The Effect of Continuous Support Combined with Breathing Exercise on The Progress of Labor and Intrapartum Fatigue

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Abstract

Introduction: Intrapartum fatigue is an unpleasant sensation and if allowed to continue will lead to exhaustion. It has a negative effect on the health of both mother and fetus. This study **aimed** to evaluate the effect of continuous support combined with breathing exercise on the progress of labor and intrapartum fatigue**. Design**: A non-randomized controlled clinical trial was utilized. **Subjects:** A purposive sample of 80 laboring women was recruited from labor and delivery unit of National Medical Institution in Damanhour, Albehera Governorate**. Tools:** Three tools were used for data collection**. Tool (I):** Socio-demographic and obstetric structured interview schedule, **Tool (II):** Partograph, **Tool (III):** Fatigue Continuum Form Checklist. **Results**: It was revealed that the mean descent of the fetal head and the mean duration, frequency and intensity of uterine contraction were significantly increased among the intervention group than the control group. Also, the mean cervical dilatation was significantly increased among the intervention group than the control group. In addition, the mean duration of the first, second and third stage of labor were significantly decreased among the intervention group than the control group (P=.003, P=.000 & P=.000). Furthermore, intrapartum fatigue was significantly decreased among the intervention group than the control group after intervention, (p=0.000). **Conclusion**: laboring women who receive continuous support combined with breathing exercise during their active phase of labor exhibit faster progress of labor and less intrapartum fatigue than those who received routine intervention. **Recommendations:** Continuous support combined with breathing exercise should be recommended as a non-pharmacological management to faster progress of labor and decrease fatigue level during labor.

Keywords: continuous support, breathing exercise, progress of labor, intrapartum fatigue

Introduction

The experience of childbirth is one of the most serious events in a woman's life, with significant physical, emotional, and psychological consequences. The labor process is an exciting and unique experience. Yet, it is occasionally worrisome for some laboring women. Each woman is concerned about labor pain, the progress and duration of labor. Therefore, decreasing the negative aspects associated with childbirth and increasing the favorable aspects are significant considerations (Mortazavi & Borzoee 2019; Baljon *et al*., 2020).

Inadequate uterine contractions are the most prevalent cause of slow labor progress. Inadequate uterine contractions are affected by numerous psychological and physical factors, including lack of energy provision, ketoacidosis, dehydration, fatigue, and psychological and physical factors (Prosser et al., 2018; Sui et al., 2021).

Intrapartum fatigue is a distressful symptom that occurs with childbirth. Childbirth is a time in a woman's life that includes psychological and physiological fatigue. Intrapartum fatigue is an unpleasant sensation and, if allowed to continue, will lead to exhaustion. Fatigue during childbirth has three related factors including physiological, psychological, and situational factors. The first, physiological-related fatigue, is normal physiological changes such as contraction pattern, labor length, and response to pain. The second, psychological-related fatigue, is a psychological state and response to childbirth. The third factor that contributes to situational fatigue is the environment and personal characteristics (Tzeng et al., 2008; Tzeng et al., 2017; Henderson et al., 2019).

The causes of intrapartum fatigue are physical changes when entering the first stage of labor; intermittent uterine contractions, contributing to myometrial contraction, reducing blood flow, and temporary ischemia, which lead to uterine exhaustion. As a result, it may cause fatigue if it continues for a lengthy period of time (Lowdermilk, Perry, Cashion, & Alden, 2012). During the second stage of labor, women attempt pushing, which consumes much more energy in

order to increase sufficient does not receive any compensated energy, it will lead to more fatigue (Thummarattanakul, and Sittipa, 2019). The third stage of labour requires strong, frequent uterine contractions for the expulsion of the placenta. At this stage, women are losing some amount of blood and minerals and it will lead to fatigue (Khiaokham, 2016; Delgado et al., 2019; Liu et al., 2020)

Intrapartum fatigue affects women's ability to undergo the hard labor process. It can also impede the ability of parturients to cope with pain and pushing during the second stage of labor (Tzeng et al., 2008). Fatigue can cause some problems during delivery, like secondary arrest of cervical dilation, prolonged labor, instrumented delivery, and cesarean section (Ebrahimzadeh et al., 2012). In addition, fatigue inhibits maternal recovery and hinders the performance of maternal roles during postpartum (Tzeng et al., 2017). It may be linked to a decline in the interest of mothers to their newborns as well as postpartum blues and postpartum depression, all of which might jeopardize the mother-baby bond (Delgado et al., 2019).

Fatigue during labor has a negative impact on women's psychological and physical health. It also has an effect on the fetus and newborn (Tzeng et al., 2017). Therefore, laboring women who experience fatigue require effective management. One of the methods of fatigue management is non-pharmacological therapy. Non-pharmacological therapy includes aerobic exercise, music therapy, massage, energy therapy, yoga, acupressure, progressive muscle relaxation, reflexology, hypnosis, nursing supportو and breathing exercises (Qian et al., 2021; Georgia et al., 2019; Song et al. 2018). Continuous support and breathing exercises during labour can decrease physical and psychological fatigue since both methods can speed up the second stage of labour, reduce anxiety and stress (Khiaokham et al., 2016).

