# AUDIT OF ANTENATAL CARE AT PRIMARY HEALTH CARE CENTERS, AL QASSIM REGION, SAUDI ARABIA

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**ABSTRACT**

**Background:** The prime objective of antenatal care (ANC) is to monitor healthy pregnant women to detect early signs of pregnancy associated illnesses, risk factors related to a particular condition for intervention for safer outcomes.Current study was done to evaluate the extent of implementation of the ANC model in Primary Health care centers in Al-Qassim region, KSA. **Objective:** To evaluate the level of quality of performance and outcome of the ANC model in Primary Health care centers (PHCs) in Al Qassim region, in term of frequency and timing of antenatal visits and classification into low / high risk groups and outcome in terms of alive mother and newborn using antenatal cards, antenatal care and high risk registers used in PHCs settings. **Materials & Methods:** A retrospective study was conducted at Primary Health care centers (PHCs) in Al Qassim region of KSA from the year march 2013 to October 2013. Out of 170 existing PHCs in Al Qassim region, 10% (17 centers) were selected randomly and from the registered women in antenatal clinic in the selected PHCC who was deliver during the year 2012 from January up to October 2012, a total 173 women were selected randomly and enrolled in this study which represents approximately one percent (1%) of expected target population of women attended ANC services during the study year. Information was collected using structured questionnaire and data was extracted from the health records and antenatal care file by trained female physicians working in selected centers. Data comprised of age, gestational age, number of abortions, details of $1^{st}$, $2^{nd}$, $3^{rd}$ and $4^{th}$ visits, family history, past and current obstetrical history and medical history, high risk group, vaccination status, referral and outcome of pregnancy. Analysis of data was done by using Epi-info-7 statistical software package. **Results:** Total 173 women were enrolled. Mean age of pregnant woman's was 31 years (±6.1std). Majority of the women 99 (57%) were in 28-38 years age group. Mean gestational age at $1^{st}$, $2^{nd}$, $3^{rd}$ and $4^{th}$ visit was 15, 26.3, 32.0 and 36.3 weeks respectively. Of the 173 women's, 73 (47%) had their first ANC at the recommended period before 16 weeks where late entry to ANC was 14% (n = 22). Regarding previous history of abortions; 50 (29%) women had at least one abortion. Abortions were more common in younger age groups and most of the women had their abortions in their first trimester. More than half 92 (53%) were classified as high risk pregnancy based on family history, medical history and current & past obstetrical history. 120 (69%) women did not have any kind of family history of illness. Mean BMI (Body Index Mass) was 28. 1 (± 5.6 Std) and 22% of study population was obese (>32.3). Regarding tetanus toxoid (TT) vaccination, 103 (59.5%) were fully vaccinated, 63 (36.5%) were partially vaccinated. Out of 173 women booked, 154 (89.5%) ended safely (alive mother and newborn), three (1.78%) aborted and one (0.58%) had still birth. 14 (8.14%) lost to follow up. **Conclusion:** Based on the study results, out of 173 antenatal mothers, more than half 92 (53%) were classified as high risk pregnancy, only 42 (24%) of pregnant women's were completed all the four antenatal visits, about 19.6% were multigravida, and 28.9% mothers were giving > one abortions history. Only 62% mothers were received required doses of Tetanus toxoid doses including previous TT immunizations. There is a need to improve and adopt new WHO model of ANC programme at PHCC where more number of visits will give more exposure to health care facility to safe guard of mother and child in terms of mortality and morbidity.

**KEYWORDS:** Age, Vaccination status, ANC visits, ANC cards, Pregnancy outcome, Al Qassim Region.

## INTRODUCTION
It has been estimated that 303 000 women died from pregnancy-related causes and 2.6 million babies were stillborn in 2015 globally and 50% of this happened during the third trimester.[1,2] Provision of timely and appropriate practices during ANC by trained health care workers save both mother and fetus resulting in healthy pregnancy outcomes.

