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Features of High Risk Pregnancy Among Women Attending a District Hospital in Greater Cairo. A Case Control Study

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ABSTRACT

Background: A high-risk pregnancy (HRP) refers to any medical condition or pathology that puts the mother, fetus, or neonate at increased risk for morbidity or mortality during pregnancy or childbirth.

Objectives: The current study aimed to detect main features of high risk pregnancy among women attending antenatal care clinics at a district hospital in Greater Cairo to achieve finally safe motherhood and better outcome of the pregnancy. **Methods**: A case control study was used where pregnant women attending antenatal care at gynecological outpatient clinics of (Abol-Monagga district hospital (MOH), Shobra El-Khema district, Greater Cairo) were investigated three days weekly during January and February 2015 for being at high risk pregnancy using a modified form of Morrison and Olsen scoring tool to form the case group (141women), while women whose pregnancy was proved to be normal or at low risk were included as a control group (181 women). **Results** revealed that the main current associated morbidities of the high risk pregnancy women included anemia in (17%),gestational DM (14%),pregnancy induced hypertension (13%)and gynecological disorders in(27%).The most prominent features which were significantly related to development of HRP among studied women included obesity (31.2%), history of previous pregnancy associated morbidities (24.8%), previous delivery with CS (24.1%), multigravidae (32.6 %), multiparity (19.9 %), recurrent abortions (14.2 %) and complicated previous pregnancy outcome in (31.9%), while insignificantly detected factors included un-optimal maternal reproductive age (<18 & >35 years), working during pregnancy, illiteracy, (+ve) husband consanguinity, non practicing regular physical activities during pregnancy, (+ve) past history of infertility and family history of morbidities. **Conclusion and recommendations**: Comparing (HRP) women with normal and low risk group revealed a higher prevalence of current morbidities such as anemia, DM and HTN among (HRP) women in addition to other risk factors such as obesity, multigravidae, multiparity, past history of delivery with CS, recurrent abortions and complicated previous pregnancy outcome. The study recommended proper screening techniques to be used for all pregnant women attending antenatal care clinics to pick up the factors that qualify the pregnant women to be at high risk. Preconception assessment and counseling are strongly encouraged and should include the provision of specific information concerning the risk factors which predispose to risky pregnancy.

Key words: High risk pregnancy, maternal morbidity, antenatal care

INTRODUCTION

Though pregnancy per se usually constitutes a heavy burden on women health as it places additional physical and emotional stress on her body, yet health problems that occur before or during pregnancy may also increase the likelihood for a high-risk pregnancy. A high-risk pregnancy (HRP) refers to any morbidity or abnormal condition that puts the mother, fetus or neonate at increased risk for morbidity or mortality during pregnancy or childbirth. Every year nearly 5, 290,000 women die globally due to pregnancy related causes. For each death nearly 118 women suffer from life threatening events or severe acute morbidity.[1, 2]

With 99% of maternal deaths occurring in developing countries, it is too often assumed that maternal mortality is not a problem in wealthier countries. Yet, statistics released in September of 2010 by the United Nations place the United States 50th in the world for maternal mortality — with maternal mortality ratios

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higher than almost all European countries, as well as several countries in Asia and the Middle East. Even more troubling, the United Nations data show that between 1990 and 2008, while the vast majority of countries reduced their maternal mortality ratios for a global decrease of 34%, maternal mortality nearly doubled in the United States.[3]

Perinatal mortality rate in Egypt is about 45/1000 total births, compared with 11/1000 in the developed countries, most perinatal deaths are due to pregnancy and delivery –related complications.[4]

Several risk factors for high risk pregnancy has been identified and included risks that developed as a result of pregnancy status and risks that were present before pregnancy. Multiple pregnancies, maternal age under 18 or over 35 years, pregnancy more than 4 times and interval between pregnancies less than one year, can be considered as risk factors for high-risk pregnancy.[5]

Hypertensive disorders of pregnancy seem to be one of the major causes of maternal morbidity and mortality leading to 10-15% of maternal deaths especially in developing countries. Pregnancies complicated with hypertensive disorders are associated with increased risk of adverse fetal, neonatal and maternal outcome including preterm birth, intrauterine growth retardation, perinatal death, ante partum hemorrhage, postpartum hemorrhage and maternal death.[6, 7]

