale										
Range	2.0 - 5.0		0.0 - 5.0		0.0 - 5.0		0.0 - 5.0		44.75	0.000**
Mean±SD	4.3 ± 0.8		1.7 ± 1.3		2.7 ± 1.6		2.97 ± 1.7			

** The Chi-square statistic is high significant at the 0.001 level.
The number in each group= (number of perineal tears + episiotomy).

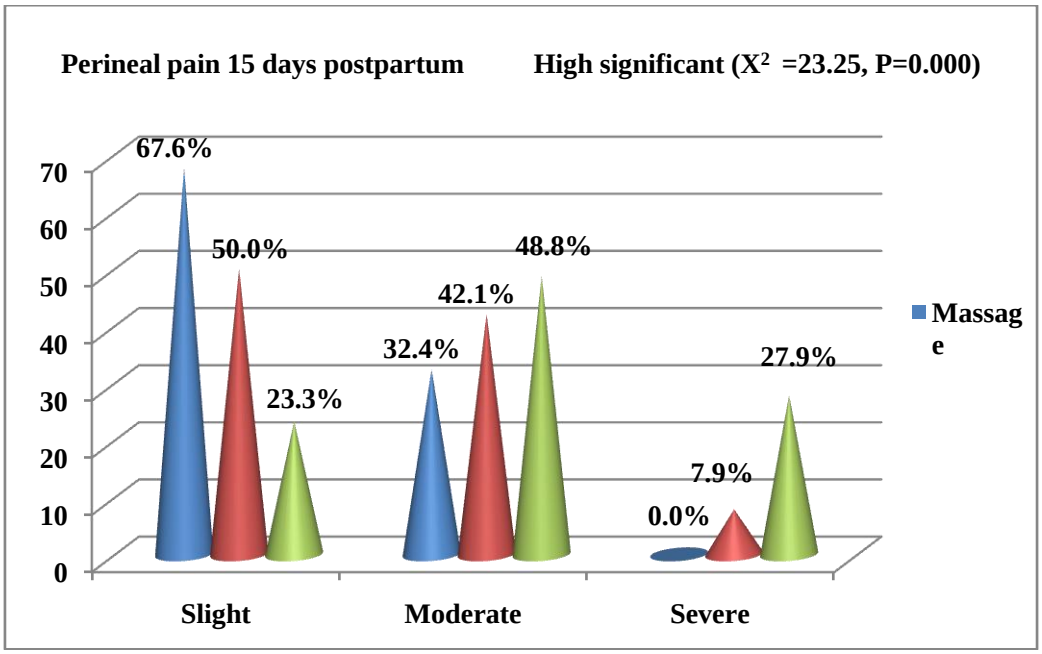

Figure 2: Distribution of the studied pregnant women according to perineal pain as perceived by the woman 15 days postpartum (n= 118)

Faten Ibrahim Elsebeiy. "Comparison of The Effects of Prenatal Perineal Massage Versus Kegel Exercise on Labor Outcome"." IOSR Journal of Nursing and Health Science (IOSR-JNHS) , vol. 7, no.3 , 2018, pp. 43-53.