Antenatal care (ANC) is a careful, regular assessment of pregnant women and consists of education, counseling, screening, and treatment to achieve healthy maternal and fetal outcomes.[3] ANC visits provide the pregnant women the opportunities through series of services to identify any unseen complication in apparently healthy women which could endanger life of both mother and infant. ANC is especially crucial for women at high risk of bad obstetrical outcomes demanding special care.[4,5,6] In the past decades, there is appreciable improvement in service coverage targeting maternal-child-health services coverage[7,8] however overall advancement in terms of pregnancy outcomes is lacking. To find out the impact of antenatal care on pregnancy outcome, in the 90's randomized trials were conducted and the standard model of ANC was compared with a new model of care.[9] The new WHO model of antenatal care divides pregnant women into two groups: those need only routine antenatal care and others with risk factors making them eligible for special care, obstetrical and neonatal care with severe diseases and complications. For the first category, four antenatal visits are recommended. During each visit there should be measurement of blood pressure, testing of urine for bacteriuria and proteinuria, and blood tests to detect syphilis and severe anemia. Checking for weight and height measurement is optional. Women classified as high risk, need special care.[10] On the other hand in standard model, during each month, there is one ANC visit till first six months of pregnancy, then in coming months, one visit in every 2 weeks. After 36 weeks, once every week. This makes a total of 12 visits during a pregnancy. Routine blood and urine tests are done in this model.[11]

In standard model, there is over utilization of health services without much improvement in pregnancy outcomes and this is especially important in context of resource poor countries. In addition, despite of too many visits, in case of high risk pregnancies, quality of care provided is not what is termed as standard.[12]

The WHO randomized trial of antenatal care and the WHO systematic review reported that ANC with fewer antenatal visits could be equally effective resulting in healthy woman and the fetus at the end of the pregnancy.[13] WHO conducted a multicenter cluster–randomized controlled trial to evaluate routine antenatal care. Four countries namely Argentina, Cuba, Saudi Arabia and Thailand with 53 antenatal care clinics randomly assigned were selected to provide either the new WHO model of care or the standard model. Results showed that providing routine antenatal care using the new model produced same results as in the standard model in terms of maternal and fetal outcomes. There was acceptability to this new model from both women and health care providers and was cost effective as compared to standard ANC model.[14]

In this study, ANC visits are measured in two dimensions. One, time and extent of utilization of ANC health services including gestational age at initiation of care and secondly level of implementation of new WHO ANC model using ANC guidelines being in practice in kingdom of Saudi Arabia to see impact of applying this guideline.

## OBJECTIVE
To evaluate the level of quality of performance and outcome of the ANC model in Primary Health care centers (PHCs) in Al Qassim region, in term of frequency and timing of antenatal visits and classification into low / high risk groups and outcome in terms of alive mother and newborn using antenatal cards, antenatal care and high risk registers used in PHCs settings.

## METHODOLOGY
A retrospective study was conducted at Primary Health care centers (PHCs) in Al Qassim region of KSA from the year march 2013 to October 2013. Out of 170 existing PHCs in Al Qassim region, 10% (17 centers) were selected randomly and from the registered women in antenatal clinic in the selected PHCC who was deliver during the year 2012 from January up to October 2012, a total 173 women were selected randomly and enrolled in this study which represents approximately one percent (1%) of expected target population of women attended ANC services (17, 300) during the study year.

A structured questionnaire was used to collect the data on the information required to be sorted at first or subsequent antenatal visits to have healthy outcome of pregnancy. All related data was extracted from the health records and antenatal care files of chosen women by trained female physicians working in selected centers. Informed consent was obtained before administering the questionnaires from the public health administration. In Saudi Arabia, standard antenatal card was used and performance in antenatal care was reviewed according to the Standard antenatal care guidelines adopted from WHO new model of antenatal care to record all information about pregnant women including demography, obstetrical history, medical history, family and social history, past obstetrical history, physical examination and laboratory findings. Card also provides details on how to classify high risk pregnancies. All pregnant women have their follow-up inside the centers' antenatal clinic till last trimester when their appointment is scheduled at the obstetric clinics of the hospital. To minimize recall bias on information related to previous pregnancies, midwives at the respective health centers

assisted in data collection and ANC cards were used to compare the information to minimize errors if any.

