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Outcomes of Adolescent Pregnancy -Gaza Governorate

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Outcomes of Adolescent Pregnancy -Gaza Governorate

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Outcomes of adolescent pregnancy in Gaza Governirate: Cross sectional Study

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Dedication

This is dedicated

To my beloved father and beloved mother,

To my husband,

Tomy friends and colleagues and of course

To all women in Palestine, particularly lived in the Gaza Strip.

With Love and Respect

NourAsad El-Graiz

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.

Signed:

NourAsad El-Graiz

…./…./….

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First and foremost, I thank Allah for helping me every moment during my study.

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Abstract

Adolescent pregnancy is considered a health risk for mother and her fetus and it is associated with high maternal, fetal and neonatal morbidity and mortality.

This study aimed to examine the relationship between adolescent pregnancy and the increased risk for adverse pregnancy outcomes for both mothers and neonates in Gaza in order to shed light on the maternal and neonatal outcomes of adolescence pregnancy and to provide possible recommendations to help in reducing adverse outcomes of this health problem.

A hospital based cross-sectional comparative study **was** carried out in The Obstetrics and Gynecology hospital at El Shifa Complexand included delivered women attended the hospital for delivery during the period of data collection. The study sample consisted of 110 cases (adolescent delivered mothers) and 110 matched controls (adult delivered mothers). Data were collected through a highly valid interviewing questionnaire by the researcher herself.

findings showed that the mean age of cases was 18.1 years compared to 23.5 for controls. The researcher found that the adolescent mothers had a significantly higher incidence of preterm delivery, low birth weight babies, admission to neonate intensive care unit and meconium aspiration when compared to the control group (OR, 2.87; CI 95%, 1.15-7.20; OR, 1.86 CI 95%, 1.05 – 3.29; OR, 3.33, CI 95%, 1.83 – 6.06; OR, 4.51, CI 95%, 1.45 – 13.9, respectively). Furthermore, there was no statistically significant difference between the two groups regarding fetal distress, low Apgar score, birth asphyxia, stillbirth and neonatal malformation. Results also revealed that adolescent mothers had a significantly higher incidence of low educational level and access to antenatal care when compared to the control group (OR, 3.5; CI 95%, 1.5 - 8.3; OR, 2.50 CI 95%, 1.40 - 4.46 respectively). Regarding intrapartum outcomes, cesarean section, vacuum instrumental delivery, episiotomy, induction labor, abnormal amniotic fluid color were reported a significantly higher incidence among adolescent mothers (OR, 6.58; CI 95%, 1.8 - 23.3; OR, 5.55 CI 95%, 1.1 - 26.4; OR, 5.02, CI 95%, 2.83 - 8.92; OR, 1.55, CI 95%, 0.80 - 3.00; OR, 3.89, CI 95%, 1.59 – 9.50, respectively). In term of postpartum outcomes, adolescent mothers had a significantly higher incidence of postpartum hemorrhage and blood transfusion (OR, 3.16; CI 95%, 1.1 - 8.3; OR, 2.81 CI 95%, 0.96 - 8.18 respectively).

Pregnant adolescent mothers had more maternal ,fetal and neonatal complications than those of pregnant adults. For that the researcher recommends a plan to enhance adolescent women's accessibility to the antenatal care and supplying them with extra nutrients during pregnancy to improve outcome and to decrease complications;increasing awareness of pregnant adolescentsabout importance of providing antenatal, intranatal and postnatal care; conducting more research studies are needed to address the other aspects of this public health problem in order to minimize its incidence and complications.

Key words: adolescent, pregnancy, outcomes, Gaza.

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List of Abbreviations

BMI	BodyMassIndex
CDC	Center for Disease Control and Prevention
CS	Cesarean section
GDM	Gestational Diabetes Mellitus
GG	Gaza Governorate
GS	Gaza Strip
IUGR	Intra Uterine Growth restruction
LBW	Low Birth Weight
MOH	Ministry of Health
NICU	Neonatal Intensive Care Unit
PCBS	Palestinian Central Bureau of Statistics
PIH	Pregnancy-Induced Hypertension
PHCC	Primary Health Care Center
PNA	Palestinian National Authority
PROM	Premature Rupture of Membranes
SPSS	Statistical Package for Social Sciences
SIDS	Sudden Infant Death Syndrome
UNRWA	United Nations Relief and Works Agency for Palestinian Refugees in the Near East
WB	West Bank
WHO	World Health Organization

Chapter 1

Introduction to the study

1.1 Research background

Adolescence is a critical period of human life, during which a person is no longer a child but in the other hand is not a fully mature adult. This phase of life characterized by a rapid physical, mental, emotional and social development which usually affect on adolescent life (World Health Organization-WHO, 2014). Adolescence period extends from 10 to 19 years old, and pregnancy during this period from 13 to 19 years old is called adolescent pregnancy. Often the terms teenage pregnancy and adolescent pregnancy are used as synonyms (WHO, 2014).

Adolescent pregnancy remains an important social and public health problem in both developing and developed countries, and has been associated with numerous risk factors (Mchunn et al., 2012);these factors encountering adolescent girls may lead to many reproductive health risks which include unawareness of adolescents about the sexual life at early stages of sexual relationships and the challenge to access to appropriate reproductive health services. The WHO has estimated the rate of adolescent girls who gave birth around the world is approximately 16 million each years with a percentage of 11% of births worldwide; ninety-five percent of these births were in low and middle income countries (WHO, 2013). Although, fertility rates in adolescents have declined since 1990, a gradual progress has been noticed in this century, mainly in sub-Saharan Africa and Latin America (United Nation, 2010).

Early childbearing, particularly among adolescents has negative demographic, socio-economic and reproductive consequences. Adolescent mothers are likely to suffer from severe complications during pregnancy, labor and post-partum period, which result in higher morbidity and mortality for them and their neonates; hence pregnancy and

childbirth is the number one killer of 15-19 years old women (Girleffect, 2012). The adverse effects of early marriage and pregnancy involve high rate of preterm labor, anemia, hypertensive disorders of pregnancy, urinary tract infection, abortion, mental illness and high rate of cesarean section. The adverse fetal outcomes including preterm births ,low birth weight infants, stillbirths, birth asphyxia, respiratory distress syndromes and birth trauma or injury (Yasmin, Kumar and Parihar, 2014).

Although the problem of adolescent pregnancy has been extensively studied globally, and after a thorough review of the literature, it was determined that current research regarding adolescent pregnancy in Arab countries; particularly in Palestine is limited. Therefore, the researcher found it beneficial to address the problem through identifying the adverse reproductive outcomes of adolescent pregnancy in Gaza governorate (GG). So, the purpose of this study is to determine the relationship between adolescent pregnancy and adverse maternal and neonatal outcomes finally to decrease morbidity and mortality among adolescent mother and their neonatesin GG.

1.2 Research problem

Adolescent pregnancy is an important public health problem, especially in developing countries, with a high rate of marriage at young age, along with poor prenatal and postnatal care (Mukhopadhyay, Chaudhuriand Paul, 2010).It could lead to incomplete education, unemployment and other numerous physical and emotional adverse outcomes. Adolescent girls body is not developed as adult women in term of childbearing. Thus, they are often to face certain complications during pregnancy including abortion as well as an increased risk of maternal and neonatal mortality (Nalenga, 2012).

Adolescent pregnancy is one of the main issues in every health care system since early pregnancy can have harmful impacts on girls physical, psychological, economic and social

status. Girl who becomes pregnant while still adolescent face multitude of problems. She face motherhood prematurity usually before her own maturation has been completed. Potentially severe medical complications place both the mother and their infants at risk of a higher rates of morbidity and mortality (Mchunn et al, 2012). It is known that neonatal mortality increases as the age of mother decreases and adolescents who give birth before the age of 15 years are five times more likely to die during pregnancy or delivery as women in their 20 years as a result of physical immaturity. Older adolescents are twice as likely to die during pregnancy and delivery (Gyesaw and Ankomah, 2013).

Globally, in the late twentieth century, there were 17,000,000 babies born to adolescents mothers, of which 16,000,000 occurred in developing countries. In developing countries 15%-20% of all deliveries were in mothers aged younger than 19 years old, and 25% of maternal deaths occurred in this age group (Najati and Gojazadeh, 2010). Recently, however, early marriage has declined markedly in parts of Arab region, most notably in Kuwait, Libya and United Arab Emirates. Also, Worldwide the incidence of premature birth and low birth weight is higher among adolescent mothers (Marnach, ForrestandandGoldman, 2013). Adolescent mothers between 15-19 years old were more likely to have anemia, preterm delivery and low birth than mothers between 20-24 years old physiologically for the child as well as the mother. (Nalenga, 2012).

In Palestine, women start childbearing at adolescent stage as a part of cultural and social norms. According to applicable laws in Palestine, the minimum age for marriage in the West Bank (WB) is 15 for girls and 16 for boys whereas 17 years, 18 years in GGs respectively for girls and boys. Palestinian Centre Bureau of Statistics (PCBS) outlined that one out of five women aged 20-49 years were married at age of 18 years old or less (PCBS, 2014). The median age of women at their first marriage was 20.2 years and 24.7 years for men in Palestine (PCBS, 2015).

Political conflict in Palestine has also played a role in increasing the size of the problem of early marriage for women at young age which could explain the high fertility rate in Palestine, especially in the GGs. In 2014, the total fertility rate was 4.1 births per women (3.7 births per women in the WB and 4.5 births per women in the GGs). In Palestine, at 2014 there were 48 births per 1000 women and this rate was higher in GGs which reach to be 66 births per 1000 women compared to 35 births per 1000 women in WB (PCBS, 2014).

1.3 Justification of the study

Early marriage with its related social and health problems is a significant phenomenon in the Palestinian society and therefore becomes a topic that need many areas of concern. Marriage of girls before the age of 18 is considered a violation of human rights and deprives young girls from their basic rights in education and health (Women Affairs Center, 2015). The causes and consequences of adolescent pregnancy have been the topic of much research, policy and program discussion and debate. Some studies have suggested that adverse outcomes of adolescent pregnancy are due to physiological and anatomical factors associated with young maternal age while other studies have reported external factor such as socioeconomic status, social support, inadequate antenatal care and other behavioral determinants associated with adolescent (Mukhopadhyay, Chaudhuriand Paul, 2010).

However, up to date, only few studies have researched on the topic of adolescent pregnancy in the Arab countries specially in Palestine, while adolescent pregnancy is the main reproductive health problems. This is why the researcher would like to investigate the outcomes of adolescent pregnancy in GG. The study will provide information on the impact of adolescent pregnancies and childbearing in GGs that will inform policy makers and assist program managers as well as the decision makers to come up with interventions

to reduce adolescent pregnancies and severity of other complications associated with it. This will greatly help in improving maternal health, and reducing the overall maternal and neonatal morbidity and mortality. The information generated will also be used by different stakeholders including scholars and other interested agencies and organizations for further reference. In addition, it will give direction to future research and provide information for improving the existing service delivery approaches for young mothers.

1.4 Study objective

1.4.1 General objective

The main aim of this study is to determine the relationship between adolescent pregnancy and the increased risk for adverse pregnancy outcomes for both mother and her fetus/neonate in Gaza Governorate.

1.4.2 Specific Objectives

(1) To compare the obstetric outcomes of adolescent pregnancy with that of the control group.

(2) To determine the most common maternal complications associated with adolescent pregnancy in GG.

(3) To identify the most common fetal/neonatal adverse outcomes associated with adolescent pregnancy in GG.

(4) To suggest recommendations for action could be taken to reduce adverse outcomes of adolescent pregnancy in GG.

1.5 Research questions

1. Is there differences between adolescent and adulthooddelivered mothers regarding their occupation, education, place of residence, and access to care?
2. What are the effects of adolescent pregnancy on neonatal morbidity in GGs?

3. What are the effects of adolescent pregnancy on maternal morbidity in GGs?
4. Which factors are contributed to adolescent pregnancy adverse outcomes in GGs?
5. Does adolescent pregnancy play a role in increasing the incidence of abortion in GGs?
6. Is there is a relationship between pregnancy induced hypertension and adolescent pregnancy?
7. Is adolescent pregnancy associated with a higher incidence of gestational diabetes?
8. Is there an association between the mother's age and giving a neonate with congenital malformations?
9. Does adolescent pregnancy has an impact on the prevalence of preterm labor in GGs?
10. Is there a significant difference of neonates' birth weight related tomaternal age?
11. To what extent the adolescent pregnancy affect the mode of delivery?
12. Does adolescents exposed to perineal tears during delivery more than non-adolescents?
13. What are the suggestions and recommendations that could be drawn from the study that could minimize the adverse outcomes of adolescent pregnancy in GG?

1.6 Study Context

1.6.1 Geographical context

1.7 Context of the study

1.7.1 Demographic Context

Palestine is an Arabic Country, relatively a small one, the total surface area of the historical Palestine is about 27.000 Km^2. Palestine has been occupied since 1948 by Israel and the two remaining parts are separated geographically (West Bank and Gaza Strip) after the war in 1967. Palestine is surrounded by Lebanon, Syria, Jordan, Egypt, and the Mediterranean Sea. The total area of the Gaza Strip(GS) and West Bank is about 6,020 Sq. Km with total population living in is about 4.29 million

individuals (1.77 million in GS and 2,80 WB) with population density 653 capita per Km. GS is a narrow piece of land lying in the coast of Mediterranean Sea. The total area of GS is about 365 square kilometer. It is an overcrowded area with total population about 1.77 million (895,000 are females) with population density of 4279 inhabitants/ Km² and about 69% of them are refugees as estimated by the year 2010 (MOH, 2014; PCBS, 2012).

GS is divided into five governorates: Gaza Governorate, North Governorate, Mid-zone Governorate, Khan-Younis Governorate, and Rafah Governorate (MOH, 2014).

1.7.1a Population Growth:

According to MOH (2014), the natural increase of population in Palestine was 2.9%; 2.6% in the WB and 3.7 % in the GS.

1.7.1b Fertility and Births in Palestine:

Reported Live Births:

The total number of reported live births in Palestine was 121,330 (65,778) (54.2%) in WB and (55,879) (45.8%) in GS (MOH, 2014).

Reported Crude Birth Rate:

Despite progressive decline over the years, the number of live births per 1000 of population per year is still high compared with other countries. The reported Crude birth rate in 2014 was 26.7 per 1000 of population in 2014, in WB (23.6/ 1000) and (31.6 /1000) in GS (MOH, 2014).

Fertility:

Fertility data are based on a family survey that PCBS conducted the total fertility rate in Palestine was 4.1,(3.7 in WB and 4.5 in the GS. In 2011, the total number of reported

deaths in Palestine was 11,415 (6,105 males (53.5%) and 5,310 females (56.5%), (7,237) out of them were in WB (3,785) males and (3,452) females, (4,178) deaths reported in GS (2,320) males and (1,858) females (MOH, 2014).

1.7.2 Palestinian Health Care system:

Prior of the Israel occupation of Gaza strip in 1967, GS was administered by Egypt, while East Jerusalem and the West Bank were administered by Jordan. The health organizations and institutions were operated separately and independently from each other. The health system in Palestine followed Egyptian protocols for health care services and medical licensing, while the health system in the West Bank followed Jordanian protocols. During the period from 1967 to 1994, GS and the WB were administered by Israel and both areas had different health protocols. Since 1948, United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) was charged to providing basic healthcare and medical services to Palestinian refugees in both Gaza strip and the West Bank. Following the Oslo agreement between the Palestinian Liberation Organization (PLO) and Israel in 1993, the Palestinian and Israel negotiated to transfer the administration of the health system to the Palestinian National Authority (PNA). The PNA has assumed the responsibility of health services for GS and Jericho in May 1994 as the first step, then to the rest of the WB at the end of same year (1994). Nowadays, the Palestinian health system in GS is commonly described as comprising of five main sectors for providing health care: the government sector, which administered and led by the Ministry of Health (MOH); UNRWA; the NGOs sector; the military medical services and the private sector. The MOH is considered as the central regulatory and administrative body for the Palestinian health system, despite that the responsibility of some relevant areas are done by other ministries, for instance, the Ministry of Finance (budgeting), the Ministry of Education and Higher education (training and vocational programs) and the Ministry of Planning (infrastructural

development programs). The MOH responsibility is to manage public health issues and to provide primary, secondary and tertiary care at government health facilities. The MOH is also the main provider of patient's admission and hospital beds in governmental hospitals .