The presence of an empathic person who provides guidance, information, comfort measures, and other types of actual grants to help a woman cope with the stress during labor is referred to as labor support (Kabakian-Khasholian & Portela, 2017). The World Health Organization (WHO) has suggested labor support to enhance labor outcomes and women's satisfaction with care. Continuous labor support is also a fundamental component of the WHO's vision of high-quality care for pregnant women and babies (WHO., 2014).

Continuous support includes physical support by providing comfort measures such as massage, touch, applying warm or cold compresses, and breathing exercise. Emotional support occurs by providing continuous companionship, encouragement, reassurance, and anticipatory guidance. In addition, providing information about the labor process and how to cope with it, helping the woman to make an informed decision, and facilitating communication between the woman and other caregivers (Prasan et al., 2021).

Breathing Exercises are an important part of childbirth education. It's commonly used and thought to be an efficient approach to manage pain and stress during childbirth (Amola et al., 2019). This breathing is encouraged by nurses and midwives to distract the laboring woman from her discomfort and to involve her partner in her care (Cicek & Basar, 2017; Baljon et al., 2022). Breathing exercise is a planned process of breathing technique that maintains complete relaxation and is linked with physical movements that women can do on their own while doing breathing exercises (Argade et al., 2020)**.** It affects the stress response mechanism and reduces energy utilization, allowing the mind and body to relax. Breathing exercise also promotes relaxation by enhancing oxygen supply to the tissues and improving blood circulation. (Cicek & Basar, 2017; Georgia et al., 2019).

Significance of the study

Fatigue is a symptom commonly reported by laboring women as part of the childbirth experience. It has a negative impact on both mothers' and fetuses' health (Tzeng et al., 2017). It is important to increase nurses' awareness of intrapartum fatigue during childbirth and assist nurses in taking the proper early preventative and intervention strategies to decrease the negative impacts of fatigue and enhance the quality of intrapartum care (Tzeng **et al., 2013**; Delgado et al., 2019). The majority of empirical researches on the management of childbirth fatigue has been undertaken on antepartum and postpartum fatigue, with little attention paid to intrapartum fatigue. Unfortunately, there were no studies in the

literature that addressed the impact of continuous support and breathing exercises on the progress of labor and intrapartum fatigue. Therefore, the aim of the present study was to determine the impact of continuous support combined with breathing exercises on the progress of labor and intrapartum fatigue.

Aim of the study:

This study aims to evaluate the effect of continuous support combined with breathing exercise on the progress of labor and intrapartum fatigue

Research hypothesis:

H0: Laboring women who receive continuous support combined with breathing exercise during their active phase of labor exhibit similar progress of labor and intrapartum fatigue as those who received routine intervention.

H1: Laboring women who receive continuous support combined with breathing exercise during their active phase of labor exhibit faster progress of labor than those who received routine intervention.

H2: Laboring women who receive continuous support combined with breathing exercise during their active phase of labor exhibit less intrapartum fatigue than those who received routine intervention.

Operational definitions:

- **Intrapartum Fatigue:** Refers to sensation of tiredness and powerless exhibited by the women during labor.
- **Breathing exercise:** Means that the woman takes a deep inspiration from her nose and then expire out the air slowly from her mouth with a sigh and relax (Diaphragmatic breathing). And when the uterine contractions became stronger and more frequent and the cervical dilatation was increased, the woman take a deep breathe from her nose, and then open out her ribs and expire the air from her mouth with a sigh slowly and relax (Costal breathing).
- **Progress of labor:** In the present study refers to progress in uterine contraction characteristics, increase in dilation of the cervix, and progressive descent of the fetal head throughout the first stage of labor

Material and Methods

Research design:

A non-randomized controlled clinical trial was used.

Material

Setting:

This study was carried out at the labor and delivery unit of the National Medical Institution in Damanhour, Albehera Governorate. This hospital was selected because it is the only main hospital in Damanhur City in which deliveries are carried out, and the delivery turnover is satisfactory for the study.

Subjects:

The study sample was selected through a non-probability sampling technique. A purposive sample of 80 laboring women was recruited. The following parameters were used to estimate the sample size using the Epi-Info 7 programme: population size equal 1200 per 3 months, expected frequency equal 50%, acceptable error equal 5%, and confidence coefficient equal 95%.

In this study, participants were chosen according to the following inclusion criteria: aged 18 - 35 years, with a singleton pregnancy, early in the first stage of normal onset of labor (had a cervical dilatation of 3–4 cm), full-term baby (38–42 weeks of gestation), vertex presentation, and willing to take part in the study. The laboring women who had medical or obstetric problems that may affect the labor progress were excluded from the study.

