

Deanship of Graduate Studies

Al-Quds University



**Impact of Birth Exercise on the Delivery Outcomes at
Governmental Hospitals in the Gaza Governorates:**

Case Control Study

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MPH Thesis

Jerusalem- Palestine

1437 / 2016

**Impact of Birth Exercise on the Delivery Outcomes at
Governmental Hospitals in the Gaza Governorates:
Case Control Study**

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**A Thesis Submitted in Partial Fulfillment of
Requirements for the Degree of Master of Public
Health - Management**

Al- QudsUniversity

1437 / 2016

Al-Quds University
Deanship of Graduate Studies
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Thesis Approval

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Hospitals in the Gaza Governorates:**

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Jerusalem- Palestine

1437 / 2016

Dedication

All the kind feelings to my parents who were praying for me all the way

I would like to convey my sincere gratitude to my husband and my children who encouraged me all the way through this study ... without their support and encouragement, this work wouldn't reach the end ...

Special thanks to my sisters and my brother for their support which provided me with extra energy to complete my study

I would like to express my appreciations to all those who contributed to the completion of this thesis.

Suha Al-Najjar

Acknowledgement

First of all, praise to Allah, the lord of the world, and peace and blessings of Allah be upon our prophet Muhammad, all thanks for Allah who granted me the capability to accomplish this thesis.

I would like to express my deepest thanks to the academic and administrative staff at Al Quds University for the knowledge and skills I gained through my study.

I had the great fortune to complete this study under the supervision, and guidance of Dr. Walid Abu-Hatab.

I would like to convey my warm thanks to all the obstetricians and midwives at maternity departments in Al-Tahreer hospital and Al-Shifa hospital for their cooperation during data collection.

To my friends, and all those who contributed to the completion of this study, thank you very much.

Suha Al-Najjar

January, 2016

Declaration

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signature:

Suha

Abstract

Exercise is a main method of non-pharmacological labor pain management techniques, and every woman need to be aware of safe exercises during labor that would benefit the mother and her baby. This study aimed to assess the pain characteristics and delivery outcome among women who used birth exercise during labor in comparison to those who did not exercise. To carry out this study, the researcher used prospective, case-control design. The sample of the study consisted of 290 pregnant women divided equally into two groups; (case group) consisted of 145 women who delivered at Al-Tahreer Hospital and used any kind of exercise during labor, and (control group) consisted of 145 women who delivered at Al-Shifa hospital and did not perform exercises during labor. A checklist prepared by the researcher was used for data collection. For data analysis, SPSS was used and statistical analysis included frequencies and percentage calculation. The results of the study showed that age of the study participants ranged between 15 – 55 years ($m = 25.76$), 29% of cases and 33.1% of controls were primiparous, 31.7% of cases and 29% of controls had history of previous abortions, and 6.2% of cases and 9.7% of controls had previous cesarean section. All the participants attended antenatal clinic during pregnancy with variations in the number of visits. Moreover, 98.6% of cases and 96.6% of controls had singleton pregnancy. The results also showed that 99.3% of cases and 97.9% of controls had cephalic presentation, 93.8% of cases and 81.4% of controls had spontaneous onset of labor while 6.2% of cases and 18.6% of controls needed induction mainly with oxytocin and prostaglandin. The results also found lower rates of augmentation among cases compared to controls, and that 31% of cases and 20% of controls needed artificial rupture of membrane, 6.9% of cases and 28.3% of controls received oxytocin, and 9% of cases and 28.3% of controls needed both artificial rupture of membrane and oxytocin. Furthermore, women who exercised had shorter duration of labor, and 94.5% of cases had normal vaginal delivery compared to 85.5% of controls and 4.1% of cases had assisted delivery compared to 13.1% of controls. Concerning pain characteristics, exercising women had higher pain frequency with 92.4% of cases and 59.3% of controls had more than 2 contraction pains every 10 minutes, each contraction pain lasted less than 30 seconds among 37.9% of cases and 22.8% of controls, and 19.3% of cases and 3.4% of controls experienced mild pain, 40.7% of cases and 45.5% of controls experienced moderate pain, and 40% of cases and 51% of controls experienced severe pain. The results also showed that the majority of babies had normal birth weight, but neonates who were born to women who were exercising during labor were less likely to be admitted to Special Care Baby Unit comparing to non-exercising women (6.9% vs. 29%), babies who born to exercising women had higher Apgar score at one minute and at five minutes, and the majority of exercising women breast fed their babies early compared to non-exercising women (84.8% vs. 1.4%). Lower rate of episiotomy required for women who were exercising during labor (23.4% vs. 49.7%), and exercising women had less complications; 13.8% of cases and 17.9% of controls had perineal laceration, 0.7 vs. 4.1% had retained placenta. Exercising women were less likely to use medication during labor, as 63.4% of cases and 34.5% of controls did not use any medication during labor, 33.8% of cases and 38.6% of controls received one type of medication, 2.8% vs. 26.9% received two and more types of medication, and the most common medication used were oxytocin and analgesic medication. The study also showed that 9.7% of women used pelvic rock exercise, 26.9% squatting, 12.1% used birth ball, 42.1% walking, 10.7% leaning, and 49.3% deep breathing. In conclusion the study emphasized the need to practice exercise during labor, and Ministry of Health need to adopt birth exercise as part of maternity health services.

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List of Abbreviations

ACOG	American College of Obstetricians and Gynecologists
ACSM	American College of Sports Medicine
ADA	American Diabetes Association
ARM	Artificial Rupture of Membrane
CDC	Centers for Disease Control and Prevention
CS	Cesarean Section
GS	Gaza Strip
ICM	International Confederation of Midwifery
MOH	Ministry of Health
NGOs	Non Governmental Organization
NMC	Nasser Medical Complex
NVD	Normal Vaginal Delivery
PCBS	Palestinian Center Bureau of Statistics
PHC	Primary Health Care
RCOG	Royal College of Obstetricians and Gynecologists
SCBU	Special Care of Babies Unit
SPSS	Statistical Package for Social Sciences
UNRWA	United Nations Relief and Works Agency for the Palestinian Refugees
USDHHS	U.S. Department of Health and Human Services
WB	West Bank
WHEC	Women's Health and Education Center
WHO	World Health Organization

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Chapter One

1.1 Introduction

Childbirth is a major life event for every woman. It is a normal physiologic process for every pregnant woman. Ensuring that women receive safe care during childbirth is a basic human right (World Health Organization - WHO, 2010). For most women, labor pain is considered as an unwanted experience of their lives. The pain of uterine contractions is a complex process involving interactions between central and peripheral mechanisms. Labor pain involves emotional, sensorial, environmental and existential factors, so, the management of labor pain is one of the main goals of maternity care which can be achieved by pharmacological and non-pharmacological approaches. The non-pharmacological approach includes a wide variety of techniques that address not only the physical sensations of pain, but also attempt to prevent suffering by enhancing the psycho-emotional and spiritual components of care (WHO, 2010).

Exercise is a main method of non-pharmacological labor pain management techniques, and every pregnant woman needs to be aware of safe and beneficial exercises for a healthy delivery process and a healthy baby. A literature review on the effects of maternal movements during labor found that it can decrease pain, facilitate maternal-fetal circulation, increase the intensity of uterine contractions, reduce the duration of labor, help with the descent and station of the fetal presenting part and bring down perineal trauma and episiotomy rates (Zwelling, 2010). Also, women who performed squatting exercise had significant shorter duration of labor, less use of forceps delivery, and less Cesarean section (CS) (Allahbadia and Vaidya, 1993), labor complications including perineal tears, paraurethral tears, shoulder dystocia, and forceps application were significantly less in the squatting women (Nasir et al., 2007). Furthermore, exercising with the birth ball enhance

pelvic rotation, muscle stretching and strengthening (Simkin and Bolding, 2004), pain relief and enhance progression of labor (Silva et al., (2011) and higher rates of spontaneous delivery, lower rates of induction and CS (Leung et al., 2013). Using the birth ball as exercise tool found to be useful in many studies. Furthermore, Leung et al., (2013) reported that 88% of women who were exercising using birth ball gave spontaneous delivery compared to 75% among those who did not use birth ball exercise. Also women who used birth ball exercise had episiotomy 10% less than other women, the first stage of labor was shorter, promotion of comfort and relaxation, low anxiety and lower labor and back pain (Hau et al., 2012), furthermore, 75% of women who were walking and 95% of those who used birth ball had Normal Vaginal Delivery (NVD) (Mathew et al., 2012). In addition duration of labor was significantly shorter, and oxytocin was used less frequently among walking women (Shilling, 2009). Also, Mirzakhani et al., (2015) found that 92.6% of women who used birth ball exercise had NVD and 7.4% underwent CS, while 66.7% of women who did not exercise had NVD and 33.3% underwent CS. Another study found that the duration of the second stage of labor was shorter among the exercising women compared to nonexercising women, 87.5% vs. 73% had NVD, 1.6% vs. 6.3% of neonates had Apgar score less than 7 at one minute, and 12.5% vs. 25% had assisted delivery (Forouhari et al., 2008). It is clear that performing different types of exercises and being active during labor will enhance and ease the delivery and decrease the complications.

The WHO in coordination with Ministry of Health (MOH) established and implemented a project for safe delivery and birth exercises in Gaza Strip (GS). The project started first in Al Tahreer hospital in March 2011. WHO has supplied the hospital with the needed equipment and supported training program for the health care provider (obstetricians, midwives and physiotherapists) about exercise methods such as breathing exercise, muscle relaxation during labor, birth ball exercise, and squatting.

Evaluation of maternal health care services aiming at improving the quality of obstetric care , especially during delivery process, and in this study the researcher will assess the impact of natural, non-pharmacological approach by using different types of exercises (in Al Tahreer hospital) during labor on the outcome of delivery process, in comparison with women who did not exercise during labor (in Al-Shifa hospital).

1.2 Research problem

The idea that pregnant women should be active and practice different types of exercises during pregnancy is well documented and recommended by many researchers and health authorities (American College of Sports Medicine - ACSM, 2000; Committee on Obstetric Practice, 2002; Paisley et al., 2003; Juhl et al., 2008), but practicing exercise during labor is still controversial. Some studies revealed that practicing different types of exercises during labor would be useful to enhance delivery, shorten the duration of labor and decrease complications (Allahbadia and Vaidya, 1993; Paisley et al., 2003; Shilling, 2009; Hau et al., 2012), while other studies did not show significant differences in regard to application of episiotomy (Nasir et al., 2007), the use of Pitocin and Apgar score (Hau et al., 2012). The transition from medical intervention to natural birth is considered new model in maternity care in GS. Al Tahreer hospital is the only hospital that adopted exercise during labor as a nonpharmacological approach of delivery by instructing and teaching the women how to exercise during labor. Up-to-date, the practice of exercises during labor has not been evaluated for its effectiveness in facilitating labor process. To gain accurate insight about the benefits of exercises during labor, this study will evaluate and compare labor process and outcome among women who practiced exercise during labor and those who did not exercise in view of selected variables as labor duration, pain characteristics, mode of delivery, neonatal outcome, and complications that may encounter during labor.

1.3 Justification of the study

With the change in focus from an illness to a wellness based approach to health care in the declaration of Alma-Ata of "Health for all by the year 2000", significant steps have been made in the evolution of health promotion as an approach to achieving this goal. One important part of health promotion is the kind of care which is introduced to pregnant woman, especially at birth process. In an area like GS with high birth rate and limited resources, challenges regarding the use of birth exercise would be decrease the cost of deliveries and enhance natural delivery with less use of drugs and un-needed interventions.

It is important to mention that the number of deliveries inGS increased rapidly, for example, at Al Tahreer hospital and at Al-Shifa hospital, the total number of deliveries in 2011 was (10246 vs. 13756), in 2012 (10408 vs. 12469), in 2013 (10377 vs. 11756), and in 2014 (10400 vs. 13051). (Nasser Medical Complex - NMC, 2014, Al Shifa hospital, 2014). Increase in number of deliveries, need more support and concerns in order to facilitate the delivery of babies in a safe method, free of complications, and to decrease the time spend during labor. On the other side, the NVD is completely natural and have no side effects as opposed to other artificial labor induction methods or CS. This study would be the first of its kind and the results that will be obtained from this study could be used as an evidence to expand the birth exercise program to other hospitals.

1.4 General objective

The general objective of this study is to identify the labor pain characteristics and labor outcome among women who used birth exercise during labor in comparison to those who did not exercise.

1.5 Specific Objectives

- To assess the obstetric history among study participants in Al Tahreer hospital and Al-Shifa hospital.
- To examine the status of current pregnancy among study participants.
- To explore the differences in the labor process (presentation, gestation, onset, augmentation, and duration of labor) among women who used birth exercise and those who did not exercise.
- To determine the labor pain characteristics (duration, frequency, intensity) among women who used birth exercise and those who did not exercise.
- To compare the labor outcome (neonatal birth weight, Apgar score, and admission to Special Care Baby Unit - SCBU) among women who used birth exercise and those who did not exercise.
- To provide suggestions and recommendation for possible future implementation of birth exercise in other hospitals.

1.6 Questions of the study

- What is the obstetric history among study participants in Al Tahreer hospital and Al-Shifa hospital?
- What is the status of current pregnancy among study participants?
- Are there significant differences in the delivery process (presentation, gestation, onset, augmentation, and duration of labor) between women who used birth exercise and those who did not exercise?
- Are there significant differences in labor pain characteristics (duration, frequency, intensity) between women who used birth exercise and those who did not exercise.
- Are there significant differences in the delivery outcome (neonatal birth weight, Apgar

score, and admission to SCBU) between women who used birth exercise and those who did not exercise.

1.7 Context of the study

1.7.1 Demographic Context

Historical Palestine lies within an area of 27,000 Km², expanding from Ras Al-Nakoura in the north to Rafah in the south. Due to Israeli occupation, Palestinian territory is divided into three areas separated geographically; the West Bank (WB) 5.655 Km², GS 365 Km² and east Jerusalem. The total population of Palestinians globally is almost 12 million, of them 4.68 million live in WB and GS, while the rest divided in Arab and foreign countries. 1.82 million live in GS (925,000 males and 895,000 females) The population density (capita/km²) is very high 778 in Palestine (506 in WB and 4,986 in GS). The fertility rate among women during their reproductive age in Palestine was 4.1 births per woman; 4.5 in GS and 3.7 in WB. The crude birth rate in the Palestinian territory estimated to be about 31.9/1000 population in 2015 (29.0/1000 in WB and 36.3/1000 in GS), and the crude death rate in Palestine was estimated about 3.4 /1000 live birth (3.7 /1000 in WB and 3.4 /1000 in GS) (Palestinian Central Bureau of Statistics - PCBS, 2015).

1.7.2 Socio-economic Context

The political situation instability in Gaza imposed negative impacts on the socioeconomic status. The Palestinian economy is under increased pressure to create decent and productive jobs, reduce poverty and provide economic security on an equal basis for all social groups in a rapidly growing and urbanizing population. Due to the siege and political dissociation, many workers lost their jobs and many factories closed. The unemployment rate was 16.3 in WB while in GS it reached 41.6, the poverty rate increased to serious levels as it was 17.8 in

WB while in GS it reached 38.8 (PCBS, 2015). The above numbers reflect the hard economic situation in GS which will impose negative impact on the ability of the government to offer adequate services for the people in GS, and much work and effort is needed from the government and nongovernmental organizations to create jobs to improve the economic status in GS.

