Fetal Development Insights: The Prevalence of Abnormalities Diagnosed on 18-24 Week Ultrasound

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Abstract:

Anatomical and functional abnormalities with a prenatal aetiology that are noticeable at birth are referred to as congenital disorders, birth defects, or fetal anomalies. Usually, they fall into two categories: minor anomalies and major anomalies. Congenital abnormalities include heart defects, neural tube defects, respiratory system defects, gastrointestinal system defects, musculoskeletal system defects, genitourinary system anomalies, anterior abdominal wall anomalies, and reproductive system anomalies. The term "Anomaly scan" refers to the ultrasound examination performed in the first or second trimester of pregnancy to identify foetal abnormalities and verify normal grow. The objective of my study was to estimate the prevalence of fetal anomalies at 18 to 22 weeks of pregnancy with the help of sonography. In most parts of the world, congenital abnormalities are a common cause of foetal morbidity and mortality. 360 samples of abnormality scan reports from women 18 to 24 weeks pregnant were provided for this study by the Rawal General Hospital, Life Care Lab, and Medical Diagnostic Centre. Most of the patients in this study were between the ages of 25 and 35, and they were between 18 and 24 weeks pregnant. The most frequently reported condition is heart abnormalities, which affects 2.5% of women. Among the mother's distribution, frequency of 1 fetus is more than others and our study shows that 35 fetuses are discovered to be dead before birth, and their mothers undergo abortions. The majority of congenitally abnormal fetuses were observed in pregnant mothers between the ages of 25 and 35 years, we found that the majority of fetal abnormalities are visible at 20-22 weeks of gestation and majority of anomalies are associated with low socio-economic status. All the data were analyzed through SPSS software.

INTRODUCTION:

Fetal anomalies, birth defects, and congenital disorders are all terms used to describe anatomical and functional aberrations that are apparent at birth and have a prenatal etiology. They are typically subdivided into two categories: minor and major anomalies. A structural abnormality that is present at birth and has little impact on clinical function but could have aesthetic impacts is referred to as a minor anomaly[1]. While major congenital abnormalities are illnesses severe enough to shorten lifespans or impair regular function. When a newborn infant cannot survive without medical or surgical intervention, major deformities are considered severe[2].