Participants in the study were split into two equal groups, each with 40 laboring women. One of them was an intervention group (received continues support in addition to breathing exercise), while the other was a control group (received routine hospital care).

Tools:

Three tools were utilized for data collection.

Tool (I): Socio-demographic and obstetric structured interview schedule

It was created by the researchers and contains two parts. Part one: Socio-demographic characteristics, including age, educational level, original residence, occupation, family type, and family income/month. Part two: Obstetric history, including number of gravidities, abortions, and type of pregnancy.

Tool (II): World Health Organization (WHO) partograph: (labor progress record)

It was developed by **the World Health Organization (WHO)** in 1994. The partograph is a low-cost instrument that offers a continuous graphical representation of labor and has been found to enhance outcomes when used to monitor and manage labor. It is one piece of paper that contains data about ***the fetus*** such as heart rate, membranes and liquor, and the moulding of the fetal skull. In addition, the partograph includes information about the ***progress of labor,*** such as cervical dilatation, descent of the fetal head, and uterine contraction. Also, it includes ***maternal*** information such as vital signs, drugs and IV fluids as well as the oxytocin regimen **(WHO., 1994)**.

Tool (III): Fatigue Continuum Form Checklist

Fatigue Continuum Form Checklist was developed by Pugh et al in (1999), to assess childbirth fatigue. It contains a thirty item with ordinal response (Not at all =1; Somewhat = **2**; Moderately **So** =**3;** Very Much So= **4**) to evaluate physical and psychological symptoms of fatigue experienced during childbirth. The range of possible scores was 30 to 120 points **(Pugh et al., 1999)**. The participant's level of fatigue increased as the scores increased. The Fatigue Continuum Form Checklist had a total score of 120 points, which could be classified into:

- Low fatigue ranged from 30 to less than 40
- Moderate fatigue ranged from 40 to less than 80
- High fatigue was a score of 80 or more

Method:

The study was executed according to the following steps:

Approval:

1- An approval from Research Ethics Committee, at the Faculty of Nursing-Damanhour University, was obtained

2- An official letter from the Dean of Faculty of Nursing, Damanhour University was submitted to the hospital administrator to obtain his approval to conduct the study after explaining its aim.

Tools:

1- Tool I was created by the researchers after reviewing new and related literature. Tools II and III were adopted, then Tool III was translated into the Arabic language.
2- A panel of five professors in the field of obstetrics and gynecologic nursing reviewed all tools of the study for content validity.
3- Reliability for internal consistency of the Tools II and III was assessed through Cronbach's alpha coefficient test were r=0.89 & r=0.95 respectively.

Pilot study:

- A pilot study was conducted on eight laboring women (who were not included in the actual study subjects) to assess and ensure the clarity of the tools as well as to estimate the time needed to complete the tools.

Data collocation:

1- The collection of data lasted for six months, from April 2021 to September 2021. Data was collected from one laboring women per day.

2- Each laboring woman who met the inclusion criteria and agree to join the study was assigned either to the intervention or the control group.

3- To prevent sample contamination, the control group was begun and finished before the intervention group.

4- Data of tool I were gathered from both groups during the active of the first stage of labour, immediately following assignment, through an interview that was done individually and in complete privacy.

5- After that, data of tool II was collected from both groups through an abdominal examination to assess FHR, descent of fetal head in fifths, and uterine contractions (frequency, interval, duration and intensity). Vaginal examination was also performed to assess cervical dilatation and condition of membranes as well as molding of the fetal head. Then the data was plotted on the partograph in addition to maternal vital

signs. This assessment performed every hour until delivery.

6- Then data of tool III was collected from both groups to assess the intrapartum fatigue level (pretest).

The control group:

- It included 40 laboring women who received only the routine hospital cares (such as intravenous fluids administration, instruction not to drink or eat anything, instruction to move freely throughout the labor, and assume any comfortable position,,….). Each woman was individually interviewed during their active phase of labor (3-4 cm cervical dilatation) to collect the necessary data.

The intervention group:

- It included 40 laboring women who received routine labor care in addition to continuous labor support. The researchers were present with each woman continuously from admission in delivery unit until delivery of the fetus to provide the necessary labor support. During this time, the researcher provides emotional support by giving reassurance, encouragement, and information about labor progress, while the researcher provides physical support by encouraging mobility, changing position, applying massage to the woman's back, and teaching the woman breathing exercises. The researcher instructed each woman to choose a comfortable position and unwind fully. After that, she was instructed by the researcher to inhale deeply through her nose, exhale gently through her mouth while sighing, and relax. In order to preserve energy, the researcher encouraged each woman to avoid pushing during the first stage of labour. The researcher instructed each woman to take a deep breath through her nose, open out her ribcage, and gently expel the air from her mouth while relaxing as the uterine contractions were stronger and more frequent and the cervical dilatation increased. Each woman was instructed to perform this breathing exercise repeatedly during each contraction, and to breathe normally during the rest periods.

