IJBPAS, November, 2022, 11(11): 4968-4978

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

RETROSPECTIVE CROSS SECTIONAL STUDY ON INCIDENCE OF COMPLICATIONS IN PREGNANT WOMEN AND THEIR ASSOCIATION WITH CONGENITAL ANOMALIES IN NEONATES

D. DHANA LAKSHMI [*1], AFSANA MOMTAZ[1], T. PRAVEEN KUMAR[2], M. CHINNA ESWARAIAH[3]

1: Department of Pharmacy Practice, Anurag Pharmacy College, Affiliated to Jawaharlal Nehru Technological University Hyderabad, Kodad, Suryapet, India, Pin 508 206

2: Department of Pharmaceutics, Anurag Pharmacy College, Affiliated to Jawaharlal Nehru Technological University Hyderabad, Kodad, Suryapet, India, Pin 508 206

3: Department of Pharmacognosy, Anurag Pharmacy College, Affiliated to Jawaharlal Nehru Technological University Hyderabad, Kodad, Suryapet, India, Pin 508 206

***Corresponding Author: D. Dhana Lakshmi: E Mail: praveensuri1@gmail.com**

Received 26th Jan. 2022; Revised 24th Feb. 2022; Accepted 12th March 2022; Available online 1st Nov. 2022

https://doi.org/10.31032/IJBPAS/2022/11.11.6531

ABSTRACT

Background: Pregnancy and childbirth were seen as a rebirth for women. Maternal complications and abnormalities in newborns provide a traumatic experience for the pregnant woman and her family. **Aim:** The aim was to study the incidence of complications in pregnant women and their association with congenital anomalies in newborns. **Methodology:** Our study is a retrospective study conducted over a 1-year period from January 2020 to December 2020 in the Obstetrics and Gynaecology department of several tertiary hospitals with a sample of 301 patients. The severity of complications was assessed in pregnant women and newborns. Data were statistically analyzed using MS Office 2007 and Graph Pad Prism 8 software. **Results:** We had observed more maternal complications and neonatal deaths in multi gravid women than in prima gravid women. Among the 54 complications reported, the maximum complications were due to Anemia (16.5%) followed by Preeclempsia (11.5%), Gestational diabetes mellitus (10.5%), premature rupture of membrane (9.2%). In our study,

full-term pregnancies were reported in 158 cases and preterm pregnancies in 143 cases. Of 301 cases, live newborns were reported in 74.7% of cases, followed by intrauterine deaths (4.3%), neonatal deaths (5.6%), stillbirths (11.2%), termination of pregnancy (3.9%). The body system most affected by abnormalities was the central nervous system (11.6%), followed by the respiratory system (11.2%). Major abnormalities were observed in 38.2% of the infants and minor abnormalities in 14.6% of the infants. **Conclusion:** From our study it was concluded that each factor had a profound influence on maternal complications and neonatal abnormalities i.e multi factorial etiology.

Keywords: High Risk Pregnancy, Maternal complications, neonatal abnormalities, prenatal care, still birth

INTRODUCTION

The phenomenon of pregnancy for every woman is a beautiful and pleasant experience that is associated with many physiological changes **[1]**. Most pregnancies happen without complications. However, some pregnant women will experience complications that can affect their health, their baby's health, or both. Sometimes the diseases or conditions that the mother had before getting pregnant can lead to complications during the pregnancy. Even with complications, early diagnosis and antenatal care can reduce any additional risks to mother and baby **[2]**.

Women experience common pregnancy-related complications such as gestational diabetes mellitus **[3],** pre-eclempsia **[4],** intrauterine growth retardation **[5],** polycystic ovary syndrome, thyroid disorders, autoimmune diseases, anti phospholipid syndrome **[6]**, preterm labor **[7]** and abortion **[8]**. The treatment; management of expectations, vacuum aspiration or surgical emptying of the uterus also causes complications **[9]**. Identifying risk factors for early pregnancy complications is helpful in treating the underlying condition before future conception.

World health organization defines congenital anomalies as structural or functional abnormalities, including metabolic disorders that are present at birth. About 40-60% of congenital anomalies are of unknown etiology **[10]**. In 20-25% of anomalies the cause is multifactorial, 10-13% due to the environment and 12-25% due to genetic causes. Risk factors include maternal and paternal age, teratogens, and nutritional deficiencies, low socioeconomic status and poor antenatal care prevent early diagnosis of malformations **[11]**.