Following major congenital abnormalities are anomalies that have a considerable impact on life expectancy and are present in 2-3% of live births and 20-30% of still births. Heart abnormalities are the most common morphological defects, accounting for up to 40% of all congenital malformations[3]. The prevalence of congenital heart defects (CHDs) is commonly stated as 6–8 instances per 1000 live births, with ventricular and atrial septal abnormalities being the most prevalent entities. Fetal ventriculomegaly (VM), defined as dilatation of the cerebral ventricles, is the most common intracranial anomaly detected on prenatal ultrasound, with an estimated prevalence of up to 1:500 newborns (0.3–1.5/10). The majority of confirmed congenital lung malformations, or congenital pulmonary airway malformations (CPAMs), formerly known as congenital cystic adenomatoid malformations (CCAMs), affect the fetal lung.[4]They make about 30–40% of these cases. The aberrant embryonic development of the future central nervous system leads to neural tube defects (NTDs), which are a complication. Open defects, including craniorachischisis, exencephaly-anencephaly, myelomeningoceles, and closed abnormalities, like encephalocele, meningocele, and spina bifida occulta, are the two categories into which NTDs have traditionally been subdivided. A NTC anomaly known as craniorachischisis affects both the cranial and spinal parts of the neural tube. It is the severest form of an open NTD.Congenital diaphragmatic hernia (CDH) is a serious abnormality that develops as a result of a deficiency in the diaphragm, which causes intraabdominal organs to herniate into the thoracic cavity.[5] Musculoskeletal system anomalies are Achondroplasia causes short, squat bones as a result of a reduction in endochondral bone development. The most typical skeletal dysplasia that is not fatal is this one. Achondrogenesis is a disorder characterized by cartilage defects that results in improper bone production and hypo mineralization.[6] Reproductive system anomalies are Congenital uterine anomalies (CUAs) are abnormalities in the architecture of the uterus that emerge as a result of the Mullerian ducts developing improperly during embryonic development. While most congenital uterine anomalies are asymptomatic and linked to healthy pregnancy outcomes, some may also be linked to unfavorable pregnancy outcomes.
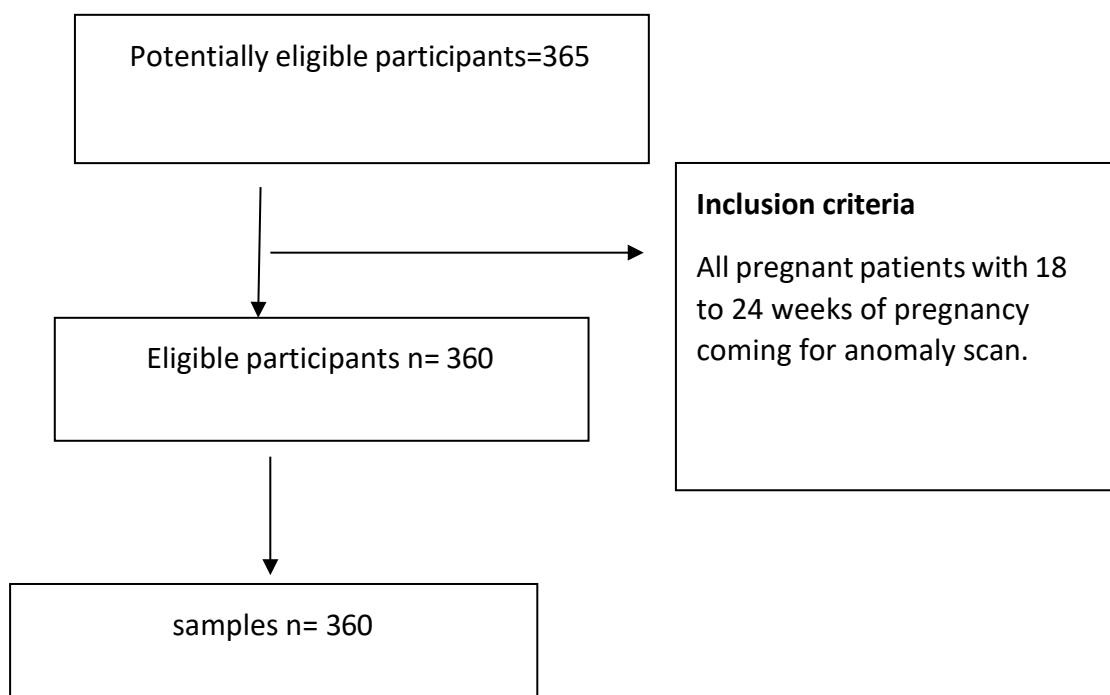
Researchers claim that a complex confluence of factors, including low socioeconomic status, pregnancy in old age, diabetes, obesity, issues with high or low blood pressure, chromosome abnormalities, drug exposure, nutrient deficiencies, and infections related to pregnancy, is to blame for the majority of birth abnormality.[4] However, due to a complex interaction between genetic and environmental factors, their incidence fluctuates over time and in different parts of

the world. They represent 15% to 30% of pediatric hospitalizations and roughly 3% of live births in the US.[8]

Patients with congenital anomalies may appear with physical problems (such as paralysis and urine and bowel control problems), blindness, deafness and lack of consciousness.[9] Pakistan still has a challenge in terms of reducing the percentage of women who terminate their pregnancies merely because of regional risk factors.

Materials and Methods:

A total of 360 samples were included which was calculated by the WHO sample size calculator. All these samples were taken from Rawal General Hospital, Life Care Lab, and Medical Diagnostic Centre. The ethical committee of university gave their approval to this study. Patient informed consent was obtained before any data was gathered. The Cross-sectional descriptive study is performed on this sample population. Inclusion criteria is all pregnant patients with 18 to 24 weeks of pregnancy coming for anomaly scan.