Evaluation:

1- At the end of the labor process, data of tool III was collected from each laboring woman of both groups to assess intrapartum fatigue level (posttest).

2- After that, the Partograph sheet of each laboring woman was reviewed for the following: the characteristics of uterine contractions, the progress of cervical dilatation, the descent of the fetal head, and the duration of labor stages.

Ethical considerations:

Before implementation of the intervention, consent from the research ethics committee of the faculty of nursing at Damanhour University was taken. The following issues were taken into consideration for each recruited woman: securing the woman's written informed consent after explaining the aim of the research; maintaining her privacy and anonymity; guaranteeing the confidentiality of her data; and the right to withdraw at any time without affecting the care she received. In the case of any emergency, the intervention could be stopped.

Statistical analysis:

After data collection, the SPSS program version 20.0 was used to analyzed the data once it was entered into the computer (SPSS, Chicago, IL). Analytical and descriptive statistics were applied, including percentages, means, and standard deviations. Chi-square-test, Fisher Exact-test, T-test, and One–Way ANOVA test were used to detect the difference between groups. The cutoff for statistical significance was $p \leq 0.05$.

Results

Table (I) shows that more than one-half (52.5%) of the intervention group were 18 to less than 20 years old, compared to 35% of the control group. 40% & 52.5% of the intervention and control groups respectively, were illiterate or just read and write. Sizeable proportions (65% &77.5%) of the intervention and control groups respectively, were working. About one-half (45% &52.5%) of the intervention and control groups respectively, were rural residents. And 42.5% & 57.5% of both groups respectively had nuclear family. Around one-half (45% & 52.5%) of them respectively had enough family income. There were no statistically significant differences in the socio-demographic characteristics between the two groups.

As shown in Table (II), the mean descent of the fetal head/fifths was significantly increased among the intervention group in 3rd hours than the control group (P=.000), where the mean descent of the fetal head /fifths was 3.85±.933 among the intervention group, while it was 3.05±.944 among the control ones. In addition, there was a statistically significant increase in the mean descent of the fetal head /fifths within the intervention group during the first, the third hours (P=0.000), while it was found during the first, the third and the sixth hours among the control group.

According to table (III), it was observed that a significant difference was found between the intervention and control groups in relation to the mean frequency of contraction during the third and the fourth hours (P=.002 & P=.000) respectively, while during the first and the second hours it was not statistically significant difference among them. However, the differences within the intervention and control groups were statistically significant from the first to the sixth hour (p=0.000). Regarding the mean interval of uterine contraction, it was noticed that there were a significant differences between the intervention and control groups in relation to mean interval of uterine contraction during the third and the fourth hours (P=.004 & P=.002) respectively, while during the first and the second hours it was not statistically significant difference among them (P=.198 & P=.915) respectively. Moreover, the differences within the intervention and control groups were a statistically significant from the first to the sixth hour (p=0.000).

Table (IV) reveals the mean duration of uterine contraction among intervention and control groups. It obvious that mean duration of uterine contraction in the second, third, fourth and fifth hours were significantly increased among the intervention group than the control group (P=.011, P=.000, P=.000, & P=.006), where the intervention group had higher mean contraction in the second, third, fourth and fifth hours (51.43 ± 3.622 , 55.16 ± 2.707, 58.83± 1.497, &58.80 ±1.095) respectively, than the control group (49.12± 4.244, 52.08 ± 3.751, 55.73± 2.504, & 58.95± 1.253) respectively. In addition, the differences in the mean duration of uterine contraction within the intervention and control groups were a statistically significant from the first to the sixth hour (p=0.000).

Table (V) demonstrates the intensity of uterine contraction among the intervention and control groups. It reveals that the intensity of uterine contraction in third & fourth hours were significantly strong among the intervention group than the control group (P=.000 & P=.003), where the strong uterine contraction in the third, & fourth hours was observed among (51.3% &92.6%) of the intervention group respectively, than the control group (15.4% &57.1%) respectively. In addition, the differences in the intensity of uterine contraction within the intervention and control groups were a statistically significant from the first to the sixth hour (p=0.000).

Table (VI) clarifies the mean cervical dilatation among the intervention and control groups. It was obvious that the mean cervical dilatation in the third, fourth and fifth hours were significantly increased among the intervention group than the control group (P=.021, P=0.000 & P=.049), where the intervention group had higher mean cervical dilatation in the third, fourth and fifth hours (7.64± 1.088, 9.78 ± .641 &10 ± .000) respectively, than the control group (7.00± 1.298, 8.71 ±1 .243 & 8.47 ± 1.125) respectively. In addition, the differences in the mean cervical dilatation within the intervention and control groups were a statistically significant from the first to the sixth hour (p=0.000).