1.7.3 Health care System

In Palestine, there are five sectors that provide health care services, including MOH, United Nations Relief and Works Agency for the Refugees of Palestine (UNRWA), Medical Military Services for Police and General Security, Non-Governmental Organizations (NGOs) and Private sector. The total number of employees who are working in MOH is 14,619 employee (42.6% in WB and 57.4% in GS), nurses and midwives who are working in MOH facilities was 3,942; of them, 57.4% in WB and 42.6% in GS, distributed as 92% nurses and 8% midwives. Distribution according to workplace was 26% in Primary Health Care (PHC), 71% in hospitals, and 3% in administrative and other directorates. For midwives, 37% are working in PHC, 60% in hospitals, and 3% in other directorates (MOH, 2012).

1.7.4 Maternity services

Maternity services are offered mainly at MOH hospitals as the vast majority of deliveries take place in the governmental hospitals (Al-Shifa, Al-Harazeen, Al-Aqsa Martyrs, Al-Tahreer in NMC, and Al-Emirati Hospitals (MOH, 2014). Antenatal and postnatal care are provided in PHCs and UNRWA health centers, but deliveries take place in hospitals. Severe under-staffing restricts obstetricians and midwives capacity to ensure safe childbirth, and despite increasing caseloads, the number of professionals have not been increased (Abdul Rahim, et al., 2009). Workload is high in the maternity departments due

to high birth rate compared to the number of professional obstetricians and midwives. The number of delivery rooms in MOH hospitals in the GS reached to five rooms: Al-Emirati Crescent Hospital (10 beds), Al-Tahreer(13 beds), Al-Aqsa Martyrs Hospital (9 beds), Al-Shifa Hospital (13 beds), Al-Harazeen Hospital (3 beds) (MOH, 2014).

1.7.4.1 Nasser Medical Complex (NMC)

NMC is the second largest governmental medical institution in the GS, it was established on 1958 and started working on 1960, on an area of 50000 sq. m, contains 258 beds, and provides secondary services (medical, surgical, pediatric and maternity care).

Al-Tahreer hospital is a small hospital inside of NMC, started on 1999 and offer maternity and pediatric services, it became the main maternity hospital in the southern of GS, and serves more than 300,000 inhabitants. It consists of maternity outpatient clinic (5 beds), two obstetric wards (45 beds), operating room (2 tables) and one delivery room (12 beds). The delivery room consist of two big rooms, one for the first stage and the other room for second stages. Total number of nurses and midwives is 55, and the number of obstetricians and physicians is 34 (NMC, 2014).

1.7.4.2 Al Shifa Medical Complex

It was established in 1946 in the western middle area of Gaza city, on a land 42000 m², serving more than 500,000 citizens in Gaza City. The complex includes three hospitals, surgery, medical and obstetric hospital. The overall beds in the hospital are 704. The obstetric hospital was established in 1986 and it have been renovated and expanded on 1994 after the Palestinian National Authority took over the responsibility about GS. In the obstetric hospital, around 13000 deliveries and 500 CS are performed every year. The

obstetric hospital consisted of one reception department, NVD department, natural birth department, high risk department, three departments for admission and post-delivery, Out Patient Clinic, and operating theatre. Total number of nurses and midwives working in the obstetric hospital is 166, and the number of physicians and obstetricians is 81 (Al-Shifa hospital, 2014).

1.8 Definition of terms

Birth Exercise

The researcher defined birth exercise operationally as any types of exercise practicing by pregnant women during labor. It includes; pelvic rock exercise, birth ball, deep breathing exercise, and change position, squatting, and walking.

Labor Pain

"Is the pain experienced in labour as a result of an interaction between physiological and psychological factors, and it is caused by pressure on the cervix and stretching of the vaginal walls (Abushaikha and Oweis, 2005).

Labor process

It is a physiologic process by which the fetus, placenta and membranes are expelled through the birth canal (Marshall J. and Raynor M., 2014).

Episiotomy

An incision through the perineal tissues which is designed to enlarge the vulvar out let during birth (Ricci S., 2009).

Midwife

A midwife is a person who has successfully completed a midwifery education program that is recognized in the country where it is located based on the International Confederation of Midwives (ICM) Essential Competencies for Basic Midwifery Practice and the framework of the ICM Standards for Midwifery Education; who has acquired the requisite qualifications to be registered and legally licensed to practice midwifery and use the title "midwife"; and who demonstrates competency in the practice of midwifery (ICM, 2011).

Apgar Score

Apgar score is a tool used to evaluate newborns at one minute and five minutes after birth. It is provide data about newborns initial adaptation to extra uterine life (Ricci S., 2009).

1.9 Layout of the study

This study composed from five chapters: introduction, conceptual framework and literature review, methodology, results and discussion, conclusion and recommendations.

The first chapter browsed general introduction to the study, where a brief background regarding the subject of the study was provided. The researcher illustrated the problem statement, justification for conducting the study, the general goal and specific objectives, research questions, definition of terms and context of the study.

The second chapter consisted of two parts: the first part is conceptual framework where the researcher provided a schematic diagram of the conceptual framework of the study. The second part is the literature review related to the study topic and variables. Indepth detailed inquiry including previous studies were presented.

The third chapter described methodology including study design, population, sample, instruments, data collection, ethical considerations, statistical analysis.

The fourth chapter presented the study results and discussion. The researcher treated the results in form of tables and figures that make it easy for the reader to understand and make comments. The results were discussed in respect to available previous studies that directly related to the topic of this study and its objectives.

Finally, in the fifth chapter, the researcher presented conclusion and recommendations in the light of the study results.

Chapter Two

Conceptual framework and literature review

2.1 Conceptual framework

The conceptual framework is the map that guides the design and the implementation of the study. It was designed by the researcher based on review of available literature and previous studies.

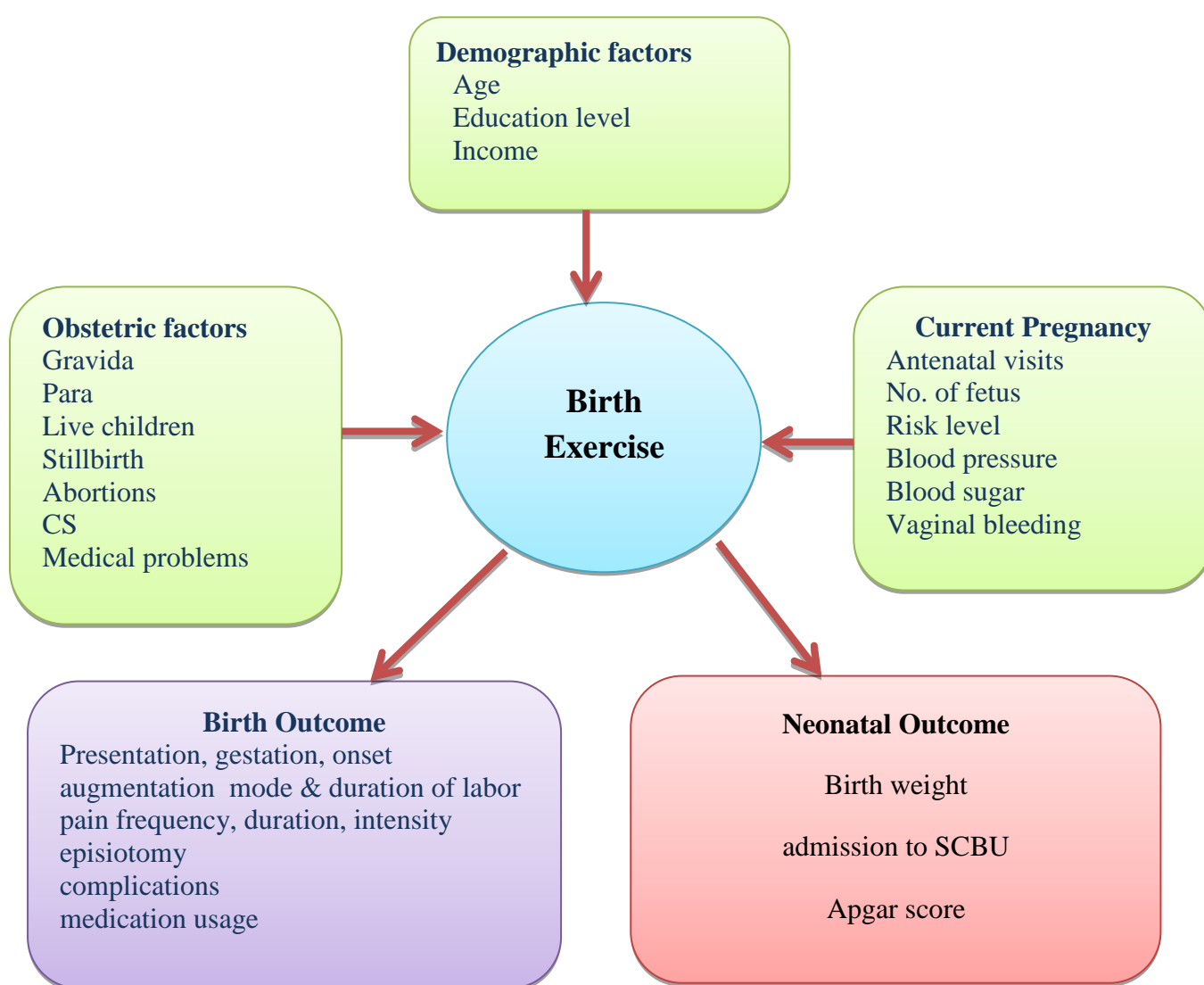


Figure (2.1): Diagram of conceptual framework

The above diagram shows that different factors are interrelated with exercising during labor. Among these factors:

Demographic factors:

Demographic factors of the pregnant woman include age, which plays a major role in exercising as younger women are stronger and supposed to perform exercise more frequently compared to older age women. In addition level of education could be another factor as highly educated women will understand the benefits of exercises and would exercise more frequently than lower educated women. In addition, women who are working are usually more active as a result to their work requirements.

Obstetric factors:

Information about number of previous pregnancies and deliveries, and abortions will increase the insight about the women's previous obstetric history and the risk level that will determine if the woman fits for exercises or not.

Current pregnancy:

Data regarding current pregnancy and conditions surrounding the pregnancy period are valuable predictors of labor and childbirth. Frequency of antenatal visits will give information about how much the pregnant woman follow recommendations of health care providers. Number of fetus is an indicator to risk level, as it is suspected that multiple pregnancies would categorize the woman as high risk. In addition, high Blood pressure (BP) and high blood sugar would be indicators for high risk and these women need close observation and special care.

Birth outcome:

This factor includes different variables related to labor progress and pain characteristics. Presentation of the fetus is an indicator for normal or high risk delivery; cephalic presentation usually is easier to manage while breech presentation would indicate seriousness of the case and further intervention is needed. Also, duration of labor is an indicator for normal labor process or slow labor. Pain characteristics including frequency, duration and intensity reveals uterine contractions status and gives an idea about the stage of labor. In addition, this factor includes mode of delivery (spontaneous or induced), augmentation and type of medications used to enhance labor process. Finally, this factor includes complications that may occur during labor as perineal laceration, retained or abruption placenta. These complications may lead to bleeding and the need for obstetrical intervention.

Neonatal outcome:

This factor includes variables as birth weight and Apgar score. Low birth weight and low Apgar score are indicators for the need to admission to SCBU for further observation and management.

In this study, the researcher will tackle these factors and analyze how these factors are interrelated in the course of pregnancy and delivery, and will make a comparison between pregnant women who exercise during labor and those who do not exercise.

2.2 Literature review

2.2.1 Background

Pregnancy is a normal process that every married woman wants to attain and considered an important event in a woman's life and one of the happiest periods in the life of a woman. Passing the pregnancy period and giving birth safely is the optimal goal for every pregnant woman and for health care givers. Good prenatal care with proper nutrition and medical supervision has gone a long way in reducing infant and maternal mortality in both developed and developing countries (Gunasheela et al., 2013). The physiologic and morphologic changes of pregnancy may interfere with the ability to engage safely in some forms of physical activity. A woman's overall health, including obstetric and medical risks, should be evaluated before prescribing an exercise program. Generally, participation in a wide range of activities appears to be safe during pregnancy; however, each sport should be reviewed individually for its potential risk, and activities with a high risk of falling or those with a high risk of abdominal trauma should be avoided during pregnancy (Women's Health and Education Center – WHEC, 2015).

2.2.2 Labor onset and stages

At the completion of pregnancy labor starts by contraction of the uterus to move the fetus down the birth canal. The onset of term labor starts by regular contractions occurring less than 10 minutes apart and progressive cervical dilation or cervical effacement (Jokic et al., 2000). The process of normal childbirth is categorized in the following stages of labor:

2.2.2.1 First stage

Starts from the time of the onset of true labor until the cervix is completely dilated to 10 cm. The first stage is subdivided into three phases;

Early phase: The latent phase is generally defined as beginning at the point at which the woman perceives regular uterine contractions with cervical effacement, and this phase may last 2 – 3 days (Satin, 2013).

Active phase: the active phase starts by having contractions more frequent than every 5 minutes, in addition to either a cervical dilation of 3 cm or more or a cervical effacement of 80% or more (Su et al., 2004). In the US, the definition of active phase starts from 3 to 5 cm of cervical dilation for multiparous women and at 6 cm for nulliparous women, this phase averages some 8 hours for primiparous women and shorter for multiparous women (American College of Obstetricians and Gynecologists - ACOG, 2012).

Transition phase: Continues from 7 cm. until the cervix is fully dilated to 10 cm (American Pregnancy Association, 2015).

2.2.2.2 Second stage

Also called the expulsion stage. It begins when the cervix is fully dilated, and ends when the baby is born. At the beginning of the normal second stage, the head is fully engaged in the pelvis; the widest diameter of the head has passed below the level of the pelvic inlet. The fetal head then continues descent into the pelvis, below the pubic arch and out through the vaginal opening. This stage will vary by factors including parity, fetal size, anesthesia, and the presence of infection (Rouse et al., 2009).

2.2.2.3 Third stage: Placental delivery

This stage begins from just after the fetus is expelled until just after the placenta is expelled. Placental expulsion begins as a physiological separation from the wall of the uterus, and the average time from delivery of the baby until complete expulsion of the placenta is estimated to be 10–12 minutes (Jangsten et al., 2011). Placental expulsion can

be managed actively or it can be managed expectantly, allowing the placenta to be expelled without medical assistance. Active management is described as the administration of a uterotonic drug after fetal delivery, controlled traction of the umbilical cord and fundal massage after delivery of the placenta, followed by performance of uterine massage every 15 minutes for two hours (Ball, 2009). A study carried out in New Zealand compared the outcome of physiological care and active management of third stage of labor and found higher rates of blood loss among women in the active management group. The main results are presented in the diagram below (New Zealand College of Midwives, 2006).