Data was entered in excel and was analyzed using Epi Info (version 7) and necessary statistical tests were applied. For descriptive variables, frequencies and percentages were calculated while means were calculated for continuous variables. Ethical approval was obtained from Institutional Review Board (IRB) of Qassim Research Bioethics Committee.

## RESULTS

Out of 170 existing PHCs in Al Qassim region, the total number of assigned women was 173, which represents approximately 1% of expected target population of women attended ANC services (17, 300) during the study year. Whereas, the expected number of pregnant women in Al Qassim region during 2012 was approximately (26, 000) pregnant women, only (66.5%) of pregnant women's in Al Qassim region visited PHCs for antenatal care and this could be due to Qassim had high number of private sector introduced ante natal care services recently and majority of the private companies having family insurance.

Of the total 173 women's were enrolled in this study; the mean age of pregnant woman's was 31 years (±6.1std). More than half of the women 99 (57%) were in 28-38 years age group. (Table 1) Mean gestational age at first visit was 15 weeks. Of the 173, 123 pregnant women's (71%) had their first ANC visit at the recommended period before 16 weeks of gestation whereas 50 pregnant women's (29%) came for first antenatal visit after 16 weeks of gestation and during that period this women should have in their first visit all activities recommended for previous missed visits, as well as those which recommended in the current visit.

Regarding frequency of ANC visits; all the pregnant woman's was completed the task of 1st visit, 116 (67%) was completed the task of 2nd visit, 75 (43.5%) was completed the task of 3rd visit, and only 42 (24%) was completed the task of 4th visit.

Regarding previous history of abortions; 123 (71%) of women did not have any previous history of abortions, 45 (26%) had 1- 2 abortions and 05 (2.9%) had ≥ 3 previous abortion. (Table 2) Abortions were more common in younger age groups e.g. 18-28, 29-38 years groups. Most of the women had their abortions in their first trimester (1-12 weeks). Regarding past medical history, 114 (66%) women did not have any significant disease in the past while rest 34% had been suffering from diseases like bronchial asthma, allergies, obesity, hypertension, hypothyroid and epilepsy. Among surgical procedures, 34 (21%) had C- sections; two had cholecystectomy and herniorraphy each. For family history of diseases, hypertension (08), diabetes (19), while 26 had both Hypertension (HTN) and Diabetes

(DM) in their families. 120 women did not have positive family history of illness.

Past obstetrical history showed that 139 (80.4%) women were previously delivered normally and 27 (15.6%) had 1-2 Caesarian sections whereas 7 (4%) women had ≥3 caesarian sections.  50 women's have given abortion history, 34 had C-section, 05 women's had gestational diabetes (GD), only one women had history of ectopic pregnancy, only 04 women's had low-birth weight, and only one women had rhesus incompatibility. Only 3 women had history of neonatal death including one infant death and all of them booked for ANC visit after first trimester. Currently 92 (53.1%) women had high risk pregnancy and 81 (46.8%) women was low risk pregnancy. Among remaining 74 women's, 07 women's (3.7%) presented with antepartum hemorrhage, 05 women's (2.8%) had (GD), and only one woman was hypertensive.

Regarding vaccination status of tetanus toxoid (TT), 103 (59.5%) were fully vaccinated for TT, 63 (36.5%) were partially vaccinated whereas 7 (4%) had non availability TT records. All women underwent lab investigations namely hemoglobin, blood sugar, VDRL, Rubella, toxoplasmosis and HBsAg (Hepatitis b surface antigen) at first or subsequent ANC visits. Hemoglobin (HB) was checked in 168 (97%) booked women. Only 05 women had HB not done and all were in first trimester supposed to be done as the criteria set by WHO. All pregnant women except for one were prescribed folic acid at their first ANC visit regardless of gestational age.

Regarding physical examination, mean BMI (Body Mass Index) was 28. 1 (± 5.6 SD). 04 (2.3%) women were underweight, 33 (19%) normal, 72 (51%) overweight (BMI between 25-32.3) and 31 (22%) were obese (BMI > 32.3). Data was missing in 32 (18.7%) cases. 22% of study population was obese at the time of visit.120 (69%) women did not have family history of any kind of illness.