Table (VII) demonstrates the mean duration of labor's stages among the intervention and control groups. It was revealed that mean duration of the first, second and third stage of labor were significantly decreased among the intervention group than the control group (P=.003, P=.000 & P=.000), where the mean duration of the first, second and third stage of labor among the intervention group were (5.55 ±.932, 22.05 ± 2.230 & 12.78 ±1 .368) respectively, compared to (6.30 ± 1.224, 25.81 ± 2.738 &17.29 ±2.020) respectively among the control group.

As shown in Table (VIII), 52.5% & 20% of the intervention group had moderate and high fatigue respectively, compared to 67.5% & 7.5% of the control group respectively before the intervention without statistically significance difference (p=0.216). While After intervention, highly a statistically significant difference was observed between the intervention and the control groups in the favor of the former

(p=0.000), where moderate and high fatigue were observed among only 25% & 7.5% of the intervention group respectively, compared to 60% & 25% of the control group respectively. Moreover, a statistically significant difference was observed among the intervention group before and after the intervention (p=0.002). The same difference was not statistically significant among the control group.

Table (I): Distribution of the study subjects according to their socio-demographic characteristics

Socio-demographic characteristics	Groups				FET / χ^2 (P)
	Intervention (40)		Control (40)		
	N	%	N	%	
Age: (years)					
- 18 to less than 20	21	52.5	14	35.0	7.180
- from 20 to less than 25	12	27.5	20	50.0	(.066)
- from 25 to less than 30	3	07.5	5	12.5	
- 30 to 35	5	12.5	1	02.5	
Level of education:					
- Illiterate/ read and write	16	40.0	21	52.5	5.159
- Primary/ preparatory.	21	52.5	15	37.5	(.397)
- Secondary	2	5.0	4	10.0	
- University	1	2.5	0	0.0	
Occupation:					
- Working	26	65	31	77.5	1.526
- Not working	14	35	9	22.5	(0.217)
Original Residence:					
- Rural	18	45	21	52.5	0.450
- Urban	22	55	19	47.5	(.502)
Family type:					
- Nuclear	17	42.5	23	57.5	1.800
- extended	23	57.5	17	42.5	(.180)
Family income:					
- enough	18	45	21	52.5	0.450
- not enough	22	55	19	47.5	(0.502)

FET (P): Fisher Exact Test & P for FET-Test. χ^2 (P): Chi-Square Test &P for $X^{2.}$ Significant at $P \leq 0.05$

Table (II): distribution of the study subjects according to mean decent of their fetal head /fifths

decent of the Fetal head /fifths	Intervention Group= (40)		Control Group =(40)		T (P)
	N	Mean & SD	N	Mean & SD	
- 1st hours	40	1.82 ± .747	40	2.15±1.001	2.707 P=.104
- 3rd hours	39	3.85±.933	39	3.05±.944	13.981 P=.000
- 6th hours	-	-	4	5.00±.000	-
F (P)	86.464 (0.000)		17.488 (0.000)		

F (P): ANOVA test & p for ANOVA test: **T (P):** T- test & p for T- test *: Significant at $P \leq 0.05$

Table (III): Mean distribution of the study subjects according to their progress of Frequency and Interval of uterine contraction

Progress of uterine contraction	Intervention Group (40)		Control Group (40)		T (P)
	N	Mean & SD	N	Mean & SD	
Frequency of contraction					
- 1st hours	40	2.95 ± .749	40	3.15 ± .746	1.451(P=.232)
- 2nd hours	40	3.05 ± .846	40	3.08 ± .797	0.019(P=.892)
- 3rd hours	39	3.90 ± .718	39	3.36 ± .778	10.095(P=.002)
- 4th hours	27	4.89 ± .320	28	4.39 ± .497	19.181(P=.000)
- 5th hours	3	5.00 ± .000	17	5.00 ± .000	-
- 6th hours	0	-	4	5.00 ± .000	-
F (P)	38.004 (0.000)		27.196 (0.000)		
Interval of contraction					
- 1st hours	40	3.55 ± .932	40	3.28 ± .960	1.688(P=.198)
- 2nd hours	40	3.28 ±.132	40	3.25 ± .954	.011(P=.915)
- 3rd hours	39	2.21 ± .409	39	2.62 ± .747	9.041(P=.004)
- 4th hours	27	2.00 ± .000	28	2.29 ± .460	10.407(P=.002)
- 5th hours	3	2.00 ± .000	17	2.00 ± .000	-
- 6th hours	0	-	4	2.00 ± .000	-
F (P)	26.505 (0.000)		14.009 (0.000)		

F (P): ANOVA test & p for ANOVA test: **T (P):** T- test & p for T- test *: Significant at P ≤ 0.05

Table (IV): Mean duration of uterine contraction among intervention and control groups