The UNRWA has 17 primary health facilities and 3 secondary health facilities distributed across refugees' camps in GS. The proportion of refugees accessing UNRWA health care and medical services in 2009 was 85.0 %. The UNRWA healthcare services concentrate mainly on disease control and primary prevention, primary healthcare, family health, health education and awareness activities, school health, physiotherapy, environmental health and psychosocial support services and consultation. Most of staff and healthcare providers in the governmental sector, UNRWA, military medical services and private sectors are salaried employees and some of them are working as volunteers (MOH, 2011). The main roles and responsibilities of the MOH according to the Palestinian Public Health Law is: providing, regulating and supervising the provision of health care in Palestine. Also, MOH is responsible about planning the health care services in coordination with different stakeholders, enhancing health promotion to improve the health status, developing human resources in health sector, managing and disseminating health information, and others (MOH, 2014).

1.7.2a Primary health care (PHC)

PHC is a major component of Palestinian health care system. PHC provides preventive, promotional, curative and rehabilitative health care to all Palestinian people especially for children and other vulnerable groups through MOH, UNRWA, non-governmental and private centers. At the end of 2014, the total number of PHC centers in GS was 54 centers guided by MOH, 21 centers guided by UNRWA and other 15 PHC centers guided by Non-governmental organizations and military medical services (MOH, 2014).

1.7.2b Secondary and tertiary health care:

There were 80 governmental and non-governmental hospitals in Palestine 50 in WB and 30 in GS with a capacity of 5,939 beds; 59% in WB and 41% in GS, 73% of them are general beds, 18.6% specialized beds, 3% rehabilitation beds and 5.3% maternity beds. In Palestine, there are 13.1 beds per 10,000 of population; 12.6% in WB and 13.8% in GS (MOH, 2014).

1.7.2c Work-in Health Sector

A total of 8,810 physicians were registered in Palestine in 2012. The average number of physicians per 1,000 of population was 2.2: 2.3 in the WB and 2.2 in the GS. There were 11,633 nurses registered in Palestine in 2012. The average number of nurses per 1,000 of population was 2.7: 2.2 per 1000 in the WB and 3.4 in the GS (PCBS, 2014).

1.7.2d Obstetric healthcare:

Palestinian women aged 15-49 years in rural areas visited qualified staff the least during their previous pregnancy. In 2010, the percentage of women who visited qualified staff (four visits at least) in rural areas was 89.9% compared with 94.6% in urban areas and 96.5% of women in camps (PCBS, 2014). However, In 2010, 98.0% of births in Palestine it is at least in rural areas was 89.9% compared with 94.6% in urban areas and 96.5% of women in camps (PCBS,2014). Additionally, in 2010, 98.0% of births in Palestine occurred at a health facility: 97.7% in the WB and 98.3% in the GS. Data showed that the rate was lowest in rural areas at 96.7% compared with 98.2% in urban areas (PCBS, 2014).

1.8 Maternal Mortality Rate

Maternal mortality rate (MMR) is one of the most important indicators to determine health status of women within any health care system. The Palestinian MOH estimates that pregnancy in general pregnancy related complications are the third leading cause of death

among women during the child-bearing age. Most maternal deaths results from hemorrhage, PIH, obstructive labor and adverse effects of unsafe abortion. although the MMR is about 24.7 per 100,1000 live births in Palestine (30.6 in GS and 19.8 in WB), these rates are comparatively considered lower than those of the other neighbor countries (MOH, 2014).

1.9 El Shifa Complex

The complex (El Shifa Hospital) was established in 1946 on an area of 45,000 square meter. Since established, the hospital passed many development stages. It is considered the largest hospital in GS providing secondary and tertiary health services including medical, surgical and obstetric and gynecological care for most of GS inhabitants. El Sfifa complex is subdivided into three hospitals. These hospitals are surgical hospital, medical hospital, and obstetrics and gynecology hospital. Each of the three hospitals has its own administrative team that includes medical director, nursing director, and director for support and paramedical services (Hospital Records, 2015).

At (2015), El Shifa complex contained 741 hospitalization beds distributed in different departments. The average occupancy rate in this hospital was 80.9%; this rate includes the occupancy rate of day care beds while the average length of stay was 2.7 days (Hospital Records, 2015).

The obstetrics and gynecology hospital contains 251 beds 58 of them at the daily care and outpatient clinic. On average the facility receives about 50-65 delivery cases per day, despite the presence of four obstetrics and gynecology operation rooms only. At 2015, the occupancy rate in The obstetric hospital was 120% and the average length of stay was 2 days (Hospital Records, 2015).

1.7 Operational Definitions

Adolescence (or Teenage): It is the period between the ages of 10-19 years that encompasses time from puberty onset to full legal age (WHO, 2015).

Adolescent Pregnancy: Adolescent pregnancy also defined as a pregnancy in young woman who has not reach her 20thbirthday when the pregnancy ends (Hamilton and Ventura, 2012).

Pregnancy outcome: Pregnancy outcome is the final result of a fertilization event. Types of pregnancy outcomes include live birth (full term or preterm birth), stillbirth, spontaneous abortion, and induced abortionor maternal outcomes such as gestational diabetes, PIH, Bleeding, PROM(Baure et al., 2016).

Gestational hypertension or pregnancy-induced hypertension (PIH): is usually defined as having blood pressure higher than 140/90 mmhg measured on two separate occasions, more than 6 hours apart, without the presence of protein in the urine and diagnosed after 20 weeks of gestation(Mission and Caughey, 2013).

Gestational diabetes (or **gestational diabetes mellitus**, **GDM**): Is a condition in which women without previously diagnosed diabetes exhibit high blood glucose (blood sugar) levels during pregnancy (especially during their third trimester) (CDC, 2015).

Low birth weight (LBW): Is defined as a birth weight of a live born infant of less than 2,500 g regardless of gestational age. Subcategories include very low birth weight, which is less than 1500 g, and extremely low birth weight, which is less than 1000 (WHO, 2015).

Premature: Is defined as babies born alive before 37 weeks of pregnancy are completed (WHO, 2015).

Premature rupture of membranes (PROM), or pre-labor rupture of membranes: It is defined as rupture of membranes (breakage of the amniotic sac) before the onset of labor (Beckmann, 2010).

Induction of labor:It refers to techniques for stimulating uterine contractions to accomplish delivery prior to the onset of spontaneous labor (American College of Obstetricians and Gynecologists, 2012).

1.11 Layout of the study

Chapter one: Introduction

In this chapter, the researcher gives an introductory background about the study, sets the research problem and justification then identifies the main aim and specific objectives of the study. After that, the researcher illustrates the research questions and provide some details about the context of this study.

Chapter two: Conceptual frame work and literature review

The main purpose of this chapter is to synthesize theoretical and empirical evidence. The review sought to summarize the results of related studies that investigated similar and alternatives methodological approaches or examined the determinants of the problem of adolescent pregnancy in different settings. It also determine the gaps in existing knowledge that can be addressed in future research.

Chapter three: Study Method

This chapter concerns with the research methodology which is discussed in terms of how the study participants were selected, how and when data were collected and how data were analyzed. It encompasses the selection of research methods, study design, instruments, study population, sample and sampling, ethics and data analysis.

Chapter four: Results and Discussion

In this chapter, the results and findings of the study are presented as they relate to the research purpose and research questions. It summarizes the results of the study to provide useful information about the study population in terms of classification, tabulation and presentation.

Chapter five: Conclusion and recommendations

The study conclusions are the researcher attempt to show what knowledge has been gained by the study and an attempt to suggest some recommendations to whom could be involved in solving of the study problem.

Chapter 2

Conceptual Framework and Literature Review

2.1 Conceptual Framework

This conceptual framework was developed by the researcher after check of literature related to adolescent pregnancy to illustrate the adverse outcomes of adolescent pregnancy. These outcomes are classified as:

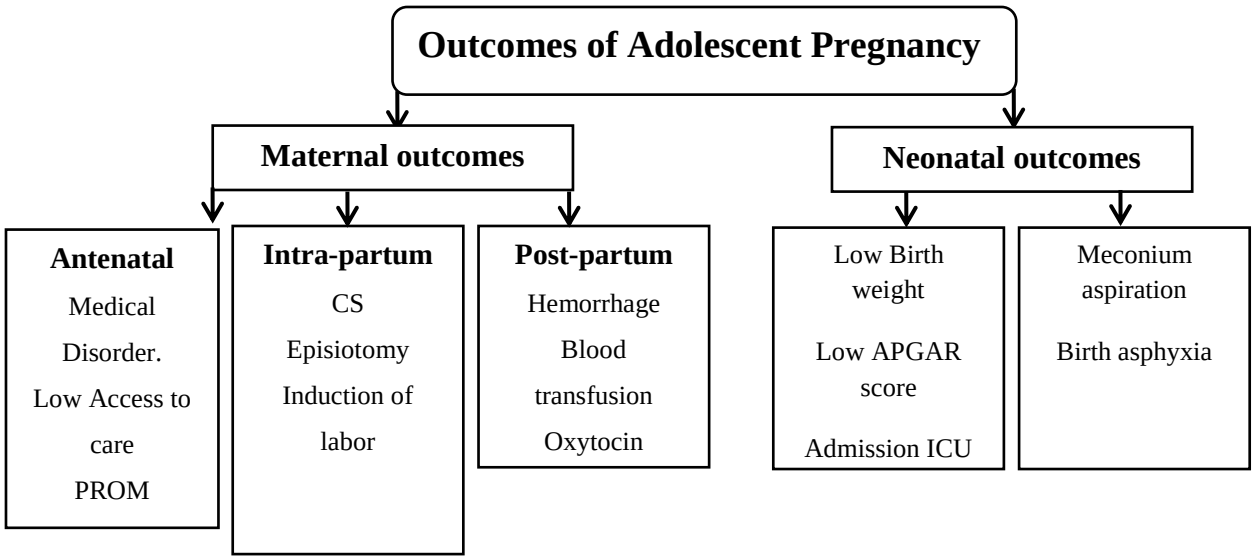

Figure (2.1) Self-developed conceptual framework

2.1.1Maternal outcomes: Which classified as following:

Antenatal outcome: which includesmothers, lack of accessibility to antenatal care, and medical diseases such as gestational diabetes, PIH, bleeding, and anemia.

*Intrapartum outcome:*which includes CS, episiotomy, induction of labor, PROM, using oxytocin augmentation, complication during labor, and using pain relief.

*Postpartum outcome:*which includes postpartum hemorrhage, blood and using oxytocin.

2.1.2 Neonatal outcomes: e.g.(gestational age, birth weight, low APGAR score, admission to NICU, malformation, meconium aspiration and birth asphyxia.

2.2 Literature review

2.2.1 Overview

Pregnancy and child birth are number one killer of 15 to 19 years old girls worldwide (Girleffect, 2012). The term adolescent pregnancy refers to individuals between the age of 15-19 years which make up more than one billion of the world population and still a growing number specially in developing countries. One of the reasons for rapid population growth rate is early marriage and childbearing. Maternal mortality is twice as greatest for women between 15 and 19 than women between the ages of 20 and 24 (Pun et al., 2011). Adolescent girls when become pregnant are at increased risk for maternal and neonatal complications. Maternal complications include PIH, preeclampsia, anemia, perineal tear and episiotomy. Neonatal complications include prematurity, IUGR, LBW, neonatal mortality and stillbirth. These adverse outcomes could be related to biological factors and socio-economic conditions (Pun et al., 2011).Also, adolescent girls who are less informed, may not access the appropriate reproductive health services and are therefore at greater risks for adverse pregnancy complications than adult pregnant women(Shrestha, 2012).

2.2.2Adolescent age period

Adolescence is a period of preparation for adulthood occurs from age 10 to 19 years old. It is characterized by key developmental change including physical and sexual maturation, forcing adolescent to move toward social and economic independence, and development of identity (WHO, 2015). In studying adolescent developmentphysical maturation marked by the onset of puberty and the termination of physical growth; cognitively,as change in the ability to think logically and multi- dimensionally; socially, as period of preparation for adult roles and responsibility(Arnett, 2007).

2.2.3Adolescent and biological development

Puberty is a period of several years in which rapid physical growth and psychological changes taking place. The average onset of puberty is at 10 to 11 for girls and age 11 to12 for boys (Kail and Cavanaugh, 2010). Period of puberty is influenced primarily by heredity and then environmental factors such as diet and exercise (Kaplowitz et al, 2001). Puberty occur through along process and begins with increase in hormone production that is considered one of the main causes of physical changes which characterized by the appearance and development of secondary sex characteristics for example deeper voice and larger Adams apple in boys. In girl development of breasts and more curved and prominent hips (Slap, 2001). The major landmark of puberty for males is the first ejaculation ,which occurs on average at age 13 years. For female, it is menarche , the onset of menstruation which occurs on average between age 12 and 13 years old. The age of menarche is influenced by heredity and lifestyle (Anderson, Dallal and Must, 2003).

The timing of puberty can have important psychological and social consequences. Early maturing boys are 9usually taller and stronger than their friends. Early maturing boys often tend to have a good body image, are more confident and more independent . Late maturing boys can be less confident because of poor body image when comparing themselves to developed friends and peers(Kail and Cavanaugh, 2010).

For girls, early maturation can sometime lead to increase self-consciousness and more dependent (Palo Alto Medical Foundation, 2009). In addition girls may have deal with sexual advances from older boys before they are emotionally and mentally mature which lead to adolescent pregnancy (Palo Alto Medical Foundation, 2009). Moreover, Girls attain reproductive maturity about four years after the first physical changes of puberty appear. In castrate, boys accelerate more slowly but continue to grow for about six years after the first visible pubertal changes (Kail and Cavanaugh, 2010).

2.2.4 Adolescent and psychological development

Biological changes related to puberty which characterized adolescent life have strongly impact on psychological development. An increased awareness of sexuality and elevate concentration on body image are fundamental psychological tasks during adolescence period. Dramatic changes in body shape and size can cause a great deal of inconsistency among adolescents, especially among females, leading to development poor body image and eating disorder if not addressed by family or health care professionals(Hazen, Schlozman and Beresin, 2008).

Social and emotional changes are very significant for the early adolescent. Feelings of self-consciousness and awareness about body are heightened as early adolescents develop a sense of identity. This greater need for a sense of personal identity coincides with the beginning of an emotional separation from their parents. Early adolescents begin to recognize that their parents are not perfect; they may even have increased conflicts with parents with rule and boundary testing. While early adolescents have a desire for privacy and independence, many return to childish behaviors when faced with stressful situations. At this stage adolescents are beginning to have some moral thinking and are concerned about how they are viewed by others. Friends begin to have a profound influence on the early adolescent who now begins to identify with a peer group (Hazen, Schlozman and Beresin, 2008).