High-risk pregnancy (HRP) is a condition in which the mother, the developing fetus, or both are at increased risk for complications during or after pregnancy

[12]. To date, several studies have been conducted in developed countries to evaluate the determinants of high risk pregnancy, but the risk factors varied for different ethnic group **[13]**. Furthermore, there are no studies that have characterized congenital anomalies in women with HRP with different obstetric history.

Therefore, the present study aimed to determine the prevalence, types and distribution of various Congenital Anomalies and also to know the various risk factors for different obstetric histories.

METHODOLOGY

This study was a descriptive, cross-sectional retrospective study conducted over a 1-year period from January 2020 to December 2020 in Obstetrics and Gynecology department of several tertiary hospitals. A total of 301 cases were included in our study.

Inclusion criterion

All newly enrolled pregnant women who have been seen in hospitalization and in outpatient clinics of the Department of Obstetrics and Gynaecology, regardless of duration of pregnancy, age, consanguinity, parity, family history, diet, maternal complications, and type of pregnancy outcome. Inclusion criteria for infants were age less than 9 months, sex, birth weight of infants <2500 to> 2500g, type of birth, systems of anomaly, and severity of abnormalities.

Exclusion criteria

The patient admitted to hospital with pregnancy for in vitro fertilization and the patient who attended the gynecological ward other than pregnancy were excluded. Patients who were not interested to give their data were excluded from the study.

Ethical consideration

The study protocol was approved by the Institutional Ethics Committee prior to the start of the study. Written informed consent was requested from all pregnant women before requesting data collection. The woman's identity was kept confidential.

Study procedure

Simple random sampling was done to collect the data. The patients were then classified according to their disease status. The severity of complications was assessed in pregnant women and newborns.

Evaluation methods

Relevant data was collected from past medical history and current medical history. Physical examination followed by confirmation from investigations, eg. Ultrasounds, x-rays, ultrasound scans and also through expert opinion of the pediatrician were performed to confirm abnormalities in newborns.

Statistic analysis

Statistical analysis was performed by Microsoft Office (MS-Word, MS-Excel) and student T test and Chi Square test was done using Graph Pad Prism wherever

applicable. Analysis of descriptive data was performed as a percentage of demographic variables.

RESULTS

Maternal factors

All cases were classified as age, parity, nutritional status, parental consanguinity, family history, gestational period, maternal complications, fetal sex, birth weight, and type of delivery, conditions of pregnancy, fetal abnormalities, and severity of the abnormality.

We studied cases between the ages of 16 and 40, attending the Obstetrics and Gynecology services of tertiary hospitals. There are 47 cases in 16 to 20 year age group and 145 cases in 21 to 25 year age group, 81 cases in 26 to 30 year age group, 23 cases in 31 to 35 year age group and 5 cases in age group from 36 to 40 years **(Table 1)**.

When we compared the severity of abnormalities in infants with the age of the mother, it was observed that 15 cases were Major, 5 minor abnormalities in 16 to 20 age group, 52 cases were Major, 29 minor abnormalities in the 21-25 year age group. 32 cases were Major, 7 minor abnormalities in the age group 26 to 30, 14 cases were Major, 3 minor abnormalities in age group 31 to 35. 2 cases had Major abnormalities in the 36-40 year age group **(Table 2)**.

Among the 301 cases studied, 143 cases had primary gestation with 117 complications, 29 neonatal deaths were reported and 158 cases were multiple pregnant women with 130 complications and 47 neonatal deaths were reported **(Table 3)**.

Among the 301 cases, 219 were fed and 82 were malnourished during gestational age. We observed the nutritional status of mothers with maternal complications and the severity of the anomalies. It was found that out of 219 nursing mothers, 178 had complications and 41 had no complications, of which 175 gave birth to live babies and 44 neonatal deaths were reported. In 82 malnourished mothers, 69 had complications and 13 had no complications, of which 50 were live newborns and 32 neonatal deaths were reported **(Table 3)**.

Out of 301 cases, 89 cases were related to consanguineous marriage, of which 57 developed complications and 21 newborns deaths were reported 212 cases did not have consanguineous marriage, of which 102 developed complications and 55 newborn deaths were reported **(Table 3)**.