Duration of contraction	Intervention Group (40)		Control Group (40)		T (P)
	N	Mean & SD	N	Mean & SD	
- 1st hours	40	48.37 ± 3.780	40	47.97 ± 3.711	.228 (P=.634)
- 2nd hours	40	51.43 ± 3.622	40	49.12± 4.244	6.797 (P=.011)
- 3rd hours	39	55.16 ± 2.707	39	52.08 ± 3.751	17.004 (P=.000)
- 4th hours	27	58.83± 1.497	28	55.73± 2.504	27.299 (P=.000)
- 5th hours	3	58.80 ±1.095	17	58.95± 1.253	9.188 (P=.006)
- 6th hours	0	-	4	58.25 ± 2.062	-
F (P)	47.771 (0.000)		26.532(0.000)		

F (P): ANOVA test & p for ANOVA test: **T (P):** T- test & p for T- test *: Significant at P ≤ 0.05

Table (V): Number and percent distribution of the study subjects according to their intensity of uterine contraction

Intensity of uterine contraction	Intervention group (40)			Control group (40)			FET / X^2 (P)
	Total number	N	%	Total number	N	%	
1st hours							
- Mild	40	27	67.5	40	28	70	0.071 0.965
- Moderate		10	25		9	22.5	
- Strong		3	7.5		3	7.5	
2nd hours							
- Mild	40	18	45	40	27	67.5	4.229 .121
- Moderate		18	45		10	25	
- Strong		4	10		3	7.5	
3rd hours							
- Mild	39	1	2.6	39	14	35.9	18.832
- Moderate		18	46.2		19	48.7	.000
- Strong		20	51.3		6	15.4	
4th hours							
- moderate	27	2	7.4	28	12	42.9	9.103
- strong	-	25	92.6		16	57.1	.003
5th hours							
- strong	3	3	100	17	17	100	-
6th hours							
- strong	-	-	-	4	4	100	
- FET / χ^2 (P)	173.617 (0.000)*			148.324 (0.000)*			

FET (P): Fisher Exact Test & P for FET-Test. X^2 (P): Chi-Square Test &P for X^2 *: Significant at P ≤ 0.05

Table (VI): Mean cervical dilatation among the study and control groups

Cervical dilatation	Intervention Group (40)		Control Group (40)		T (P)
	N	Mean & SD	N	Mean & SD	
- 1st hours	40	4.10 ± 1.057	40	4.20 ± 1.137	.166(P=.685)
- 2nd hours	40	5.45 ± 1.037	40	5.28 ± 1.109	.532(P=.468)
- 3rd hours	39	7.64± 1.088	39	7.00± 1.298	5.588(P=.021)
- 4th hours	27	9.78 ± .641	28	8.71 ±1 .243	15.730(P=0.000)
- 5th hours	3	10 ± .000	17	8.47 ± 1.125	4.464(P=.049)
- 6th hours	0	-	4	9.75 ± .500	-
F (P)	112.702 (0.000)		77.872 (0.000)		

F (P): ANOVA test & p for ANOVA test: **T (P):** T- test & p for T- test *: Significant at P ≤ 0.05

Table (VII): Mean duration of labor's stages among the intervention and control groups

Duration of stages of labor	Intervention Group=40	Control Group=40	T (P)
	Mean & SD	Mean & SD	
- **duration of 1st stage (hours)**	5.55 ±.932	6.30 ± 1.224	9.507 P=.003
- **duration of 2nd stage (min)**	22.05 ± 2.230	25.81 ± 2.738	40.609 P=.000
- **duration of 3rd stage (min)**	12.78 ±1 .368	17.29 ±2.020	125.762 P=.000

T (P): T-test & P for T-test *: Significant at P ≤0.05

Table (VIII): Total score of fatigue among the intervention and control groups before and after the intervention

Total score of fatigue	Intervention group=40				Control group=40				Before intervention	After intervention
	before		after		before		after			
	N	%	N	%	N	%	N	%	FET / χ^2(P)	FET / χ^2(P)
- Low fatigue	11	27.5	27	67.5	10	25.0	6	15.0	3.07 (0.216)	22.898 (0.000)*
- Moderate fatigue	21	52.5	10	25.0	27	67.5	24	60.0		
- High fatigue	8	20.0	3	07.5	3	07.5	10	25.0		
FET / χ^2(P)	12.913(0.002)				4.946(0.084)					

FET (P): Fisher Exact Test & P for FET-Test χ^2 (P): Chi-Square Test &P for χ^2 *: Significant at P ≤ 0.05

Discussion

Intrapartum fatigue is a common cause of mental and physical discomfort during childbirth, and it increases the likelihood of medical interventions including caesarean section and instrumental delivery. Even so, because fatigue is widely seen as an unavoidable aspect of the labor experience, little attention has been paid to possible management (Tzeng et al., 2013). Safe and effective fatigue management is significant for laboring women, and various types of non-pharmacological management have been shown to be beneficial to decrease or alleviate fatigue during labor (World Health Organization, 2018; Olza et al., 2020). However, there is little evidence released on the effects of combined management. So, this study has shed some lights on the impact of continuous support combined with breathing exercise on the progress of labor and Intrapartum fatigue.