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│  Potentially eligible participants=365 │
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│ Eligible participants n= 360 ││ to 24 weeks of pregnancy     │
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│     samples n= 360      │
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Transabdominal ultrasonography was used in this investigation to evaluate the subjects. A sonogram, sometimes referred to as an ultrasound imaging examination, uses sound waves to create a picture of the organs, tissues, and other interior body parts. The American Congress of Obstetricians and Gynecologists (ACOG) recommends that all pregnant women have an ultrasound between weeks 11 and 13.6 and another between weeks 18 and 20. Ultrasound exam at 1st or 2nd trimester of pregnancy is done to detect fetal anomalies and to confirm normal growth and is known as Anomaly scan. It can also be called as anatomy scan. Radiologist mainly prefer doppler ultrasound while ruling out tricky fetal anomalies because 3D ultrasound has poor performance due to its inferior resolution and longer processing time than gray-scale

and color Doppler ultrasonography alone. In addition, color-flow Doppler imaging increases the likelihood that fetal heart disease can be easily detected.

Results

Complication and statistical analysis of the data was performed using IBM SPSS statistics ver.22 and MS excel. Data was analyzed using descriptive statistics such as frequency and presented in the form of percentages, graphs and charts. The study included 360 patients.
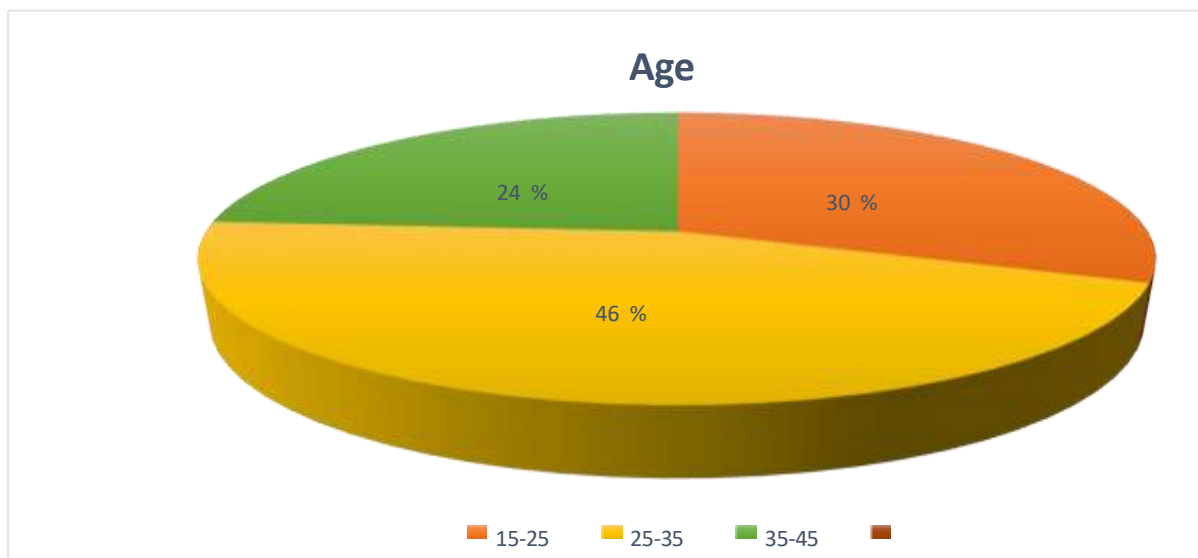

