Outcome of antenatal care at high risk pregnancy in Qena University Hospitals

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Background:The central purpose ofantenatal care is to screen for and identify high risk pregnancies as early as possible from a general population of pregnant women, and then provide appropriate skilled care for women with high risk pregnancies while continuing to give adequate care for the women with low risk pregnancies. This "risk approach" is a managerial tool for improving maternal and child health care.
Objective:To evaluate the impact of antenatal care for pregnant women with high risk pregnancy.
Patients and method(s): This is a prospective cohort study of a group of pregnant women with high risk pregnancy. Detailed history, examination, and screening investigations were done throughout pregnancy.
Setting:pregnantwomen's with high risk outpatient clinics and emergency unit, Qena university hospital, Egypt
Result(s): The study included 120 women with high risk pregnancy. There was 16.7% incidence of first trimester complications (hyperemesis& threatened miscarriage). Most of women suffered from second and third trimester complications (80.8%) as preeclampsia in 20.8%, Gestational diabetes in 15%, PROM in13.3%, and preterm labour in 9.2%. fetal complications is seen in 35.8%.
Conclusion: There was significant relationship between number of visits and the occurrence of complications during the second and the third trimester and during the post-delivery period.
Keywords: Antenatal care, High risk, Pregnancy, Qena, Egypt.

Introduction:

Antenatal care (ANC) is defined as the care provided to a woman during her pregnancy, is an important component of reproductive health care. ANC can serve as a platform for the delivery of highly–effective health interventions that can reduce preventable maternal and newborn deaths (**United Nations, 2014**).
The current World Health Organization (WHO) recommendation is that each woman receives a minimum of four goal–oriented or focused ANC visits for low–risk deliveries, to be supervised or attended by a skilled ANC attendant. The first visit timing should be before 16 weeks of pregnancy, the second visit should be between 24 and 26 weeks, the third visit between 30 and 32 weeks, and the fourth visit between 36 and 38 weeks. WHO defines a thorough set of essential elements for each visit (**Saad-Haddad et al., 2016).**

The central purpose of antenatal care is to screen for and identify high risk pregnancies as early as possible from a general population of pregnant women, and then provide appropriate skilled care for women with high risk pregnancies while continuing to give adequate care for the women with low risk pregnancies. This "risk approach" is a managerial tool for improving maternal and child health care(**Oyibo et al., 2011).**

Many studies in developing countries have provided evidence that the improvement of quality antenatal care (ANC) can significantly mitigate the incidence of low birth weight(**Zhou et al., 2019**). Quality ANC involves accessibility to ANC, the number of ANC visits, and the content of ANC (**Pinzon-Rondon et al., 2015).**
The current study aims to evaluate the impact of antenatal care for pregnant women with high risk pregnancy.

Materials and Methods:
Study design:
A prospective cohort study.

Study setting:
This study was carried out in Qena University Hospital; the patients were selected from the outpatient clinics and emergency unit after counseling and taking a written consent from every patient. The study was done during the period from 1st of January2016 till 30th of December 2016

Sample size:
Sample size was calculated using the EPI info 2000 statistical package. The calculation was done using confidence interval 99.9 % was 120. According to the equation for sample size for descriptive study design, prevalence of high-risk pregnancy 8.2% of total population attending the Obstetrics and Gynecology Department at Qena Faculty of Medicine, South Valley University was done by a pilot study with confidence interval 99.9% was 98 patients. Raising the sample size will be done up to 120 to avoid the drop out. Accordingly, by using the following formula

$$n = p\,(1\text{-}p) * Z\alpha^2/ME^2$$

Patients:
All patients had the following **inclusion criteria**:

Pregnant women with;
- Diabetes mellitus.
- Hypertension and pre-eclampsia.
- Cardiopulmonary diseases and rheumatic heart disease.
- Severe anemia.
- Multiple gestations.

Methods:
All patients were evaluated according to the following program contents:
A detailed history taking: personal history (age, marital status, parity, occupation, special habits, residence, educational level, and socioeconomic status), menstrual history, obstetric history, presents history, past history & family history
Antenatal care package:
We adopted the package by Egyptian ministry of health which include every 4 weeks until 28 W, and from 28 to 36 (every 2 weeks), > 36 weekly. During antenatal care visits the following will be done

- History
- Check of pulse, blood pressure, temperature each visit.
- Check of protein each visit.
- Check of warning symptoms including severe headache, blurring of vision, epigastric pain, vomiting, vaginal pleading, and decreased fetal movement.
- Check of Hemoglobin twice (at initial visit & at 28 week).
- Check of fasting blood sugar, 2 hours post Oral Glucose Tolerance Test (OGTT) 75 gm, at initial visit & 24 – 28 weeks if the patient is not known to be diabetic.
- Check of fetal growth by symphysis fundal height (in cm), and assess fetal biometry by ultrasound every 2 week, if there is abnormal growth starts from 24 week till end of pregnancy.
- Amniotic fluid volume.
- Doppler if there is intrauterine growth retardation.