Among 301 cases, a gestation period of 12 weeks was observed in 3 cases which resulted in incidence of complications in mother and death of neonate in 3 cases, a gestation period of 13-24 weeks was observed in 8 cases which resulted in incidence of complications in 4 pregnant women and death were reported in 8 neonates, a gestation period of 25-36 weeks

was observed in 111 cases which resulted in incidence of complications in 95 pregnant women and death of neonate were seen in 42 cases, and a gestation period of 37 -40 weeks was observed in 161 cases which resulted in incidence of complications in 131 pregnant women and 22death of neonate were reported . A gestation period of over 40 weeks was observed in 35 cases which resulted in incidence of complications in 18 pregnant women and 1 death of neonates was reported **(Table 4)**.

Family history was reported in 128 cases. 105 infants were alive and 23 were aborted and the main family history of abortion is congenital anomalies. Most cases had a family history of cardiovascular disease 48.43% (62), diabetes mellitus 27.34% (35) congenital anomalies 10.93% (14).173 cases have no family history, but 102 of them had maternal complications and 120 were live infants and 53 were died **(Figure 1)**.

Among 301 cases, 247 cases had 303 complications. The most prevalent maternal complication was anemia, reported in 16.5% (50) of cases leading to 42 live and 8 stillbirths. The second most common complication was pre eclempsia reported in 11.5% (35) cases resulting in 9 deaths and 26 live infants, followed by diabetes mellitus in 10.5% (32) of cases with 24 live and 8 deceased newborns. Premature rupture of membrane was observed in 9.2% (28) of cases with 22 alive and 6 deaths. Gestational hypertension was observed in 8.5% (26) of cases with 21 alive and 5 deaths.54 cases had no maternal complications.

But among them 40 infants were alive and 14 infants were reported dead due to a congenital anomaly in family history. Among the 40 live infants, 23 had no family history and 17 had a family history.

Fetal factors

Among the 301 cases, 157 were male and 136 were female new borns. Gender was not identified in 8 cases as they were aborted due to complications. Among them, 39 male and 29 female infants were reported dead (Student test: P value 0.0105) **(Table 5)**.

Among the 301 cases, 152 infants had a birth weight greater than 2.5 kg and 134 had a birth weight of less than 2.5 kg. Weight was not recorded in 14 infants (Chi square test: P value <0.0001) **(Table 5)**.

Full term pregnancy was reported in 158 cases. Preterm delivery was reported in 129 cases, followed by preterm delivery (hysterectomy) in 5 cases, preterm delivery (Medical termination of pregnancy 1) in 5 cases, preterm delivery (Medical termination of pregnancy 2) in 3 cases, preterm delivery (Medical termination of pregnancy2) (hysterectomy) in 1 case (Student test: P value 0.0288) **(Table 5)**.

Among 301 cases, 225 cases of live newborns and 13 cases of Intra uterine death, 17 cases of neonatal death, 34 cases of stillbirth and 12 cases of birth were reported **(Table 6)**.

Among 159 neonates, 62 anomalies were reported. Highest reported anomaly was Asphyxia 11.24 % (19) followed by Respiratory Distress Syndrome8.28% (14), IUGR 5.32 % (9), Cleft lip, Infant septicemia, Spina bifida were seen in 4.14 % (7).

Among 301 cases, 159 cases had anomalies. The body system most affected by abnormalities was the central nervous system 11.62% (35) which resulted in 17 neonatal deaths followed by the respiratory system 11.29% (34) which resulted in 5 neonatal deaths, musculoskeletal system 5.64% (17), cardiovascular system 4.98% (15), chromosomal abnormality 4.98% (15) resulting in 4 neonatal deaths. Most neonatal deaths have also been reported in central nervous and respiratory system abnormalities.

In 301 cases, 115 had major abnormalities leading to 80 live infants and 35 infants were aborted. Minor abnormalities were observed in 44 infants resulting in 43 live infants and 1 infant was aborted. 142 had no anomalies among them 102 were alive newborns and 40 newborns were aborted due to maternal complications (Chi square test: P value 0.0007) **(Table 7)**.