Analysis of medical, obstetrical and family history records showed that more than half 92 (53%) were high risk pregnancy. All pregnant women labelled as high risk had mean gestational age at first visit of 14 weeks. While women with normal pregnancy 81 (47%) had their first ANC visit at mean gestational age of 17 weeks showing that women with complicated pregnancy tend to have ANC visits relatively earlier. Three high risk women who previously had neonatal death were referred. There were only 50 women's (29%) postnatal visits. Out of 173 women booked, 154 (89.5%) ended safely (alive mother and newborn), three (1.78%) aborted and one (0.58%) had still birth. 14 women's (8.14%) lost to follow up.

**Table 1: Frequency of age groups.**

| Age Groups | Frequency | Percent |
|---|---|---|
| 18 - <28 years | 55 | 31.79% |
| 28 - <38 years | 99 | 57.23% |
| 38 - <48 years | 16 | 9.25% |
| >48 years | 3 | 1.73% |
| **TOTAL** | **173** | **100.00%** |

**Table 2: Certain ANC indicators in the study population.**

| Parity | Frequency | Percentage (%) |
|---|---|---|
| 0 (Primigravida) | 41 | 23.7% |
| 1-2 | 59 | 34.1% |
| 3-4 | 39 | 22.6% |
| >5 | 34 | 19.6% |
| **Abortions** | | |
| 0 (No Abortion) | 123 | 71.1% |
| 1-2 | 45 | 26% |
| 3 and above | 05 | 2.9% |
| **Past caesarian section (CS)** | | |
| 0 | 139 | 80.4% |
| 1-2 | 27 | 15.6% |
| 3 and above | 7 | 4% |
| **Past history of IMR** | | |
| Previous history of IMR | 4( Out of 173) | 2.4% |

**Table 3: Characteristics ANC, PNC & TT Immunization of study population.**

| Variables | No. of cases | Percentage (%) |
|---|---|---|
| Registration: Expected number / year Registered number / year | 26, 000 17,300 | 100% 66% |
| **Total pregnant women enrolled** | 173 | 100% |
| 3-ANC visits: 1st visit 2nd visit 3rd visit 4th visit | 173 116 75 42 | 100% 67% 43.5% 24% |
| 4- PNC Visits a. Complete PNC visits b. One PNC visit c. Not available records | 50 101 20 | 29.2% 58.3% 11.5% |
| 5. Haemoglobin status <11 gms/dl at first visit | 40 | 23% |
| 6- Tetanus Toxoid to pregnant woman complete doses ( 6 doses) incomplete doses Not available records | 103 31 07 | 59.5% 36.5% 4% |

Table 3 depicts that out of 173 antenatal mothers, all the four visits completed people were only 24%. At the first antenatal visits it was 100%, subsequent visits there was drastic fall in the antenatal visits. Similarly among the post natal visits, about only 29.2% mothers received post natal visits in the first week of delivery and at the end of 6 weeks of delivery (puerperal period). Coming to TT immunization, all 6 doses including previous immunization received people was only 59.5% and about 4% people TT immunization was not found. About 23% antenatal mothers were showing < 11 gms/dl haemoglobin at the first antenatal visit.

**Table 4: Categorization of pregnant women into high risk and normal pregnancies based on current & past obstetrical history, medical history and family history.**

| S. No | Variables | Frequency | Percentages |
|---|---|---|---|
| 1 | Previous Obstetrical History<br>Bad obstetrical  history<br>Normal Pregnancy | 70<br>103 | 40.4%<br>59.5% |
| 2 | • Present Pregnancy<br>• Normal<br>• Gestational Diabetes<br>• Antepartum Haemorrhage<br>• Rhesus incompatibility<br>• Multiple pregnancy | 159<br>5<br>7<br>1<br>1 | 90.9%<br>2.8%<br>3.7%<br>.58%<br>.58% |
| 3 | • Medical History<br>• HTN, Diabetes, Asthma, Obesity<br>• Have no medical illness | 114<br>59 | 65.8%<br>34.1% |
| 4 | • Family History<br>• Positive family history of chronic illness (HTN, DM)<br>• No family history of chronic illness | 53<br><br>120 | 30.6%<br><br>69.3% |
| 5 | High Risk Pregnancies<br>• Yes<br>• No (low risk) | 92<br>81 | 53.1%<br>46.8% |
| 6 | Pregnancy outcome in terms of neonates<br>• Abortion<br>• Still birth<br>• Alive<br>• Missing | 3<br>1<br>154<br>15 | 1.74%<br>0.58%<br>89.5%<br>8.2% |
| 7 | BMI<br>Calculated BMI<br>Not Calculated BMI<br>Among calculated BMI 25-32.3<br>BMI > 32.3 | 141<br>32<br>72<br>31 | 81.5%<br>18.5%<br>51%<br>22% |
| 8 | Blood sugar<br>Undergone test<br>Not undergone test<br>Among test > 110mg/dl | 152<br>21<br>5 | 88%<br>12%<br>3.2% |