Special care according to underlying risk:
- Diabetes Mellitus
- Control of blood sugar using home Glucometer and home monitoring over 3 days and recording of the reading by the pregnant lady and check at each visit.
- Adjust the dose of insulin according to the biweekly visit.
- Check of fetal Biophysical profile (BPP) starting at 32 week (Weekly).
- Termination of pregnancy at 38 week if blood glucose is controlled and fetus is normal (No IUGR, No Macrosomia& normal Doppler)
- Hypertension & Pre-eclamptictoxaemia (PET)
- Control of blood pressure
- Check of maternal biochemistry complete blood count (CBC), renal functions, liver functions, PT, PC, if the results normal check weekly.
- Adjust antihypertensive dose
- Check of fetus
- Termination of pregnancy at 34 week for severe preeclampsia, at 37 week for mild PET or mild hypertension.
- Rheumatic heart
- Care by cardiologist for proper control of cardiac condition

- Adjust dose of cardiac drugs
- Check of fetus.
- Termination of pregnancy according obstetric factors.
• Multiple pregnancy & Anemic patients: used plain for high risk.

Outcome Determinants:
• Miscarriage.
• Antepartum hemorrhage.
• Deterioration of the pre-existing disease.
• Detection rate of medical disease in those who are not known to have disease.
• Method of delivery.
• Post-partum hemorrhage.
• Fetal and newborn outcome (intra uterine growth restriction, intrauterine fetal death, birth weight, apgar score and admission to neonatal intensive care unit).
• Premature rupture of membrane.
• Maternal complications.
• Blood transfusion and its complications.

Statistical analysis:
The collected data were be analyzed to generate the basic descriptive statistics such as mean, and standard deviation. T-test is used to compare means of continuous variables and Chi-Square test & Fischer Exact test for ordinal or nominal variables. All statistical analyses were performed using SPSS version 21 (IBM Corp., Armonk, NY, USA). Statistical significance was inferred for differences with P values <0.05.

Results:
We started recruitment and review of the cases at 1st of January 2016 till 30th of December 2016. During the period of one year of follow up pregnant women we reviewed 200 pregnant women with high risk pregnancy. After counseling 160 pregnant women agree to participate in the research. There were 40 drop-out cases due to miscarriage, travelling, and some due tochange in to other antenatal care programs. Cases completed the research period were 120 women. Table 1 shows the basic criteria of the study participants.

Table (1) Demographic characteristics of the studied sample (No=120)

Parameters:	
Age in years (Mean±SD)	29.8±7.11
Residence:	N (%)
Rural	70 (58.3%)
Urban	50 (41.7%)
Socio Economic Status (SES):	N (%)
Low	76(63.3%)
Middle	41(34.2%)
High	3(2.5%)
Occupation:	N (%)
House wife	69(57.5%)
Employed	51(42.5%)
Smoking:	N (%)
Non-Smoker	33(27.5%)
Passive smoker	85(70.8%)
Smoker	2(1.7%)

Table (2) shows that 41.7% of the studied sample was grand multipara; the majority (60.8%) was free from preexisting chronic diseases (diabetes mellitus 15.8%; HTN 12.5%; RHD 7.5% and chest 3.3%) and 82.2% of the studied sample had no operations.

Table (3) shows that 83.3% of the studied sample had no complications of first trimester; (19.2%) had no complications of second and third trimester; (93.3%) had no post-delivery complications; (20.8%) had PET. (93.3%) of the studied sample had no post-delivery complications; (64.2%) had no fetal complications; (29.2%) were NICU admitted and (6.7%) had jaundice.

Table (2): Clinical characteristics of the studied sample (No=120)

Parameters:	
Number of visits (Mean±SD)	21.85±3.61
Gestational age (weeks)(Mean±SD	9.67±5.6
Parity:	N (%)
Primigravida	31(25.8%)
Multi para	39(32.5%)
Grandmultipara	50(41.7%)
Previous CS:	N (%)
No	84(34.7%)

1 CS	7(5.8%)
Multiple CS	29(24.2%)
Preexisting chronic diseases:	**N (%)**
Free	73(60.8%)
Diabetes mellitus	19(15.8%)
HTN	15(12.5%)
Rheumatic heart disease	9(7.5%)
Chest diseases	4(3.3%)
Previous operations:	**N (%)**
Yes	19(15.8%)
No	101(84.2%_

Table (3): Complications among studied sample (No=120)