Diabetes mellitus (DM) occurs in 3 to 5% of pregnancies, but incidence will probably increase as the incidence of obesity increases. Pregnant women with preexisting insulin-dependent diabetes are at increased risk of pyelonephritis, ketoacidosis, pregnancy-induced hypertension (HTN), fetal death, major fetal malformations, fetal macrosomia (Fetal weight > 4.5 kg) and if vasculopathy is present, fetal growth restriction will occur.[8,9]

Obesity during pregnancy is considered a high-risk state because it is associated with many complications. Compared with normal-weight patients, obese patients have a higher prevalence of infertility. Once they conceive, they have a higher rate of early miscarriage and congenital anomalies, including neural tube defects.[10, 11]

Teenage pregnancy in USA accounts for 13% of all pregnancies leading to an increased prevalence of anemia, low-birth-weight (LBW) infants, pregnancy-induced (HTN) and cesarean section (SC). On the other hand, in pregnant women > 35 years, the incidence of preeclampsia is increased, as well as gestational diabetes, dysfunctional labor, abruptio placentae and placenta braevia.[12, 13]

This study was designed as an attempt to identify the main features of high risk pregnancy among pregnant women attending antenatal care clinics at a district hospital in Greater Cairo to enable health care providers early identify, effectively prevent and manage those women which in turn will result in decreasing the incidence of maternal and neonatal mortality.

SUBJECTS AND METHODS

-Study design**:** A case control study was used to profile high risk pregnant (HRP) women through comparing them with low and/or non risky pregnant women.

-Study setting: The study was conducted at the gynecological outpatient clinics of Abol-Monagga district hospital (MOH), Shobra El-Khema district, Greater Cairo.

-Study subjects: From all pregnant women attending routine antenatal care in the previously mentioned setting during January and February 2015, two groups were included in the study: first was the case group which included all women whose pregnancy was proved to be at high risk, while those who were proved to be normal or at low risk were considered a control group. Examination of women for risky pregnancy was done three days weekly where a total number of (141 HRP women) were included in the case group, while every 5th women with normal or low risk pregnancy was included into the control group (181pregnant women) during the period of study.

-Tools of data collection**:** Two tools were used:

*Tool I: A modified version of Morrison and Olsen high risk scoring inventory tool [14] was used to detect women at high risk pregnancy. It is a simplified, valid form for antenatal risk scoring which shows that there are a number

of cumulative risk factors in certain pregnancies which influence the perinatal outcomes in a synergistic fashion and that these factors are more readily to be expressed and easily recognized in terms of numerical score. These risk scores with their designed numerical definitions categorize women as regards their pregnancy to be non risky or low risky(0-2) and high risky (≥3) on the basis of past obstetric history, medical condition and events in the current pregnancy.

*Tool II: An interview questionnaire sheet was based on relevant literature for data collection and it included :The socio-demographic characteristics of the studied subjects such as age, employment status, education level, husband consanguinity, patterns of current antenatal care (as regards initiation and regularity of follow up) and regular physical activity during pregnancy. Taking present history of morbidities, history of the previous pregnancy associated morbidities, nature of the previous delivery, women's family history of morbidities, past obstetrical history of infertility, gravidity, parity, previous recurrent abortions and outcome of the previous pregnancy was done.

- Weight and height of the interviewed women were measured for calculating body mass index (BMI).

-A pilot study was done on 10 pregnant women before starting the study to ascertain the relevance of the questions.

-Ethical considerations**:** An official permission to carry out this study and verbal consent of the studied women were obtained before starting the interview.

-Statistical analysis: Data were collected and analyzed by using SPSS statistical package version 20. Graphs were done using Excel program. Statistical parameters used were mean±SD and frequency distribution. Statistical tests used were x^2 test and independent samples t- test. Accepted level of significance was considered when $P < 0.05$ and highly significant when $P<0.01$.