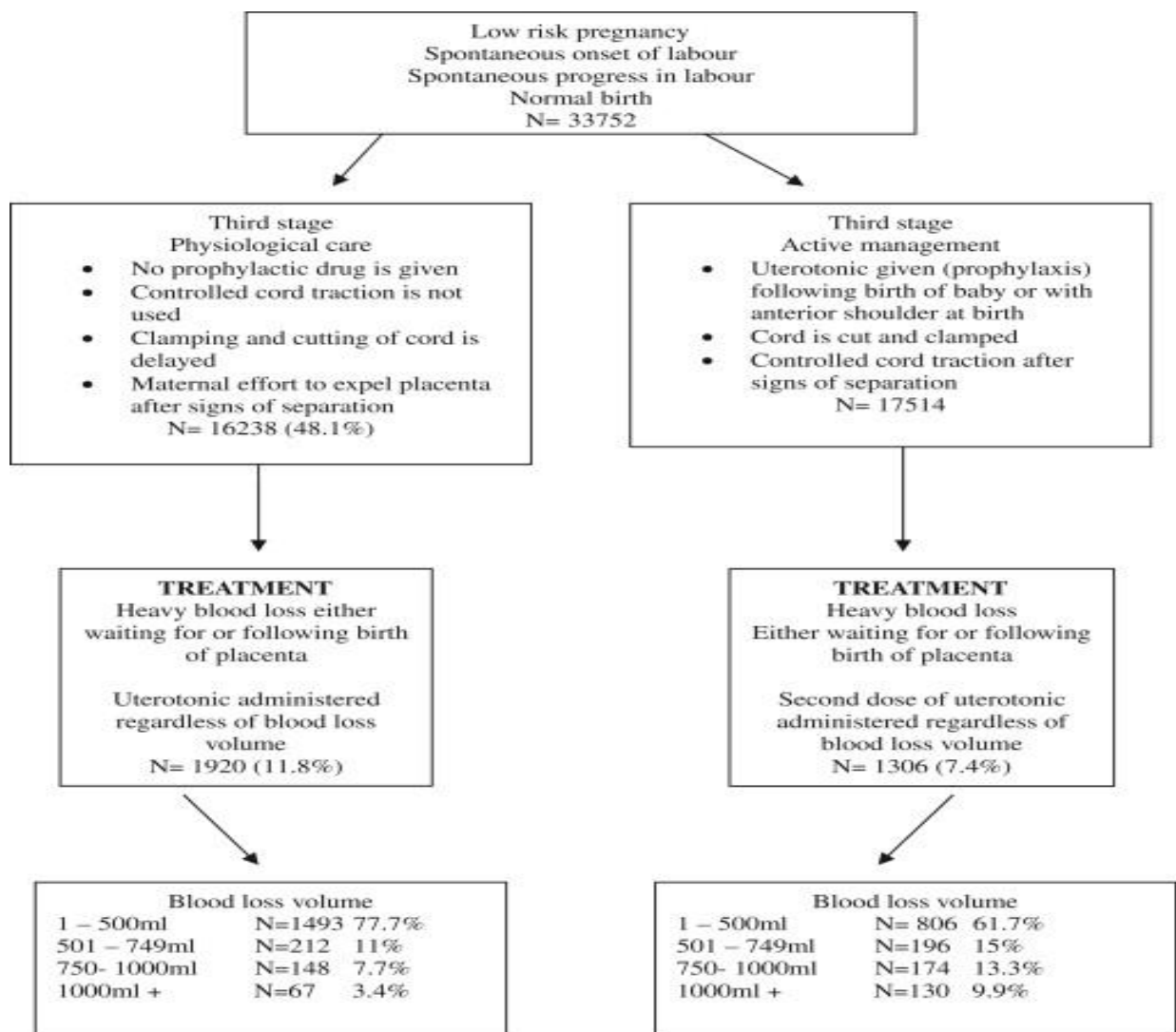


Figure (2.2): Diagram of physiologic and active management of third stage of labor

2.2.2.4 Fourth stage

The fourth stage of labour is the period beginning immediately after the birth of a child and extending for about six weeks. The terms postpartum and postnatal are often used to describe this period. It is the time in which the mother's body, including hormone levels and uterus size, return to a non-pregnant state and the newborn adjusts to life outside the mother's body. WHO describes the postnatal period as the most critical and yet the most neglected phase in the lives of mothers and babies, and that most deaths occur during the postnatal period (WHO, 2013).

2.2.3 Physiological adaptive changes in pregnant women affecting physical activity

During pregnancy, some physiological adaptive changes related to exercise occur. So, healthcare providers advising exercise in pregnancy should be aware of these changes.

These changes include:

- Marked musculoskeletal alterations in the pregnant woman's body could potentially raise the risk of injury during exercise, furthermore, hormonal changes lead to raised joint laxity and hypermobility, so, activities such as contact sports and weight-bearing exercise should be warned (Artal and O'Toole, 2003).
- Hyperthermia is a concern, given that both exercise and pregnancy raise the metabolic rate and that maternal core temperatures in excess of 39.2 degrees Celsius are potentially teratogenic in the first trimester. Also, raised minute ventilation and skin blood flow augment heat dissipation and offset somewhat the potential hyperthermic effects of exercise. Sensible precautions are suggested such as maintaining adequate hydration and avoiding exercising in very hot, humid environments (Royal College of Obstetricians and Gynecologists -RCOG, 2006).

- Exercise in the supine position should be avoided after 16 weeks of gestation due to vena cava compression, as this position is associated with lower maternal cardiac output and symptomatic hypotension. In addition, women should avoid overexertion in altitudes over 2500 meters as this has been shown to lower uterine blood flow. The demands of exercising muscles diverts blood flow from the uteroplacental unit, raising the theoretical risk of fetal hypoxia. In actuality, compensatory changes with exercise, such as raised maternal hematocrit and oxygen extraction, appear to prevent impairment of fetal oxygenation (RCOG, 2006).

2.2.4 History of physical exercise during pregnancy

In the recent history, pregnant women were treated as if they had an illness and were subjected to a state of confinement, they were advised to relax, avoid strenuous exertion, and minimize stretching and bending for fear of strangling or squashing the baby, more recently, it was considered acceptable to continue to exercise if the woman was active prior to becoming pregnant. Generally, two schools of mutually incompatible thought existed; the conservative faction, felt that exercise was potentially harmful and recommended a restrictive, cautious approach to physical activity during pregnancy, and the liberal group perceived no adverse consequences, and felt exercise improved the course and outcome of pregnancy (Hammer et al., 2000).

As health care providers' ideas about prenatal exercise began to change, the American College of Obstetricians and Gynecologists (ACOG) published its first guidelines for exercise during pregnancy in 1985 and another modified guidelines were published in 1994 (ACOG 1985, 1994), and with changes in the attitudes of professionals towards exercise and pregnancy, a body of research has appeared that helps support more liberal guidelines.

Continuing or even beginning an exercise program during pregnancy is now generally viewed as safe (Hammer et al., 2000).

Existing recommendations for physical activity during pregnancy have been extrapolated from the physical activity and public health literature and the first public health guidelines were subsequently adopted by ACOG (Haskell and Lee , 2007). Updated public health recommendations provide specific definitions of moderate and vigorous intensity. In 2008, the U.S. Department of Health and Human Services (USDHHS) issued comprehensive guidelines on physical activity and pregnant women; first, healthy women (non-exercisers and moderate exercisers) should begin or continue moderate-intensity aerobic activity during pregnancy, accumulating at least 150 minutes per week. Because vigorous-intensity exercise has not been carefully studied, these women are not advised to start vigorous exercise. Second, women who currently exercise vigorously may continue their exercise provided they remain healthy (USDHHS, 2008). Dempsey et al., (2004) reported that exercise may be beneficial in the primary prevention of gestational diabetes, particularly in morbidly obese women (Body mass index – BMI > 33). The American Diabetes Association (ADA) has endorsed exercise as a helpful adjunctive therapy for gestational diabetes mellitus when euglycemia is not achieved by diet alone (USDHHS, 2008).

2.2.5 Physical exercise during pregnancy: is it safe or not?

According to many national recommendations, women should be physically active during pregnancy. In this regard, health authorities in the United States, Great Britain, Norway, and Denmark recommend a level of physical activity for pregnant women similar to that of the nonpregnant women (Committee on Obstetric Practice, 2002; Directorate for Health and Social Affairs, Norway, 2005). In addition, the National Board of Health in Denmark recommended that pregnant women should engage in moderate exercise, and this

recommendation was based on the health benefits of physical activity for the mother, including prevention of obesity, gestational diabetes, and preeclampsia (Juhl et al., 2008).

The current Centers for Disease Control and Prevention and ACSM recommendation for exercise aimed at improving the health and well-being of non-pregnant individuals, suggests that an accumulation of 30 minutes or more of moderate exercise a day should occur on most of the days of the week, it is suggested that in the absence of either medical or obstetric complications, pregnant women also can adopt this recommendation (ACSM, 2000). Review of recent studies on prenatal exercise from several different countries suggest that only approximately 40% of pregnant women exercise, even though about 92% are encouraged by their physicians to exercise (Field, 2012).

According to Paisley et al., (2003), exercise is safe for both mother and fetus during pregnancy and they support recommendations to initiate or continue exercise in most pregnancies to derive the health benefits associated with such activities. In this regard, the RCOG suggests that:

- All women should be encouraged to participate in aerobic and strength-conditioning exercise as part of a healthy lifestyle during their pregnancy.
- Reasonable goals of aerobic conditioning in pregnancy should be to maintain a good fitness level throughout pregnancy without trying to reach peak fitness level or train for athletic competition.
- Women should choose activities that will minimize the risk of loss of balance and fetal trauma.
- Women should be advised that adverse pregnancy or neonatal outcomes are not increased for exercising women.

- Initiation of pelvic floor exercises in the immediate postpartum period may reduce the risk of future urinary incontinence.
- Women should be advised that moderate exercise during lactation does not affect the quantity or composition of breast milk or impact on fetal growth (RCOG, 2006).

Exercise offers many potential benefits for women during pregnancy including maintaining a healthy body weight and avoiding excess fat accumulation, cardiovascular fitness, muscular strength, improving posture and body mechanics, prevention or treatment of pregnancy-induced complications such as gestational diabetes, pregnancy-induced hypertension and preeclampsia, spontaneous miscarriages (Hammer et al., 2000). Furthermore, active pregnancy may alleviate physical discomfort, and complications during labor and birth as well as speed up the recovery after birth, less prone to depressive symptoms during and after pregnancy, and have a more positive self-image (Mottola, 2011).

On the other hand, many obstetricians continue to recommend limiting exercise and maintain maternal heart rate to less than 140 beat per minute, while other obstetricians suggest that in the absence of either medical or obstetric complications, 30 minutes or more of moderate exercise a day is recommended for pregnant women (WHEC, 2015). More recently, concerns have arisen about the risk of more robust exercise during pregnancy, including strains and sprains caused by weight-bearing exercises, hyperthermia, and hypoglycemia, fetal distress / hypoxia, hormonal stress (catecholamines and prolactin, which may cause premature increases in uterine contractility), miscarriage, and fetal growth restriction (Hammer et al., 2000).

2.2.6 Exercise during labor stages vs. not exercising

Labor and its pain has been described as one of the most intense pains that a woman can be experienced. Effective pain management is crucial in the labor process, and in order to relieve pain, pharmacological approach such as injection of analgesic medication is commonly used (Leung et al., 2013). New trends in the management of pregnant women during labor emphasize the non-pharmacological approach to ease the labor process and alleviate pain. Nowadays many obstetricians recommend that normal pregnant women stay active and engage in exercise during pregnancy and labor. Different exercises were recommended including squatting, exercise ball, pelvic rock / tilt, leaning, walking, and deep breathing.

Squatting is one of the exercises that are recommended during labor. A case control study (100 cases who were squatting during labor stages, and 100 controls who did not squat). The study was conducted at the Jinnah Postgraduate Medical Centre, Karachi from January 1999 to January 2000, and the results showed that there was no difference in the application of episiotomies in both groups, but extension of the episiotomy occurred in 7% women of the non-squatting group, para-urethral tears occurred in 5% women in squatting group, but all occurred in women who were not given an episiotomy, also, second degree, and third degree perineal tears occurred in 9% of women in the non-squatting group but none in the squatting group. Forceps application was also significantly less in the squatting group (11%) compared to (24%) in non-squatting group. Furthermore, there were two cases of shoulder dystocia in non-squatting group but none in the squatting group. During the third stage of labor there were no cases of retained placenta in the squatting group but there were 4% cases of retained placenta and 1% case of postpartum hemorrhage of more than 500 ml due to atony of the uterus in the non-squatting group, one woman in the non-squatting group had to have a caesarean section due to persistent occipito posterior

position. The results also showed that there was no significant difference in the Apgar scores, fetal heart rate patterns or requirement of neonatal resuscitation (Nasir et al., 2007).

Different results were observed in an older study conducted in India among 200 normal pregnant women (100 squatting and 100 non-squatting). The results showed that the squatting group had significant shorter duration of labor compared to the control group, in the squatting group there were 79 normal vaginal delivery, 16 forceps delivery and 5 caesarean sections whereas in the non-squatting group there were 80, 18 and 2 cases respectively, the incidence of maternal injuries was observed in 14 cases in non-squatting group and 38 cases in squatting group (Allahbadia and Vaidya, 1993).

Another exercise is the use of birth ball exercise. The birth ball is also known as the fit ball, Swiss ball, and Petzi ball, and was first used by physiotherapists for patients with back pain in the 1960s, and in the 1980s it was introduced into antenatal classes and called a birth ball (Perez, 2000). Later it was developed as a midwifery tool to help women to control their labor. Obstetric units in Germany and the United Kingdom started to use it in the 1990s (Shallow, 2003). Gradually, its use became widespread and has been recommended as an excellent comfort and fitness tool for women to use during pregnancy, labor, birth, and the postpartum period (Hau et al., 2012). Birth ball exercises enhance pelvic rotation and increase pelvic mobility of pregnant woman, postural corrections, relaxation, and muscle stretching and strengthening, the exercise is performed in the upright and sitting positions, which is believed to encourage delivery and support the perineum to facilitate relaxation, and ease labor pain (Simkin and Bolding, 2004). Furthermore, Sekendiz et al. (2010) indicated that movements with birth ball increase the strength, resistance, flexibility, and balance of the trunk, lower back, and quadriceps.

Silva et al., (2011) reported that indications for the use of birth ball included promoting fetal descent (32.4%), relaxation (19.7%), progression of labor (17.1%), exercise of the perineum (14.5%), pain relief (11.8%), in addition to psychological benefits and maternal movement.

A study conducted in China showed that: among women who had ball exercise during labor, 88% underwent spontaneous delivery, 3% underwent instrumental delivery, 9% had CS, and 5% received induction or augmentation, whereas, the women who did not practice ball exercise 75% had spontaneous delivery, 3% underwent instrumental delivery, 22% underwent CS, and 27% received induction or augmentation, in addition, back pain comparison reflected that the mean pain score was 1.9(2.1) before exercise, decreased to 1.5(1.8) after exercise (Leung et al., 2013). Another case control study conducted in Hong Kong (110 women enrolled in ball exercise and 107 women who did not exercise). The results found that no adverse effects were noted in association with the use of the birth ball, the use of oxytocin was similar in the two groups, the first stage of labor was shorter among the case group compared to the control group (5.3 vs. 7.1 hours), but there were no significant differences between the two groups in duration of the second stage, and rates of vaginal delivery, but episiotomy rate was 10% less in the case group compared to the control group. Furthermore, there were no significant differences in Apgar score of the babies and admission to the SCBU in the two groups. In addition most of the women reported that the use of birth ball promoted comfort and relaxation, reduced anxiety as well as labor and back pain, and 95% of the women reported that they would like to use the birth ball in a future pregnancy (Hau et al., 2012).

A randomized control study was conducted in India and included 60 primigravida mothers divided equally into three groups (ambulation, birthing ball, and control group), the results showed significant improvement in maternal outcome for the ambulation and birth ball

groups, 75% of the walking group and 95% of the birth ball group underwent normal vaginal delivery (Mathew et al., 2012). Another study conducted at two Canadian hospitals where women in labor were assigned to a regular labor room or to an ambient room, the results showed that the duration of labor was 50% shorter among ambient women compared to women in the regular delivery room, and reducing the need for oxytocin (Shilling, 2009). Furthermore, a randomized trial included 3706 pregnant women aiming to determine the effects of exercise in upright position versus recumbent position found that women randomized to upright position were less likely to have analgesia, have shorter duration of labor, and did not experience any negative effect on the mothers and babies wellbeing (Regaya et al., 2010).