The late adolescent females are usually fully developed physically, while young men continue to increase in height, weight, muscle mass, and body hair. The late adolescent has the ability for delayed gratification, can think about the future, cane valuate his or her personal experiences and process their ideas and thoughts. Their social and emotional development involves a more established sense of identity and emotional stability and can

show more concern for others. Peer relationships remain important and the late adolescent will now develop more sustained relationships (Connolly and McIsaac , 2008)

2.2.5Adolescent pregnancy

Adolescent pregnancy which is defined as a pregnancy in young woman who has not reach her 20th birthday when the pregnancy ends, is a common public health problem worldwide which is detrimental to the health of mother and child and has long been considered a high-risk situation (Hamilton and Ventura, 2012). Adolescent pregnancy continues to be a challenging public health issue around the world, mainly in developing countries (Najimet al., 2015). By age 18 years, one in five girls has given birth, and in the poorer regions of the world, one in three girls become a pregnant adolescent (WHO, 2010). The United Nations (2012) noted that adolescent pregnancy remains a problem for many regions.

Data suggest that pregnant adolescents are more likely than adult women to suffer adverse medical and obstetric outcomes, such as hypertensive disease, anemia, infection, and depression during pregnancy and more likely need CS or operative vaginal delivery (Cunningham et al., 2010). Pregnancy outcomes may include induced abortions, spontaneous fetal losses, or live births. In the United States, 26% of all adolescent pregnancies ended in induced abortions, 15% in fetal losses, and 59% in live births .Also adolescent pregnancy has been associated with an increased incidence of several adverse perinatal outcomes such as low birth weight, preterm delivery, small-for-gestational-age infants and perinatal death (Kathira et al., 2015).

2.2.6Epidemiology of adolescent pregnancy

2.2.6.1 Globally

A substantial rates of adolescent pregnancy and adolescent births are intended in developing countries where many women still marry early. However reviews of adolescent pregnancy and childbearing rates across countries and the trends of this problem up to the mid-1990s found that these events were becoming less common in the majority of countries for which evidence was available. At that time, adolescent pregnancy rate was higher in the United States than any other developed country for which estimates were available except Russia. Regional estimates for the developing countries indicated that adolescent births rates were high specially in Sub-Saharan Africa (Sedgh et al., 2015).

Now a day, about 16 million women 15–19 years old give birth each year, about 11% of all births worldwide. Ninety-five percent of these births occur in low- and middle-income countries. The global average rate of births per 1000 females aged 15-19 years is 65. A range of social, cultural, biological and service delivery factors contribute to the high levels of adolescent pregnancy and childbirth. The youngest mothers (16 years) had substantially higher risks for maternal and peri-natal morbidity and mortality than the late adolescent age group (16-19 years) especially if they live in a developing country (Yasmin et al., 2014). .

As estimated 3 million unsafe abortions occur globally every year among adolescent girls aged 15-19 years . Data show that globally 529,000 women die every year due to pregnancy and child birth related complications, whereas the risk of death due to pregnancy related causes is double among women aged 15-19 compared to women in their twenties (Sayem and Nury, 2011).

In the United States: The adolescent birth rate for the United States in 2013 was 26.5 births per 1,000 adolescents aged 15–19, down 10% from 2012 (29.4); the rate has fallen 57% since 1991. The number of births to teenagers aged 15–19 was 273,105 in 2013, down 11% from 2012 (305,388) and 47% from 1991 (519,577). Birth rates for adolescents aged 15–17 and 18–19 in 2013 were 12.3 births per 1,000 for the younger age group and 47.1 births per 1,000 for the older group, down 13% and 8% from 2012, respectively, and record lows for both groups. Since 1991, the rates for these two groups have fallen 68% and 50%, respectively. The birth rate for teenagers aged 10–14 declined to 0.3 births per 1,000 women in 2013, a record low, from 0.4 in 2012 (Martin et al., 2015).

In Europe and Australia: Birth rate is decreasing among women aged 15-19 across Europe. The United Kingdom's birth rate among women aged 15-19 was higher than the European Union rate in 2012 (19.7 births per 1,000 women compared with 12.6 births among the European Union). However, the United Kingdom's birth rate has fallen by more than a quarter (26.8%) since 2004 compared to a fall of almost one fifth (18.2%) among the European Union over the same period. In 2004, the United Kingdom's rate was 26.9 births per 1,000 women aged 15-19 compared with the European Union's rate of 15.4 births. Across the European Union in 2012, the birth rate among women aged 15-19 was lowest in Denmark (4.4), Slovenia (4.5) and the Netherlands (4.5). The highest birth rates were in Romania and Bulgaria at 39.4 and 42.6 respectively (Office for National Statistics, 2014).

Outside the European Union, Switzerland had the lowest birth rate with 3.4 births per 1,000 women aged 15-19 in 2012 and Azerbaijan had the highest rate with 50.0 births. In 2012, the birth rate among young women was 16.1 per 1,000 women aged 15-19 in Australia, 24.9 in New Zealand . Similarly to Europe, the birth rate has decreased in each of these two countries since 2004 (Office for National Statistics, 2014).

In Africa, Asia and Latin America: In low- and middle-income countries, almost 10% of girls become mothers by age 16 years, with the highest rates in sub-Saharan Africa and south-central and south-eastern Asia. The proportion of women who become pregnant before age 15 years varies enormously even within regions – in sub-Saharan Africa, for example, the rate in Rwanda is 0.3% versus 12.2% in Mozambique.The proportion of births that take place during adolescence is about 2% in China, 18% in Latin America and the Caribbean. Half of all adolescent births occur in just seven countries: Bangladesh, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Nigeria and the United States.In Latin America, the risk of maternal death is four times higher among adolescents younger than 16 years than among women in their twenties (Sedghet al., 2015).Evidence further indicates that nearly 60% of all girls are married by the age of 18 years and one fourth is married by the age of 15 years in South Asia, whereas within South Asia, the recorded teenage pregnancy rate is highest in Bangladesh (35%) followed by Nepal (21%) and India (21%)**(**Sedghet al., 2015)

2.2.6.2Eastern Mediterian Countries

Customs, traditions and poverty are the main factors contributing to adolescent marriages in developed countries, one in seven girls in the Arab region marries before her 18th birthday. The highest rates of child marriage are found in the poorest countries such as Yemen, Sudan, and Somalia.In Kuwait, 8.4% of all women giving birth in hospitals were teenagers(Al-Haddabi et al, 2014).

According to recent Demographic and Health surveys in Morocco, Egypt and Turkey, slightly more than 10% of adolescent women age 15-19 are ever-married. The proportion of ever-married adolescent women who have begun childbearing (or are pregnant with a first child) is 6.4% in Morocco, 9.4% in Egypt and 7.5% in Turkey. In all three countries the proportion of adolescent women starting to have children increases rapidly after age 17

(Yavuz, 2010). In Egypt, by the age of 19 years, are fifth ofmarried women have already begun child bearing (Ali et al., 2015).

2.2.6.3Palestine

According to MOH (2014), the women of childbearing age constitutes a slightly less than 25% of the total population (4,550,368) in Palestine (23.8% in GS and 25.3% in WB). Of the total females aged 15 years and over, 56.2% were married and the total fertility rate for women in reproductive age (15-49 years) in Palestine for the period 2011-2013 was 4.1 births per woman; while the adolescent fertility rate in the age group 15-49 years was 48 births per 1000 women. One out of five women in the age (20-49 year) were married before the age of 18, this percentage is higher in Gaza Strip compared to the West Bank (28.6 percent and 21.4 percent respectively) (PCBS, 2015).

2.2.7 Factors influencing adolescent pregnancy

2.2.7.1 Biologic characteristics

Obstetrical risks for adolescents had been found to be associated with poverty, inadequate nutrition or a poor health before pregnancy, rather than maternal age itself. However, it has been suggested that the two general features of biologic immaturity of pregnant adolescents: a young gynecologic age (defined as conception within two years after menarche) and the effect of a girl's becoming pregnant before her own growth has ceased might be associated with increased risk of adverse outcomes. Immaturity of the uterine or cervical blood supply in adolescent mothers could increase the risk of subclinical infection and prostaglandin production, and lead to increased risk of preterm delivery. Some studies suggested that the adolescent mothers who themselves continue to grow during pregnancy could compete with the developing fetus for nutrients, leading to inadequate weight gain of the fetus and consequently reduced birth weight. Others have postulated that the low birth weights of infants born to adolescents are related to their low gynecological age. Hence,

the intrinsic increase in the risk of adverse outcomes of pregnancy among adolescents is likely to be partly attributable to young gynecologic age or inadequate weight gain (Hammad and Al-Enazi, 2008).

2.2.7.2 Socio-economic characteristics

Adolescent pregnancy occurs when women aged less than 20 years become pregnant. This is of serious concern because maternal age plays a significant role in adverse outcomes and complications of pregnancy. Adolescent pregnancies represent a high-risk group in reproductive terms because of the double burden of reproduction and growth. Complications of pregnancy and childbirth are the leading cause of mortality among girls aged 15-19 years in developing countries. The combination of poor nutrition and early childbearing expose young women to serious health risks during pregnancy and childbirth, including damage to the reproductive tract, pregnancy related complications, such as anemia, pregnancy induced hypertension, preterm labor, cephalopelvic disproportion, maternal mortality, perinatal and neonatal mortality, and low birth-weight**.** Industrialized and developing countries have distinctly different incidences of adolescent pregnancy. In developed regions, adolescent mothers tend to be unmarried, and adolescent pregnancy is seen as asocial issue whereas, in developing countries, such pregnancies mostly occur in married adolescents, and their pregnancy is most often welcomed by family and society. However, in these societies, early pregnancy may combine with malnutrition and poor healthcare to cause medical problems (Mukhopadhyay, Chaudhuri and Paul, 2010).

Pregnant adolescents are more likely to interrupt education leading to less job opportunities. The major reasons of interruption to education include the heavy responsibilities of motherhood, a lack of partner and family support. Inadequate qualifications create difficulties of entering into labor markets and well-paid jobs. Therefore, adolescent pregnancy can lead to economic vulnerability (Shrestha, 2012).

Studies on complications ofadolescent pregnancy have yielded conflicting results, and opinions of different authors vary in this regard. Some have opined that age by itself is not a risk factor, and poor outcomes are associated more with socioeconomic factors rather than with biological factors. Other researchers have failed to find any evidence for major impairments of pregnancy outcome among adolescent mothers with provision of high-quality maternal care with complete coverage(Mukhopadhyay, Chaudhuri and Paul, 2010).

Educational Status

Education plays crucial a role in guiding and bringing change in adolescents' behavior. Higher educational attainment, also results in the greater use of reproductive health services, awareness levels. It develops self- confidence and decision making power in adolescent girls and develops knowledge, attitude, beliefs and values on sexuality helping to delay sexual activities and age of marriages. Educated women can plan for the future, use contraceptives properly, and develop self-esteem (Acharya, Van Teijlingenand Simkhada, 2009). A study conducted byShrestha (2012) in Nepal showed that women with higher education on average begin sexual intercourse four years later than those with no education. Similarly, fertility is also inversely proportional to education level i.e. 3.7 births among those with no education and 1.7 births among women with higher education.In Switzerland, statistics indicated that adolescent pregnancy rates vary with levels of education and cultural background of adolescent girls (Sedgh, et al., 2015).In a prospective study conducted in Bagdad-Iraq, to assess the adverse maternal, fetal and neonatal outcomes in early and late teenage pregnant mothers, a high number of non-educated women are found in the adolescent group especially in the young adolescents. Most of the adolescent mother's education did not correlate with their age since they left school when they got married. Low educational standards are more in adolescents and this is similar to the results of a study from Turkey (Najim, et al., 2015)which shows a higher

proportion of inappropriate education for age in adolescents (82.5% versus 70.1%; P value=0.001).

Accessibility to antenatal care

Timely and adequate antenatal care is generally acknowledged to be an effective method of preventing adverse outcomes in pregnant women and their babies (Jebet, 2012). The antenatal period clearly presents opportunities for reaching pregnant women with a number of interventions that may be vital to their health and well-being and that of their infants (Abou-zhar, 2003). Use of antenatal and delivery care services have been recommended for the management of adverse birth outcomes such as perinatal deaths (Jebet, 2012). The onset of antenatal clinic visits during the pregnancy is very important for the health of the mother and the fetus. Early initiation of prenatal care is important to prevent and treat obstetric and medical complications (Ziyo, 2009). Late antenatal care or inadequate attendance at antenatal clinics has been associated with poor pregnancy outcomes, such as low birth weight, prematurity and increased delivery intervention (Harville, Madkour and Xie 2012).

In their study to find the incidence and to evaluate the maternal and fetal outcome of teenage pregnancies in India, by YasminKumar and Parihar in 2014, the researchers recommended that the health care provider should consider Teenage pregnancy as a 'high risk' pregnancy and should educate the pregnant teenagers to have more number of antenatal visits so that the signs and symptoms of various complications of teenage pregnancy could be recognized at the earliest. Attention should be given to the use of various screening and diagnostic tests and to the interventions needed if any complication does occur during the course of pregnancy (Yasmin, Kumar and Parihar, 2014).

In the other hand, a study conducted to determine whether adolescent mothers are at higher risk of maternal and perinatal adverse outcomes compared with mothers aged 20–24 years,

found that the increased risk in perinatal outcomes does not seem to be mediated by a different access of adolescents to antenatal care or a different quality in the care. The differences in access to care are relatively minor among the groups, and the quality measured by the prevalence of screening tests and preventive interventions seems to have been comparable overall to adults (Althabi et al., 2015).

In a study conducted in Saudi Arabia to determine the frequency of teenage pregnancy and to compare the obstetric outcome of teenage pregnant less than 20 with that of older (20-29) years, the results showed that the overall antenatal care attendance rate and early booking in first trimester were not different between teenage and adult mothers. This is not surprising because antenatal care in Saudi Arabia is provided free of charge through a widespread network of easily accessible and acceptable PHCC. This is in contrast to other studies which showed that teenagers book later in pregnancy (Hammad and Al-Enazi, 2008)**.**

2.2.8Consequences of adolescent pregnancy

Adolescents account for 23% of the overall burden of disability and diseases dueto pregnancy and childbirth. Adolescent pregnancy creates risks associatedwith low birth weight infants , neonatal deaths from acuteinfections, Sudden Infant Death Syndrome (SIDS), and maternal mortality. These rates are two to three times higher than those for adult women. Other medical complicationsinclude poor maternal weight gain, prematurity,pregnancy-induced hypertension, anemia, and sexually transmitted infections (Holness, 2014). It is found that when adolescent girls aged 15-19 years become pregnant, they are twice and adolescents under 15 are five times more likely of dying during pregnancy or childbirth compared to woman over 20 years (Acharya, 2010).

2.2.8.1 Maternal and neonatal complications

A randomized prospective clinical study conducted by Najim et al., (2015) at Al-Elwiya Maternity Teaching Hospital, Baghdad, Iraq, to assess the adverse maternal, fetal and neonatal outcomes in early and late teenage pregnant mothers. Study sample consisted of 220 prim gravid women with a singleton, cephalic, viable fetus and had no congenital abnormality. The 1stgroup: early teenage (46 women between 11-14 years), the 2nd group: late teenage (74 women between 15-19 years) and the 3rdgroup: control group (100 women between 20-29 years). Pregnancy outcomes were observed for mothers: mode and duration of labor, post-partum hemorrhage and endometritis and for neonates: gestational age, birth weight, Apgar score, admission to neonatal care unit and neonatal outcome. Anemia found to be the only significant medical complication associated with pregnancy that was observed in both teenage groups (P-value=0.0001). Prolonged labor, postpartum hemorrhage and blood transfusion all were significantly higher in teenage groups (P-value=0.019, 0.0001 and 0.0001 successively). Adolescents showed lower birth weights as compared to adults (mean birth weight was 2.8kg, 2.98kg in both teenage groups and 3.98kg in the control group), Lower Apgar scores at 1 minute and 5minute (P-value=0.001 and 0.023 successively). Adolescent births were associated with an increased risk for preterm delivery (P-value=0.0001).