RESULTS

Table (1): Showed the most relevant socio-demographic data of the case and control groups where it was found that ;the greater proportion of the case group(39%) were aged<18 years vs (33.7%) of control group with mean age 24.4±9.7 vs 25±8.3 years respectively. Also, most cases (61.7%) were working during pregnancy vs (53%) of controls. As regards education level, the majority of cases (51.8%) were illiterate vs (44.8%) of controls .Husband consanguinity was detected among (37.6%) of cases vs (28.7%) of controls. All these differences were statistically insignificant.

Table 2: The pattern of attending antenatal care was shown among case and control pregnant women as follows: regular attending antenatal care was reported by majority of cases (52.4%) vs (33.1%) of controls with statistically significant difference .Initiating antenatal care at 1st trimester was recorded by (44.7%) of case group vs (27.6%) of controls with highly significant difference (P=0.001). Regarding BMI measurements, more obese women (31.2%) were found among case group than control one (20.4%). The difference was statistically significant. More women among control group (39.8%) were practicing regular physical activities during pregnancy than case group (31.9%) with statistically insignificant difference.

Table 3: Showed that the current pregnancy associated morbidities were reported by (100%) of case group vs (23.2%) of controls. It was also found that (24.8%) of the case group had a history of previous pregnancy associated morbidities vs (8.8%) of the control group. Also, (24.1%) of cases had a history of previous delivery with (SC) vs (11.6%) of control women .All these differences were highly significant (P<0.01). Percentages of multigravidae (No. of previous pregnancies ≥5), multiparity (No. of previous deliveries ≥5), history of recurrent abortions (≥2) and complicated previous pregnancy outcome were higher among case group women as (32.6%), (19.9%) (14.2%) and (31.9%) respectively than control women as (9.4%), (7.7%) ,(6.1%) and (7.2%) respectively with highly significant differences (P<0.01) for multigravidae, multiparity and complicated previous pregnancy outcome. Family history of morbidities and past history of infertility were recorded by (29.8%) and (16.3%) respectively

of cases vs (21%) and (9.9%) respectively of control women with no significant differences.
Figure1: Illustrated the distribution of current pregnancy associated morbidities among cases and controls as follows: (27%) of cases were affected with gynecological problems (threaten abortion, placenta praevia ,vaginal bleeding and surgical operations), (24%) had multiple disorders, (17%) were anemic,(14%) had gestational diabetes mellitus (GDM),(13%) had pregnancy induced hypertension (HTN) and (5%) had other complaints as heart ,chest, urinary tract and musculoskeletal diseases vs (5%), (4%), (8%), (2%), (1%) and (3%) respectively of controls.

Figure 2: Revealed that (31.9%) of the case group women had a history of complicated previous pregnancy outcome vs (7.2%) of controls. The distribution of the complicated previous pregnancy outcome for case group women was (13.2%) for neonatal intensive care unit (NICU) admission, (7.9%) multiple complications, (7%) low birth weight (LBW), (3.8%) neonatal deaths vs (2.6%), (2.2%), (1.5%)and (0.9%) respectively for controls.

DISCUSSION

High risk pregnancy (HRP) is considered a major worldwide health problem leading to an increased risk of perinatal and maternal mortality, so (HRP) identification is a challenging work.[15] This study detected insignificantly higher percentages of case group women at the un-optimal reproductive age (<18 and > 35 years) than controls. A study conducted by Waldenström et al.[12] mentioned that maternal age 35 years or older was associated with increased risk of fetal deaths. Also, Hafez et al.[16] reported that forty percent of the studied Saudi pregnant women were at a high-risk because of their age > 35 years. They concluded that it is generally assumed that women >35 years have an increased risk for complications during pregnancy, and most reported age-related risk factors were through their association with age-dependent confounders such as hypertension, diabetes, high parity..etc. As regards young mothers (< 18 years) , Rosenstein et al.[15] stated that it is important to note that the pregnant adolescent is at increased risk of pregnancy complications such as eclampsia, premature labor, prolonged or obstructed labor, fistula, anemia and death .For her baby, there is a greater risk of premature birth, low birth weight, other health problems and death.