Table 1: Age Group Distribution of Patients

Age Group	Number
16- 20	47 (15.61%)
21-25	145 (48.17%)
26-30	81 (26.91%)
31-35	23 (7.64%)
>35	5 (1.66%)
Total	301
Mean = 24.6412, Std dev = 4.191757	

Table 2: Gravida Women Age Group with Severity of Anomalies in Neonates

Age Group	Number	Major anomalies	Minor anomalies
16- 20	47	15 (13.04%)	5 (11.36%)
21-25	145	52 (45.21%)	29 (65.90%)
26-30	81	32 (27.82%)	7 (15.90%)
31-35	23	14 (12.17 %)	3 (6.81%)
>35	5	2 (1.73 %)	0
Total	301	115	44

Table 3: Categorization of Parity with Incidence of Maternal Complications and Neonate Deaths

Parity	Number	Complications	Deaths
Primary gravida	143 (47.5%)	117(47.36%)	29(38.15 %)
Multi gravida	158 (52.49 %)	130 (52.63 %)	47 (61.84%)
Nutritional status			
Nourished	219 (72.75 %)	178(72.06%)	44 (57.89%)
Undernourished	82(27.24 %)	69(27.93%)	32 (42.10 %)
Parental consanguinity			
Consanguineous marriage	89 (29.56 %)	57 (35.84%)	21(39.62 %)
Non-consanguineous marriage	212 (70.43 %)	102 (64.15 %)	55 (60.37%)

Table 4: Gestation Period of Pregnant Women

Gestation period	Number	Complication	Death
12 weeks	3 (0.99%)	3 (1.21%)	3 (3.94%)
13- 24	8 (2.65%)	4 (1.61%)	8 (10.52%)
25-36	111 (36.87 %)	95 (38.4%)	42 (55.26 %)
37-40	161 (53.4%)	131 (53.03%)	22 (28.94%)
> 40	18 (5.9%)	14(5.66%)	1 (1.31%)

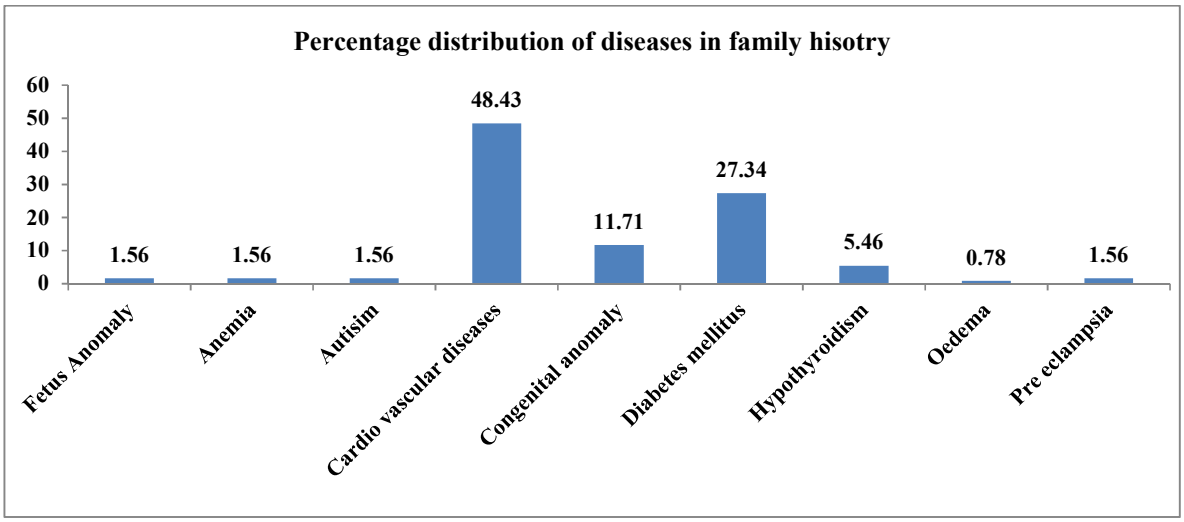

Figure 1: Incidence of diseases in family history in gravida women

Table 5: Categorization of Neonatal Factors

Sex	Number	Death	P value
Male	157 (53.58%)	39 (42.64%)	0.0105
Female	136 (46.41%)	29 (57.35%)	
Birth weight			
>2500g	152 (50.49 %)	20 (26.31%)	<0.0001
<2500 g	135 (44.85 %)	42 (55.26%)	
Weight not recorded	14 (4.65%)	14 (18.42 %)	
Terms of pregnancy			
Full term	158 (52.49 %)	20 (26.31 %)	0.0288
Pre term	143 (42.85%)	56 (55.26 %)	

Table 6: Incidence of Type of Birth in Neonates

Type of birth	Number
Intra Uterine Death	13 (4.31%)
Live	225 (74.75%)
Neonatal death	17 (5.64%)
Still Birth	34 (11.29%)
Termination of pregnancy	12 (3.98%)

Table 7: Categorization of severity of anomalies with incidence of live and death in neonates

Severity of Anomalies	Number	Live	Death	P value
Major	115 (35.20%)	80 (35.55 %)	35 (46.05 %)	0.0007
Minor	44 (14.61%)	43 (19.11 %)	1 (1.31 %)	
No anomaly	142 (47.17%)	102 (45.33%)	40 (52.63%)	
Total	301	225	76	

DISCUSSION

With nutritional deficiency diseases and infections, congenital anomalies have become the leading causes of perinatal mortality in developed countries and in developing countries **[14]**.