A descriptive prospective cross sectional study was conducted by Ali et al., (2015) in Egypt. The study included 100 teenage pregnant women between 13 -19 years old with single fetal pregnancy and without any chronic diseases. The selected cases were followed up to detect pregnancy complications and outcome. The researchers found that abortions were 8%, preterm deliveries were 10%, and post-date deliveries were 11% while at-term deliveries were 71%. The study concluded that clear adolescent pregnancy is a high risk pregnancy; resulting in increased risks of abortions, premature deliveries, congenital

malformations, pre-eclampsia, IUGR, cephalo-pelvic disproportion, PROM, low birth weight and maternal anemia.

A cross-sectional observational study was undertaken by Mukhopadhyay, Chaudhuri and Paul (2010) to compare the different sociodemographic characteristics and perinatal outcomes of teenage primigravida mothers with those of adult primigravida mothers in a tertiary-care hospital in eastern India. A sample of 350 each in cases and comparison group comprised the study subjects. Results revealed that the teenage mothers had a higher proportion (27.7%) of preterm deliveries compared to 13.1% in the adult mothers and had low birth-weight babies (38.9% vs 30.4% respectively). Stillbirth rate was also significantly higher in teenage deliveries (5.1% vs 0.9% respectively). The teenage mothers developed more adverse perinatal complications, such as preterm births, stillbirths, neonatal deaths, and delivered low birth-weight babies, when compared with those of the adult primigravida mothers.

In the other hand, another study conducted in Saudi Arabia by Hammad and Al Fanazi (2008) to determine the frequency of teenage pregnancy and to compare the obstetric outcome of teenage pregnant women less than 20 years with that of older (20-29 years), found that the incidence of teenage pregnancy was 3.7% of all live births. Both groups were similar regarding maternal education and occupation, and time of start of antenatal care booking and number of antenatal care visits. Antenatal complications like pre-eclampsia, gestational diabetes, anemia, antepartum hemorrhage and urinary tract infections were similar in study and control groups. Also, the two groups showed no significant difference regarding instrumental vaginal delivery, cesarean section, low birth weight, preterm delivery, posterm delivery, Apgar score at 5 minute and need of newborn babies to admission to neonatal intensive care units. The researchers concluded that

teenage pregnancy is not associated with bad obstetric outcomes when adequate antenatal care is received(Hammad and Al-Enazi, 2008).

In recent study, a retrospective cohort study was conducted by Ngowa et al., (2015) to determine the obstetrical and perinatal outcomes of nulliparous adolescent pregnancies in a reference hospital in Cameroon. Finding showed that adolescent mothers had a significantly higher incidence of preeclampsia/eclampsia, preterm delivery and low birth weight babies (<2500 g) when compared to the control group. However, placenta previa, abruption placenta, episiotomy, cesarean section, vaginal instrumental delivery, perennialtears and post-partum hemorrhage were not significantly different in the two groups. Furthermore, there was no statistically significant difference between the two groups regarding fetal distress, low Apgar score (<7 at the 1st and 5th minutes), the rate of admission in the neonatal intensive care unit, stillbirth and neonatal death. In the same years 2015, a descriptive comparative study was conducted in Egypt by Edessy et al., to determine whether teenage pregnancy is associated with increased rates of adverse perinatal outcome and to compare obstetric outcome of teenage with middle aged pregnancy. The study findings showed that the complications rate, was a significant lower risk among middle aged females compared to teenage apart from hypertension, ectopic pregnancy and antepartum hemorrhage,. Comparison between the two groups showed significant differences in mode of delivery, ICU need and hospital stay, while the presentation showed non-significant difference. Preterm labor was significantly higher among teenage mothers. Also, birth weight was lower in teenage pregnancy. There was significant difference between the two groups regarding the risk for congenital anomalies or stillbirth. There was no significant difference between the two groups regarding APGAR score at birth. Regarding education level, occupation and residence, there was highly significantly a difference between the two groups (Edessy et al., 2015)

In 2001, a descriptive cross sectional study was conducted by Pun and Chauhanresearchers to find out the outcomes of adolescent pregnancy at Kathmandu University Hospital, Dhulikhel Hospital in Kavre. It included all primiparous mothers of age 15-19 (n=168) and 20-24 (n=401). Finding showed that preterm birth was not associated with adolescence pregnancy. Normal delivery was the common mode of delivery among both groups. Among the neonatal complication, newborns of adolescents had greater neonatal complications than newborns of the young mothers. Maternal complication like antepartum hemorrhage and postpartum hemorrhage was higher among adolescents.

In Pakistan, in the same years 2011, Shah et al., conducted a prospective case-control study to compare the obstetric outcome of teenage pregnancies with that of non-teenage pregnancies. Finding showed that teenage mothers were more likely to suffer from severe anemia and their infants were more likely to suffer from post maturity and meconium aspiration syndrome compared to non-teenage mothers. On the other hand they were less likely to be overweight than the non-teenagers. Teenagers had instrumental deliveries more often than non-teenagers. The risk of preterm delivery, low birth weight infant, respiratory distress syndrome, fetal and perinatal death was not significantly different in the two groups.

In addition 2011, Chotigeat and Sawasdiworn researcher conducted prospective study was carriedat Queen Sirikit National Institute of Child Health to compare the outcomes of sick infants born to teenage mothers with those born to adult mothers (age > or = 20 years). The study group consisted of sick babies born to teenage mothers. These babies were compared to sick babies (control group) born to adult mothers during the same period. Finding shows that there was a significantly higher mortality in the study group (7 cases, 9%) than the control group (4 cases, 2.7%). There was statistically significant difference in most of the

demographic characteristics between the teenage and adult mothers except anemia, premature rupture of membrane and meconium stain amniotic fluid. Although there was a trend of more cases of anemia and meconium stain amniotic fluid in teenage mothers than in adult mothers, there was no statistically significant difference. There was a shorter interval time from marriage to pregnancy in teen mothers than in adult mothers and a lower number of antenatal care visits with late antenatal care among the teenage mothers too. On comparing the data in infants, the teenage group had more males and a higher blood pressure than those in the adult group. There were significantly more preterm infants and higher cesarean section in the adult group too (Chotigeat and Sawasdiworn, 2011).

In 2010, a descriptive study was conducted by Kovavisarach et al., at Rajavithihospital in Thailand to compare maternal and neonatal outcomes between pregnant teenage girls (age <20 yrs) and pregnant adults (age 20-34 yrs). It included 750 fifty pregnant teenagers. A control group included 750 pregnant adults delivered during the same period. Finding showed that preterm labor was the significant antepartum complication in the teenage mothers while diabetes mellitus was the significant one in the adult mothers as compared to those in the other groups. Teenage mothers had significantly higher incidence of cesarean delivery than that in the adult mothers but lower incidence of induction of labor. The neonates of the teenage mothers showed higher number of complications than those of the adult mothers.

In 2008, a hospital based retrospective cohort study of 4,101 deliveries was conducted by Yadav et al., in Nepal to compare the outcomes between teenage and non-teenage pregnancies, showed that Pregnancy in teenagers was associated with significantly increased risk ($P<0.05$) of delivery of very and moderately preterm births and Low Birth Weight babies. There was no significant difference in risk of having small for gestational age babies, low APGAR score at birth at 1 min and 5 min, stillbirth, neonatal death, and

post-partum hemorrhage. However, the risk of having delivery by episiotomy, vacuum or forceps and Caesarean section was significantly lower ($P<0.05$) among teenage mothers (Yadav et al., 2008).

In the same years, a descriptive study was conducted by Gupta, Kiran and Bhalresearchersto quantify the age related risk of adverse obstetric outcome in primigravid women less than 20 years of age. The study sample was drawn from Cardiff Births. There was a higher incidence of anemia among adolescent pregnancy. There was a lower incidence of induction of labor and use of regional analgesia in the teenage group (Gupta, Kiran and Bhal, 2008).

In 2007, a retrospective case control study was conducted by Thato, Rachukul and Sopajareeresearchers to quantify the age related risk of adverse obstetric outcome in primigravid women less than 20 years of age. Participants of this study consisted of 401 randomly selected adolescent females and 815 adult mothers who gave birth at a regional hospital in Bangkok from 2001 to 2003. Finding revealed that, compared to the adult mothers, teenage mothers were less likely to make the first prenatal visit in their first trimester (16% and 38.9%, $p<.001$), to have adequate prenatal care (83% and 91%, $p<.01$), and cesarean sections (odds ratio (OR) 2.05, confidence interval (CI) 1.44, 2.92). They had higher rates of anemia (OR 0.44, CI 0.26, 0.75), preterm deliveries (OR 1.21, CI 1.01, 1.75), and lower mean birth weight babies (2931 g and 3077 g, $p<.001$).

In 2006, Watcharaseranee et al., conducted retrospective study at the Department of Obstetrics and Gynecology in Thailand to determine the incidence of teenage pregnancy and compare obstetric and neonatal complications of teenage mothers with adult mothers.The study group consisted of primigravida women aged 13-20 years who gave birth at Chonburi Hospital. The control group consisted of primigravida women aged 20-25 years who gave birth during the same period. Finding showed that the study group had

a lower gestational age at delivery than the control group and a higher preterm delivery rate. The study group had more inadequate antenatal care than control group. Low birth weight infant rate in study group was higher than control group significantly. Anemia was a significant difference between the study and control groups (Watcharaseranee et al., 2006). Additionally in the same years, Raatikainen et al., conducted a population-based database analysis to assess the relationship between young age of the mother and pregnancy risk factors and adverse pregnancy outcome in conditions of high-quality maternity care used by almost the entire pregnant population. Finding shows, teenage mothers smoked, were unemployed and had anemia more often than older mothers. On the other hand, they were overweight and had maternal diabetes less often than adults. Teenage mothers had as many instrumented deliveries but fewer Caesarean sections than adults. We found no evidence for increased risk of preterm delivery, fetal growth restriction, low birth weight, malformation or fetal or perinatal death in teenage mothers.

Summary

Adolescent pregnancy is a common public health problem worldwide which is detrimental to the health of mother and child and has long been considered a high-risk situation and considered a challenging public health issue around the world, mainly in developing countries.Now a day, about 16 million women 15–19 years old give birth each year, about 11% of all births worldwide. Ninety-five percent of these births occur in low- and middle-income countries.Adolescents account for 23% of the overall burden of disability and diseases dueto pregnancy and childbirth. Adolescent pregnancy creates risks associatedwith low birth weight infants , neonatal deaths from acuteinfections, Sudden Infant Death Syndrome (SIDS), and maternal mortality.Data suggest that pregnant adolescents are more likely than adult women to suffer adverse medical and obstetric outcomes, such as hypertensive disease, anemia, infection, and depression during pregnancy and more likely need CS or operative vaginal delivery as well as they are susceptible to a higher incidence of intra-natal and postnatal complications.

Chapter 3

Study Method

This chapter illustrates a detailed discussion of all aspects of the research methodology used in this study. It presents the design and method, the study population, the sample and sampling process, setting and ethical considerations. Then, it presents the instrument, the method of validation, piloting and data collection and analysis. This chapter also depicts the eligibility criteria and limitation of the study.

3.1 The study design

The design of this study is A hospital based cross-sectional comparative study. This study was carried out in Obstetrics and Gynecology hospital at El Shifa Complex which is the largest governmental hospital in Gaza Strip and the women attended the hospital can represent the people of GG. The study was conducted during the period from October 2015 and the end of December 2015. Data were collected through an interview with the participants and from the hospital and the primary health care clinic's records. Antenatal data included the number of antenatal visits and the problems appeared during this period such as anemia, pre-Eclampsia and bleeding. Cross sectional studies are suitable in term of time, people, money, and it is relatively practical and manageable, also it was chosen because it enables the researcher to meet the study objectives in a short time

3.2 Study settings

This study was conducted in obstetrics and gynecology hospital in Al-Shifa complex in Gaza governorate.

3.3 Period of the study

The study started in May 2015 by preparing and approving the proposal from Al-Quds University, and designing the questionnaire. Pilot study was conducted in Sept. 2015. Data collection was started in October 2015 and continued till the end of December 2015. Data entry, analysis and writing the final reports continued till April 2016.

3.4 Study Population

The study consists of all eligible adolescent women who admitted and gave births in labor wards in obstetrics and gynecology hospital at Al-Shifa complex during the period of the study.

3.5 Sample and Sampling

The researcher used Epidemiological Information Program (Epi-info) to calculate the sample size (Annex 2). The total sample size was 110 subjects and an equal number of controls were finally included in the study. The subjects were selected through a convenient sampling approach during the period of data collection and the controls were matched in the same way and exhibited the same criteria except that they were adult women gave births in the same department in the same period of the study.

3.6 Eligibility criteria

3.6.1 Inclusion criteria:

- **Cases**

- Pregnant women who are 13- 19 years old.
- Admitted for delivery in obstetrics and gynecology hospital at Al-Shifa complex
- A prim-gravida or para one with a singleton fetus.
- Accepted to participate in the study

- **Controls**

- Pregnant women who are >19- 30 years old.
- Admitted for delivery in obstetrics and gynecology hospital at Al-Shifa complex
- A prim-gravida or para one with a singleton fetus.
- Accepted to participate in the study.

3.7 Study instrument

A face-to-face interview administered questionnaire was constructed by the researcher herself after reviewing related literatures including the perianal tear questionnaire that developed by Oslo University and applied in maternity department in Gaza hospitals. A structured interview used in this study to give opportunity to the respondents to seek clarification by helping them, if necessary, and to understand the questions as intended. In addition, all the questions ideally asked in the same way during the data collection to achieve a high degree of validity and reliability. The following sections were included in the questionnaire (Annex 3):

Background information section included demographic information and personal characteristics regarding age, marriage, educational level , occupation, residence, weight, height and passive smoking habit.

Obstetric history and delivery complication section: Included a set of questions related to the period of pregnancy and questions related to time and way of delivery and any complications if any. These questions assessed the mothers' related items such as ante natal care, the complication related to pregnancy as hypertension, anemia, gestational age, abortion and presentation, hemorrhage, and blood transfusion.

Neonatal outcome section: Included questions related to the state of neonate after delivery as birth weight, gestational age, Apgar score, reference to NICU, neonatal malformation, meconium aspiration, and birth asphyxia.

The questionnaire was reviewed by a number of experts. This technique was needed to increase both validity and contents of information could enrich in this study.

3.8 Pilot study

A pilot study was performed for 40 subjects (twenty cases and twenty controls) to evaluate the validity of its questions. Findings showed that the questionnaire was understandable, simple and quick and took less than 20 minutes to complete. As a result, minor modifications were needed and subjects who were selected for piloting were included in the study sample.

3.9 Data collection

Data were collected through face-to-face interview and the questionnaire was filled by the researcher herself. Data were collected through interviewing participants and from subjects' hospital records. At the beginning, all questionnaire forms were prepared, organized, and classified with serial numbers to ensure the availability of the needed information. Informed consent was obtained first followed by proper introduction of the research purpose with great care to privacy and confidentiality as well as the lack of risks and the benefits of the study. The researcher informed mothers about their right to withdraw or to refuse participation; explained the procedures; and finally obtained a written informed consent. Filling each questionnaire took about 20 minutes. Throughout the interview, the researcher was neutral, impartial, not reacting to gesture or word, either positively or negatively, to any response; not changing the wording or sequence of questions; asking questions directly and consistently and not creating false expectations, thanking respondents for their time and assuring them that their contributions are valuable.

3.10 Data entry

The questionnaires were overviewed first prior to data entry. Designing the data entry model using the computer Software Statistical Package for Social Sciences (SPSS) program version 20 was done. Then coded variables were entered into the computer by the researcher. Data cleaning was conducted to check for any missing or error happen during data entry (through running frequency analysis). All suspected or missed values were checked by revising the available questionnaire. The objective of this step is to transfer data from questionnaires to the computer in a uniform numerical format which can be interpreted by the computer in the subsequent stage of tabulation.