Another case control study was conducted in Iran (27 cases used birth ball and 27 controls) found that 92.6% of women in the case group underwent vaginal delivery and 7.4% had CS, while 66.7% of women in the control group underwent vaginal delivery and 33.3% had CS (Mirzakhani et al., 2015). Another case control study was conducted in Iran included 120 healthy pregnant women found that the duration of the second stage of labor was shorter among the exercising group (m= 33 minutes) compared to the non-exercising group (m= 46.3 minutes), 31% of the exercising women had less than 30 minutes duration of second stage compared to 9.7% of non-exercising women, the first minute Apgar score in the majority of neonates in both groups was 7 – 10 (98.4% and 93.7% respectively), only 1.6% of neonates in the exercising group and 6.3% in the non-exercising group had Apgar score less than 7, but the fifth minute Apgar score was normal for both groups. Furthermore, the majority of women in the exercising group (87.5%) had NVD, and 73% had NVD with episiotomy, while in the non-exercising group 12.5% of cases had assisted vaginal delivery and 25% cases in the non-exercising group had assisted delivery (Forouhari et al., 2008).

In Taiwan, an interventional study included 39 women who used birth ball (intervention group) and 39 women who did not (controls), the results revealed that birth ball exercises provided statistically significant improvements in childbirth self-efficacy and pain. Specifically, self-efficacy had a 30-40% mediating effect on relationships between birth ball exercises and childbirth pain, also, mothers in the intervention group had shorter first-stage labor duration, less epidural analgesia, and fewer caesarean deliveries than the control group (Gau et al., 2011).

Another study was conducted in Brazil included 100 women in labor between 2005 – 2006 reported that when comparing before and after pain intensity, the application of Non-Pharmacological Strategy (NPS) at 6, 8, and 9 cm cervical dilation showed significant differences at the three stages of labor, which indicated that NPS (respiratory exercises, muscle relaxation, and lumbosacral region massage) was effective in relieving labor pain (Davim et al., 2009). Furthermore, recent study conducted in Brazil included 30 pregnant women, aimed to assess NPS effectiveness (respiratory exercises, muscle relaxation, lumbosacral region massage, and showers) for pain relief during the active labor phase found that these strategies were effective in the three stages of the active phase of labor (acceleration, maximum slope, and deceleration), showing pain reduction in the parturient women (Davim et al., 2007).

Walking and position changes, including upright positions, improve the effectiveness of contractions and reduce the length of the first stage of labor by an average of one hour, without increasing intervention use or negative effects on either mother or baby (Simkin and Ancheta, 2011).

2.2.7 Contraindications for exercises during pregnancy and labor

For some women, there may be times when physical activity may not be appropriate or may need to be modified. There are certain contraindications to exercise during pregnancy or labor. Relative contraindications include previous spontaneous abortion or premature labor, mild / moderate cardiovascular or respiratory disease, anemia, eating disorders, twin pregnancy after 28th week, while absolute contraindications include ruptured membranes, persistent bleeding in the second or third trimester, premature labor, triplets pregnancy, pre-eclampsia, pregnancy induced hypertension, uncontrolled diabetes, hypertension, thyroid disease, cardiovascular and systemic diseases (Canadian Society for Exercise Physiology, 2002).

According to the ACOG, there are some conditions that prevent the pregnant woman from exercising during pregnancy and labor; among these are:

Relative contraindications include: Severe anemia, unevaluated maternal cardiac arrhythmia, chronic bronchitis, poorly controlled type I diabetes, extreme morbid obesity, extreme underweight (body mass index <12), history of extremely sedentary lifestyle, intrauterine growth restriction in current pregnancy, poorly controlled hypertension/pre-eclampsia, orthopedic limitations, poorly controlled seizure disorder, poorly controlled thyroid disease, and heavy smoker.

Absolute contraindications include; heart disease, restrictive lung disease, incompetent cervix/cerclage, multiple gestation at risk for premature labor, persistent second or third trimester bleeding, placenta previa after 26 weeks gestation, premature labor during the current pregnancy, ruptured membranes, and pregnancy induced hypertension (ACOG, 2002).

Warning signs to terminate exercise include;Excessive shortness of breath, chest pain or palpitations, presyncope or dizziness, painful uterine contractions or preterm labour, leakage of amniotic fluid, vaginal bleeding, excessive fatigue, abdominal pain, particularly in pubic area, pelvic girdle pain, reduced fetal movement, dyspnea before exertion, headache, muscle weakness, calf pain or swelling (RCOG, 2006).

2.2.8 Conditions related to labor

2.2.8.1 Labor pain and contractions

Pain during labor is a universal experience, although the intensity of the pain may vary. Labor and child birth are viewed as natural process, both can produce significant pain and discomfort. Simkin and Ancheta, (2011) noted that the pain of labor might be defined as an unpleasant bodily sensation that one wishes to avoid or relieve. Leonard, (2007) reported that physical causes of pain during labor include cervical stretching, hypoxia of the uterine muscle due to a decrease in perfusion during contractions, pressure on the urethra, bladder, and rectum and distention of the pelvic floor muscles.

Women's pain perception can be influenced by her previous experiences with pain, fatigue, pain anticipation, positive or negative support system, labor and birth environment, cultural expectations, and level of emotional stress and anxiety (Albers, 2007). Klein et al., (2007) described contraction as the womb squeezes up and become hard, and there are two kinds of contractions; practice and labor contractions. The first which happen throughout pregnancy, mild, irregular and usually felt high in the belly. It may start and stop several times and it may get stronger a few days before labor begins. The second one is labor contractions, in which it begins closer to the time of baby delivery. It is usually felt lower in the belly or back and get much stronger than practice contraction. Labor contraction

usually become more and more strong and can be very painful or intense. In many hospitals, laboring women are asked periodically to assess their pain, using a visual analog scale of 0 (No pain) to 10 (Worst pain imaginable); it also includes images of faces indicating expressions ranging from smiling to somber to agony (Simkin and Ancheta, 2011). In this regard, Understanding of the physical and psychosocial aspects of labor pain is needed to provide laboring women with proper management in accord with the individual woman's needs and desires.

2.2.8.2 Duration of labor

Each labor is an individual event even in the same women, and there are wide variations in duration of labor, particularly between primigravida and multigravida. The length of labor varies widely and is influenced by parity, birth interval, psychological state, presentation and position of the fetus, also uterine contractions, maternal pelvic shape and size affect length of labor. Labor is too long when strong contractions last more than 12 hours for women who have given birth before, or 24 hours for women given birth for the first time (Klein S., et al., 2007). Tortora and Derrickson, (2011) pointed that the greatest part of labor is taken up by the first stage and it is common to expect the active phase to be completed within 6-12 hours. When women have a long labor, they will experience more fatigue and stress. Consequently, their pain threshold is affected. The mother will ultimately need assistance in coping with pain.

The duration of labor varies greatly; the average in the first stage is 5 - 8 hours, the average time of the second stage is 20-50 minutes, the third stage is usually completed in 30 minutes. The first stage defined as the time when the cervix under goes rapid dilatation, start at 4 cm dilatation to 10 cm, with the presence of rhythmic contraction and the transitional phase as starting from 8 cm until fully dilation. There is no good evidence

about the absolute time limits of physiological labor (Downe 2004; Zhang et al 2010). Allen et al., (2009) added that most researchers showed that the second stage of labor can last for up to 3 hours or so before the risk of maternal and fetal compromise begin. Shortening the phase of active pushing and lengthening the early phase of passive descent can be achieved by encouraging the woman not to push until she has a strong desire to do so and until the descent and rotation of the fetal head are well advanced. Effective pushing can be achieved by assisting the woman to assume a more upright or squatting position (Hanson, 2006).

Zhang et al, (2010) reported that the onset of labor diagnosed was extremely important, since it is on the basis of this finding in which decisions are made that will affect care during intra partum period and support provided. Sometimes a long labor can cause serious problems, including fistula (a hole in the vagina that can leak urine), torn womb, or the mother or baby dying. When a mother is having a long labor, close observation for warning signs is essential.

2.2.8.3 Labor induction and augmentation

Induction of labor is the use of medications or other nonpharmacological to bring on or induce labor. Induction is initiated to stimulate contractions of the uterus in an effort to have a vaginal birth, and it is recommended if the health of the mother or fetus is at risk. Medications used to induce labor include prostaglandins and oxytocin, while nonpharmacological methods include stripping the membrane and Artificial Rupture of Membrane (ARM) (ACOG, 2012). Difficult labour (dystocia) is characterized by abnormally slow labor progress arising from inefficient uterine contractions, abnormal fetal presentation or position, inadequate bony pelvis or abnormalities of the pelvic soft tissues of the mother, and it is more common among nulliparous women and is associated

with considerable maternal and perinatal morbidity and mortality as a result of infections, uterine rupture and operative deliveries (Ronel et al., 2012; McClure et al., 2009).

Augmentation of labour is the process of stimulating the uterus to increase the frequency, duration and intensity of contractions after the onset of spontaneous labour, and it is commonly used to treat delayed labour when uterine contractions are insufficiently strong or inappropriately coordinated to dilate the cervix. Labour augmentation has traditionally been performed with the use of intravenous oxytocin infusion and/or ARF. The procedure aims to shorten labor in order to prevent complications relating to undue prolongation, and to avert caesarean section (WHO, 2014).

In spite of the general rule that labour augmentation with oxytocin should only be performed for valid indications, reports have shown poor adherence to this rule in clinical practice. There is evidence that a significant proportion of women with uncomplicated pregnancies are subjected to routine augmentation of labour with oxytocin (Bernitz et al., 2014). There have also been reports of unstructured use of labour augmentation, where women are given oxytocin inadequately or unnecessarily (Selin et al., 2009). While augmentation of labour may be beneficial in preventing prolonged labour, its inappropriate use may cause harm. Augmentation with synthetic oxytocin may result in uterine hyperstimulation, with adverse effects such as fetal asphyxia and uterine rupture, thus increase the risk of a cascade of interventions during labor and delivery (Jonsson et al., 2008). Induction and augmentation of labor with oxytocin (Pitocin) may not be as safe for full-term newborns as previously believed, according to research presented at the annual clinical meeting of The ACOG. A retrospective analysis of deliveries that were induced or augmented with oxytocin for more than 3,000 women delivering full-term infants from 2009 to 2011 found that induction and augmentation of labor with oxytocin was an

independent risk factor for unexpected admission to the SCBU lasting more than 24 hours for full-term infants. In addition, augmentation also was correlated with Apgar scores of less than seven at five minutes. These results suggest that oxytocin use may not be as safe as once thought and that proper indications for its use should be documented (ACOG, 2013).

2.2.8.4 Episiotomy

An episiotomy is an incision made in the perineum to enlarge the vaginal outlet. Although still a common obstetric procedure, the use of episiotomy has decreased over the past 25 years, and can add to post-partum discomfort and perineal trauma and can lead to fecal incontinence (Cunningham et al., 2005). There is feeling of some pain around the episiotomy for two or three weeks after baby is born. Sexual intercourse can also be painful for the first few months after an episiotomy. Episiotomies have the following potential side effects; infection, bruising, swelling, bleeding, extended healing time, painful scarring that might require a period of abstinence from sexual intercourse and future problems with incontinence.

2.2.8.5 Neonatal Apgar score

The baby must be examined by a midwife after delivery, and Apgar score given. If Apgar score less than 7 after 5 minutes, the baby will need admission to SCBU for further care and close observation. Baby score between 7 and 10, usually mean that baby is in good condition. Careful examination of the newborn at birth can detect anomalies, birth injuries, and disorders that can compromise adaptation to extra uterine life (Ricci, 2009).

Chapter Three

Methodology

In this chapter, the researcher presented main issues related to research methodology including study design, population, place of study, size of sample and sampling method. Construction of study instrument for data collection, piloting and ethical considerations also explained in the context of this chapter.

3.1 Study design

The researcher used prospective, case-control approach in this study. The primary feature of prospective design is the outcome has not occurred at the time of initiating the study. A case-control study use two groups in the Sample; case group and control group. Participants with and without the condition of interest will be identified (Hess, 2004). This design had been chosen because it enables the researcher to meet the study objectives by comparing the women who will use birth exercise during labor with those who will not.

3.2 Study population

The study population consisted of all women who were in labor and admitted to the delivery room in Al-Tahreer Hospital in Khanyounis and Al-Shifa hospital in Gaza during the period from June – September 2015.

3.3 Study Sample and sampling method

The study sample consisted of two groups: the case group consisted of women who were admitted to Al-Tahreer Hospital and used any kind of birth exercise during labor (pelvic rock, squatting, walking, deep breathing, leaning, and birth ball exercise). The total number of women who were eligible and performed exercise and met inclusion criteria was

145 women. The control group consisted of 145 women who delivered at Al-Shifa hospital during the same period but did not perform any birth exercises. Age and gravida matching were considered in the two groups.

3.4 Period of the study

The study was conducted during the period from March 2015 to November 2015, and data collection took place during June – September 2015.

3.5 Setting of the study

The study was carried out at Al Tahreer hospital in Khanyounis and Al-Shifa hospital in Gaza.

3.6 Eligibility

3.6.1. Inclusion criteria

For case group:

- Women in labor who were able to perform any birth exercise (squatting, pelvic rock, exercise ball, walking, leaning, and deep breathing).
- Free from health problems (heart disease, hypertension, Diabetes mellitus, asthma).

For control group:

- Women who delivered at Al Shifa hospital but did not perform any type of exercise during labor stages.

3.6.2. Exclusion criteria

- Pregnant women who delivered at Al Tahreer hospital but did not perform exercises during labor.

- Pregnant women who have heart disease.

3.7 Instrument of the study

The researcher reviewed previous literature then developed a checklist for data collection. For validation of the study instrument, the researcher distributed the checklist to a group of experts (annex 1) and their comments and recommendations were considered in finalizing the instrument. The checklist consisted of the following parts: (annex 2 and 3).

First part: personal information.

Second part: obstetric history.

Third part: data related to current pregnancy.

Fourth part: data related to current delivery.

Fifth part: data related to medication given during labor.

Sixth part: data related to type of birth exercises.

3.8 Data collection

The researcher reviewed the registry record in the delivery room at Al Tahreer hospital and Al-Shifa hospital for identification of eligible participants. Data related to obstetric history was collected from participants' records. The researcher trained 4 midwives (2 for each hospital) to assist in data collection. The researcher reviewed the checklist with the assistants, gave them instructions how to collect and record the needed data. Participants from the case group were observed during performing exercises and instructions were given to help the women in exercises. Pain characteristics and pregnancy outcome were assessed for all the study participants (partogram, annex 6; labor and delivery form summary, annex 7).

3.9 Data analysis

In order to analyze the collected data and obtain the results, the researcher followed the following steps:

- Checklists were reviewed.
- The next step was designing a data entry model using SPSS program version 20.
- Checklists were coded and entered into the computer by assistance of a statistician.
- Data cleaning was performed to ensure that data were entered correctly. This process was achieved via checking out a random number of questionnaires and checklists and performing descriptive statistics for all the variables.
- Data analysis was performed by assistance of a statistician and under supervision of the supervisor as follows: Frequencies, and percentage were calculated for selected variables.

3.10 Ethical and administrative considerations

Before starting the study, the researcher obtained approval from Al-Quds University, approval from Helsinki Committee (annex 4). To conduct the study, approval letter was obtained from MOH in GS to collect the data from the designated hospitals (annex 5). In addition, women who participated in the study were notified that participation in the study is voluntary and assured that collected data will be used for scientific research only.

3.11 Limitation of the study

- Frequent cut-off of electricity which made it difficult to write and type the research text.
- Limitation of resources about birth exercise.
- Financial constraints.
- Availability of birth ball for exercising (only one ball available at Al Tahreer hospital).

Chapter Four

Results and discussion

In this chapter, the researcher presented the results of the study, including sociodemographic characteristics of study participants. The results were discussed in comparison with literature review and related previous studies.