Figure 1: The respondent's age spans from 15 to 45 years. Age groups are classified into three categories, which are 15 to 25 years, 25 to 35 years and 35 to 45 years. Among patients having age between 15 to 25 years, 110 are pregnant (18 to 24 weeks), 164 women having 18 to 24 weeks pregnancy lies in 25 to 35 years age group while 38 are pregnant (18 to 24 weeks) among ages between 25 to 35 years. In this study, the majority of the patients were in the age group of 25 to 35 years having 18 to 24 weeks of pregnancy.
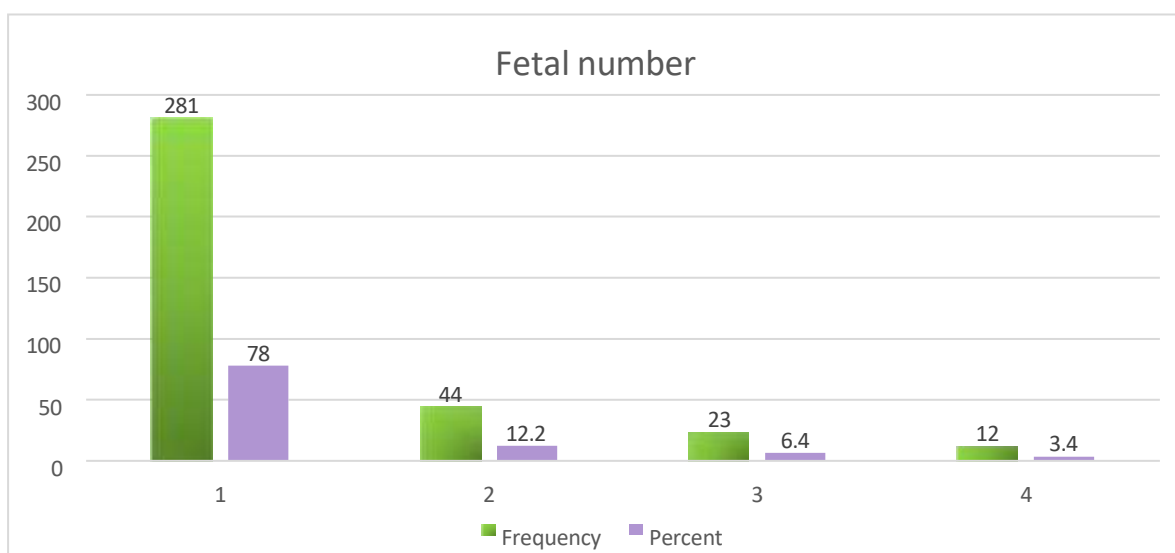

Figure 2: Among the mother's distribution according to the number of fetuses, 281 women have 1 fetus i.e. 78%, 44 women have 2 fetuses i.e. 12.2 %, 23 women have 3 fetuses i.e. 6.4%, and 12 women have 4 fetuses i.e. 3.4%. Among the mother's distribution, frequency of 1 fetus is more than others.
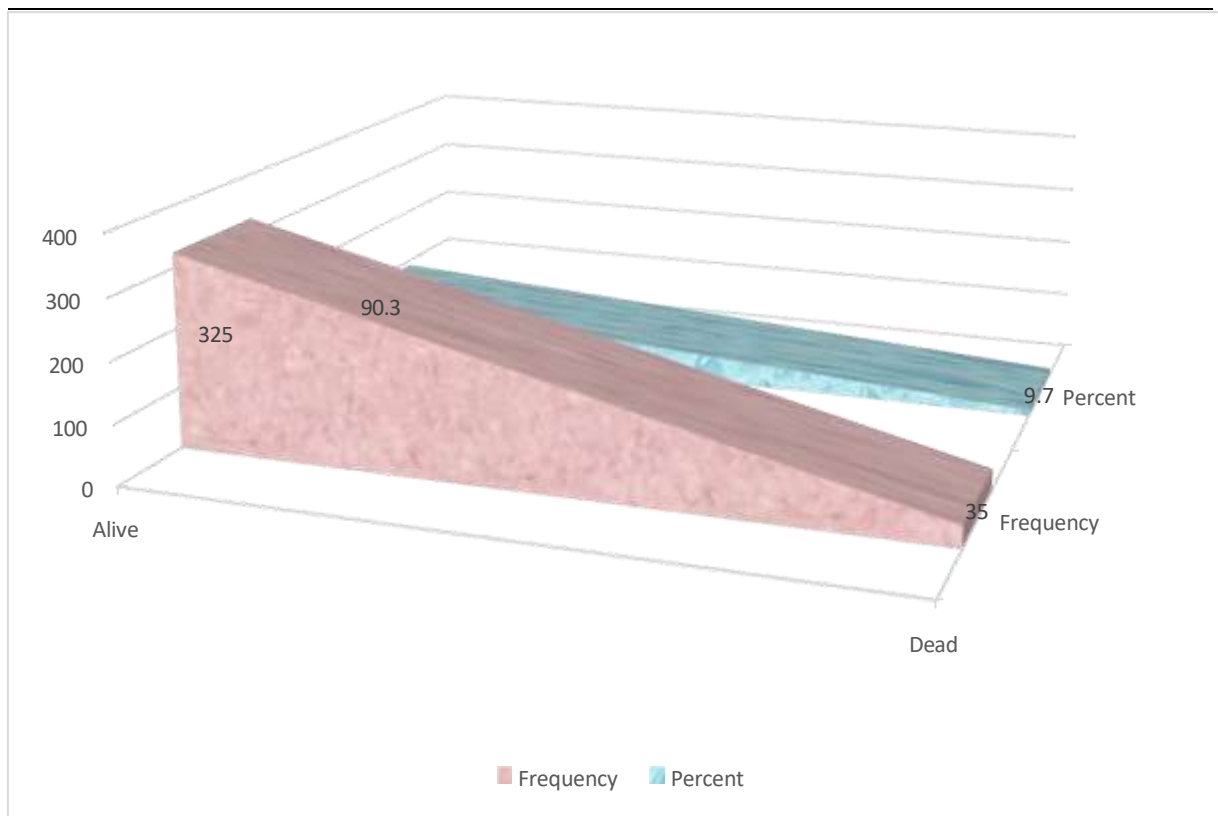
Figure 3: The data obtained showed that among 360 pregnant women, 35 fetuses are found to be dead before birth and their mothers undergo abortion. Percentage distribution of dead fetuses.