3.11 Data analysis

Data analysis is the process by which the researcher take raw data and turn it into information that can be used to answer the questions posed by the research study. Once data are summarized and analyzed, it can provide useful and helpful information about the study population. The process of analysis involves editing, coding, classification and tabulation to help achieve data reduction and presentation. The analysis of data involves computation of certain indexes or measurers searching for certain patterns of relationships and trends, testing of hypotheses and graphical presentations. Important techniques such as chi-square test was used in this study. After that, the researcher performs recoding for continuous variables .Chi square test used to examine the relationship between adolescence pregnancy outcomes and categorical variable, confidence interval and odds ratio also used to assess the relation between groups. A p-value ≤ 0.05 is considered statistically significant.

3.12 Validity and Reliability

Validity is the most important concern of any research data collection instrument. A valid tool should satisfy face validity, content validity, and criterion-related validity. Face

validity concerned with how a measure or a procedure appear. Content validity was done to identify the degree to which the used tool measure what it was supposed to measure. Tool developed by the researcher examined by a panel of experts to determine whether the included items clearly and adequately cover the domain of content addressed (Annex, 4). Also, a pilot study conducted before the actual data collection to examine accuracy of data. Since the data collected by the researcher and at one time event, reliability of the questionnaire was not required.

3.13 Ethical Considerations

The researcher paid attention to the research ethics including:

An academic Approval obtained from School of Public Health at Al-Quds University, and an ethical approval obtained from the Helsinki Committee in Gaza to carry out the study (Annex 5).

An official letter of request was obtained from the director general of the MOH to conduct the study in Al Shifa complex (Annex 6).

Every woman participated in this study received complete explanation about the research, purpose, confidentiality and sponsorship.

3.14 Limitations of the Study

The support the researcher received from the staff of the School of Public Health, the family, the supervisor and the professionals of the Obstetric hospital at Al Shifa hospital decreased the limitations and constraints. However, some constraints appear throughout the study and include:

- The frequent cutoffs of electricity.
- Time factor.
- Financial limitations as the study was self-funded by the researcher herself.

Chapter 4

Results and Discussion

This chapter illustrates the results of statistical analysis of the data, including descriptive analysis that presents the background and maternal characteristics of the study sample. The researcher used simple and advanced statistics including frequency, means percentage, and Chi square test. Lastly, according to literature review, many similar studies have been conducted worldwide to evaluate the maternal and neonatal outcomes in adolescent pregnancy. Many of these studies showed that several factors could affect on maternal and neonatal health status. Thus, the researcher demonstrated the outcomes arising from this study and compared them with those studies conducted in different areas of the world.

4.1 Descriptive analysis

4.1.1 Background characteristics of the study participants

The study sample consisted of 220 women, 110 (50%) were cases and 110 (50%) were controls. Table 4.1 presents the characteristics of the study population, it shows that the maximum number of adolescents mothers belonged to the age-group of 18-19 years (approximately 70%). There was no adolescents mothers aged less than 15 years. Their mean (±SD) age was 18.1±0.9 years. The maximum number of adult mothers belonged to the age-group of 24-27 years (approximately 50.0%), and only 5.5% belonged to the age-group of 28-30 years. Their mean (±SD) age was 23.5±2.3 years. The study finding are congruent with Palestinian law that present the minimum age for marriage in the GS is 17 for girls and 18 for boys. Also PCBS outlined that one out of five women aged 20-49 years were married at age of 18 years old or less (PCBS, 2014).

Findings showed that 32% of adolescents mothers were married for first cousins and only 12.5% of adult mothers were married for the first cousins. Secondary educational level was

more common among the adolescents mothers compared to the adult mothers (62.7%-43.6% respectively). Similarly, university education level was more common among adult mothers compared to the adolescents mothers (31.8%- 10.0% respectively).

Table (4.1): Background characteristics of the study participants

Variables	**Categories**	**Adolescence mothers**(110 cases)		**Adult mothers**(110 controls)	
		No.	%	No.	%
Maternal age	*(Mean ± SD)*	*(18.12 years ± 0.99)*		*(23.5 years ± 2.33)*	
Marriage	First cousins	36	32.7	14	12.7
	Not relative	74	67.3	96	87.3
	Total	**110**	**100**	**110**	**100**
Educational Level	Primary	19	17.3	11	10.0
	Elementary	11	10.0	16	14.5
	Secondary	69	62.7	48	43.6
	University	11	10.0	35	31.8
	Total	**110**	**100**	**110**	**100**
Place of residence	Urban	64	58.2	83	75.5
	Non-urban	46	41.8	27	24.5
	Total	**110**	**100**	**110**	**100**
Occupation	Housewife	98	89.1	104	94.5
	Employed	12	10.9	6	5.5
	Total	**110**	**100**	**110**	**100**
Body Mass Index	*(Mean ± SD)*	*(29.9±3.8)*		*(30.0±2.5)*	
	Normal weight	12	10.9	8	7.3
	Over weight	38	34.5	30	27.5
	Obesity	60	54.5	71	65.1
	Total	**110**	**100**	**110**	**100**
Passive Smoking history	Yes	7	6.4	3	2.7
	No	103	93.6	107	97.3
	Total	**110**	**100**	**110**	**100**

Table 4.1 shows that slightly less than 60% of adolescents mothers and 75.5% of adult mothers are living in urban areas. The researcher found that 41.8% of adolescents mothers and 24.5% of adult mothers are living in refugee camps.

In term of the mother's occupational status, the above table shows that most of them were housewife (89.1% and 94.5%) of adolescents and adult mothers respectively.

The researcher categorized BMI based on WHO criteria, BMI less than 18.5kg/m2 means underweight, 18.5-24.9kg/m2 normal weight, 25-29.0 kg/m2 overweight, and BMI more than 30kg/m2 means obesity.The results showed that the incidence of overweight and obesity was high among adolescent and adult mothers (89.1%-92.7% respectively). The mean of BMI among controls was similar. For passive smoking history, findings shows that 6.4% of adolescents mothers and 2.7% of adult mothers were exposed to smoking.

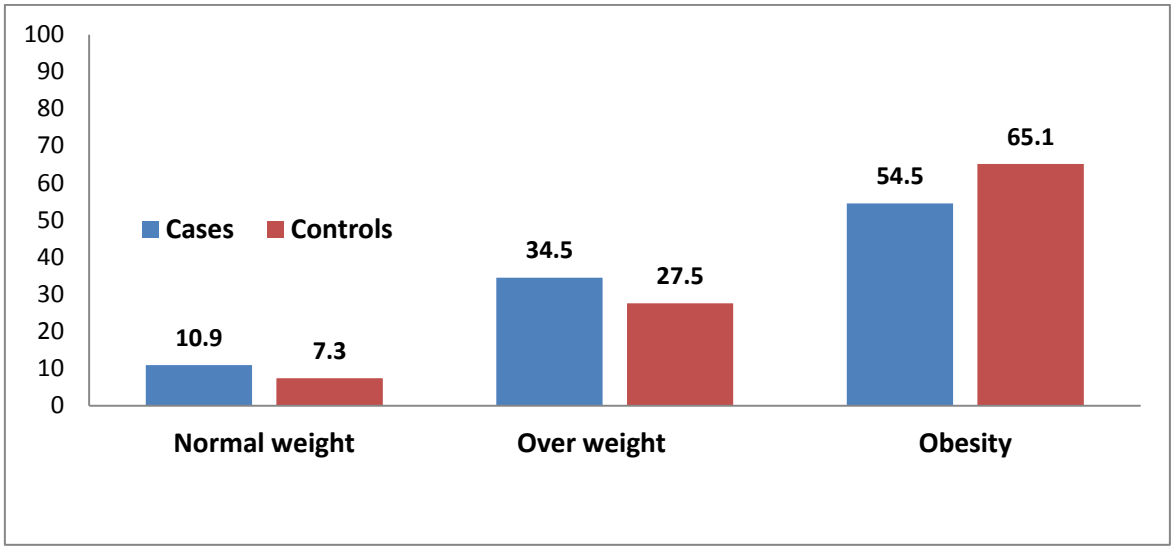

Figure (4.1):Percentage distribution of adolescence and adult mothers by Body Mass Index

4.1.2 Maternal health in Pervious pregnancy

Distribution study population in regard to pervious pregnancy was reported in table 4.2. The researcher noted that 5.5% of adolescence women have pervious C.S compared with 12.7% of adult women. Moreover, slightly high incidence of abortion was reported among adolescence women compared adult (13.6%-12.7%) respectively. Also, ectopic pregnancy was only reported among six adolescent mothers.

Furthermore, table 4.2 showed that 6.4% of adolescent women have reported medical history compared with 9.1% for adult women. Hypertension was the highest incidence that reported in adolescent women, while diabetes mellitus was the highest among adult women.

Table (4.2): Distribution of participants by previous pregnancy (Excluding current)

Variables	Categories	Adolescence mothers(110 cases)		Adult mothers(110 controls)	
		No.	%	No.	%
C.S history	Non	104	94.5	96	87.3
	One	6	5.5	14	12.7
	Total	**110**	**100**	**110**	**100**
Abortion history	None	95	86.4	96	87.3
	More than one	15	13.6	14	12.7
	Total	**110**	**100**	**100**	**110**
Ectopic Pregnancy history	None	104	94.5	110	100
	One	6	5.5	0	0.0
	Total	**110**	**100**	**110**	**100**
Pervious medical history	Yes	7	6.4	10	9.1
	No	103	93.6	100	90.9
	Total	**110**	**100**	**110**	**100**
Health problem	HTN	5	4.4	3	2.7
	DM	1	1.0	7	6.4
	Asthma	1	1.0	0	0.0
	Total	**7**	**6.4**	**10**	**9.1**

** *Match between groups, HTN Hypertension, DM Diabetes Mellitus*

4.1.3 Maternal health status in current pregnancy

The majority of pregnant adolescents (56.4%) and adult women (76.4%) made at least five antenatal visits, with mean 5.47 visits for adolescent women and 6.72 visits for adult women (Table 4.3).

Table (4.3): Distribution of study participants in regard to antenatal visit numbers

Variables	**Categories**	**Adolescence mothers**(110 cases)		**Adult mothers**(110 controls)	
		No.	%	No.	%
Number of antenatal visit	*(Mean ± SD)*	*(5.47 visit ± 1.60)*		*(6.72 visit ± 2.29)*	
	< 5 time	48	43.6	26	23.6
	≥ 5 time	62	56.4	84	76.4
	Total	**110**	**100**	**110**	**100**

Table 4.4 describes the health problems presented with pregnant women in this pregnancy. The researcher noted that 50.9% of adolescent women have reported health problems compared with 49.1% for adult women. The highest incidence of medical problems reported in both group was anemia (26.3% for adolescent women compared with 30.0% for adult women).

Table (4.4): Distribution of study participants in term of health problems

Variables	**Categories**	**Adolescence mothers**(110 cases)		**Adult mothers**(110 controls)	
		No.	%	No.	%
Health problem in current pregnancy	Yes	56	50.9	54	49.1
	No	54	49.1	56	50.9
	Total	**110**	**100**	**110**	**100**
Type of problem	Gestational HTN	16	14.6	11	10.0
	Anemia	29	26.3	33	30.0
	Gestational Diabetes	8	7.3	8	7.3
	Other	3	2.7	2	1.8
	Total	56	50.9	54	49.1

Table (4.5): Distribution of study participants in regard to reporting medication

Variables	Categories	**Adolescence mothers**(110 cases)		**Adult mothers**(110 controls)	
		No.	%	No.	%
Reporting medication in this pregnancy	Yes	90	81.8	98	89.1
	No	20	18.2	12	10.9
	Total	**110**	**100**	**110**	**100**
Type of medic.	Antihypertensive	15	13.6	12	10.9
	Insulin	8	7.3	7	6.4
	Iron-folic acid-vitamin	57	51.8	67	60.9
	Other	10	9.1	12	10.9
	Total	90	81.8	98	89.1

The above table shows that most of the study participants reported medication consumption in this pregnancy (81.8% for cases and 85.5% for controls). The most common medication consumed by cases and controls was Iron-Folic acid and Vitamin (51.8%-60.9%) respectively, followed by antihypertensive drugs (13.6%-10.9%) respectively.

Table (4.6): Distribution of study participants by reason for arrival to hospital

Variables	Categories	**Adolescence mothers**(110 cases)		**Adult mothers**(110 controls)	
		No.	%	No.	%
Reason for arrival to hospital	Labor pain	97	88.2	95	86.4
	Rupture of membrane	11	10.0	15	13.6
	Hypertensive disorder	2	1.8	0	0
	Total	**110**	**100**	**110**	**100**

Table 4.6 shows that most of participants arrived to labor department as contraction started (88.2% for cases and 86.4% for controls). Only 10% of cases and 13.6% for controls visit department because of rupture of membrane.

4.2 Inferential Analysis

Inferential analysis was used in this study to explore differences between adolescents mothers and adult mothers in reference to obstetric and neonatal related variables. Inferential analysis was done as illustrated below.

4.2.1 Neonataloutcomes

The adverse effects of adolescent childbearing extend to the health of their neonates Although there are several reports indicating that adolescent pregnancy is not associated with increased risks of adverseprenatal outcomes, most studies from both developed and developing countries have consistently reported that pregnant adolescents are at increased risk for preterm delivery. The researcher presented the agreement and disagreement in the discussion below.

Gestational age

For easier comparison and analysis between cases and controls in reference to gestational age, it was divided into two groups; preterm and full term baby (Table 4.7). Preterm is defined as babies born alive before 37 weeks of pregnancy are completed, and term is defined as babies born alive after 37 weeks of pregnancy and completed 42 weeks. Preterm birth is also the most common direct cause of newborn mortality. (WHO, 2015).

Table (4.7): Comparison of gestational age between adolescence and adult mothers

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Gestational age								
Preterm delivery	18	16.3	7	6.4	25	11.4	2.879	0.019
Term delivery	92	83.7	103	93.6	195	88.6	(1.15-7.20)	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Table 4.7 showed that 11.4% of the study population had delivered before completing the 37^{th} week of gestation. Preterm delivery was higher among the adolescent mothers than adult mothers (16.3% vs. 6.4%). The researcher found that adolescent mothers have the chance 2.8 times than the adult one to deliver baby in preterm birth and the difference between two groups reached significant level (p value=0.019). This means that there was a positive association between adolescence pregnancy and preterm delivery.

In this study, there was statistical significance difference between adolescent and adult mothers in regard to premature deliveries. These results agree with Ali et al. (2015) descriptive cross sectional study that conducted in Egypt which shows, preterm deliveries were observed in 10% of the study participant and adolescent pregnancy is a high risk pregnancy; resulting in increased risks of premature deliveries. Also, it is consistent with Najim et al. (2015), a randomized prospective clinical study conducted in Iraq, to assess the adverse maternal, fetal and neonatal outcomes in early and late teenage pregnant mothers that shows Adolescent births were associated with an increased risk for preterm delivery (P-value=0.0001). In addition, it confirms toMukhopadhyay, Chaudhuri and Paul (2010), a cross-sectional observational study that compare the different socio demographic characteristics and perinatal outcomes of teenage primigravida mothers with those of adult primigravida mothers in a tertiary-care hospital in eastern India, it revealed that the teenage mothers had a higher proportion of preterm deliveries compared to adult mothers.

The researcher can attribute this finding to biologic immaturity of pregnant adolescents such as immaturity of the uterus and cervix, immature metabolic system and prostaglandin production which lead to increased risk of preterm delivery.

Birth weight

Low birth weight is defined by the WHO as weight at birth less than 2500 g. Low birth weight continues to be a significant public health problem globally and is associated with a range of both short- and long term consequences (WHO, 2014).