**Table 5: Serological inferences among antenatal mothers.**

| Test | Number | NA/Not done | Positive | Negative |
|---|---|---|---|---|
| VDRL | 173 | 65(47%) | 1(0.5%) | 107(52.5%) |
| HBsAg | 173 | 43(25%) | 0(0%) | 130(75%) |
| Rubella | 173 | 70(41%) | 28(16%) | 75(43%) |
| Toxoplasmosis | 173 | 66(38%) | 25(15%) | 82(47%) |

**Table 5 revealed that VDRL sero prevalence was about 0.5% and Rubella positivity was about 16%.**

## DISCUSSION

The present retrospective study was conducted at Primary Health care centers (PHCs) in Al Qassim region of KSA from the year march 2013 to October 2013. Current study found that out of 173 pregnant women enrolled in the study and followed up till delivery, 71% (n = 123) had their first ANC visit at the recommended period before 16 weeks gestation whereas 29% (n=50) came for first antenatal visit after 16 weeks of gestation. Only 27 (15.6%) women had four ANC visits. More than half of the women 99 (57%) were in 28-38 years age group. Analysis of medical, obstetrical and family history records showed that more than half 92 (53%)

were high risk pregnancy. All pregnant women labeled as high risk has mean gestational age at first visit of 14 weeks. While women with normal pregnancy 81 (47%) had their first ANC visit at mean gestational age of 17 weeks showing that women with complicated pregnancy tend to have ANC visits relatively earlier. There were only 50 (29%) postnatal visits.

For complete information related to current pregnancy and components of the care to be provided, it requires more than one ANC visit. In addition to number of visits, timing at the time of first visit is very important for healthy outcome.[15] In our study, out of 173, only 27

(15.6%) had all four antenatal as recommended by WHO. 71% (n = 123) had their first ANC visit at the recommended period before 16 weeks whereas 29% (n=50) came for first antenatal visit after 16 weeks of gestation. Out of 92 high risk pregnancies, had mean gestational age at first visit of 14 weeks, showing compliance with WHO new ANC model. Results showed that outcome of pregnancy was comparable to standard ANC model as 89% of pregnancies ended successfully with 7.4% lost to follow up.

Regarding BMI among study population, 04 (2.3%) women were underweight, 34 (24%) normal, 72 (51%) overweight and 31 (22%) were obese. Data was missing in 32 (18.7%) cases. A total of 73% of study population was overweight and obese during time of the antenatal visits. Mean body mass index in the study population was (28.11). This figure reflects alarming situation about obesity and also obesity associated co-morbidities and immediate correction is required. Fat food consciousness is required since adolescence and younger age. Findings are consistent with prevalence of obesity in Saudi Arabia.[16]It has been documented that pregnant women consume more food mostly of high calories than they normally would thinking that they have to compensate for two e.g. mother and fetus.[17] However as there was no baseline data on weight before pregnancy, so it could not be commented that weather this weight gain is due to pregnancy or women is obese.

Similar results observed with the study conducted in Bosnia & Herzegovina[25,26] Obesity and increasing of obesity in young women is a major public health problem in the entire world and the same is in Bosnia and Herzegovina study. Obesity and over weightness can result in adverse pregnancy, childbirth, and neonatal outcomes[27] Furthermore, the results of this present study, similar observations on body mass index with the study conducted in Bosnia and mentioned results in the following. In early stages of pregnancy, the majority of pregnant women were overweight 50.8 %, there were 24.8 % obese women and 24.5 % had normal weight. At the end of the pregnancy, the highest number was obese pregnant women 71.2 %, while 25.2 % pregnant women were overweight, and only 3.6 % pregnant women had normal weight.