While most HRP women in our study (61.7%) were working at the time of the study vs (53%) of controls with statistically insignificant difference, the study carried out by Stocker et al.[17] mentioned that the results from their meta-analysis study suggested that physical activity by shifted work during pregnancy may provide a protective effect against the development of pregnancy associated morbidities such as gestational DM. Also, a higher percent of illiteracy (51.8%) was insignificantly detected among (HRP) women vs (44.8%) of controls . The result obtained from the study conducted by Orskou et al.[18] found that pregnant women with a higher level of 10 or more years of formal education had a statistically significant higher percent of risky pregnancy. On contrast to that result, there was an intervention study concluded that education had positively affected women response to perinatal health education sessions and so reduced indirectly delivery complications.[19]

In the present study, majority of the case group (52.4%) had regular antenatal visits and (44.7%) of them had initiated antenatal care early at 1st trimester. On the contrary to that result, Hafez et al.[16] found that only (5%) of the studied HRP women had initiated their antenatal care at 1st trimester and only (33%) showed regular antenatal visits. They considered that as an inadequacy in antenatal care pattern and so may be one of the contributing factors of high rate of HRP (63%) in their study. Of course, there are many factors which determine the degree of compliance towards antenatal care (ANC) duties including socio-demographic factors and severity of the ailments. Use of (ANC) early in the pregnancy is professionally considered important to ensure that appropriate ANC is arranged and, therefore, good quality and quantity of information with education are delivered to improve pregnancy outcomes. A study was conducted and found that women were not compliant with the recommended time of the first visit of pregnancy. Instead, most women

make their first visit after 21 weeks or when the pregnancy started to appear. The listed reasons included shame for having too many pregnancies or being over 40 years old and pregnant. Women also mentioned service-related reasons; for example, negative attitudes of service providers and poor quality of care, besides multiparous and older women preferred fewer visits as a result of the experience they had during previous pregnancies.[20]

Obesity was found to be a significant risk factor for (HRP), where (31.2%) of (HRP) women in our study were obese vs (20.4%) of control women. Many studies agreed with this result such as Janbi et al.[10] in KSA and Stamatis et al.[21] in Greece .Also, a high frequency of obesity (60%) among HRP in (Taif, KSA) with a limited physical activity was observed in the study conducted by Hafez et al.[16]who explained that by excessive gestational weight gain in KSA which represented an emerging predictor of maternal obstetric complications. Mothers who gain weight excessively during pregnancy are more likely to deliver by caesarean section, develop pre-eclampsia and become overweight or obese in later life. In the USA, more than one third of women are obese, more than one half of pregnant women are overweight or obese and 8% of the reproductive-aged women are extremely obese, putting them at a greater risk of pregnancy complications.[22]

In the current study, there was a lower percent of (HRP) women (31.9%) who were practicing regular physical activity during pregnancy vs (39.8%) of control women with a statistically insignificant difference. Another study carried out by Barakat et al.[23] mentioned that there are potential benefits of appropriate physical activity in terms of maternal weight control and fitness which are likely to have significant long term public health benefits.

In this study, the current pregnancy associated morbidities which were considered as causes of HRP among the studied case group women included: anemia (17%), gestational DM (14%), pregnancy induced HTN (13%), gynecological disorders (27%) and multiple morbidities (24%). Other studies reported similar results such as Hafez et al.[16] in their study where they found that current health related problems of the studied HRP women were (25.3%) for anemia, (16.2%) for HTN,(15.2%) for gestational DM and(3%) vaginal bleeding. They noticed some variations with other studies and attributed that to socioeconomic status and some other variables like parity and age. They also considered the reason may be due to late antenatal care initiation and the high frequency of irregular visits. Pregnancy induced hypertension increased the risk of subsequent type 2 diabetes mellitus by 3.4 -fold.[24] Another study done in Riyadh (KSA) by Al-Rowaily and Abol-Fotouh [25] reported a prevalence of GDM with (12.5%).The relatively high frequency of multiparous women (19.9%) among case group in our study may predispose to increased percentage of GDM .The study conducted by De-Sisto et al.[26], stated that multiparous women were 8.3 times more likely to have GDM than nulliparous ones.