Table (4.8): Comparison of birth weight between adolescence and adult mothers

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Birth weight								
Low weight	44	40.0	29	26.3	73	33.2	1.862 (1.05-3.29)	0.032
Normal weight	66	60.0	81	73.7	81	66.8		
(Mean ± SD) kg	*2.905.4±728.1*		*3.025.4±578.3*					
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Table 4.8 showed that the prevalence of low birth weight among study population was 33.2%. low birth weight was more common in case of adolescent pregnancies than adult (40% - 26.3%) respectively, and the difference was statistically significant (P value =0.032). The risk of low birth weight associated with adolescence pregnancy was high and significant (OR = 1.862, 95% C.I. 1.05-3.29). This means that there was a positive association between adolescence pregnancy and low birth weight. On the other meaning, women who deliver at age less than 19 years have more risk to have low birth weight approximately two times than adult women who deliver at age more than 19 years.

The study finding is consistent with these of Najim et al. (2015), a study conducted in Iraq that mentioned adolescents showed lower birth weights as compared to adults (mean birth weight was 2.8kg, 2.98kg in both teenage groups and 3.98kg in the control group), and with Ali et al. (2015) study showed that adolescent pregnancy is a high risk pregnancy; resulting in increased risks of low birth weight and maternal anemia. Also it consistent

with Mukhopadhyay, Chaudhuri and Paul (2010) study which revealed that the teenage mothers had a higher proportion of low birth-weight babies deliveries compared to adult mothers.

The researcher can attribute this result to low nutritional intake during pregnancy, the health problems could confront pregnancy and that the adolescent mothers who themselves continue to grow during pregnancy; could compete with the developing fetus for nutrients, leading to inadequate weight gain of the fetus and consequently reduced birth weight.

APGAR score

The Apgar scale is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10. The test is generally done at one and five minutes after birth, and may be repeated later if the score is and remains low. Scores 7 and above are generally normal, 4 to 6 fairly low, and 3 and below are generally regarded as critically low. A low score on the one-minute test may show that the neonate requires medical attention(Casey, McIntire, and Leveno, 2001), but does not necessarily indicate a long-term problem. A score of 10 is uncommon, due to the prevalence of transient cyanosis, and does not substantially differ from a score of 9 (Gonzales, and Salirrosas, 2005).

By using independent, sample T test to compare the means of ABGAR score at 5 and 10 minutes between cases and controls. Found controls have mean ABGAR score at 5 minutes higher than cases (7.436-7.645 respectively). Furthermore, at 10 minutes, the mean ABGAR score higher among control. However, the difference between the two groups regarding APGAR score at 5 and 10 minute not reach significant level (Table 4.9).

Table (4.9): Comparison of ABGAR score between adolescence and adult mothers

Variable	Subject	No	Mean	SD	t	P. value	(CI 95%)
ABGAR score at 5 minute							
	Cases	110	7.436	1.129	1.430	0.154	(0.497 – 0.079)
	Controls	110	7.645	1.036			
ABGAR score at 10 minute							
	Cases	110	8.123	2.402	1.048	0.296	(0.628 – 0.192)
	Controls	110	8.612	1.792			

The study finding is consistent with Ngowa et al., (2015) study that conducted to determine the obstetrical and perinatal outcomes of nulliparous adolescent pregnancies in a reference hospital in Cameroon, which showed that there was no significant difference in risk of having low APGAR score at birth at 1 min and 5 min, and with Hammad and Al Fanazi (2008) study that aimed to determine the frequency of teenage pregnancy and to compare the obstetric outcome of teenage pregnant women less than 20 years with that of older (20-29 years) in Sudia Arab, found that Low 5 minute Apgar score (< 7) among babies born to teenage mothers was higher compared with control group, the difference was not statistically significant. In addition, it congruent with Yadav et al., (2008) study which found that there was no significant difference in risk of having low APGAR score at birth at 1 min and 5 min (Yadav et al., 2008). But in contrast with Najim et al., (2015) study that shows adolescents have lower Apgar scores at 5minute (P-value= 0.023). The findings can be related to high quality of care and well training neonatal medical team .

Admission to ICU

Table 4.10 explore the relationship between study population and neonatal admission to ICU. It shows that neonatal admission to ICU is found in 32.7% of the study population with 45.4% in case group vs. 20.0% in control group, with a OR of 3.333. The differences

between group reach highly statistically significant level (P value =0.0.000). This means that there was a positive association between adolescence pregnancy and neonatal admission to ICU.

Table (4.10): Comparison between adolescence and adult mothers for admission ICU

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Admission to ICU								
Yes	50	45.4	22	20.0	72	32.7	3.333	0.000
No	60	54.6	88	80.0	148	67.3	(1.83-6.06)	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

In this study, there was a statistical significance difference between adolescent and adult mothers in regard toadmission to ICU. These results disagreewith Hammad and Al Fanazi (2008) study which found that the two study groups showed no significant difference regarding need of newborn babies to admission to neonatal intensive care units.

This result was not surprising due to most of adolescent neonates suffer from LBW and prematurity who must be admitted to NICU to stay under medical supervision and receive medical care.

Neonatal outcome (Alive-Stillbirth)

Table 4.11 examines the relationship between study population and neonatal outcomes. It showed that 95.9% of neonates was alive while only 4.1% of them was stillborn. Neonatal death was higher in case of adolescence pregnancies than adult (4.5% vs. 3.6%), and the difference between two group not reach a significant level.

Table (4.11): Comparison between adolescence and adult mothers in regard to of neonatal outcome at birth (Alive-Stillbirth)

Features	Adolescence mothers (110 cases)		Adult mothers (110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Newborn at birth								
Stillbirth (death)	5	4.5	4	3.6	9	4.1	1.261 (0.32-4.93)	0.733
Alive	105	95.5	106	96.4	201	95.9		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

In this study, there was no statistical significance difference between adolescent and adult mothers in regard to still birth. The study findings were consistent with Yadav et al., (2006) study who compared the outcomes between teenage and non-teenage pregnancies in Nepal and showed that Pregnancy in teenagers was associated with significantly increased risk ($P<0.05$) of delivery of very and moderately preterm births and Low Birth Weight babies. There was no significant difference in risk of having small for gestational age babies, low APGAR score at birth at 1 min and 5 min, stillbirth, neonatal death, and post partum hemorrhage. However, the risk of having delivery by episiotomy, vacuum or forceps and Caesarean section was significantly lower ($P<0.05$) among teenage mothers. Also, consistent with Watcharaseranee et al., (2006) study that conducted at the Department of Obstetrics and Gynecology, Chonburi Hospital in Thailand to determine the incidence of teenage pregnancy and compare obstetric and neonatal complications of teenage mothers with adult mothers that showed no statistical significance between study group as regards still birth. But in contrast with Mukhopadhyay, Chaudhuri and Paul (2010) who stated that Stillbirth rate was significantly higher in teenage deliveries.

Neonatal malformation

Table 4.12 explores the relationship between study population and neonatal malformation. The findings showed that neonatal malformation were found in 4.5% of the study population with 6.4% in control group vs. 2.7% in subject group, with a OR of 1.275. The differences not reach significant level (P value =0.195). This means that adolescence pregnancies did not play a role in increasing the incidence of neonatal malformation.

Table (4.12): Comparison of newborn malformation among study population

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Newborn malformation								
Yes	3	2.7	7	6.4	10	4.5	0.413 (0.10-1.63)	0.195
No	107	97.3	103	93.6	210	95.5		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

This study indicated that there was no statistical significance difference between adolescent andadult mothers in regard to malformation. These results agree withMukhopadhyay, Chaudhuri and Paul (2010) study who found that there wasn'tstatistical significance difference between two groups. But finding does not agreement with Ali et al. (2015) study who found that adolescent pregnancy is a high risk pregnancy; resulting in increased risks of congenital malformations and with Raatikainen et al. (2006) study that conducted to assess the relationship between young age of the mother and pregnancy risk factors and adverse pregnancy outcome in conditions of high-quality maternity care used by almost the entire pregnant population, that found adolescent pregnancy is a high risk pregnancy for congenital malformations.

Meconium aspiration

Normal amniotic fluid is clear or tinted yellow. Fluid that looks green or brown usually means that the baby has passed his first bowel movement (meconium) while in the uterus. If the baby passes meconium in the uterus, it can get into his lungs through the amniotic fluid. This can cause serious breathing problems, called meconium aspiration syndrome, especially if the fluid is thick. Some babies with meconium in the amniotic fluid may need treatment right away after birth to prevent breathing problems. Babies who appear healthy at birth may not need treatment, even if the amniotic fluid has meconium (March of Dimes Foundation, 2010).

For examining the association between cases and controls in regard to meconium aspiration, table 4.13 showed that meconium aspiration found in 9.1% of the study population, and it was higher among the adolescent mothers than adult mothers (14.5% - 3.6% respectively), and the difference between two group was found statistically significant (P value=0.005). The risk of meconium aspiration associated with adolescence pregnancy was high and significant (OR = 4.5, 95% C.I. 1.45-13. 9). This means that there was a positive association between adolescence pregnancy and meconium aspiration.

Table (4.13): Comparison between study population by meconium aspiration

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Meconium aspiration								
Yes	16	14.5	4	3.6	20	9.1	4.511	0.005
No	94	85.5	106	96.4	200	90.9	(1.45-13.9)	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Findings are in line with Shah et al., (2011) study that conducted in three tertiary care hospitals of Sindh, Pakistan to compare the obstetric outcome of teenage pregnancies with

that of non-teenage pregnancies. Finding showed that teenage mothers were more likely to suffer from meconium aspiration syndrome (6.5% vs. 2.4%, $p < 0.01$) compared to non-teenage mothers.

The researcher can attribute this result to immaturity of prostaglandin receptor which lead to prolong labor that increase stress on baby during delivery process.

Birth asphyxia

Table 4.14 explores the relationship between study population and birth asphyxia. Birth asphyxia was found only in 2.3% of the study population with 3.6% in cases group vs. 0.9% in control group, with OR of 4.113, the differences did not reach a significant level (P value =0.195). This means that adolescence pregnancies did not increase the incidenceof birth asphyxia.

Table (4.14): Comparison between study group in regard to birth asphyxia

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Birth asphyxia								
Yes	4	3.6	1	0.9	5	2.3	4.113	0.175
No	106	96.4	109	99.1	215	97.7	(0.45-37.4)	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

In this study, there was no statistical significant difference between adolescent and adult mothers in regard to respiratory distress. This result agreewithShah et al., (2011) which showed that no statistical significance difference between teenage and no teenage mothers in regard to respiratory distress. But in contrast, it was not consistent with Mukhopadhyay, Chaudhuri and Paul (2010) study who found that there was statistical significance difference between two groups.

4.2.2 Maternal outcomes

Adolescent pregnancy is a public health issue. Studies on the outcome of adolescents pregnancies have yielded conflicting results. Some studies have reported an increased risk of pregnancyrelated complications in adolescents, includinganemia, cesarean delivery, small-for gestational- age infants,although other studies have failed to find an association between adolescents and some pregnancy related complications. The researcher present studies that reported an increased risk of pregnancy related complications in adolescents and studied failed confirm relationship in discussion.

4.2.2.1 Maternal antenatal outcomes

Educational level and occupation

Table 4.15 shows, around two third of the study population had passed a secondary level of education and less; one quarter had only primary education, and the remaining 20.9% had a university level of education. Elementary and less and secondary education level was higher among adolescent mothers . The difference between two groups reach highly significant level (p value= 0.000). These findings reflect to negative impact of early or adolescent marriage and pregnancy on the education of the girls. Finding are in line with Edessy et al., (2015) study who determine whether teenage pregnancy is associated with increased rates of adverse perinatal outcome and to compare obstetric outcome of teenage with middle aged pregnancy in Egypt which found that educational level was highly significantly a difference between the adolescent and adult mothers groups, and it is similar to the results of a study from Turkey (Edirne et al., 2010) which shows a higher proportion of inappropriate education for agein adolescents (P value=0.001). But, did not agree with the resultWatcharaseranee et al (2006) study which found that teenage mothers had lower levels of education.

Table (4.15): Comparison between adolescent and adult mothers in regard to educational level and occupation

Variable	Adolescence mothers (110 cases)		Adult mothers (110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Educational level								
Elementary and less	30	27.3	27	24.6	57	25.9	3.5 (1.5-8.3)	0.000
Secondary	69	62.7	48	43.6	117	53.2	4.5 (2.1-9.8)	
University	11	10.0	35	31.8	46	20.9	1[1]	
Total	**110**	**100**	**110**	**100**	**110**	**100**		
Occupation								
Housewife	98	89.1	104	94.5	202	91.8	0.471 (0.17-1.30)	0.139
Employed	12	10.9	6	5.5	18	8.2		
Total	**110**	**100**	**110**	**100**	**110**	**100**		

For occupation, the researcher noted that 91.8% of the study population were housewife; of them 89.1% were adolescence mother. The difference between two groups not reached significant level (p value=0.139). Findings are inconsistent with Portuguese study that conducted by Figueiredo et al., (2006) to compare the experience of pregnancy in teenage years and later adulthood and to examine insecure attachment style as a risk factor for depression during pregnancy which reported that employment and manual work were more in the old compared to teenager group, and Edessy et al., (2015) study who found that difference between the adolescent and adult mother was, of course, highly significant in regard to occupation.

Accessibility to antenatal care

Timely and adequate antenatal care is generally acknowledged to be an effective method of preventing adverse outcomes in pregnant women and their babies (Alderliesten, 2007). Use of antenatal and delivery care services have been recommended for the management of adverse birth outcomes such as perinatal deaths (Ogunles, 2005). The onset of antenatal

clinic visits during the pregnancy is very important for the health of the mother and the fetus. Early initiation of prenatal care is important to prevent and treat obstetric and medical complications (Ziyo, 2009). Late antenatal care or inadequate attendance at antenatal clinics has been associated with poor pregnancy outcomes, such as low birth weight, prematurity and increased delivery intervention (Ezegwui et al., 2012).

Table (4.16): Comparison between adolescence and adult mothers by antenatal visit

Variable	Subject	No	Mean	SD	t	P. value	(CI 95%)
Number of antenatal visit							
	Cases	110	5.336	1.615	5.192	0.000	(1.918 – 0.862)
	Controls	110	6.727	2.298			

By using independent, sample T test to compare the means number of antenatal visit between cases and controls. Found controls have a higher number of visit than cases (6.727-5.336 respectively). Moreover, thisstudy found that the difference between the two groups reached a highly significant level (p value=0.001). The results revealed that adolescent mothers were not a good candidate for follow-up. Fewer antenatal care of adolescent mothers reflects less responsibility and/or less maternal care in this group. This indicates that the adolescent mothers were less careful about their pregnancy probably because of the lack of awareness and less maturity.

Theresearcher found that the adolescent mothers have a statistically significant higher inadequate ante natal care (<5 visits) than adult mothers. Itwas inconsistent with Althabi et al (2015) study that conducted to determine whether adolescent mothers are at higher risk of maternal and perinatal adverse outcomes compared with mothers aged 20–24 years, found that the increased risk in perinatal outcomes does not seem to be mediated by a different access of adolescents to antenatal care or a different quality in the care. The differences in access to care are relatively minor among the groups and this also consistent

with Watcharaseranee et al., (2006) who found that adolescent mothers had significantly received less pregnant care services and this also agreed with ChotigeatandSawasdiworn (2011) study that carried to compare the outcomes of sick infants born to teenage mothers with those born to adult mothers (age > or = 20 years) at Queen Sirikit National Institute of Child Health which stated that the number of antenatal care in teenage mothers was less than in standard pregnancy care. In contrast, it was inconsistent with Hammad and AlAnzi (2008) study that conducted in Saudi Arabia to determine the frequency of teenage pregnancy and to compare the obstetric outcome of teenage pregnant less than 20 with that of older (20-29) years, the results showed that the overall antenatal care attendance rate and early booking in first trimester were not different between teenage and adult mothers (Hammad and AlAnzi, 2008).