Unfortunately, a literature search was not able to identify any study investigating the effect of continuous support combined with breathing exercise on the progress of labor and fatigue during childbirth. However, some studies examining the effectiveness of continuous support or breathing exercise on the progress of labor only. This study will discuss its results on the frame of suggested hypotheses which is laboring women who receive continuous support combined with breathing exercise during their active phase of labor exhibit faster progress of labor and less Intrapartum fatigue than those who received routine intervention. In the present study, progress of labor was determined by the changes in uterine contraction characteristics, cervical dilatation, and descent of the fetal head throughout the first stage of labor.

On evaluating the progress of uterine contraction, the results of the current study show statistically significant difference among the intervention and control groups from the 3rdto 4th hour in relation to frequency, interval and intensity, but from 2nd to 5thhour in relation to duration of uterine contraction in the favor of the former. This result was obviously showed remarkable increase in strong uterine contraction and decreased mild and moderate contraction among intervention group than control group. This progress of labor explained how the continuous support combining with deep breathing exercises play a crucial role in helping the women to accommodate her labor progress and effectively accelerate the process of complete opening time in vaginal delivery than the control group (Bohren MA et al., 2017).

This is contributed to the fact that the components of labor support such as human reassurance and touch are known to facilitate release of the peptide hormone oxytocin, which stimulates uterine myometrial contractions and labor progress. In addition, oxytocin induces several effects that counteract stress including calm, joy and empowerment, as well as reduction of fear, anxiety and pain and decreased cortisol levels (Uvnas-Moberg et al., 2019; Olza et al., 2020). Also, less fear leads to less anxiety; this, in turn, leads to less labor pain. Reduced perceptions of pain decreases the release of catecholamines; thus strengthening uterine contractions and shortening the duration of active labor (Yuenyong S et al., 2012).

In agreement with the results of the current study, (Mongan, 2016) who reported that the method of continuous support combined with breathing exercise can provide positively impacts the mother's psychological state, which affects the smoothness of the labor process. At the time of delivery, stress hormones, such as adrenaline, interact with beta-receptors in the uterine muscle and inhibit contraction and delay labor, therefore mothers require relaxed and comfortable conditions.

Also (Muhidayati et al., 2018) supported the same idea and reported that a significant effect of breathing exercises on frequency and duration of uterine contraction, So the use of this methods can be suggested as a supplement non-pharmacological method alternative for augmenting uterine contractions instead of oxytocin because, it does not have the side effects of oxytocin.

On examining cervical dilation, the present study clarifies that the mean cervical dilatation elucidated significant difference between the intervention and the control groups from the 3rd to the 5th hour in the favor of the intervention group. The results of this study is in congruent with that of Abdel Azeem & Mohamady (2019) who found that the mean cervical dilatation was significantly increased among the women in the supportive care group during the active stage of labor, compared to the control group. Muhidayati et al., 2018 also reported that the breathing exercise group's average cervical dilatation in the first four hours of the first stage was significantly higher than that of the control group. This similarity it has been reported in the literature that the woman can conserve energy during labour stages by using the breathing technique. Breathing slowly maximizes waves of vertical muscles to work more effectively in pulling up the lower circular muscles, as well as diluting and opening the cervix (Mongan, 2016).

When focusing on decent of fetal head, the present study showed a highly statistically significant difference (p= .000) between the intervention and control groups during the 3rd hour regarding the decent of fetal head in the favor of the intervention group. The result of the current study is in congruent with that of Abdel Azeem & Mohamady (2019) who found that the mean descent of the presenting part was evident among the supportive care group than the control group during the active stage of labor, with statistically significant differences ($P < 0.001$). More over the result of present study is in line with that of (Muhidayati et al., 2018) who reported a statistically significant difference between breathing exercise and control groups regarding the progress of the fetal head descent.

Concerning the duration of labor, the result of the present study revealed that the intervention group had significantly shorter duration of the first, second and third stage of labor than the control group. Similarly, Karkada et al (2022) concluded that breathing exercises during labor can facilitate spontaneous vaginal birth, shorten the duration of labor, and reduce the need for operative interference. In addition, Muliani et al., (2020) concluded that breathing ball exercises effectively decrease the duration of the first and second stages of labor in primigravidas. In this respect, Marzouk T et al., (2019) found that the study group had shorter active phase and second stage of labor than the control group. They explained that the shortening in the active phase of labor may be attributed to that the breathing exercise results in more oxygen reserve and improved maternal energy, which in turn makes parturient women more productive. Furthermore, repeated deep inhalation and exhalation increase oxygen supply to abdominal and pelvic floor muscles, activating contractions and increasing foetal descent. Consequently, it enhances labor progress and reduces its duration.