Age	Anomalies		Total
	Yes	No	
15-25 years	11	99	110
25-35 years	17	147	164
35-45 years	13	73	86
Total	41	319	360

Table 1: The prevalence of congenital anomalies in hospitals were found in 41 fetuses, or 11.4%. The majority of congenitally abnormal fetuses were observed in pregnant mothers between the ages of 25 and 35 years while mothers having ages between 15 and 25 years have least congenitally abnormal fetuses.
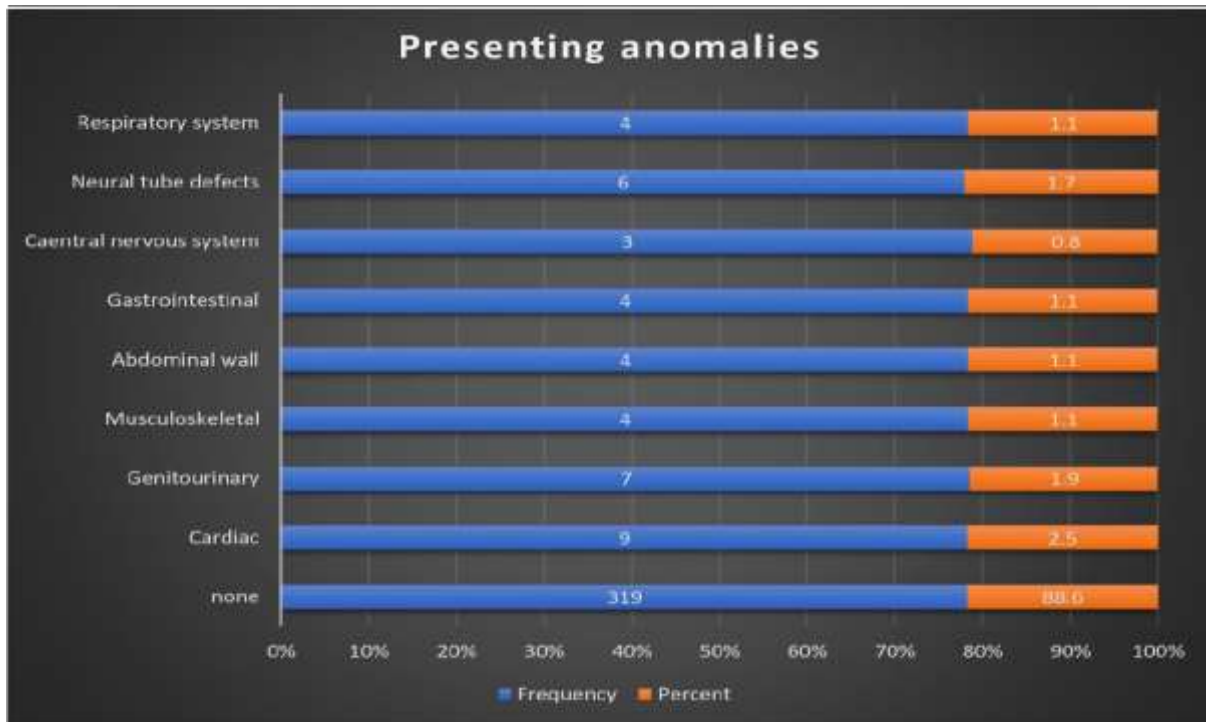
Figure 4:41 out of 360 bits were found to represent the overall prevalence of congenital abnormalities. The two most common malformations in our study are cardiac and genitourinary. The least frequent anomalies are of central nervous system. The most common reported condition is cardiac abnormalities, whereas the least common reported condition is musculoskeletal. The figure 04 displays the congenital anomalies distribution along with its relative prevalence.