Medical diseases

Some conditions may already exist before a woman gets pregnant. These may include hypertension, diabetes, respiratory conditions like asthma, cardiac, and other health conditions. Anemia is a life-threatening complication for women during pregnancy and puts them at risk of dying from even small amounts of blood loss during pregnancy and postpartum period. Women with severe anemia are particularly at risk and have a 3.5 times greater chance of dying than women without anemia (Lule et al., 2005).

Regarding medical diseases associated withpregnancy; 50% of the study participants have health problems. Gestational HTN was observed higher among adolescent mothers (59.3%), while anemia was higher among adult mothers (53.2%). The difference between two group not reach a statistically significant level.

Table (4.17): Comparison between adolescence and adult mothers by health problems

Variable	Adolescence mothers (110 cases)		Adult mothers (110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Medical disease								
No	54	49.1	56	50.9	110	50.0	1[1]	
Gestational HTN	16	59.3	11	40.7	27	24.5	1.5 (0.6-3.5)	0.343
Anemia	29	46.8	33	53.2	62	56.5	0.9 (0.4-1.6)	0.770
Gestational DM	8	50.0	8	50.0	16	14.5	1.0 (0.3-2.9)	0.945
Other	3	60.0	2	40.0	6	4.5	1.5 (0.2-9.6)	0.633

Anemia was the antepartum complication found significantly higher in adolescents mothers inmany previous studies. For example, Shah et al., (2011) who found that teenage mothers were more likely to suffer from severe anemia (8% versus 4.3%; p = 0.03) compared to non-teenage mothers. Also, Gupta, Kiran and Bhal (2008) who conducted a study to quantify the age related risk of adverse obstetric outcome in primigravid women less than 20 years of age, found that there was a higher incidence of anemia among adolescent pregnancy. Moreover, Thato, Rachukul and Sopajaree (2007) conducted a study to quantify the age related risk of adverse obstetric outcome in primigravida women less than 20 years of age. Finding revealed that, adolescent mothers had higher rates of anemia. In the present study, a comparable incidence of anemia was demonstrated in both groups nearly similar. The researcher suggested that criteria for diagnosis of anemia, antecedent anemia, different races and countries should probably explain these controversial results.

4.2.2.2 Maternal intrapartum outcomes

Mode of delivery

Table 4.18 explores the relationship between the study population and mode of delivery. Normal delivery was more common among adult (95.5%) as compared with adolescent mothers (77.3%). Instrumental delivery with vacuum was found also higher among adolescents mothers than adults (8.2%-1.8%) respectively. Cesarean section rates were more common among the adolescents mothers 14.5% compared with 2.7% among the adults, and the most common reason for cesarean section indication is abnormal Cardiotocography and fetal distress. There was a statistically significant level when comparing normal vaginal with vacuum or caesarean section (p value =0.006-0.001) respectively. This means that there was a positive association between adolescence pregnancy and mode of delivery.

Table (4.18): Comparison between adolescence and adult mothers by delivery method

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Mode of delivery								
Caesarean section	16	14.5	3	2.7	19	8.6	6.58 (1.8-23.3)	0.175
Vacuum	9	8.2	2	1.8	11	5.0	5.55 (1.1-26.4)	
Normal vaginal	85	77.3	105	95.5	190	86.4	1[1]	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

The study findings are consistent to Pun and Chauhan (2011) descriptive cross sectional study that varied to find out the outcomes of adolescent pregnancy at Kathmandu University Hospital, Dhulikhel Hospital in Kavre which found, normal delivery was the common mode of delivery among both groups. But not congruent with Ngowa et al., (2015) study which showed that cesarean section and vaginal instrumental delivery were not significantly different in the two groups, and with Hammad and Al Fanazi (2008) study

that aimed to determine the frequency of teenage pregnancy and to compare the obstetric outcome of teenage pregnant women less than 20 years with that of older (20-29 years) in Sudia Arab, found that the two study groups showed no significant difference regarding instrumental vaginal delivery, cesarean section.

The researcher can attribute this result to that most of adolescent women's fetuses suffer from distress and adolescent womenhaveabnormal CTG which lead doctors to make quick intervention and repaid termination of pregnancy by ventoes or CSandmost of adolescent women are uncooperative with the medical team which lead doctors finally to terminate pregnancy her by CS or instrumental delivery.

Episiotomy

Table 4.19 explores the relationship between study population and episiotomy, finding shown, 47.3% needed Episiotomy during delivery with 66.4% in case group vs. 28.2% in control group, with a OR of 5.0, the differences reach highly significant level (P value =0.000). This means that adolescence pregnancies is a high risk for episiotomy.

Table (4.19): Comparison between adolescence and adult mothers by episiotomy

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Episiotomy								
Yes	73	66.4	31	28.2	104	47.3	5.028 (2.83-8.92)	0.000
No	37	33.6	79	71.8	116	52.7		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Finding are in line with Najim et al., (2015) study that shows, incidence of episiotomy is higher in adolescent group as compared to adult group (P-value=0.002), but inconsistent with Ngowa et al., (2015) study that found episiotomy was not significantly different in the two groups.This result could be related to underdevelopment of the pelvis and the

reproductive organs of adolescent women as well as to lack of protocols established to determine the criteria needed to perform episiotomy during delivery specially among adolescent girls.

Onset of Labor

For the relationship between cases and controls in reference to labor start (Table 4.20), the researcher observed, 79.1% of the study population was start labor spontaneously. While 20.9% of them start labor by induction methods, induction was higher among the adolescent's mothers than adult mothers (24.5% vs. 17.3 %). In addition, our data found that adolescent's women have the chance 1.5 times to start labor by induction methods and the difference between two groups reached highly significant level (p value=0.018).

Table (4.20): Comparison between adolescence and adult mothers by labor start

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Onset of labor								
Induction	27	24.5	19	17.3	46	20.9	1.558 (0.80-3.00)	0.018
Spontaneous	83	75.5	91	82.7	174	79.1		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Finding are not in line with Ngowa et al., (2015) study who found that induction of labor was significantly less frequent in the adolescent mothers, and with Gupta, Kiran and Bhal (2008) study who found that there was a lower incidence of induction of labor in the teenage group. Also, not in line with Kovavisarach et al., (2010) study that conducted at Rajavithi Hospital in Thailand to compare maternal and neonatal outcomes between pregnant teenage girls (age <20 yrs.) and pregnant adults (age 20-34 yrs.). It included 750 fifty pregnant teenagers that mentioned Teenage mothers had lower incidence of induction of labor when comparing to adult.

The researcher attribute this study finding to immature of prostaglandin receptor which lead to prolong labor that can be treated by induction of labor.

Amniotic fluid color

The amniotic fluid is the protective liquid contained by the amniotic sac of a pregnant female.The fluid is absorbed through the fetal tissue and skin. After the 20th-25th week of pregnancy when the keratinization of an embryo's skin occurs, the fluid is primarily absorbed by the fetal gut (Larsen, 2001).Normal amniotic fluid is clear or tinted yellow. Fluid that looks green or brown usually means that the baby has passed his first bowel movement (meconium) while in the womb(March of Dimes Foundation, 2010).

Table (4.21): Comparison of amniotic fluid color between adolescence and adult mothers

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Amniotic fluid color								
Abnormal	23	20.9	7	6.4	30	13.6	3.890 (1.59-9.50)	0.001
Normal	87	79.1	103	93.6	190	86.4		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

The above table explores the relationship between study population and amniotic fluid color. It showed that abnormal amniotic fluid color was found in 13.6% of the study population with 20.9% in cases group vs. 6.4% in control group. The difference between two group has reached a highly significant level (P value=0.001). The risk of abnormal amniotic fluid color associated with adolescence pregnancy was high and significant (OR = 4.5, 95% C.I. 1.45-13.9). This means that there was a positive association between adolescence pregnancy and abnormal amniotic fluid color.

Oxytocin augmentation uses and indication

Table (4.22): Comparison of oxytocin augmentation used in labor between adolescence and adult mothers

Variable	Adolescence mothers (110 cases)		Adult mothers 110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Oxytocin augmentation								
Used	29	26.7	19	17.3	48	21.8	1.715 (0.89-3.28)	0.103
Not used	81	73.6	91	82.7	172	78.2		
Indication oxytocin used								
Prolonged 1st stage	14	53.8	12	46.2	26	54.1	0.544 (0.16-1.77)	0.311
Prolonged 2ed stage	15	68.2	7	31.8	22	45.83		

The researcher used Chi-square test for examining the relationship between oxytocin augmentation used among cases and control and noted that 78.2% of the study population did not receive oxytocin during labor. In contrast 21.8% of women had received oxytocin during labor with 60.4% in case group vs. 39.6% in control group with OR of 1.71.The difference between the two groups did not reach a statistically significant level (P value =0.103). This means that there was no association between adolescence pregnancy and oxytocin use during labor. In addition, the finding showed that 54.1% of the study population hadreceived oxytocin for prolonged first stage compared with 45.83% used oxytocin for second stage, and the difference between two group had not reached a statistically significant level (P value =0.311).

Complication during labor

Adolescents are more likely than older women toexperience complications during delivery that because of the relative immaturity of their physiological development(Greenberget al., 2006).

Table (4.23): Comparison between adolescence and adult mothers in regard to complication during labor

Variable	Adolescence mothers(110 cases)		Adult mothers (110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Complication during labor								
No	90	81.7	105	95.5	195	88.6	1[1]	0.001
Convulsion	9	8.2	0	0	9	4.2	-	
Bleeding	7	6.4	3	2.7	10	4.5	2.7 (0.6-10.8)	
Others	3	2.7	3	2.7	6	2.7	1.1 (0.2-5.9)	

Table 4.23 explores the relationship between adolescent and adult mothers in regard to complications during labor. Finding shows that 11.4% of the study population had suffered from complications during labor. Complication was higher among the adolescent mothers than adult mothers, and the difference between the two groups was found statistically significant (P value=0.001). The risk of complication associated with adolescent pregnancy was high and significant for bleeding (OR = 2.7, 95% C.I0.6-10.8). This means that there was a positive association between adolescence pregnancy and labor complication. Complicationswere higher among the adolescent mothers than adult mothers especially bleeding and this result can be attributed to anemia which most of women in GGs suffer from this health problem which is considered the main cause of bleeding during delivery.

Reporting pain relief during labor

Table (4.24): Comparison using pain relief between adolescence and adult mothers

Features	Adolescence mothers (110 cases)		Adult mothers (110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Pain relief								
No	46	41.8	82	74.5	128	58.2	1[1]	0.001
Pethedine	22	20.0	12	11.0	34	15.4	3.2 (1.4-7.2)	
Local infiltration	42	38.2	16	14.5	58	26.4	4.6 (2.3-9.2)	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

The above table compares between adolescent and adult mothers in regard to use of pain relief. Pain relief was used during labor for 41.8% of the study participants. Adolescent mothers using pain relief during labor higher than adult mothers, and the difference between two group was found statistically significant (P value=0.000). The researcher can relate this finding to low pain tolerance and increased anxiety due to lack of experience of adolescent women during the labor process.

4.2.2.3 Maternal postpartum outcomes

Postpartum hemorrhage

Table (4.25): Comparison between adolescence and adult mothers in regard to bleeding in postpartum period

Features	Adolescence mothers (110 cases)		Adult mothers (110 controls)		Total		OR (CI 95%)	P. value
	No.	%	No.	%	No.	%		
Postpartum hemorrhage								
Yes	17	15.5	6	5.5	23	10.5	3.168 (1.19-8.37)	0.015
No	93	84.5	104	94.5	197	89.5		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Table 4.25 explores the relationship between cases and controls in reference to postpartum bleeding. It showed that 10.5% of the study population had bleeding during the postpartum period. Postpartum bleeding was higher among the adolescent mothers than adult mothers (15.5% vs. 5.5 %). The studyfindings found that adolescent women have the chance 3.16 times to suffer from bleeding in postpartum period and the difference between the two groups reached a highly significant level (p value=0.015). This means that there was a positive association between adolescence pregnancy and postpartum bleeding.

Finding are not in line with Ngowa et al., (2015) study which found that post-partum hemorrhage was not significantly different in the two groups and with Chotigeat and Sawasdiworn (2011) who presented the same findings, also with Yadav et al., (2008) study who found that there was no significant difference in risk of post-partum hemorrhage. The result was not surprising for the researcher due to that most of adolescent suffer from anemia which consider the main cause for post-partum hemorrhage.with most of mode of dilivery for adolescent is cs which make womens highly suspetable to postpartum hemorrage

Blood transfusion

Table (4.26): Comparison between adolescence and adult mothers by blood transfusion

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Blood transfusion								
Yes	13	11.8	5	4.5	18	8.2	2.814	0.049
No	97	88.2	105	95.5	202	91.8	(0.96-8.18)	
Total	**110**	**100**	**110**	**100**	**220**	**100**		

Table 4.26 presents the relationship between the two groups and blood transfusion. The researcher noted that 8.2% of the study population needed a blood transfusion during the post-partum period. Blood transfusion was higher among the adolescent mothers than adult mothernd that adolescent women have the chance 2.8 times to need blood transfusion in post-partum period and the difference between two groups reached a statistically significant level (p value=0.049). This means that there was a positive association between adolescence pregnancy and blood transfusion.Finding are in line with Najim et al., (2015) study that shows, blood transfusion are found more significant in adolescents as compared to adults (P-values= 0.0001).

Oxytocin used postpartum

Table (4.27): Comparison between adolescence and adult mothers in regard to oxytocin used in postpartum period

Features	**Adolescence mothers** (110 cases)		**Adult mothers** (110 controls)		**Total**		**OR (CI 95%)**	**P. value**
	No.	%	No.	%	No.	%		
Oxytocin used postpartum								
Yes	104	94.5	106	96.4	210	95.5	0.654 (0.17-2.38)	0.517
No	6	5.5	4	3.6	10	4.5		
Total	**110**	**100**	**110**	**100**	**220**	**100**		

The above table compares between adolescent and adult mothers in regard to oxytocin used in postpartum period. It showed that oxytocin was used in 95.5% of the study population with 96.4% in controls group vs. 94.5% in cases group, with a OR of 0.654, the differences did not reach a significant level (P value =0.517).

The researcher can attribute this result to that oxytocin usually used during the postpartum period as an active managementand implemented for all delivered women as a hospital policy to prevent postpartum hemorrhage.

Chapter 5

Conclusion and Recommendations

Adolescent pregnancy is an important public health problem, especially in developing countries, with a high rate of marriage at young age, along with poor prenatal and postnatal care. The researcher used a quantitative, retrospective approach, hospital-based case-control method to determine the relationship between adolescent pregnancy and the increased risk for adverse pregnancy outcomes for both mother and neonates in GG.

5.1 Conclusion

In this study, the researcher found that adolescent mothers were still at increased risk for adverse pregnancy outcomes in regard to maternal and neonatal complications as compared with adult mothers. Low birth weight, preterm baby, admission to ICU and meconium aspiration, were the common neonatal complication among adolescent group. Likewise, C.S, episiotomy, abnormal amniotic fluid colour, complication during labour, antepartum haemorrhage and postpartum haemorrhage, blood transfusion were more common maternal complication among adolescent group. Adverse outcomes of adolescent pregnancy could be attributed not only to lower maternal age but also to their relatively disadvantaged socioeconomic background. Strict enforcement of laws prohibiting teenage marriage in Gaza Strip is needed to prevent from adolescent pregnancy. For those who are already pregnant at teenage, highly quality maternity services should be introduced.