Delivery at a young maternal age (i.e., ≤ 19 years) or later (i.e., ≥ 35 years) is associated with an increased risk of maternal adverse perinatal outcomes and neonates including preterm delivery, poor fetal growth, low birth weight and neonatal mortality, gestational diabetes **[15]**. The incidence of early childhood complications and death in the primi parous group was combined with a lack of awareness of antenatal care and a lack of education. Compared to first-time mothers, multi parous mothers had a significantly higher risk of omphalocele. Neural tube defects are found mainly in multi parous mothers. In our study, multi parous mothers had more complications and neonatal deaths than primi parous women.

Lack of adequate nutrition of good quality and quantity during pregnancy can cause health problems for both the mother and the fetus. From the odds ratio value it is evident that poor maternal nutritional status has been associated with adverse delivery outcomes.

The frequency of congenital malformations among consanguineous children is approximately double the frequency in the general population. Consanguineous marriage has been reported to be an important factor in the development of autosomal recessive diseases, infant mortality, infant death, miscarriage and stillbirth. Similar results were observed in our study, the incidence of complications was 64.04% in consanguineous marriages and the incidence of complications was 48.1% in unrelated marriages.

In our study, out of 76 aborted infants, 14 (18.4%) were aborted with a congenital anomaly in family history. For several major defects, an affected parent has a higher risk of giving birth to a child with the same malformation than an unaffected parent.

In our study, the incidence of congenital anomalies was higher in preterm and stillbirths than in full-term gestation. Similarly Taksande A, *et al* also found a higher incidence of congenital malformations in stillbirths. Major malformations are generally incompatible with life, which may be the reason for the high incidence of congenital malformations in stillborn babies **[16]**.

Male gender carries an increased risk of adverse neonatal outcomes, including preterm delivery, macrosomia, surgical delivery, neonatal death, and congenital anomaly similar to our findings. The hypothesis of these alterations is that male

fetuses are more vulnerable to environmental stimulation **[17]**.

Perinatal morbidity and mortality is more common in low birth weight than in normal infants and has become the second leading cause of death after preterm delivery. Women who have given birth prematurely have a higher risk of recurrent preterm birth, those who have had pre-eclempsia have a higher risk of pre-eclempsia in subsequent pregnancies, and women who have developed gestational diabetes will likely develop it again. Few published studies have compared the effects of gestational diabetes with those prior to gestational diabetes **[18]**. Our findings are consistent with the previous report showing that prior gestational diabetes confers an increased risk of adverse pregnancy outcomes, including a nearly fourfold increase in the risk of stillbirth and fetal distress.

Cardiovascular risk factors present years before pregnancy were associated with an increased risk of preeclampsia. In 2010 Bronsens *et al*., **[19]** suggested that a defective deep placenta was associated with pregnancy complications including preeclampsia, intrauterine growth restriction, preterm labor, premature rupture of membranes, late miscarriage and detachment of the placenta. The most prevalent maternal complication in our study was anemia followed by pre eclempsia, gestational diabetes mellitus, prom, and gestational hypertension.

Peters *et al*. reported that giving birth to more babies was associated with an increased risk of congestive heart diseases in the future, while breastfeeding was associated with a lower risk of congestive heart diseases; women who had children and were breastfeeding had a non-significantly increased risk of coronary heart disease **[20]**. Babies whose mothers had pre-eclempsia are also at greater risk for later problems, even if they are born later. Anemia is the most common complication of pregnancy. Deficiency of iron and folic acid were the main risk factors responsible for anemia. Similar results were reported in our study.