4.1 Sociodemographic characteristics of study participants

Table (4.1): Distribution of study participants by sociodemographic characteristics

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Age (years)						
20 Years and less	16	11.0	46	31.7	62	21.4
From 21 to 25	58	40.0	33	22.8	91	31.4
From 26 to 30	40	27.6	42	29.0	82	38.3
More than 30	31	21.4	24	16.6	55	19.0
Total	145	100.0	145	100.0	290	100.0
	(Mean =26.63)		(Mean =24.89)		(Mean =25.76)	
Body Mass Index						
Normal	36	24.8	25	17.2	61	21.0
Overweight	73	50.3	70	48.3	143	49.3
Obese	36	24.8	50	34.5	86	29.7
Total	145	100.0	145	100.0	290	100.0
Level of education						
Primary and less	15	10.3	14	9.7	29	10.0
Secondary	76	52.4	91	62.8	167	57.6
University	54	37.2	40	27.6	94	32.4
Total	145	100.0	145	100.0	290	100.0
Working status						
Working	13	19.0	10	6.9	23	7.9
Housewife	132	91.0	135	93.1	267	92.1
Total	145	100.0	145	100.0	290	100.0
Monthly income (NIS)						
Less than 2000	109	75.2	110	75.9	219	75.5
2000 and more	36	24.8	35	24.1	71	24.5
Total	145	100.0	145	100.0	290	100.0

The study participants consisted of 290 women, of them 145 women who delivered in Al Tahreer hospital in Khanyounis and had been exercising during labor (case group) and 145 women who delivered in Al-Shifa hospital but had not been exercising during labor (control group), their age ranged between 15 – 55 years, mean age for women in the case group was 26.63 years and for women in the control group the mean age was 24.89 years. For age groups, the results showed that 16 (11.%) of cases and 46 (31.7%) of controls aged 20 years and less, 58 (40%) of cases and 33 (22.8%) of controls aged between 21 – 25 years, 40 (27.6%) of cases and 42 (29%) of controls aged between 26 – 30 years, 34 (21.4%) of cases and 24 (16.6%) of controls aged more than 30 years.

Calculation of Body Mass Index (BMI) showed that 36 (24.8%) of cases and 25 (17.2%) of controls had normal BMI (18.5-24.9 kg/m²), 73 (50.3%) of cases and 70 (48.3%) of controls were overweight (25-29.9 kg/m²), and 36 (24.8%) of cases and 50 (34.5%) of controls were obese (≥ 30 kg/m²).

Regarding level of education, 15 (10.3%) of cases and 14 (9.7%) of controls had primary school education or less, 76 (52.4%) of cases and 91 (62.8%) of controls had secondary school education, and 54 (37.2%) of cases and 40 (27.6%) of controls had university education. Comparing our results with other studies, Forouhari et al., (2008) found that 17.6% of controls were illiterate or had basic literacy and 7.7% of cases had university education. Another study found that 4.7% of cases are able to read and write, 9.25% have middle school education, 8.5% had secondary school education, and 2.7% had high school education, while in the control group. 11.1% are able to read and write, 37% had middle school education, 44.4% had secondary school education, and 7.4% had high school education (Mirzakhani et al., 2015).

The results also showed that, 132 (91%) of cases and 135 (93.1%) were housewives, while 13 (9%) of cases and 10 (6.9%) of controls were working, which indicated that

the vast majority of study participants were not working. Similar results were obtained in a study conducted in Iran which showed that 81.3% of cases and 90.5% of controls were housewives (Forouhari et al., 2008), while the study of Mirzakhani et al., (2015) showed that 85.1 of cases and 77.7 of controls were housewives.

The results also indicated that 109 (75.2%) of cases and 110 (75.9%) of controls had income of less than 2000 NIS, while 36 (24.8%) of cases and 35 (24.1%) of controls earn 2000 and more NIS per month. In comparison with other studies, Mirzakhani et al., (2015) found that the income among cases and controls was as follows: less than enough (29.6% cases vs. 37% controls), enough income (59.2% vs. 48.1%), and more than enough (11.1% vs. 14.8%).

The above results indicated that the majority of study participants were from age 21 – 30 years, 21% had normal body weight while the rest were overweight and obese, one third of study participants had university education, 57.6% had secondary education and 10% had low level of education (primary school and less), also the majority of participants were from low income class, which could be reflected in their inability to afford for quality of food and nutrition and inability to pay for medical treatment in case of occurrence of health problems and that may affect their pregnancy and birth outcome.

4.2 History of previous pregnancies

Table (4.2): Distribution of study participants by frequency of pregnancies, frequency of deliveries, live children and stillbirth

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Frequency of pregnancies						
Prim gravida	39	26.9	36	24.8	75	25.9
From two to Five	74	51.0	75	51.7	149	51.4
More than five	32	22.1	34	23.4	66	22.8
Total	145	100.0	145	100.0	290	100.0
Frequency of deliveries						
Primiparous	42	29.0	48	33.1	90	31.0
From two to Four	67	46.2	55	37.9	122	42.1
More than Four	36	24.8	42	29.0	78	26.9
Total	145	100.0	145	100.0	290	100.0
Live children						
One child	43	29.7	49	33.8	92	31.7
From 2 to 4	66	45.5	58	40.0	124	42.8
More than 4	36	24.8	38	26.2	74	25.5
Total	145	100.0	145	100.0	290	100.0
Stillbirth						
None	136	93.8	131	90.3	267	92.1
One and more	9	6.2	14	9.7	23	7.9
Total	145	100.0	145	100.0	290	100.0

Table 4.2 showed that 39 (26.9%) of cases and 36 (24.8%) of controls were primigravida, 74 (51%) of cases and 75 (51.7%) of controls were pregnant 2 – 5 times, and 32 (22.1%) of cases and 34 (23.4%) of controls were pregnant more than five times. Also, 42 (29%) of cases and 48 (33.1%) of controls were primiparous, 67

(46.2%) of cases and 55 (37.9%) of controls delivered 2 – 4 times, and 36 (24.8%) of cases and 42 (29%) of controls delivered more than four times. The results also showed that 43 (29.7%) of cases and 49 (33.8%) of controls had one child, 66 (45.55) of cases and 58 (405) of controls had 2 – 4 children, and 36 (24.8%) of cases and 38 (26.2%) of controls had more than four children. Furthermore, 9 (6.2%) of cases and 14 (9.7%) of controls had one and more stillbirth babies. Nearly similar results were obtained in a study conducted in Brazil with 76% of women were multiparous with up to 2 children and 24% had more than 3 children (Davim et al., 2007).

The above results indicated that the majority of study participants were multigravida, multiparous, and have more than two children which indicated that those women have an experience of labor and know how the labor process going on, and what are the expectations. Also, multiparous women are usually more cooperative with their obstetricians and midwives, and may follow their instructions in doing exercises during labor process.

Table (4.3): Distribution of study participants by past abortions and CS

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Previous abortion						
Yes	46	31.7	42	29.0	88	30.3
No	99	68.3	103	74.0	202	69.7
Total	145	100.0	145	100.0	290	100.0
Number of previous abortions						
One time	27	58.7	27	64.3	54	62.1
Twice	15	32.6	7	16.7	21	24.1
Three times and more	4	8.7	8	19.0	12	13.6
Total	46	100.0	42	100.0	88	100.0
History of CS						
Yes	9	6.2	14	9.7	23	7.9
No	136	93.8	131	90.3	264	92.1
Total	145	100.0	145	100.0	290	100.0

Table 4.3 showed that 46 (31.7%) of cases and 42 (29%) of controls had previous abortions, but variations were noticed in the frequency of abortions. Among cases 27 (58.7%) had one abortion, 15 (32.6%) had two abortions, and 4 (8.7%) had three times abortions and more, while among controls 27 (64.3%) had one abortion, 7 (16.7%) had two abortions, and 8 (19%) had three times abortion and more. In addition, 9 (6.2%) of cases and 14 (9.7%) of controls had history of previous CS. These results reflected that one third of study participants had history of previous abortions, while 7.9% of study participants had previous CS. In this study, the causes of previous abortions and previous CS were not investigated because the focus on this study was on current pregnancy and labor. It would be valuable to conduct another study that will examine in depth the prevalence of abortion and what are the risk factors that may lead to its occurrence.

4.3 Current pregnancy profile

Table (4.4): Distribution of study participants by antenatal visits

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Gestational age at first visit to antenatal clinic						
Four weeks and less	10	6.9	34	23.4	44	15.2
From 5 to 8 weeks	60	41.4	42	29.0	102	35.2
From 9 to 12 weeks	38	26.2	50	34.5	88	30.3
More than 12 weeks	37	25.5	19	13.1	56	19.3
Total	145	100.0	145	100.0	290	100.0
Number of antenatal visits						
Six and less	63	43.4	18	12.4	81	27.9
From 7 to 8	71	49.0	51	35.2	122	42.1
Nine and more	11	7.6	76	52.4	87	30.0
Total	145	100.0	145	100.0	290	100.0

Table (4.4) showed that 10 (6.9%) of cases and 34 (23.4%) of controls visited the antenatal clinic for the first time at four weeks and less of gestation, 60 (41.4%) of cases and 42 (29%) of controls visited the antenatal clinic from 5 – 8 weeks of gestation, 38 (26.2%) of cases and 50 (34.5%) of controls visited the antenatal clinic from 9 – 12 weeks of gestation, and 37 (25.5%) of cases and 19 (13.1%) of controls visited the antenatal clinic at 13 weeks of gestation and more.

Concerning the frequency of antenatal visits, 63 (43.4%) of cases and 18 (12.4%) of controls had 6 visits and less, 71 (49%) of cases and 51 (35.2%) of controls had between 7 – 8 visits, and 11 (7.6%) of cases and 76 (52.4%) of controls had 9 visits and more. This result indicated that all the study participants visited the antenatal clinic during pregnancy with variations in the number of visits, which reflected that the study participants were concerned about their pregnancy and visited the antenatal clinic for

follow-up assessment and monitoring to make sure that their pregnancy is proceeding in the normal way and detect any abnormality that may occur during pregnancy.

Table (4.5): Distribution of study participants by antenatal conditions

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Weight gain during pregnancy						
Less than 6 Kg	9	6.2	3	2.1	12	4.1
From 6 to 12 Kg	117	80.7	86	59.3	203	70.0
More than 12 Kg	9	13.1	56	38.6	75	25.9
Total	145	100.0	145	100.0	290	100.0
Number of fetus						
One	143	98.6	140	96.6	283	97.6
Twins	2	1.4	5	3.4	7	2.4
Total	145	100.0	145	100.0	290	100.0
Risk level						
Low risk	78	53.8	59	40.7	137	47.2
High risk	67	46.2	86	59.3	153	52.8
Total	145	100.0	145	100.0	290	100.0
Blood pressure						
Normal	144	99.3	142	97.9	286	98.6
High	1	0.7	3	2.1	4	1.4
Total	145	100.0	145	100.0	290	100.0
Blood sugar during pregnancy						
Normal	145	100.0	145	100.0	290	100.0
High	0	0.0	0	0.0	0	0.0
Total	145	100.0	145	100.0	290	100.0
Vaginal bleeding						
Yes	3	2.1	4	2.8	7	2.4
No	142	97.9	141	97.2	283	97.6
Total	145	100.0	145	100.0	290	100.0

Table (4.5) showed that 9 (6.2%) of cases and 3 (2.1%) of controls gained less than 6 kgs during pregnancy, 117 (80.7%) of cases and 86 (59.3%) of controls gained 6 – 12

kgs, and 9 (13.1%) of cases and 56 (38.65) of controls gained more than 12 kgs, which means that the majority of study participants gained between 6 – 12 kgs during pregnancy.

The results also showed that the vast majority of study participants were singleton pregnancy as 143 (98.6%) of cases and 140 (96.6%) of controls had singleton pregnancy and 2 (1.4%) cases and 5 (3.4%) of controls had twins.

Furthermore, 78 (53.8%) of cases and 59 (40.7%) of controls were categorized as low risk pregnancy, while 67 (46.2%) of cases and 86 (59.3%) of controls were categorized as high risk. Also, 144 (99.3%) of cases and 142 (97.9%) of controls had normal Blood pressure(BP) during pregnancy, and all women in the case group and control group had normal blood sugar, and that 3 (2.1%) of cases and 4 (2.8%) of controls had vaginal bleeding.

The above results revealed that the vast majority of women who participated in the study had singleton pregnancy, had normal BP and normal blood glucose levels, and only 2.4% of study participants had vaginal bleeding, which revealed that the women who participated in the study were healthy, without chronic disease or other health problems that may prohibit practicing exercises. To perform exercise during labor, the woman should fit for exercises, because exercises need effort, energy, and considerable strength, and unfit woman (having heart disease for example) will put herself and her baby in danger and may be unable to pass the labor process safely.

4.4 Current labor

Table (4.6): Current labor: Presentation, gestation, onset, and mode of delivery

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Presentation						
Cephalic	144	99.3	142	97.9	286	98.6
Breech	1	0.7	3	2.1	4	1.4
Total	145	100.0	145	100.0	290	100.0
Gestation						
Pre-term	2	1.4	10	6.9	12	4.1
Full-term	143	98.6	135	93.1	278	95.9
Total	145	100.0	145	100.0	290	100.0
Onset of labor						
Spontaneous	136	93.8	118	81.4	254	87.6
Induced	9	6.2	27	18.6	36	12.4
Total	145	100.0	145	100.0	290	100.0
Method of induction						
Prostaglandin	5	55.6	27	100.0	32	88.9
Oxytocin	4	44.4	0	0.0	4	11.1
Total	9	100.0	27	100.0	36	100.0
Augmentation						
ARM	45	31.0	29	20.0	74	25.5
Oxytocin	10	6.9	41	28.3	51	17.6
ARM + Oxytocin	13	9.0	41	28.3	54	18.6
None	77	53.1	34	23.4	111	38.3
Total	145	100.0	145	100.0	290	100.0
Mode of delivery						
NVD	137	94.5	124	85.5	261	90.0
Assisted	6	4.1	19	13.1	25	8.6
CS (Emergency)	2	1.4	2	1.4	4	1.4
Total	145	100.0	145	100.0	290	100.0

Table 4.6 showed that 144 (99.3%) of cases and 142 (97.9%) of controls had cephalic presentation, while 1 (0.7%) of cases and 3 (2.1%) of controls had breech presentation,

143 (98.6%) of cases and 135 (93.1%) of controls had full term delivery, while 2 (1.4%) of cases and 10 (6.9%) of controls had pre-term delivery. The results also showed that 136 (93.8%) of cases and 118 (81.4%) of controls had spontaneous onset of labor, while 9 (6.2%) of cases and 27 (18.6%) of controls had induced labor, and for the method of induction 5 (55.6%) of cases and 27 (100%) of controls used prostaglandin and 4 (44.4%) of cases used oxytocin. For augmentation the results showed that 77 (53.1%) of cases and 34 (23.4%) of controls did not need augmentation, 45 (31%) of cases and 29 (20%) of controls had artificial rupture of membrane (ARM), 10 (6.9%) of cases and 41 (28.3%) of controls received oxytocin, 13 (9%) of cases and 41 (28.3%) of controls had both ARM and oxytocin. Also, 137 (94.5%) of cases and 124 (85.5%) of cases had normal vaginal delivery (NVD), 6 (4.1%) of cases and 19 (13.1%) of controls had assisted delivery, and 2 (1.4%) of cases and controls underwent emergency CS.