5.2 Recommendations

In order to reduce the rate of early child bearing; adolescents, their parents and community should be made more aware of the negative health, social and economic consequences of it. Such awareness could be created through social mobilization, information dissemination, sex education and communication campaigns. By reducing the number of

adolescent pregnancies and by providing better prenatal, obstetric care and family planning to those adolescents who become pregnant, maternal and perinatal morbidity and mortality in the developing world could be reduced.

(1) Strict enforcement of laws prohibiting adolescent marriage is needed to minimize the incidence of adolescent pregnancy in GGs..

(2) Community health awareness campaign are need to highlight the problem of adolescent pregnancy in GG.

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(3) Training courses for the healthcare professionals about providing antenatal,intranatal and postnatal care to adolescent are needed.

(4) A plan to enhance adolescent women's accessibility to the antenatal care and supplying them with extra nutrients and assessed several times during pregnancy to improve outcome and to decrease complications is a crucial step in minimizing the adverse outcomes of their pregnancy.

(5) More research studies are needed to study the physical, psychological and social aspects of early marriage and adolescent pregnancy.

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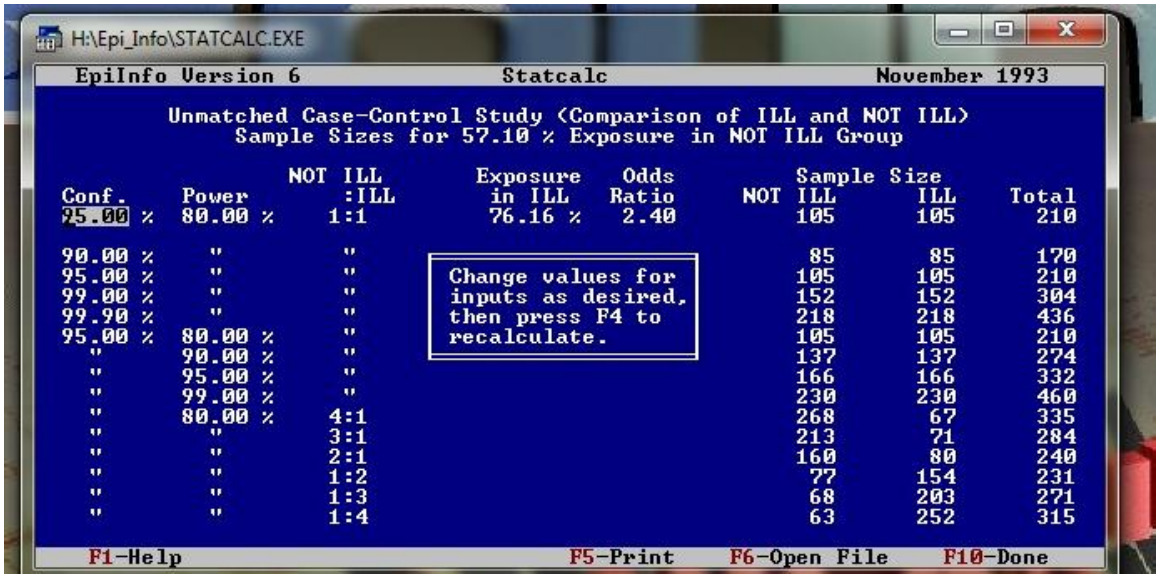
Annexes

Annex (1) Map of Palestine

(MoH, 2013)

Annex (2) Sample calculation



Annex (3) Cover Letter and Questionnaire

Outcomes of Adolescent Pregnancy in Gaza Governorate

Dear participant:

You have selected in the above-mentioned research study. This study conducted as a part of the requirements for the Master Degree in Public Health at Al-Quds University.

The purpose of this study is to apply a research about the adolescent pregnancy outcomes in the Gazagovernorate. Moreover, you are chosen as a sample in this study. The study will be through patient file of and face-to-face interviews. The interview will take place in the hospitals, and take about 20 minutes for every one patient at once.

Your participation in this study is voluntary; it is your decision to refuse or to participate in this research study.

If you agree to be in this study, you need to answer the interviewer questions that will filled. There is no right and/or wrong answers, just give your perspectives. Please reflect carefully and answer all questions as honestly as possible. Your response will be kept confidential and will be aggregated with other responses so individual respondents cannot be identified.

Statement of consent

I have read / know the above information. I have asked question and received answers. I understand that by answering the interviewer questions, I give consent for participation in this study.

Thank you for taking the time to fill out this questionnaire.

Researcher:NourAsad El-Graiz

Questionnaire

Outcomes of Adolescent Pregnancy in Gaza Governorate-Questionnaire

1. Patient code:		**2.** Phone number:		

3. Date and time of arrival	dd Mm yy Time24h	**4.** Birth attended	MW=1 OBGYN=2

Background information

5. Maternal age ____ Years	**6.** Marriage between first cousins: ◉ Yes ○ No
7. Education status: ☑ Primary ☑ Elementary ☑ Secondary ☐ University	Place of residence:
8. Pregnancy maternal weight at last antenatal visit ____ KG	**9.** Maternal height ____ cm
10. Smoking (cigarettes/arghilla) ○ Yes ◉ No	**11.** Employment ◉ Yes ○ No

Previous pregnancies (excluding current pregnancy)

12. Number of previous vaginal birth (>24 weeks)	**13.** Number of children alive
14. Number of previous caesareans	**15.** Number of abortions
16. Number of ectopic pregnancies	
17. Pre- existing medical conditions : hypertension/diabetes/anemia /hyperthyroidism/others	

Maternal health in the current pregnancy (beforelabour)

18. Last menstruation period Dd Mm Yy	**19.** EDD Dd Mm Yy
20. Gestational age at arrival ____ Weeks	**21.** Number of antenatal visits in this pregnancy

Health problem in this pregnancy

22.
- ☐ Gestational hypertension
- ☐ pre - eclampsia
- ☐ Anemia
- ☐ gestational diabetes
- ☐ Others

23. Mother reports medication has used duringpregnancy :

- ☐ None
- ☐ Antihypertensive medication
- ☐ Anticoagulants
- ☐ Pain Killers
- ☐ Iron
- ☐ Folic acid
- ☐ Vitamin supplement
- ☐ Others ***(if yes;** please write name of medication**)***

24. Medication which woman take it is: ◉ Prescribed ○ None prescribed

Reason for arrival to hospital

25.
- ☐ Contraction
- ☐ Rom
- ☐ Abdominal Pain
- ☐ Vaginal bleeding
- ☐ Hypertensive disorder
- ☐ Eclampsia
- ☐ Others

26. Blood pressure at arrival

27. Hemoglobin at admission

28. Cervical dilatation at admission:

Labour start

29. ☐ Spontaneous

30. Total number of newborn (this delivery):

31. ☑ Llabour induction

(if yes; please continue to question 35)

32. Time of delivery *(24hour format)*: **Hh : Min**

33. Indication for induction:
- ☐ PROM
- ☐ Reduced fetal movment
- ☐ Post term pregnancy

34. Newborn at birth: ☐ Alive ☐ Stillbirth

35. Admission NICU: ○ Yes ◉ No

☐ Hypertensive disorder	☐ Diabetes	**36.** Birthweight:	(grams)
☐ Fetal grow th restriction	☐ Large baby	**37.** Apgaer score 5 and 10 min:	
38. Induction method:	☐ Balloon catheter	**39.** Newborn has malformation:	◉ Yes ○ No
☐ Amniotomy	☐ Cytotec / Misoprostal	(*If Yes; specify*)	
☐ Prostin	☐ Oxytocin	**40. LBW**	◉ Yes ○ No
41. Amniotic fluid color:	☐ Normal		
☐ Meconium stained	☐ Bloody	**42.** Meconium aspiration syndrome	◉ Yes ○ No
43. Oxytocin augmentation	◉ Yes ○ No		
45. Indication for oxytocin use:		**44.** Birth asphyxia	◉ Yes ○ No
☐ Prolonged first stage	☐ Prolonged second stage		
46. Duration first stage of labour			
47. Duration second stage of labour			

Birth\delivery

Postpartum\third stage of labour

48. Pain relief:	☑ None ☑ Pethidine ☐ Analgesics ☐ Local infiltration anesthesia	**49.**	☐ Oxytocin i.m
		50.	☐ Excessive bleeding
51. Medication during labour:	◉ Yes ○ No	**52.** Blood transfusion	◉ Yes ○ No
(If yes please specify)		**53.** Hysterectomy:	◉ Yes ○ No
54. Complication during labour:	☐ None ☐ Fever ☐ Convulsions ☐ Bleeding ☐ Other if other please specify		

55.	Delivery method:	☐ Spontaneous ☐ Vacuum extraction ☐ Emergency caesarean
56.	Indication for operative delivery	☐ Abnormal ctg\fetal elistress ☐ Obstructed labour ☐ bleeding Previous cesarean ☐ Multiple gestation
57.	Episiotomy:	◉ Yes ○ No

Annex (4) List of expert name who review study questionnaire

	Name	
1.	Dr: Yehia Abed	Al-Quds University
2.	Dr: Bassam Abu Hamad	Master Programs coordinator at Al-Quds University
3.	Dr:AtefEsmail	PhD, Islamic University, Collage of Nursing
4.	Dr:YosuifAljesh	PhD, IslamicUniversity, Collage of Nursing
5.	Dr:Etaf Abed	PhD, Islamic University, Collage of Nursing
6.	Dr: ArefaAlbahri	PhD, Islamic University, Collage of Nursing
7.	Dr: Ragda Abo Laban	Obstetrician, Al Shifa Complex
8.	Dr: Hani Mahdy	Obstetrician, Al Shifa Complex
9.	Dr: HamzaAbdEljawad	PhD, University College of Applied Sciences

Annex (5) Helsinki Committee Approval Letter

المجلس الفلسطيني للبحث الصحي

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/51 /15

Name: الاسم: نور اسعد الغريز

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:-

Outcomes of Adolescent Pregnancy-Gaza Governorate

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/51 /15 in its meeting on 03/08/2015

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

Signature

Member **Member**

Chairman

Genral Conditions:-

٢٧. Valid for 2 years from the date of approval.

٢٨. It is necessary to notify the committee of any change in the approved study protocol.

٢٩. 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 (6) MOH Approval Letter

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

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

التاريخ:2015/08/09م

الرقم :..........

الأخ / د. عبد اللطيف الحاج المحترم،،،

مدير عام المستشفيات

السلام عليكم ورحمة الله وبركاته،،،

الموضوع/ تسهيل مهمة باحثة

بخصوص الموضوع أعلاه، يرجى تسهيل مهمة الباحثة/ نور أسعد الغريز الملتحقة ببرنامج ماجستير الصحة العامة – مسار علم الأوبئة – جامعة القدس أبوديس في إجراء بحث بعنوان :-

"Outcomes of Adolescent Pregnancy-Gaza Governorates "

حيث الباحثة بحاجة لتعبئة استبانه من عدد من النساء بعد الولادة في مستشفى النساء والتوليد بمجمع الشفاء الطبي، وكذلك الإطلاع على الملف الطبي الخاص بالمشاركات في البحث.

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

وتفضلوا بقبول التحية والتقدير،،،

د. ناصر رأفت أبو شعبان

مدير عام تنمية القوى البشرية

صادر: ..../....
وارد: 299
تاريخ: ....

صورة لـ/
- الإدارة العامة للرقابة الداخلية
- صاحب العلاقة

Gaza Tel / 08-2827298 Fax / 08-2868109 Email / hrd@moh.gov.ps

ملخص الدراسة

نتائج حمل المراهقات في محافظة غزة

اسم الطالبة: نور أسعد الغريز

اسم المشرف: د.علي الخطيب

يعتبر الحمل عند الفئات المرافقات (13–19)من المخاطر التي تهد حياه كل من الأم ومولدها والتي تعتبر من المشاكل الاجتماعية والصحية الكبيرة في الدول منخفضة ومتوسطة الدخل والتي أدت إلى ارتفاع نسبه الأمراض والوفيات في هده الفئة العمرية وهدفت هده الدراسة إلى التعرف على العلاقة بين حمل المراهقات و زيادة الخطر على صحة الأم ومولودها في غزة من أجل تسليط الضوء على هذه الظاهرة ومخاطرها، وتقديم التوصيات الممكنة للمساعدة في الحد من النتائج السلبية لهذه المشكلة الصحية وقد اعتمد البحث على الدراسة المقطعية حيث تكونت عينة الدراسة من 110حالة (سيدة مراهقة بعد الولادة) و عدد مماثل من الحالات الضابطة مع السيدات المراهقات بعدد مماثل (110) تم اختيارهم من مستشفى النساء والولادة بمجمع الشفاء الطبي.

لجمع البيانات فقد استخدم الباحث استبانة لجمع البيانات الشخصية والطبية مستعيناً باستبانة المشروع النرويجي لجامعة أوسلو المطبق على أقسام الولادة في قطاع غزه والضفة وبعض من مستشفيات عربية أخرى وبهدف التأكد من صدق الاستبانة فقد تم توزيع الاستبانة على عدد من الخبراء من مختلف الجامعات والعاملين في أقسام الولادة في مجمع الشفاء الطبي إضافة إلى أن الباحثة قامت بإجراء دراسة استطلاعية على عينة عشوائية من 40حالة تنطبق عليها معايير المشاركة في الدراسة.

للحصول على النتائج فقد تم استخدام البرنامج الإحصائي SPSS لمعالجة البيانات وتم اختبار النتائج باستخدام chi-square, odds ratio, p value لفحص العلاقة بين المتغيرات .

و قد أظهرت نتائج الدراسة أن نسبة الولادات المبكرة كانت مرتفعة لدى النساء المراهقات إضافة إلى انخفاض وزرن المواليد لدى هؤلاء الأمهات. كما أشارت النتائج أن دخول المواليد للأمهات

المراهقات للعناية المركزة لتلقي العلاج والمتابعة كانت أعلى مقارنة بأمهات العينة الضابطة. و قد كانت الفروق ذات دلالة إحصائية.

وعلاوة على ذلك، فقد أظهرت الدراسة بعدم وجود فروق ذات دلالة إحصائية بين المجموعتين فيما يتعلق باختناق الطفل، ولادة جنين ميت أو مشوه، الضائقة الجنينية، ومعدل APGAR SCORE.

كما كشفت نتائج الدراسة أن المستوي التعليمي لدي الأمهات المراهقات متدني مقارنة بالمجموعة الضابطة إضافة إلى انخفاض وعدم الالتزام بالمتابعة أثناء العمل في مراكز الرعاية الأولية لمتابعة الجنين.

وبشأن النتائج المتعلقة أثناء الولادة، فقد أظهرت الدراسة ارتفاع نسبة الولادة القيصرية واستخدام جهاز الشفط أثناء الولادة لدى الأمهات المراهقات مقارنة بالعينة الضابطة.

وفي الإجمال فقد أوجزت الدراسة بأن الأمهات المراهقات الحوامل أكثر عرضة للمضاعفات مقارنة بالسيدات اللاتي تزيد اعمارهن عن 30 سنة. وقد أوصت الدراسة بما يلي:

- وضع خطط تثقيفية لتشجيع وزيادة وصول السيدات الحوامل لمراكز الرعاية الأولية للمتابعة وتلقي العلاجات الدورية وتزويدها بالمواد الغذائية اثناء الحمل لتحسين نتائج الولادة وتقليل المخاطر.
- تدريب الطاقم الصحي العامل بمراكز الرعاية الأولية حول توفير الرعاية قبل وأثناء وبعد الحمل والولادة للأمهات في سن المراهقة
- تطبيق أبحاث لدراسة العوامل الاجتماعية والمشاكل الصحية لتقليل المخاطر لدي السيدات.