CONCLUSION

From the present study it was concluded that congenital anomalies and death in infants were significantly associated with age, parity, family history, maternal complications, parental consanguinity and nutritious diet. Each factor had a profound effect on pregnancy outcomes. Greater emphasis should be placed on the prevention of congenital anomalies through regular antenatal care, early diagnosis, prenatal ultrasound, genetic counseling, and management services should be provided to improve outcome. Collaboration between obstetrician, pediatrician, geneticist and

ecologist is necessary for the management of vital congenital anomalies.

ACKNOWLEDGEMENTS

The authors would like to thank the patients for their participation. We would also like to thank M. Chinna Eswaraiah, Principal of Anurag Pharmacy College, Kodad for his continuous support and guidance in completing the work.

REFERENCES

[1] Spence NJ, The long-term consequences of childbearing physical and psychological well-being of mothers in later life, Res Aging, 30(6), 2008, 722-51.

[2] Mandelson MT, Maden CB, Daling JR, Low birth weight in relation to multiple induced abortion, Am J Public Healt, 82, 1992, 391-4.

[3] Bellamy L, Casas JP, Hingorani AD, Williams D, Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis, Lancet, 373, 2009, 1773–1779.

[4] Bellamy L, Casas JP, Hingorani AD, Williams DJ, Pre-eclampsia and risk of cardiovascular disease and cancer in later life: systematic review and meta-analysis, BMJ, 335, 2007, 974.

[5] Davey Smith G, Sterne J, Tynelius P, Lawlor DA, Rasmussen F, Birth weight of offspring and subsequent cardiovascular mortality of the parents, Epidemiology, 16, 2005, 563–569.

[6] Meharunnisa K, Shahla B, Aneela SB, Risk Factors in Early Pregnancy Complications, J CollPhysSurg Pak,20(11), 2010, 744-747.

[7] Davey Smith G, Whitley E, Gissler M, Hemminki E, Birth dimensions of offspring, premature birth, and the mortality of mothers, Lancet, 356, 2000, 2066 –2067.

[8] Virk J, Zhang J, Oslen J, Medical abortion and the risk of subsequent adverse pregnancy outcomes, N Engl J Med, 357, 2007, 648-53.

[9] Nanda K, Peloggia A, Grimes D, Lopez L, Nanda G, Expectant care versus surgical treatment for miscarriage Cochrane, Database Syst Rev, 2, 2006, CD003518.

[10] Amar T, Krishna V, Pushpa C, Manish J, Congenital mal-formations at birth in Central India: a rural medical college hospital based data, Ind J Hum Genet, 16, 2010, 159–63.

[11] Patel ZM, Adhia RA, Birth defects surveillance study, Ind J Pediatr, 72, 2005, 489-91.

[12] Jonathan MC, Edward AJ, Eduardo C, Wellington PM, Luciano MMN, Antonio FM,

Applicability of the rapid biophysical profile in antepartum fetal well-being assessment in high-risk pregnancies from a University Hospital in Sa˜o Paulo, Brazil: preliminary results, ObstGynecol2013, 2013, 329542.

[13] Hafez Samar K, Dorgham Laila SH, Sayed Suheir AM, Profile of High Risk Pregnancy among Saudi Women in Taif-KSA, World J Med Sci, 11, 2014, 90–7.

[14] Swain S, Agrawal A, Bhatia BD, Congenital malformations at birth, IndPediatr, 31, 1994, 1187-91.

[15] Yogev Y, Melamed N, Bardin R, Tenenbaum-Gavish K, Ben-Shitrit G, Ben-Haroush A, Pregnancy outcome at extremely advanced maternal age, Am J ObstetGynecol, 203(6), 2010, e551–e558.

[16] Taksande A, Vilhekar K, Chaturvedi P, Jain M, Congenital malformation at birth in central india, Ind J human Genet,16, 2010, 159-63.

[17] Song S, Evidence of adaptive intergenerational sex ratio adjustment in contemporary human populations, Theor. Popul. Biol, 92, 2014, 14–21.

[18] Fong A, Serra T, Herrero D, Pan, Ogunyemi D, Pregestational versus gestational diabetes: a population based study on clinical and demographic differences, J Diabetes Complications, 28(1), 2014, 29–34.

[19] Brosens I, Pijnenborg R, Vercruysse L, Romero R, The Great Obstetrical Syndromes are associated with disorders of deep placentation, Am J Obstet. Gynecol, 204, 2011, 193–201.

[20] Peters SA *et al*, Parity, breastfeeding and risk of coronary heart disease: A pan-European case-cohort study, Eur J PrevCardiol, 23, 2016, 1755–1765.