These results reflected that the majority of study participants had cephalic presentation, delivered full term babies, had spontaneous onset of labor, and NVD. Furthermore, the results reflected that women who did not exercise had higher rates of induction and augmentation compared to women who practiced exercise during labor. Comparing our results with previous studies, a study conducted in Hong Kong found that among cases 88% had spontaneous delivery, 3% underwent instrumental delivery, 9% had CS, and 5% received induction or augmentation, while among control group, 75% had spontaneous delivery, 3% had instrumental delivery, and 27% received induction or augmentation (Leung et al., 2013). In addition, a study conducted by Hau et al., (2012) showed that 84.5% of cases and 63.6 of controls had induction of labor. In addition, Mirzakhani et al., (2015) found that 92.6% of cases had vaginal delivery and 7.4% underwent CS, while 66.7% of controls had vaginal delivery and 33.3% underwent CS.

Lower results were obtained by Hau et al., (2012) who reported that 71.8% of cases and 75.7% of controls had vaginal delivery. Another study carried out by Forouhari et al., (2008) showed that the majority of exercising group had NVD compared to nonexercising group (87.5% vs. 73.0%). Furthermore, the study of Gau et al., (2011) showed that performing birth ball exercises during the last weeks of pregnancy and labor decreases CS rate. Moreover, Mathew et al. (2012) showed a significant relationship between using birth ball during labor and mode of delivery, and that 95% of the participants in the intervention group and 65% of participants in the control group underwent SNVD. Furthermore, mothers with lower physical activity levels were more likely to have an instrumental delivery (forceps, ventouse and elective and emergency caesarean) in comparison to mothers with higher activity levels (Morgan et al., 2014).

It is important to mention that being active and performing appropriate exercises during labor would help in normal fetus rotation which would enhance cephalic presentation and facilitate the labor process with spontaneous onset and less need for induction and augmentation.

Table (4.7): Current labor: Duration of labor and pain characteristics

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Duration of labor						
2 hours and less	92	63.4	27	18.6	119	41.0
From 2.1 to 6 hours	44	30.3	50	34.5	94	32.4
More than 6 hours	9	6.3	68	46.9	77	26.6
Total	145	100.0	145	100.0	290	100.0
Frequency of pain per 10 Minutes						
Two times and less	11	7.6	59	40.7	70	24.1
More than tow	134	92.4	86	59.3	220	75.9
Total	145	100.0	145	100.0	290	100.0
Duration of Pain						
Less than 30 second	55	37.9	33	22.8	88	30.3
More than 30second	90	62.1	112	77.2	202	69.7
Total	145	100.0	145	100.0	290	100.0
Intensity of labor pain						
Mild	28	19.3	5	3.4	33	11.4
Moderate	59	40.7	66	45.5	125	43.1
Severe	58	40.0	74	51.0	132	45.0
Total	145	100.0	145	100.0	290	100.0

Table 4.7 showed that duration of labor was 2 hours and less among 92 (63.4%) of cases and 27 (18.6) of controls, labor duration was 2.1 to 6 hours among 44 (30.3%) of cases and 50 (34.5%) of controls, while 9 (6.3%) of cases and 68 (46.9%) of controls had longer duration of more than 6 hours. This result reflected that women who practiced exercise during labor had shorter duration of labor compared to those who did not exercise. Similar results were obtained by Hau et al., (2012) which showed that women who used birth ball exercise had shorter duration of first stage of labor. Another study reported that duration of second stage of labor was significantly shorter among case group (Forouhari et al., 2008). These results gave evidence that exercising

enhance delivery process and make it shorter in duration, and as a consequence, midwives and obstetricians should emphasize and encourage women to exercise during their stay in the maternity department instead of just lying down on bed.

Concerning pain characteristics, 11 (7.6%) of cases and 59 (40.7%) of controls had two episodes of pain and less every 10 minutes, but 134 (92.4%) of cases and 86 (59.3%) of controls had more than two episodes of pain every 10 minutes, which revealed that women who practiced exercise during labor had higher frequency of pain compared to those who did not exercise. In addition, 55 (37.9%) of cases and 33 (22.8%) of controls had pain duration less than 30 seconds, and 90 (62.1%) of cases and 112 (77.2%) of controls had pain duration more than 30 seconds, 28 (19.3%) of cases and 5 (3.4%) of controls had mild pain intensity, 59 (40.7%) of cases and 66 (45.5%) of controls had moderate pain intensity, and 58 (40%) of cases and 74 (51%) of controls had severe pain. These results reflected that women who exercised during labor had higher frequency of pain, higher duration, but less severe than women who did not exercise during labor. Hau et al., (2012) found that women who practiced exercises during labor had lower scores on pain scale compared to women who did not exercise, and that 81% of cases reported that using birth ball exercise was effective in reducing labor pain, and 94.4% reported that birth ball exercise promote comfort. Another study carried out in Brazil showed that 53.1% of women who used birth ball exercise reported relaxation and 46.9% reported pain relief (Silva et al., 2011).

Table (4.8): Current labor: Baby information

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Weight of baby						
Low birth weight	1	0.7	11	7.6	12	4.1
Normal Weight	136	93.8	123	84.8	259	89.8
Overweight	8	5.5	11	7.6	19	6.6
Total	145	100.0	145	100.0	290	100.0
Baby admitted to SCBU						
Yes	10	6.9	42	29.0	52	17.9
No	135	93.1	103	71.0	238	82.1
Total	145	100.0	145	100.0	290	100.0
Apgar Score at one minutes						
Seven and less	12	8.3	23	15.9	35	12.1
Eight	24	16.6	107	73.8	131	45.2
From nine to ten	109	75.2	15	10.3	124	42.7
Total	145	100.0	145	100.0	290	100.0
Apgar Score at five minutes						
Seven and less	3	2.1	1	0.7	4	1.4
Eight	4	2.8	20	13.8	24	8.3
From nine to ten	138	95.2	124	85.5	262	90.3
Total	145	100.0	145	100.0	290	100.0
Early Breast feeding						
Yes	123	84.8	2	1.4	125	43.1
No	22	15.2	143	98.6	165	56.9
Total	145	100.0	145	100.0	290	100.0
Time of Breast feeding						
20 Min. and less	37	30.1	0	0.0	37	29.6
From 21 to 30 Min	63	51.2	1	50.0	64	51.2
More than 30 Min.	23	18.7	1	50.0	24	19.2
Total	123	100.0	2	100.0	125	100.0

Table 4.8 showed that 136 (93.8%) of cases and 123 (84.8%) of controls delivered babies of normal weight, 1 (0.7%) of cases and 11 (7.6%) of controls delivered low

birth weight babies, and 8 (5.5%) of cases and 11 (7.6%) of controls delivered over weight babies. Concerning health status, 10 (6.9%) of babies from the case group and 42 (29%) of babies from the control group had been admitted to SCBU, which reflected that babies of women who exercised during labor have lower rates of admission to SCBU compared to those who did not exercise. In comparison with other studies, Hau et al., (2012) found that 6.5% of babies of the case group and 14.3% of babies of the control group had been admitted to SCBU.

Apgar score at one minute was 7 and less among 12 (8.3%) of babies from case group and 23 (15.9%) of babies from the control group, it was 8 among 24 (16.6%) of babies from case group and 107 (73.8%) of babies from the control group, and it was 9 – 10 among 109 (75.2%) of babies from case group and 15 (10.3%) of babies from the control group. Apgar score at 5 minutes was 7 and less among 3 (2.1%) of babies from case group and 1 (0.7%) of babies from the control group, it was 8 among 4 (2.8%) of babies from case group and 20 (13.8%) of babies from the control group, and it was 9 – 10 among 138 (95.2%) of babies from case group and 124 (85.5%) of babies from the control group. This result indicated that babies of women who were exercising during labor had higher Apgar score at one minute and at five minutes, which means that exercising during labor facilitate the labor process and shorten the duration of labor with better results for the delivered babies. Different results were reported by Hau et al., (2012) which showed nonsignificant differences in mean Apgar score at one minute and at 5 minutes between the babies from case group and the control group. Also Nasir et al., (2007) found nonsignificant differences in Apgar score between babies of cases and controls. Another study found that the first minute Apgar score in the majority of neonates in both groups was 7 – 10 (98.4% in case group and 93.7% in the control group), and only 1.6% of neonates in the case group and 6.3% of neonates in the

control group had Apgar score less than 7, but the differences in Apgar score were not significant (Forouhari et al., 2008).

The results also showed that 123 (84.8%) of women from the case group and 2 (1.4%) of women from the control group breast fed their babies early, 37 (30.1%) of women from the case group breast fed their babies at 20 minutes and less after delivery, 63 (51.2%) breast fed their babies at 21 – 30 minutes after delivery, and 23 (18.7%) fed their babies after 30 minutes. This result indicated that early breast feeding was higher among women who exercised during labor compared to those who did not exercise, which means that women who exercised during labor were at ease and able to feed their babies more than those who did not exercise.

Table (4.9): Current labor: episiotomy and complications

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Episiotomy						
Yes	34	23.4	72	49.7	106	36.6
No	111	76.6	73	50.3	184	63.4
Total	145	100.0	145	100.0	290	100.0
Complication during labor						
Perineal laceration	20	13.8	26	17.9	46	15.9
Retained placenta	1	0.7	6	4.1	7	2.4
Abruption placenta	0	0.0	1	0.7	1	0.3
None	124	85.5	112	77.2	236	81.4
Total	145	100.0	145	100.0	290	100.0

Table 4.9 showed that 34 (23.4%) of cases and 72 (49.7%) of controls had episiotomy, but 111 (76.6%) of cases and 73 (50.3%) of controls did not need episiotomy, which means that women who were exercising during labor had easier labor and were less

likely to have episiotomy compared to non-exercising women. similar results were obtained by Hau et al., (2012) who reported that 61.8% of cases and 71.0% of controls had episiotomy. Another study conducted in Pakistan showed that 43% of cases and 48% of controls had episiotomy (Nasir et al., 2007). Also Forouhari et al., (2008) reported higher rate of episiotomy among women who did not exercise during labor. The results also showed that 20 (13.8%) of cases and 26 (17.9%) of controls had perineal lacerations, 1 (0.7%) of cases and 6 (4.1%) of controls had retained placenta, 1 (0.7%) of controls had abruption placenta. These results indicated that women who did not exercise during labor had higher rates of complications compared to women who were exercising during labor. A study carried out in Pakistan showed that 5% of cases had para-urethral tears, and for the control group 2% had para-urethral tears, 9% had perineal tear, 4% had retained placenta, and 1% had postpartum hemorrhage (Nasir et al., 2007).

4.5 Medication during labor

Table (4.10): Medications giving during labor

Variable	Case		Control		Total	
	No.	%	No.	%	No.	%
Oxytocin						
Yes	52	35.9	87	60.0	139	47.9
No	93	64.1	58	40.0	151	52.1
Total	145	100.0	145	100.0	290	100.0
Misoprostol						
Yes	2	1.4	0	0.0	2	0.7
No	143	98.6	145	100.0	288	99.3
Total	145	100.0	145	100.0	290	100.0
Analgesia						
Yes	4	2.8	46	31.7	50	17.2
No	141	97.2	99	68.3	240	82.8
Total	145	100.0	145	100.0	290	100.0
Anesthesia						
Yes	2	1.4	1	0.7	3	1.0
No	143	98.6	144	99.3	287	99.0
Total	145	100.0	145	100.0	290	100.0
Medication Group						
No Medication	92	63.4	50	34.5	142	49.0
One Medication	49	33.8	56	38.6	105	36.2
Tow and More	4	2.8	39	26.9	43	14.8
Total	145	100.0	145	100.0	290	100.0

Table 4.10 showed that 52 (35.9%) of cases and 87 (60%) of controls received oxytocin, 2 (1.4%) of cases received misoprostol, 4 (2.8%) of cases and 46 (31.7%) of controls received analgesic medication, 2 (1.4%) of cases and 1 (0.7%) of controls received anesthesia. Overall, 92 (63.4%) of cases and 50 (34.5%) of controls did not receive any medication during labor, 49 (33.8%) of cases and 56 (38.6%) of controls

received one medication, and 4 (2.8%) of cases and 39 (26.9%) of controls received two and more medications. This result indicated that women who were exercising during labor required less medication compared to women who did not exercise.

The study carried out by Hau et al., (2012) found that 87.3 cases and 77.6 of controls received oxytocin, and 49.1 of cases and 45.8 of controls received pethidine. Furthermore, Gau et al., (2011) found that birth exercise decreased the need for analgesics. Al Madhoon (2014) conducted a study in GS found that after the adoption of the safe natural birth model in Al Tahreer hospital, the number of women who received pethidine decreased dramatically to very low percentages, and the average of women who received pethidine was 23% on 2011, decreased to 11% on 2012, and 9% on 2013.

4.6 Type of birth exercise

Table (4.11): Distribution of participants by type of birth exercise

Variable	Yes		No		Total	
	No.	%	No.	%	No.	%
Pelvic Rock	28	9.7	262	90.3	290	100.0
Squatting	78	26.9	212	73.1	290	100.0
Exercise ball	35	12.1	255	87.9	290	100.0
Walking	122	42.1	168	57.9	290	100.0
Leaning	31	10.7	259	89.3	290	100.0
Deep Breathing	143	49.3	147	50.7	290	100.0

Table 4.11 showed that 28 (9.7%) of women practiced pelvic rock exercise, 78 (26.9%) practiced squatting, 35 (12.1%) used exercise ball, 122 (42.1%) exercised by walking, 31 (10.7%) exercised by leaning, and 143 (49.3%) practiced deep breathing exercise. Previous studies revealed effectiveness of labor exercises and showed that squatting women had lower rates of perineal tears, lower rates of forceps application (Nasir et al.,

2007). Also birth ball found to be effective as it enhancing and facilitating labor with less complications (Simkin and Bolding, 2004; Sekendiz et al., 2010; Silva et al., 2011; Hau et al., 2012; Leung et al., 2013; Mirzakhani et al., 2015). Moreover, a case control study found that exercising women had shorter duration of the second stage of labor, higher rates of NVD (87.5 vs. 73.0), less assisted delivery (12.5 vs. 25.0), higher neonatal Apgar score at first minute (Forouhari et al., 2008). Another study showed that the duration of labor was 50% shorter among active ambulant women compared to women in the regular delivery room (Shilling, 2009). Furthermore, walking and position changes, including upright positions, improve the effectiveness of contractions and reduce the length of the first stage of labor (Simkin and Ancheta, 2011).

Table (4.12): Distribution of participants by number of birth exercise

Variable	Total	
	No.	%
Type of Birth exercise group		
No exercises	145	50.0
From one to three exercises	92	31.7
More than Three exercises	53	18.3
Total	290	100.0

Table 4.12 showed that among women who were exercising during labor, 92 (31.7%) practiced 1 – 3 types of exercises, and 53 (18.3%) practiced more than three types of exercises. Exercising is not limited to one type of exercise. Women who are in labor can practice more than one exercise at one time; they can take deep breath while walking or leaning or using birth ball. Also, they can change from one exercise to another, for example they can practice squatting, then walking, then use birth ball exercise. From the researcher's point of view, it is recommended to practice one exercise then move to another one with periods of rest between exercises, so the

woman will not get tired and become unable to exercise. Also, the exercises should not exhaust the woman because a considerable effort and strength is needed in the third stage of labor for the expulsion of the baby as the woman need to push down during contractions. Also, the midwives play a major role in teaching the women proper ways of performing exercises to avoid harming the woman and her baby, besides that the midwives should create a pleasant climate to make the exercises enjoyable and tolerable by women especially during labor with its painful contractions.