Complications:	
Complications of first trimester	**N (%)**
NO complications	100(83.3%)
Hyperemesis	12(10%)
Threatened miscarriage	8(6.7%)
Complications of 2nd and 3rd trimester	**N (%)**
NO complications	23(19.2%)
PET	25(20.8%)
GDM	18(15%)
PROM	16(13.3%)
Deterioration	11(9.2%)
PTL	11(9.2%)
Gestational HTN	5(4.2%)
Macrosomia	4(3.3%)
Polyhydramnios	4(3.3%)
IUGR	3(2.5%)
Post-delivery complications	**N (%)**
NO complications	112(93.3%)
Wound infection	6(5%)
PPH	2(1.7%)
Fetal complications	**N (%)**
NO complications	77(64.2%)
NICU admission	35(29.2%)
Jaundice	8(6.7%)

Table (4) shows that there was significant relationship between age and complications of first trimester, post-delivery complications and fetal complications. There was highly significant relationship between age and complications of second and third trimester.

Table (4) Relation of age on occurrence of complications among studied group (No=120)

	Age in years with complications Mean±SD	Age in years without complications Mean±SD	P-Value
Complication first trimester	30.3±7.2	26.6±5.84	0.027 S
Complication 2nd and 3rd trimester	30.11±7.38	26.5±0.52	<0.001 HS
Post-delivery complications	35.25±6.9	29.4±6.99	0.024 S
Fetal complications	32.25±6.44	28.4±7.14	0.003 S

Data are presented as mean ± standard deviation. **Independent sample t-test was used * S: statistical significant difference, P<0.05, HS: High statistical significant difference, P<0.001.

Table (5) shows that there was none significant relationship between number of visits and complications occurrence in first trimester, and fetal complications. There was highly significant relationship between number of visits and complications occurrence in second and third trimester. There was significant relationship between number of visits and post-delivery complications.

Table (5) Relation of number of visits on occurrence of complications among studied group (No=120)

	No of visits with complications Mean±SD	No of visits without complications Mean±SD	P-Value
Complications of first trimester	21.25±2.09	21.9±3.8	0.41NS
Complications of 2nd and 3rd trimester	22.15±3.6	18.9±1.64	<0.001 HS
Post-delivery complications	24.87±3.04	21.64±3.56	0.014 S
Fetal complications	22.3±3.11	21.04±4.028	0.093NS

Data are presented as mean ± standard deviation. **Independent sample t-test was used

*NS: No statistical significant difference, P>0.05. , S: statistical significant difference, P<0.05, HS: High statistical significant difference, P<0.001.

Discussion:

Antenatal care (ANC) services help pregnant women by identifying complications associated with pregnancy or diseases that might adversely affect the pregnancy(**Majrooh et al., 2014).**

The present study aimed to evaluate the impact of antenatal care for pregnant women with high risk pregnancy in Qena University Hospital. During the period of the 1st of January 2016 till 30th of December 2016.

Demographic characteristics of the studied sample:

A systematic review of 28 studies identified women's and their husbands' education, economic status, parity, place of residence and accessibility to health services as key determinants of use of ANC services (**Simkhada et al., 2008).**

Our results showed that the mean age of the studied sample was 29.8±7.11; 58.3% were residents of rural areas; 57.5% were housewives; 63.3% of low socioeconomic status and 27.5% were nonsmokers.

Maternal anthropometric measurements, smoking, alcohol consumption, coffee consumption, stress and physical activity are factors affecting pregnancy outcome (**Bang and Lee, 2009).**

In**Mlay et al., (1994)**study, 32.5% of pregnant women attending antenatal clinic had received no formal education; 13.4% had 1-6 years education, while 54.2% had 7-12 years of formal education.

Haftu et al., (2018)found that the age of the participants in mean and standard deviation were 26.4 (5.2) years. 45.3% of the participants' age was 19–25 years. Most of the participants' educational level were secondary school and above which makes 42.3% from the total. More than half of the participants (71.8%) were from urban residence. (66.1%) were housewives.

In**Acharya et al., (2018)** study, the majority of mothers was 20–34 years old (69.2%), and had a primary or greater education level (75.2%). Almost a half (49.8%) worked in the service/business/household sectors; the majority

(65.6%) had second and third terciles of family income.

Yaya et al., (2017)stated that about a quarter (24.5%) of the studied sample were in the age group of 25–29 years and about three-quarter (74.6%) were of rural origin. About two-third (65.8%) had no formal education and 26.1% had primary level education. Most of the women were from the households in the richest wealth quintile (27.1%), and about half had no employment (47.9%).

In**Oyibo et al., (2011),**the age range of the women was 16 - 43 years. The mean age was 25.3 ± 1.3 years. A majority of the women (69.2 %) were within the age group 20 - 29years. Almost half of the women (46.2 %) had no formal education.