Gestational age	Anomaly		
	Yes	**No**	**Total**
18-20 weeks	8	96	104
20-22 weeks	19	129	148
22-24 weeks	14	94	108
Total	41	319	360

Table 2: Among the distribution of presenting anomalies, we also categories gestational age into three groups which are 18-20, 20-22 and 22-24 weeks. After gathering data, we found that the majority of fetal abnormalities are visible at 20-22 weeks of gestation and are least visible at 1820 weeks of gestation.
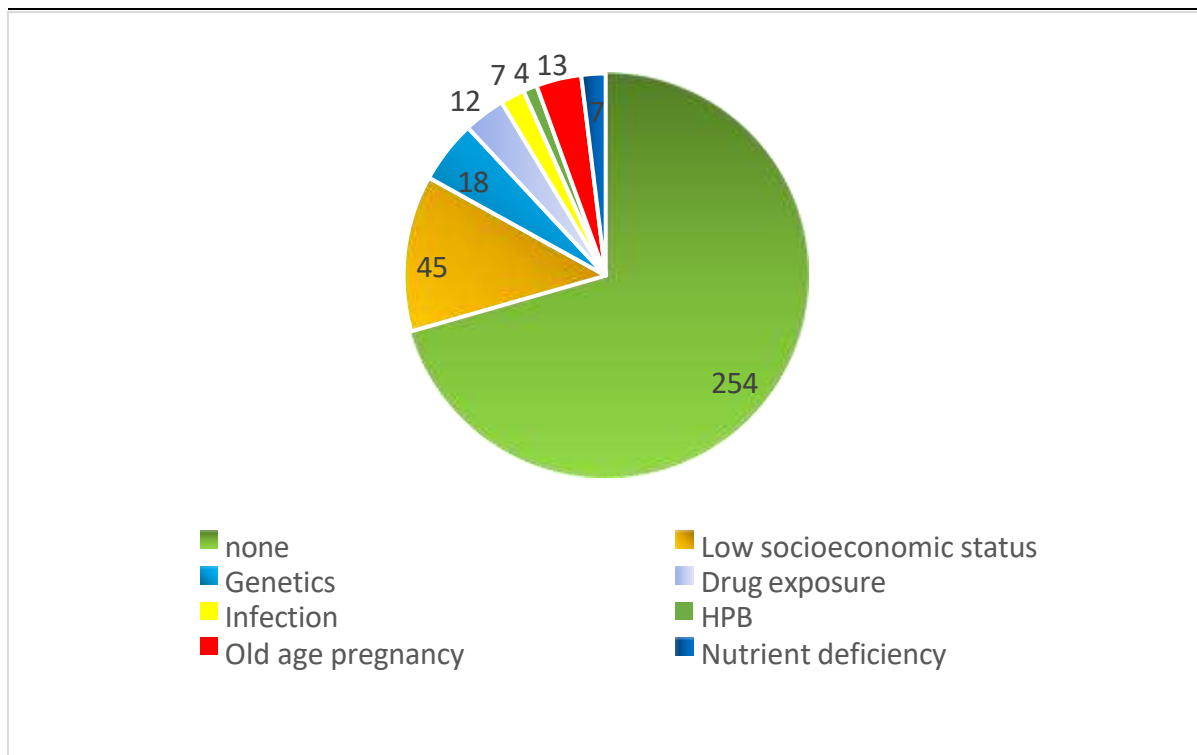
Figure 5: Among the distribution of risk factors, we found that majority of anomalies are associated with low socio-economic status. Among Other factors like genetics, old age pregnancy and drug exposure is also related with anomalies but have relatively low spread. While risk factors like infection, nutrient deficiency and high blood pressure are least among.