4.7 Summary of results

This study consisted of 145 women who were exercising during labor and 145 women who did not exercise, their age ranged between 15 – 55 years with mean age 25.76. All the women who were included in the study were healthy with no history of previous problems, normal BP and blood sugar levels, which suggests the appropriateness to perform birth exercises without contraindications. The women who were exercising had shorter duration of labor, more frequent contraction pain, but less intensity. In addition, those women who were exercising had higher rates of spontaneous onset of labor, higher rates of NVD, and less complications of delivery. Furthermore, the neonates of exercising mothers had higher Apgar scores and less frequent admissions to SCBU. Also, exercising women received less medication especially oxytocin and analgesics compared to nonexercising women. Generally, the results gave evidence that performing exercises were effective and facilitated the labor process with less complications.

Chapter Five

5.1 Conclusion

This study aimed to assess the delivery outcome among women who used birth exercise during labor in comparison to those who did not exercise. The sample of the study consisted of 290 participants (145 pregnant women who were exercising during labor from Al Tahreer hospital and 145 pregnant women who did not perform any exercise during labor from Al-Shifa hospital).

The result showed that the majority of women in the case group and control group were multiparous, 31.7% of cases and 29% of controls had history of previous abortion, 6.2% of cases and 9.7% of controls had previous CS, all the study participants attended antenatal clinic but with variations in frequency of visits. The vast majority had singleton pregnancy, had normal BP, and normal blood sugar levels.

The results also showed that the vast majority of cases and controls (99.3% vs. 97.9%) had cephalic presentation, (98.6% vs. 93.1) had full term pregnancy, (93.8% vs. 81.4%) had spontaneous onset of labor, while 6.2% of cases and 18.6 of controls needed induction with prostaglandin and oxytocin. In addition, 31% of cases and 20% of controls needed augmentation with ARM, 6.9% of cases and 28.3% of controls received oxytocin, and 9% of cases and 28.3% of controls required both ARM and oxytocin.

The result also reflected that women who were exercising during labor were more likely to have shorter duration of labor, shorter duration of contraction pain, higher frequency, but lower intensity of pain compared to those who did not exercise during labor. Concerning mode of delivery, 94.5% of cases had NVD, 4.1% had assisted delivery, and 1.4% underwent CS, while 85.5% of controls had NVD, 13.1% had assisted delivery and 1.4% underwent CS.

Concerning neonatal outcome, the vast majority of newborns were within normal birth weight, and 6.9% of neonates of cases and 29% of neonates from the control group needed admission to SCBU. In addition, neonates of exercising women had higher Apgar scores at one minute and at five minutes, and 84.8% of cases and 1.4% of controls breast fed their babies early.

Furthermore, 23.4% of cases and 49.7% of controls had episiotomy. Lower rate of complications were reported among women who practiced exercise as 13.8% of cases sustained perineal laceration compared to 17.9% of controls, 0.7% of cases had retained placenta compared to 4.1% of controls.

Concerning medication, the study found that women who exercised during labor required less medication as 63.4% of cases did not receive any medication compared to 34.5% of controls, and that 33.8% of cases required one type of medication compared to 38.6% of controls, 2.8% of cases received two medications and more compared to 26.9% of controls, and the most frequent medication used were oxytocin and analgesic medication.

In conclusion, the results of the study revealed that being active and practicing exercise during labor was efficient in facilitating the labor process, shorten the duration of labor, with less intense contraction pain, better neonatal outcome and less complications for the delivering women.

5.2 Recommendations

In the light of the study results, the researcher recommends the following:

- Emphasize the need to adopt and expand the birth exercise program to other maternity hospitals in Palestine.
- Afford adequate space and needed materials for implementing birth exercise programs.
- Training program for midwives and nurses who are working in maternity departments on appropriate exercise techniques to enable them to teach and instruct pregnant women on the proper ways and positions of exercising
- Emphasize practicing exercises during the course of pregnancy to increase women fitness and decrease undesired weight gain.
- Conducting a large controlled trial study for all the women who gave birth in one year to identify the effectiveness of birth exercise on CS deliveries.

5.3 Suggestions for further research

- To conduct a study to explore the attitudes of pregnant women toward exercising during labor.
- To conduct a study to compare the rates of mothers and neonates morbidity between those who perform birth exercises and those who are not exercising.
- To carry out an assessment study aiming to identify midwives knowledge and skills about birth exercise.

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Annexes

Annex (1): Names of expertise for validation of study instrument

Name	Place of work
Dr. Basam Abu Hamad	Al Quds University
Dr. Abdul Razik Al-Kurd	Al Emaraty Maternity Hospital
Dr. Amira Al Asoley	Al Tahreer Maternity Hospital
Dr. Akram Abu Salah	Palestine college of Nursing
Dr. Khalil Shueib	Palestine college of Nursing
Dr. Motasem Salah	Al- Shifa Medical Complex
Dr. Samer Al Nawajha	Nasser Medical Complex
Dr. Hassan Joda	Nursing Unit – MOH
Dr. Hamza Abd-El Jawad	Palestine college of Nursing

Annex (2): Checklist – first draft

Name of mother :

File number :

Date of Delivery :

1-Exercise done () Yes () No

2-Socio-economic Factor:

- Age: ()

3-Obstetric History:

- Risk Level: () High () Low

- Gravid: G () P () A () L ()

4-Contraction/Labor Pain Characteristics

- Severity: () Mild () Moderate () Severe

- Duration: () Second

- Frequency: () /10 minute

5- Out Come:

A. Neonate:

- Sex of baby : () Female () Male

- Weight of baby: () Kg

- Apgar score: (/)

- Admission to SCBU: () Yes () No

- Breast feeding start at delivery room: () Yes () No

B. Mother:

- Episiotomy: () Done () not done

- Duration of Labor: () minute

- Mode of Delivery: () N.V.S.D. () Breech D. () Assisted () C.S.

- Medication Use: () Oxytocin

Annex (3): Checklist – final draft

1. Personal information

1.	Serial number:
2.	Participant: () case () control
3.	File number:
4.	Place of delivery: () Al Tahreer () Al Shifa
5.	Age of mother: years
6.	Height of mother: cm
7.	Weight of mother: kg
8.	Level of education: () prep school and less () secondary school () university
9.	Mother occupation: () working () house wife
10.	Monthly income: () less than 2000 NIS () 2000 – 3000 NIS () more than 3000 NIS

2. Obstetric history

1.	Gravida () Para () Number of live children () Number of stillbirth ()
2.	History of previous abortion (Yes) (No), if yes, how many times ()
3.	History of previous CS (Yes) (No)
4.	History of medical problems: () pelvic fracture () DM () hypertension () heart disease () asthma () no medical problem

3. Current pregnancy

1.	Gestational age at the first antenatal visit () weeks
2.	Total number of antenatal visits ()
3.	Number of fetus () one () twins
4.	Risk level () low risk () high risk
5.	Blood pressure during pregnancy () normal () high
6.	Blood sugar level during pregnancy () normal () high
7.	Vaginal bleeding during pregnancy () yes () no

4. Current delivery

1.	Presentation () cephalic () breech
2.	Gestation () preterm () full term
3.	Onset of labor () spontaneous () induced. If induced, what type of induction () cervical balloon () ARM () prostaglandin () oxytocin
4.	Augmentation () ARM () oxytocin () ARM + oxytocin () none
5.	Duration of labor () hours
6.	Frequency of pain (..... / 10 minutes)
7.	Duration of labor pain () less than 30 second () more than 30 second
8.	Intensity of labor pain () mild () moderate () severe
9.	Mode of delivery () NVD () assisted () CS If delivered by CS, was it () emergency () elective
10.	Weight of baby () gm.
11.	Baby admitted to SCBU () yes () no

12.	Apgar score () at one minute () at 5 minutes
13.	Episiotomy done () yes () no
14.	Complications during labor () perineal laceration () retained placenta () abruption placenta () none

5. Medication given during labor

	Type of medication	Yes	No
1.	Oxytocin		
2.	Misoprostol		
3.	Analgesia (pethidine)		
4.	Anesthesia (spinal / epidural)		

6. Birth exercise

	Type of exercise	Yes	No
1.	Pelvic rock		
2.	Squatting		
3.	Exercise ball		
4.	Walking		
5.	Leaning		
6.	Deep breathing		

Annex (4): Approval from Helsinki committee



المجلس الفلسطيني للبحوث الصحية Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee For Ethical Approval

Date: 03/08/2015

Number: PHRC/HC/43 /15

Name:

الاسم: سهى سليمان النجار

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم
حول:-

Impact of Birth Exercise on the Delivery Outcomes at Governmental Hospitals in the Gaza Governorates: Case Control Study

The committee has decided to approve the above mentioned research.
Approval number PHRC/HC/43 /15 in its meeting on 03/08/2015

و قد قررت الموافقة على البحث المذكور عاليه
بالرقم والتاريخ المذكوران عاليه

Signature

Member

Chairman

Member

General Conditions:-

١٣. Valid for 2 years from the date of approval.
١٤. It is necessary to notify the committee of any change in the approved study protocol.
١٥. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

The subject was approved following the World Medical Association Declaration of Helsinki-Ethical principles for medical research involving human subjects, adopted by the 18th World Medical Association General Assembly, Helsinki, Finland, June 1964 and amended by the 59th WMA General Assembly, Seoul, Korea, October 2008.

E-Mail: pal.phrc@gmail.com

Gaza - Palestine

غزة - فلسطين
شارع النصر - مفترق العيون

Annex (5): Approval from MOH

The Palestinian National Authority
Ministry of Health
Directorate General of Human Resources Development



السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

التاريخ: 05/08/2015م

الرقم:

المحترم،،،

الأخ / د. عبد اللطيف الحاج

مدير عام المستشفيات

السلام عليكم ورحمة الله وبركاته،،،

الموضوع/ تسهيل مهمة باحثة

بخصوص الموضوع أعلاه، يرجى تسهيل مهمة الباحثة/ سهى سليمان النجار
(مدرسة قبالة - كاية فلسطين للتمريض) الملتحقة ببرنامج ماجستير الصحة العامة -
مسار الادارة الصحية - جامعة القدس ابوديس في إجراء بحث بعنوان :-

“Impact of Birth Exercise on the Delivery Outcomes at Governmental Hospitals in the Gaza Governorates: Case Control Study “

حيث الباحثة بحاجة لمتابعة حالات الولادة من لحظة دخول الحامل لغرفة الولادة حتى الخروج لتعبئة
استبانته عن كل حالة توافق على المشاركة في البحث في مجمعي الشفاء وناصر الطبيين على أن تكون
العينة الضابطة من مجمع الشفاء الطبي، وكذلك الحصول على بعض البيانات من الملف الطبي لهذه
الحالات.

نأمل توجيهاتكم لذوي الاختصاص بضرورة الحصول على الموافقة المستتيرة من السيدات اللاتي هن على
استعداد للمشاركة في البحث ومن ثم تمكين الباحثة من متابعتهم، بما لا يتعارض مع مصلحة العمل وضمن
أخلاقيات البحث العلمي، و دون تحمل الوزارة أي أعباء أو مسؤولية.

وتفضلوا بقبول التحية والتقدير،،،

د. ناصر رافت أبو شعبان
مدير عام تنمية القوى البشرية

15/1082
25 88


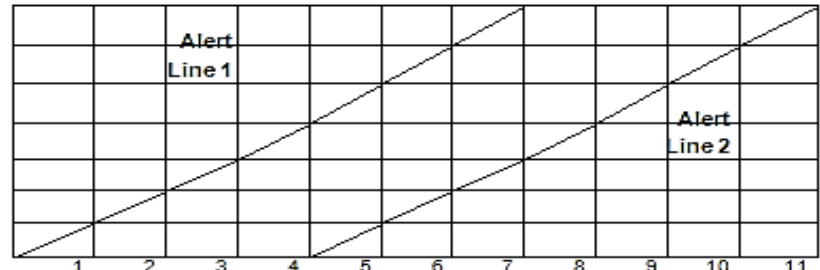
صورة لـ /
- الإدارة العامة للرقابة الداخلية
- صاحب العلاقة

Gaza Tel/ 08-2827298


Fax / 08-2868109

Email / hrd@moh.gov.ps

Annex (6): Partogram form

السلطة الوطنية الفلسطينية وزارة الصحة مستشفى		ID \ M.R. No.: Patient Name: Date of Birth: Consultant/unit:									
Partogram نموذج متابعة المخاض											
Admission Time : : Parity Gestation											
↑ Cervical Dilatation Time in hours →											
Station											
ARM											
Liquor											
Caput											
Moulding											
Signature											
Oxytocin											
Analgesia											
Signature											
FHR											
BP											
No. per 10 min											
Mild											
Up to 20s											
Good 40-60s											
Time 00-24											
Signature											
Delivered By: <input type="checkbox"/> Doctor <input type="checkbox"/> Midwife (Name: _____, Signature: _____)											

Annex (7): Labor and delivery form summary

السلطة الوطنية الفلسطينية وزارة الصحة مستشفى		ID \ M.R. No.: Patient Name: Date of Birth: Consultant/unit:
Labor & Delivery Form (summary)		
نموذج المخاض و الولادة		
Current Pregnancy: <input type="checkbox"/> Singleton <input type="checkbox"/> Multiple pregnancy Gestation at delivery <input type="checkbox"/> At-term <input type="checkbox"/> Pre-term <input type="checkbox"/> Post-termweeks Presentation: <input type="checkbox"/> Vertex <input type="checkbox"/> Breech <input type="checkbox"/> Other..... Associated Problem <input type="checkbox"/> DM <input type="checkbox"/> PIH <input type="checkbox"/> Other.....		
Details of labor <input type="checkbox"/> Spontaneous and natural <input type="checkbox"/> Induction <input type="checkbox"/> ARM <input type="checkbox"/> ARM+Oxytocin <input type="checkbox"/> PGE ₁ <input type="checkbox"/> PGE ₂ (Cytotec) <input type="checkbox"/> Augmentation <input type="checkbox"/> ARM <input type="checkbox"/> Oxytocin <input type="checkbox"/> ARM+Oxytocin		
Fetal conditions Fetal monitoring <input type="checkbox"/> Intermittent CTG <input type="checkbox"/> Continuous CTG <input type="checkbox"/> Sonic Aid/Pinard CTG/FH changes (problems) <input type="checkbox"/> No <input type="checkbox"/> Yes If yes, Specify.....		
Mode of delivery <input type="checkbox"/> Vaginal /spontaneous (NVD) <input type="checkbox"/> Cephalic (NVD) <input type="checkbox"/> Breech <input type="checkbox"/> Vaginal / Operative <input type="checkbox"/> Vacuum <input type="checkbox"/> Forceps <input type="checkbox"/> B. extraction <input type="checkbox"/> I.P Version <input type="checkbox"/> Caesarean section <input type="checkbox"/> Emergency <input type="checkbox"/> Elective Indication.....		
Third stage Delivery of Placenta <input type="checkbox"/> Spontaneous <input type="checkbox"/> CCT <input type="checkbox"/> Fundal Pressure <input type="checkbox"/> MRP Placenta/Membrane conditions <input type="checkbox"/> Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Doubtful Weight.....g Retroplacental clot.....ml Cord <input type="checkbox"/> 3 vessels <input type="checkbox"/> Cord Knot <input type="checkbox"/> Cord around neck x.....times Oxytocics <input type="checkbox"/> Oxytocin <input type="checkbox"/> Methergin <input type="checkbox"/> PGE ₂ <input type="checkbox"/> Cytotec		
Perineum/obstetric Trauma Episiotomy <input type="checkbox"/> No <input type="checkbox"/> Yes Laceration <input type="checkbox"/> No <input type="checkbox"/> Yes Degree <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV Repaired <input type="checkbox"/> No <input type="checkbox"/> Yes Sutured by..... Anaesthesia <input type="checkbox"/> Local <input type="checkbox"/> Pudendal Block <input type="checkbox"/> G.A		
Blood transfusion: <input type="checkbox"/> No <input type="checkbox"/> Yes		