Clinical characteristics of the studied sample:

In our study, 41.7% of the studied sample was grand multipara; 34.7% had no previous CS. the majority (60.8%) was free from preexisting chronic diseases (diabetes mellitus represented 15.8%; HTN 12.5%; RHD 7.5% and chest 3.3%). (82.2%) of the studied sample had no operations.

In**Acharya et al., (2018)** study, (60.9%) were multipara. In**Mlay et al., (1994)**study,32.51% were primigravidas while 67.5% were multiparous with parity varying from 2-13 deliveries.

Tesfaye et al., (2017)found that women with no parity (nulliparous) were less likely to have delayed their ANC initiation as compared to women who were primipara and above.

Obstetric history of the studied sample:

Results of the present study showed that the mean timing of delivery was 36.7±2.45 weeks and (70%) were delivered by CS.

The association between induction of labor and CS is complex. Early studies that compared women who undergo induction of labor to those who experience spontaneous labor at the same gestational age found that induction of labor was associated with increased risk for CS(**Vahratian et al., 2005).**

In contrast to our results, **Delbaere et al., (2012)** results illustrated that the rate of CS was particularly rising in the lowest risk population.

Complications among studied sample:
Results of the current study showed that 83.3% of the studied sample had no complications of first trimester; (19.2%) had no complications of second and third trimester; (93.3%) had no post-delivery complications; (20.8%) had PET. (93.3%) of the studied sample had no post-delivery complications; (64.2%) had no fetal complications; (29.2%) were NICU admitted and (6.7%) had jaundice.

In**Oyibo et al., (2011),**more than a third of the women were classified as having a high risk or very high-risk pregnancy.

Relation of age on occurrence of complications among studied group
In our study, there was significant relationship between age and complications of first trimester, post-delivery complications and fetal complications. There was highly significant relationship between age and complications of second and third trimester.

Perinatal mortality, perinatal and neonatal death, and intra-uterine fetal death also increase with increasing age. Older women are more likely to have been diagnosed with conditions such as hypertensive disorders, diabetes mellitus and other chronic diseases, for which they are already taking medication **(Jolly et al., 2000).** These chronic medical conditions may further complicate their pregnancies **(Ozalp et al., 2003).**

Some studies recorded that women who have few or inadequate visits and those who start antenatal care late than the first trimester have poorer pregnancy outcomes, such as low birth weight and pre-term birth **(da Fonseca et al., 2014)**. However, increasing the number of antenatal visits does not necessarily improve the pregnancy outcomes **(Low et al., 2005)**but should be responded with quality of care.

In**Oyibo et al., (2011)**, the vast majority of the women with at-risk pregnancies registered for antenatal care late: 58.9 % registered for antenatal care in the second trimester and 37.0 % registered for antenatal care in the third trimester of pregnancy.

Relation of number of visits on occurrence of complications among studied group
Our results showed none significant relationship between number of visits and complications occurrence in first trimester, and fetal complications. There was highly significant relationship between number of visits and complications occurrence in second and third trimester. There was significant relationship between number of visits and post-delivery complications.

Mohamed Shaker El-SayedAzzaz et al., (2016)found that women who attended an inadequate number of antenatal care visits had a significantly higher risk of post-partum hemorrhage, eclampsia, and intensive care unit admission compared with women who attended an adequate number of visits. Women who attended an inadequate number of visits had a 12-fold risk of a poor maternal outcome, a 53-fold risk of a poor fetal outcome and a significantly higher risk of neonatal mortality in comparison to women who attended an adequate number of antenatal visits.

Raatikainen et al., (2007)found that the newborns of non-attenders and under-attenders of antenatal care weighed 489 and 799 g less, respectively, than the newborns of mothers with an average number of antenatal visits, these differences being statistically significant.

In conclusion, Antenatal care is potentially one of the most effective health intervention for preventing maternal morbidity and mortality especially in places where the general health status of women is poor.

There was significant relationship between age and complications of first trimester, post-delivery complications and fetal complications. There was highly significant relationship between age and complications of second and third trimester.

It is recommended that relevant policies, service delivery guidelines, and protocols should be available in all primary health care clinics that provide ANC services and all staff members and managers should be trained to use these documents to ensure safe and standardized practice. Records should be designed so that relevant aspects of the implementation of

policies needed are recorded – this will facilitate auditing of the implementation of policies.

Conflict of interest
The authors declare that they have no conflict of interest.

Conclusion:
Antenatal care is potentially one of the most effective health intervention for preventing maternal morbidity and mortality especially in places where the general health status of women is poor. There was significant relationship between age and complications of first trimester, post-delivery complications and fetal complications. There was highly significant relationship between age and complications of second and third trimester.
Socioeconomic status and presence of chronic diseases could affect outcomes in high risk pregnancies. There was highly significant relationship between number of visits and complications occurrence in second and third trimester. There was significant relationship between number of visits and post-delivery complications.

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