Discussion:

Congenital abnormalities are a common cause of fetal morbidity and mortality in the majority of the world's areas. The Rawal General Hospital, Life Care Lab, and Medical Diagnostic Center provided 360 samples of anomaly scan reports from women who were 18 to 24 weeks pregnant for this study. Transabdominal ultrasonography was used in this investigation to evaluate the subjects. In addition, USG is the safest method for detecting anomalies and can show patients' liver disorders, renal diseases, pancreatitis, different types of fibroids, vascular diseases, breast cancers, and other diseases. According to this study, most patients with pregnancies between 18 and 24 weeks had congenital abnormalities.

Patients who fall in the 25–35 age range outnumber those in other age groups, according to the age distribution of the population. Patients between the ages of 36 and 45 made up 23.9 percent of the population, while patients between the ages of 15 and 25 made up 30.6, 26 to 35, and 45.6 respectively. The majority of patients in our study had one fetal number, according to our findings. Out of 360 patients, 281 had one fetus, 44 had two, 23 had three, and 12 had four; the percentages for these ranged from 78% to 12.2%, 6.4% to 3.4%, respectively. 35 fetuses were discovered to be dead out of 360 pregnancies, and their mothers had abortions.

It was discovered that 41 fetuses, or 11.4%, had congenital abnormalities in hospitals. The most common anomalies were determined to be cardiac in nature (2.5%), whereas the least common were central nervous system anomalies (0.8% out of 11.4%). The prevalence of other anomalies, such as those affecting the genitourinary system, musculoskeletal system,

abdominal wall, gastrointestinal system, neural tube, and respiratory system, was 1.9%, 1.1%, 1.1%, 1.7%, and 1.1%, respectively.

We coordinated the gestational age of the patient in our investigation with the presence of abnormalities. Data collection revealed that the majority of congenitally defective fetuses were discovered in patients whose gestational ages were between 20 and 22 weeks. We discovered that, among the distribution of risk factors, poor socioeconomic position is connected with the majority of anomalies. Genetics, pregnancy in old age, and drug exposure are additional factors that are associated with abnormalities but have a relatively low prevalence. Infection, a lack of certain nutrients, and high blood pressure are the least common risk factors.

There were 380 patients included in the study by A. A. ADEYEMO et al. Over the course of a four-year investigation, they looked at how severe congenital abnormalities affected morbidity among newborns admitted to the University College Hospital in Ibadan, Nigeria. Major congenital deformities were discovered in 11.1% of neonatal referrals, ranking fourth among these newborns' most frequent issues. This is similar to our study in which we found 11.4% of patients having fetal anomalies.

Conclusion:

All fetal anomalies have a significant prevalence, but cardiac anomalies are the most common, accounting for 2.5% of all cases All, with fetal anomalies being common and clearly dominant in all stages of pregnancy, with the highest percentage (41.4%) in the 26 to 35 age group. Our data revealed that the majority of fetal anomalies were discovered between 20 and 22 weeks of gestation.