In a randomized controlled experiment with 70 Turkish pregnant women, breathing exercises were conducted beginning in the early stages of labour and maintained through delivery, the same results were reported (Cicek S et al., 2017). Similar to this, Yuksel et al. (2017) observed a significant decrease in the length of the second stage of labour in a randomized controlled trial that examined the impact of breathing exercises on the duration of the second stage of labour in 250 Turkish mothers. Iranian researchers evaluated the effects of breathing exercises on 120 laboring women who were randomly assigned to breathing exercise or control groups. They reported that the intervention group had significantly shorter duration of the second stage (Vakilian K et al., 2014).

On the same track, Çankaya and Can. (2021) concluded that the intervention group, who received continuous support during labor, experienced shorter duration of labor than the control group. Similarly, Bostanoglu and Demirgoz Bal (2021) found that the total childbirth duration in the intervention group was significantly shorter than the control group. According to Stjernholm et al. (2021), continuous labour support resulted in shorter active phase of labour than routine care. Continuously supported women were more likely to deliver vaginally and tended to have lower cortisol levels during the whole of active phase of labour, which indicated less stress. In addition, Wang et al (2018) found that the length of labor was significantly shorter in primiparous women with continuous support, than primiparous women with usual hospital care. Moreover, Bohren et al (2017) concluded that continuous support during labour may result in better results for mothers and babies, such as a higher rate of spontaneous vaginal birth, a shorter labour, and a lower caesarean section rate.

Otherwise, this result is contradictory with Safarzadeh A et al., (2012) who reported that there was no significant difference in the duration of the second phase of labor among study and control groups. This difference between the current study and the previous study may be explained by the fact that the continuous support for the earlier study was given by an untrained woman, such as a female friend or relative who had been chosen by the mother, whereas the continuous support for the present study was given by the trained researchers.

Though labor is a normal physiological process but associated with stress, fatigue and pain. Combination of non-pharmacological relaxation techniques are non-invasive and appear to be safe for mother and baby.

Finally, although it is a physiologically normal process, labour is also accompanied with pain, stress, and fatigue. Using a combination of non-pharmacological relaxation techniques are non-invasive and seems to be safe for both the mother and the foetus (Waqar and Qazi, 2017). It is interesting to notice in the current study that a highly statistically significant difference was observed between the intervention and control groups after intervention, this result was reported remarkable decreased in high fatigue score among the intervention group than the control ones. The researches done to evaluate the effect of continuous support combined with breathing exercise on the Intrapartum fatigue are very rare. However, some studies in fatigue related to Hemodialysis, chronic obstructive pulmonary disease and Gynecological Cancer have proven that breathing exercises are effective in reducing fatigue.

The current result is in harmony with El-Feshawy, et al., (2020) who studied "Effect of Relaxation Breathing Exercise on Fatigue for Women with Gynecological Cancer Receiving Chemotherapy". They concluded that women who performed relaxing breathing exercise exhibit lower fatigue scores than those who did not. It also agreed with that of Hamed & Abdel Aziz (2020), who studied the "effect of deep breathing exercise training on fatigue' level among maintenance hemodialysis patients". They found that a statistically significant decrease in the total mean score of fatigue among the study group after performing breathing exercises than the control group. They also concluded that performing breathing exercises can decrease fatigue level in hemodialysis patients. In addition, Sutinah, and Azhari (2020), concluded that deep breathing exercise has positive effects on reducing the fatigue in patients with chronic kidney disease undergoing hemodialysis. Similarly, Ghanbari et al. (2018) studied the effect of breathing exercises on fatigue in patients with chronic obstructive pulmonary disease. They found that there was a significantly improve in the mean score of fatigue after doing breathing exercises (P=0.0001) in the experimental group. Moreover, Mulhaeriah et al. (2018) concluded that relaxation breathing exercise is more effective in alleviating fatigue in patients with gynaecological cancer undergoing chemotherapy.

Conclusion

Based on the findings of the present study, it can be concluded that: H1 and H2 are accepted; while H0 is rejected as evidenced by Laboring women who receive continuous support combined with breathing exercise during their active phase of labor exhibit faster progress of labor and less intrapartum fatigue than those who received routine intervention. In addition, the duration of the first, second and third stages of labor were significantly

decreased among the intervention group than the control group.

Recommendations

Based on the findings of the present study, the following recommendations can be suggested:

1. Continuous support combined with breathing exercise should be recommended as a non-pharmacological management to faster progress of labor and decrease fatigue level during labor.
2. Midwives and maternity nurses should get training about continuous support combined with breathing exercise, and encourage the laboring women to receive it.
3. Further researches are recommended in order to:
   A. Examine the impact of continuous support along with breathing exercise on labor outcomes.
   B. Examine the impact of continuous support with breathing exercise on initiation of breast-feeding and postpartum depression.
   C. Compare the effect of continuous support versus breathing exercise on progress of labor and intrapartum fatigue.

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