In the present study, HRP women showed significantly higher frequencies rather than control women as regards past history of previous pregnancy associated morbidities, previous delivery with (CS), recurrent abortions and complicated previous pregnancy outcome in addition to multigravidae and multiparity. In agreement with that, Hafez et al.[16] reported that among women with HRP; previous pregnancy associated morbidities were reported by (66%), multigravidae by (62%), multipara by (47%), recurrent abortions (35%), complicated previous pregnancy outcome (32%) and previous delivery with (CS) by (26%). The study carried out by Rossi and Perfumo[27] mentioned that previous (CS) is the main risk factor for uterine rupture and because the rate of (CS)is increasing worldwide, there is an increasing number of mothers with (CS) with a consequent higher risk of uterine rupture.

Conclusion and Recommendation

In conclusion, the findings of this study denoted that factors which were significantly associated with the development of high risk pregnancy (HRP) among the studied women included current pregnancy associated morbidities especially anemia (17%), gestational diabetes mellitus (14%) and

hypertension (13%) in addition to obesity (31.2%), history of previous pregnancy associated morbidities (24.8%), previous delivery with (CS)(24.1%), multigravidae (32.6%), multipara (19.9%), recurrent abortions (14.2 %) and complicated previous pregnancy outcome in (31.9%),while insignificantly detected factors were maternal age (<18 & >35 years), working during pregnancy , illiteracy, (+ve) husband consanguinity, non practicing regular physical activities during pregnancy , (+ve) past history of infertility and family history of morbidities.

We recommended proper screening techniques to be used for all pregnant women attending antenatal clinics to pick up factors that qualify the pregnant women to be at high risk pregnancy. Preconception assessment and counseling are strongly encouraged and should include the provision of specific information concerning the maternal and fetal risks resulting from obesity in pregnancy and encouragement to undertake a weight-reduction program. Moreover, health education sessions should be conducted for all females, especially pregnant women with special emphasis on the importance of the compliance towards antenatal care follow up to be early and regular.

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TABLES

Table 1: Maternal socio-demographic data among case and control groups

Item	Case group (n= 141) No (%)	Control group (n=181) No (%)	Statistical test
Age(years)			
<18	55(39.0)	61(33.7)	X^2=5.4
18 - 35	33(23.4)	64(35.4)	p=0.067
>35	53(37.6)	56(30.9)	
Mean ±SD	24.4±9.7	25±8.4	t=0.58 p=0.57
Employment status			
Working	87(61.7)	96(53.0)	X^2=2.4
Not working	54(38.3)	85(47.0)	p=0.11
Education level			
Illiterate	73(51.8)	81(44.8)	X^2=2.1
*Intermediate	52(36.9)	71(39.2)	P=0.3
High	16(11.3)	29(16.0)	
Husband consanguinity(+ve)	53(37.6)	52(28.7)	X^2=2.8 P=0.092

*Intermediate : from (read & write) level to secondary level

Table2: Pattern of maternal antenatal care, BMI and physical activity during pregnancy among studied cases and controls

Item	Case group (n=141) No (%)	Control group (n=181) No (%)	Statistical test
Antenatal care visits (regular)	74(52.4)	60(33.1)	X^2=5.0 P=0.025
If regular: initiating antenatal visits:			
At 1St trimester	63(44.7)	50(27.6)	X^2=13.8
2nd trimester	57(40.4)	78(43.1)	P=0.001
3rd trimester	21(14.9)	53(29.3)	
Obese BMI (30+)	44(31.2)	37(20.4)	X^2=4.8 P=0.027
Regular physical activity	45(31.9)	72(39.8)	X^2=2.1 P=0.145

Table3: Current morbidities, past and present history of reproductive items of the studied case and control groups.