Complications during labor and delivery: <input type="checkbox"/> Prolonged labor/Obstructed labour/dystocia/malpresentation <input type="checkbox"/> Post Partum hemorrhage -Type: <input type="checkbox"/> atonic <input type="checkbox"/> traumatic <input type="checkbox"/> Uterine rupture <input type="checkbox"/> Perineal Laceration during delivery - Degree..... <input type="checkbox"/> Other obstetric trauma (laceration of cervix, high vaginal laceration, etc) <input type="checkbox"/> Retained Placenta and membranes (if with hemorrhage tick also PP hemorrhage) <input type="checkbox"/> Fetal distress <input type="checkbox"/> Labor and delivery complicated by umbilical cord complications <input type="checkbox"/> Maternal sign of infection <input type="checkbox"/> Fever <input type="checkbox"/> Chorioamnionitis <input type="checkbox"/> Others..... <input type="checkbox"/> Pregnancy-induced hypertension (Eclampsia or pre-eclampsia) <input type="checkbox"/> Failed induction of labour <input type="checkbox"/> Others, specify (incl. complications during anaesthesia)..... <input type="checkbox"/> None	
Maternal Outcome: <input type="checkbox"/> Well <input type="checkbox"/> Under observation <input type="checkbox"/> Under treatment in PP ward <input type="checkbox"/> Referred to OR <input type="checkbox"/> Referred to intensive care <input type="checkbox"/> Maternal death	
Neonatal Outcome: Date Of Birth: / / (Time of birth: :..... <input type="checkbox"/> am <input type="checkbox"/> pm) Baby: <input type="checkbox"/> Single <input type="checkbox"/> Multi Fetus No..... Sex : <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Ambiguous Gestational age: <input type="checkbox"/> at term <input type="checkbox"/> pre-term <input type="checkbox"/> Alive Well <input type="checkbox"/> Alive with problems <input type="checkbox"/> SB fresh <input type="checkbox"/> SB Macerated <input type="checkbox"/> Early neonatal death Congenital anomalies <input type="checkbox"/> No <input type="checkbox"/> Yes specify..... Birth weight :g , Length :cm , O.F.C::cm Resuscitation: <input type="checkbox"/> No <input type="checkbox"/> Yes, Type:..... Vitamin K: <input type="checkbox"/> given <input type="checkbox"/> Not given Referred To SCBU : <input type="checkbox"/> Yes <input type="checkbox"/> No	
Doctor's Name:..... Signature:.....	Midwife's Name:..... Signature:.....

السلطة الوطنية الفلسطينية وزارة الصحة مستشفى		ID \ M.R. No.: Patient Name: Date of Birth: Consultant/unit:
--	---	---

Post delivery woman check نموذج فحص الأم بعد الولادة

	Immediate post delivery	1 st hour	2 nd hour	3 rd hour	4 th hour	5 th hour	6 th hour	Before discharge
Time of check								
Fundus								
Lochia								
BP								
Pulse								
Voided								
Temperature (as hosppt routine)								
For C/S site of operation								
Signature								

☐ How baby is fed ☐ Breast milk ☐ Bottle ☐ Mixed ☐ Others specify.....

☐ When Breastfeeding is initiated? ☐ 1st hour ☐ 2-6 hours ☐ > 6 hours ☐ Not yet

☐ If Supplement Given, what is given: ☐ Water ☐ Formula ☐ Others specify ☐ None

☐ Problems related to Mother 1:

☐ Problems related to Baby 2:

☐ Counseling on Breastfeeding ☐ Yes ☐ No

☐ Counseling on Danger Signs ☐ Yes ☐ No

☐ Baby is breastfeeding on discharge ☐ Yes ☐ No

☐ Baby examined by pediatrician ☐ Yes ☐ No

☐ If need for follow up, identify:

Name & Signature of staff at discharging:

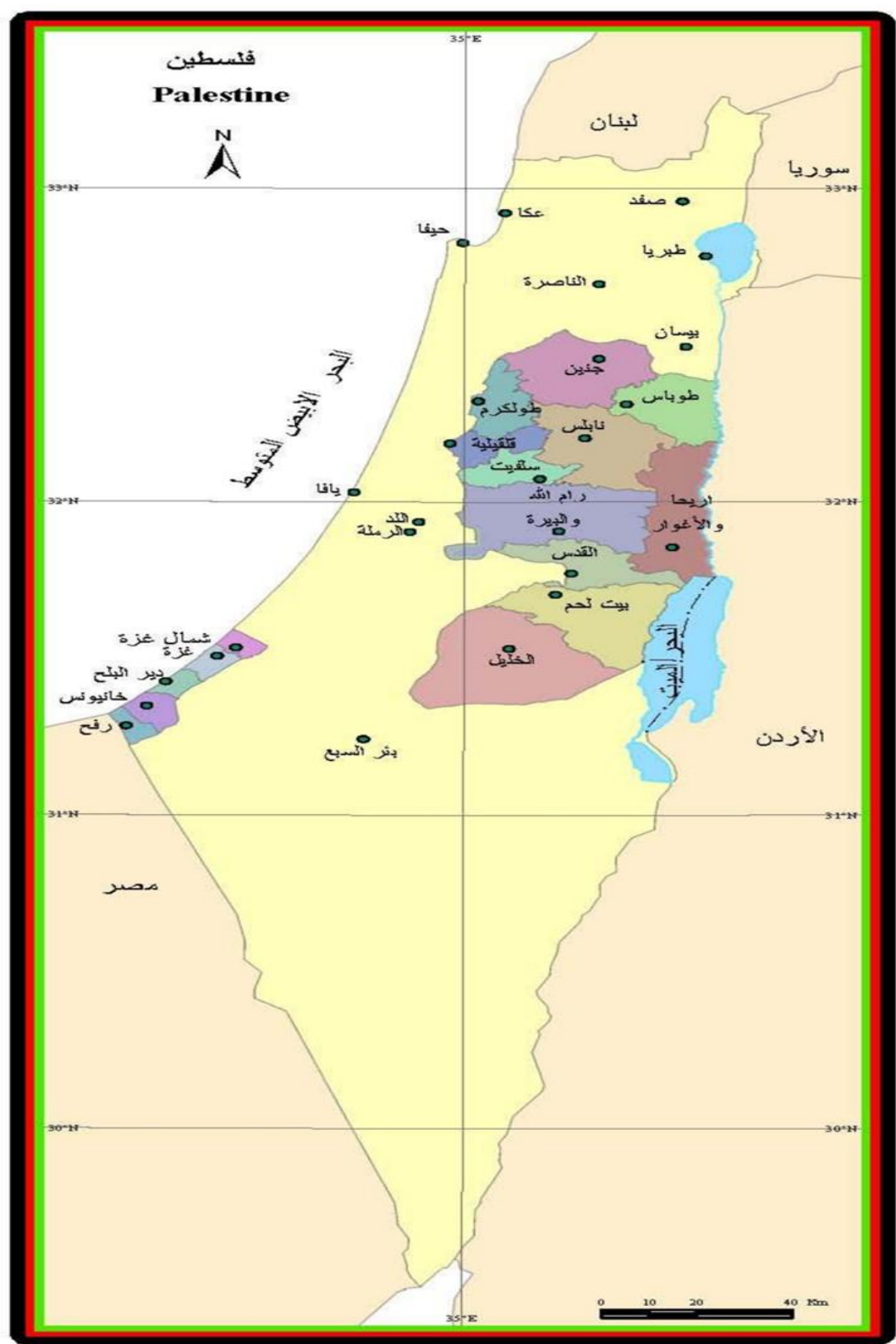
Date of Discharge : / / | Time:: ☐ am ☐ pm

1. احتضن صحة الأم الشديد 2. الأم تتناول أدوية 3. قلة خيرة الأم 4. غير ذلك حدد
 1. طفل ناقص الوزن 2. طفل لديه نقص في السكر 3. طفل مولود بعيب خلقي 4. طفل يقذف السوائل بشكل حاد بسبب مشكلة

Annex (8):Number of deliveries for the past four years in Al Tahreer hospital and Al Shifa hospital

Year	2011		2012		2013		2014	
	Al Tahreer	Al-Shifa	Al Tahreer	Al-Shifa	Al Tahreer	Al-Shifa	Al Tahreer	Al-Shifa
Month								
January	755	1229	926	1296	926	1034	952	1110
February	652	1041	822	1120	793	865	801	966
March	859	1105	879	1124	803	862	830	967
April	752	968	753	952	713	748	680	857
May	666	912	760	884	672	695	709	827
June	716	1011	779	977	761	875	750	979
July	974	1169	925	1185	985	1045	976	1242
August	998	1386	948	1110	978	1163	927	1330
September	956	1266	921	968	918	1102	939	1358
October	995	1265	904	880	955	1154	981	1252
November	934	1164	873	935	988	1092	907	1131
December	989	1240	918	1038	885	1121	948	1032
Total	10246	13756	10408	12469	10377	11756	10400	13051
Average / month	854	1146	867	1039	865	980	867	1088

Annex (9): Map of Palestine



عنوان الدراسة: ممارسة التمارين خلال مراحل الولادة وأثرها على مخرجات الولادة في المستشفيات الحكومية بقطاع غزة: دراسة مقارنة.

إعداد: سهى النجار

إشراف: د. وليد أبو حطب

ملخص الدراسة

هدفت الدراسة الحالية إلى معرفة أثر ممارسة التمارين الرياضية خلال مراحل الولادة على مخرجات الولادة، كما هدفت إلى معرفة خصائص ألام المخاض من ناحية التكرار والمدة الزمنية وشدة الألم. تكونت عينة الدراسة من 290 سيدة مقسمات إلى مجموعتين متساويتين: (مجموعة الحالات) تكونت من 145 سيدة قمن بممارسة التمارين في مستشفى التحرير التابع لمجمع ناصر الطبي بخانيونس، و(المجموعة الضابطة) تكونت من 145 سيدة من قسم الولادة بمستشفى الشفاء ولم يقمن بممارسة أي نوع من التمارين الرياضية. لجمع البيانات فقد قامت الباحثة بإعداد أداة الدراسة (قائمة محتويات) وقد تم عرضها على مجموعة من المحكمين للتأكد من مدى صلاحيتها كأداة للدراسة. قامت الباحثة بجمع البيانات في الفترة من يونيو إلى سبتمبر 2015، وقد تم استخدام البرنامج الإحصائي المحسوب SPSS لتحليل البيانات، والتي ضمت التكرارات والنسب المئوية.

وقد بينت نتائج الدراسة أن أعمار السيدات اللاتي شاركن في الدراسة تراوح بين 15 - 55 سنة بمتوسط 25.76 سنة.

بالنسبة للتاريخ الصحي الخاص بالولادات السابقة فقد تبين أن 29% من مجموعة الحالات و 33.1% من المجموعة الضابطة كانت هذه الولادة الأولى لهن كما أن 31.7% من مجموعة الحالات و 29% من المجموعة الضابطة قد حصل لديهن عملية إجهاض في السابق، كما أن كل السيدات قد قمن بمراجعة عيادة الحوامل خلال فترة الحمل ولكن كان هنالك اختلاف بين السيدات في عدد الزيارات.

بالنسبة للحمل والولادة الأخيرة فقد بينت النتائج أن 98.6% من مجموعة الحالات و 96.6% من المجموعة الضابطة كن حاملات بجنين واحد، كما تبين أن 99.3% من السيدات اللاتي مارسن

التمارين و97.9% من السيدات اللاتي لم يمارسن التمارين الرياضية كان لديهن خروج الجنين بالرأس cephalic presentation، كما أن السيدات اللاتي مارسن التمارين بدأ لديهن المخاض بشكل تلقائي بنسبة أعلى من اللاتي لم يمارسن التمارين 93.8% مقابل 81.4%، كما أن السيدات اللاتي مارسن التمارين كانت درجة احتياجهن لتنشيط المخاض أقل مقارنة باللاتي لم يمارسن التمارين حيث أن 31% من مجموعة الحالات و 20% من المجموعة الضابطة احتجن إلى عملية فض الغشاء الأمينوسي، و 6.9% من مجموعة الحالات و 28.3% من المجموعة الضابطة تلقين دواء أوكسيتوسين، و 9% من مجموعة الحالات و 28.3% من المجموعة الضابطة احتجن كلاً من فض الغشاء الأمينوسي ودواء أوكسيتوسين. كما بينت النتائج أن عملية الولادة استغرقت فترة أقل لدى السيدات اللاتي مارسن التمارين الرياضية، وقد كانت الولادة مهبلية طبيعية لدى 94.5% من سيدات مجموعة الحالات و 85.5% لدى سيدات المجموعة الضابطة.

بالنسبة لألم الم خاضفقد بينت النتائج أن 92.4% من مجموعة الحالات و 59.3% من المجموعة الضابطة كان تكرار الألم أكثر من 10/2 دقائق، أما بالنسبة لحدة الألم فقد تبين أن 19.3% من مجموعة الحالات و 3.4% من المجموعة الضابطة كان لديهن ألم م خفيف، 40.7% من مجموعة الحالات و 45.5% من المجموعة الضابطة كان لديهم ألم متوسط الشدة، في حين أن 40% من مجموعة الحالات و 51% من المجموعة الضابطة كان لديهم ألم شديد.

بالنسبة للمواليد فقد تبين أن غالبيتهم كانوا ضمن الوزن الطبيعيولك ن أطفال السيدات اللاتي مارسن التمارين كانوا أقل عرضة للدخول إلى قسم العناية المركزة لحديثي الولادة مقارنة بأطفال السيدات اللاتي لم يمارسن التمارين 6.9% مقابل 29%، كما أن أطفال السيدات اللاتي مارسن التمارين حصلوا على درجات أعلى في فحص Apgar score في الدقيقة الأولى وفي الدقيقة الخامسة، كما أن السيدات اللاتي مارسن التمارين قمن بإرضاع أطفالهن مبكراً 84.8% مقابل 1.4%. أيضاً أظهرت النتائج أن 23.4% من سيدات مجموعة الحالات و 49.7% من المجموعة الضابطة احتجرابيسيوتومي episiotomy، كما كن أقل عرضة للمضاعفات الناتجة عن عملية الولادة حيث أن 13.8% من مجموعة الحالات و 17.9% من المجموعة الضابطة حصل لديهن شرح شرجي، و 0.7% من مجموعة الحالات و 4.1% من المجموعة الضابطة حصل لديهن حشر المشيمة. أما بالنسبة لاستخدام الأدوية فقد بينت النتائج أن السيدات اللاتي مارسن التمارين كان استخدامهن للعلاج

والأدوية أقل حيث أن 63.4% من مجموعة الحالات لم يستخدم أي دواء مقابل 34.5% من المجموعة الضابطة، 33.8% من مجموعة الحالات و 38.6% من المجموعة الضابطة استخدم نوع واحد من الدواء، 2.8% من مجموعة الحالات و 26.9% من المجموعة الضابطة استخدم نوعين أو أكثر من الأدوية، وكانت الأدوية الأكثر استخداماً هي أوكسيتوسين ومسكنات الألم. بالنسبة للتمارين الرياضية فقد تبين أن التمارين الأكثر شيوعاً تمثلت في المشي، التنفس العميق، الركوع، وتمارين عضلات قاع الحوض، واستخدام الكرة الطبية.

في الإجمال فقد بينت هذه الدراسة أن ممارسة التمارين خلال مراحل الولادة قد ساعد في تسهيل الولادة وتقصير الفترة الزمنية التي تستغرقها عملية الولادة وتقليل المضاعفات الناتجة عن عملية الولادة، كما أظهرت الحاجة إلى تعزيز ممارسة التمارين خلال مراحل الولادة وتعميم هذا الإجراء في كل المستشفيات الحكومية بقطاع غزة.