The new ANC model prescribes maximum of 04 clinic visits and limited investigations for low-risk pregnant women whereas at the same time classifying the pregnant women into basic care and special care groups. In current study, following ANC model, PHCs provided four visits to enrolled women. Regarding frequency of ANC visits; all the pregnant woman's was completed the task of 1st visit, 116 (67%) was completed the task of 2nd visit, 75 (43.5%) was completed the task of 3rd visit, and only 42 (24%) was completed the task of 4th visit. This could be explained by the fact that depending upon current & past obstetrical history, medical and family history women were divided into low risk and high risk

pregnancy and this risk assessment done and repeated every ANC visit and any lady included in high risk group is not legible for basic component of ANC in PHCC and referred to hospital. Out of 173 women booked, 154 (89.5%) ended safely (alive mother and newborn), three (1.78%) aborted and one (0.58%) had still birth. 14 (8.14%) lost to follow up, though only 27 women have completed all four antenatal visits. The results are comparable to the trial [13, 19] conducted in for countries including KSA which showed that safer pregnancy outcomes could be achieve with reduced ANC visits. Provision of antenatal care is regarded as a cornerstone of maternal and perinatal health care and is expected to have a considerable impact on achieving the Millennium Development Goals (goal 5, which aims to improve the health of mothers; a large part of goal 4, which focuses on reducing child mortality.[24] Antenatal assessment gives a simple guide to the situation in general and could be used for further in depth analyses that might lead to significant improvements of the antenatal care level in primary health care. The application of this tool will be used in different nationwide primary health care centres is recommended.

WHO new ANC model tends to classify pregnant women into two groups, those need routine care and other high risk group qualifying for special care. In current study, ANC card being used in PHCs is comprehensive enough to provide all information required for high risk classification. That's why all classified women were timely referred and ended in safe mother and baby. However Ekele et al[18] reported that 234 pregnant women enrolled for the study, 157 (67%) were eligible for the basic component and 41 (18%) for special care however they could not classify remaining 36 (15%) women into any category based on the available information from card. Most (89%) of the unclassified group data on newborn was missing. Such deficiencies pose a problem in identification of women needing special care during reduced visits and can result in bad obstetric outcomes.

In the present study, out of 173 individuals, 53% were screened for syphilis and 47% were not undergone screening and the prevalence was only 05%. Other studies conducted in South Africa screening level among antenatal mothers was 18% only [20, 21]. Coming to Tetanus Toxoid immunization, all 6 doses including previous immunization received people was only 59.5%. Similar results observed with study conducted in South Africa in Rural health centre, Tetanus toxoid prophylaxis vaccination was recorded for more than half (55%) of the pregnant women. No demographic variable in this study contributed significantly either for early booking (first trimester) or for the total number of antenatal visits.[22,23]

## CONCLUSIONS
Based on the study results, out of 173 antenatal mothers, the registration at first antenatal visit is good and little improvement to be gained before 12 weeks of

registration. second thing is all the mothers must be registered and avail the facilities of all the four antenatal visits at regular intervals and regular follow up with the concerned doctors advise for healthy mother and new born. In the present study only about 24% of pregnant women's were completed all the four antenatal visits. Similarly among the post natal visits, about 29.2% mothers only received two post natal visits in the first week of delivery and at the end of 6 weeks of delivery (puerperal period). Coming to TT immunization, all 6 doses including previous immunization received during childhood was only documented in 59.5% and in about 4% of pregnant women's TT immunization was not documented. About 23% antenatal mothers were showing low haemoglobin (< 11 gms/dl) at the first antenatal visit. There is a need to improve and adopt new WHO model of Antenatal care programme at primary health centres where more number of visits will give more exposure to health care facility to safe guard of mother and child in terms of mortality and morbidity. Similar studies in our region are required for the substantiation of our study findings and this study will create the awareness about complete filling of antenatal cards and also indirectly giving alarms about antenatal care for further improvement at our level.

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