Item	Case group (n=141) No (%)	Control group (n=181) No (%)	Statistical test
Current pregnancy associated morbidities (+ve)	141(100%)	42 (23.2%)	X^2=190.5 P=0.000
Previous pregnancy associated morbidities (+ve)	35(24.8)	16 (8.8)	X^2=15.1 P=0.000
Previous delivery with (CS)	34(24.1)	21(11.6)	X^2=8.7 P=0.003
Family history of morbidities (+ve)	42(29.8)	38(21.0)	X^2=3.3 P=0.072
History of infertility	23(16.3)	18(9.9)	X^2=2.8 P=0.089
Multigravidae (≥5)	46(32.6)	17(9.4)	X^2=27.1 P=0.000
Multipara(≥5)	28(19.9)	14(7.7)	X^2=10.2 P=0.001
History of recurrent abortions (≥2)	20(14.2)	11(6.1)	X^2=5.9 P=0.014
Complicated previous pregnancy outcome	45(31.9)	13(7.2)	X^2=18.2 P=0.000

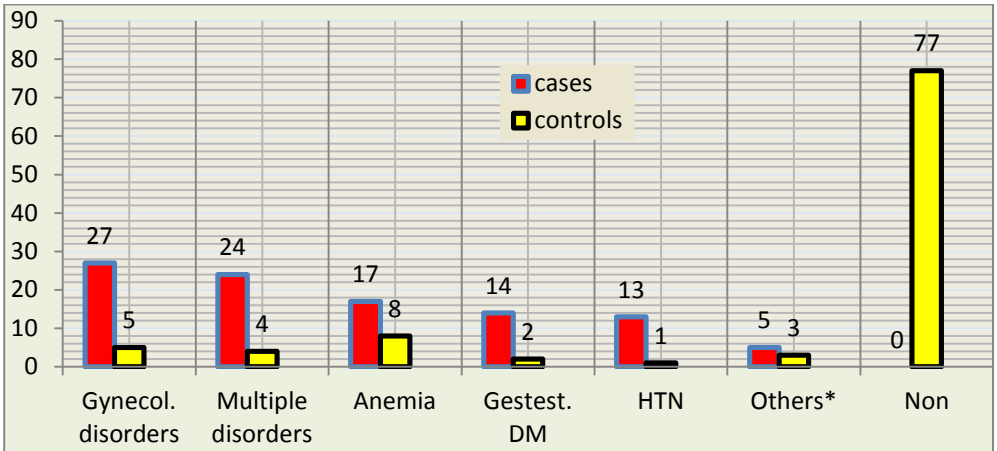

Figure 1:Percent distribution of current pregnancy morbidities among case annd control pregnant women

Others*: included chest, heart, urinary tract and musculoskeletal ailments

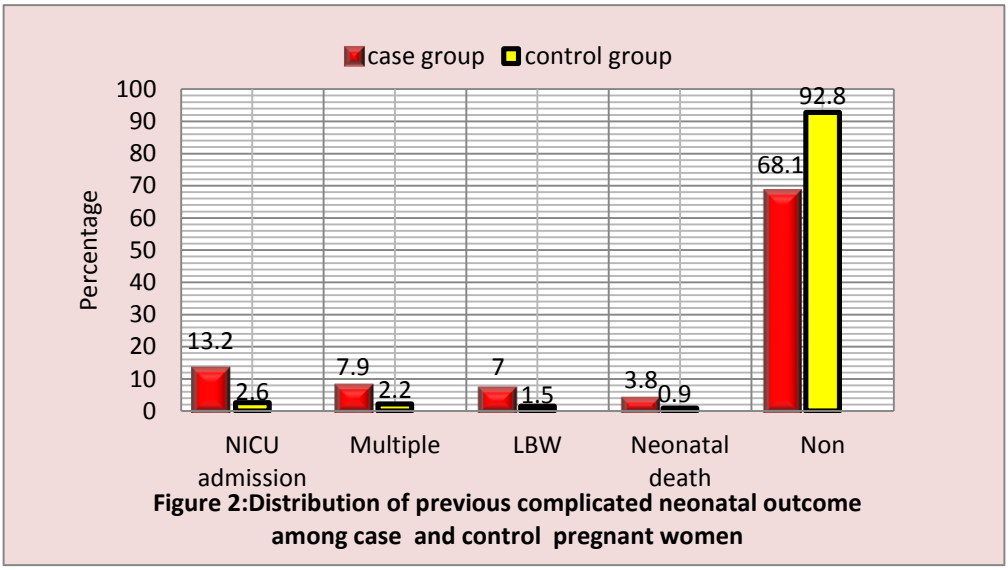

Figure 2:Distribution of previous complicated neonatal outcome among case and control pregnant women