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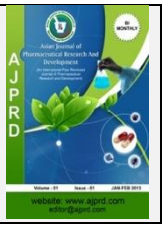

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Research Article

Occurrence of Congenital Defects and their contributing Factors in Neonates

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A B S T R A C T

Objectives: To determine the common congenital abnormalities and estimate the underlying causes correlating with hereditary anomalies. Also, to calculate the possibility of congenital deformities and recognise the ways to prevent the birth defects in neonates.

Methods: Multi-center future-oriented research ubiquity was executed at various hospitals in Karimnagar. The World Health Organization birth defect surveillance tool was employed to gather the demographic details of parents and neonates. We interviewed the mothers of newborns to analyze the exposure associated with birth defects.

Results: Overall, 250 participants were covered in the inquiry.The candidates included were neonates. Out of 250, 6 had congenital malformation. The prevalence was established as 2.4%.

Conclusion: The prevalence of birth defects was revealed to be 2.4%. The predictors aligned with the congenital anomalies were Sjogren's syndrome, Rh incompatibility, Maternal history of left talipes foot, and Idiopathic causes.

Keywords: Congenital abnormalities, Sjogren syndrome, Rh incompatibility, Neonates, Talipes.

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INTRODUCTION

Birth defects sometimes referred to as congenital anomalies, are defined as structural or functional flaws that can be identified during pregnancy and manifest at birth or advanced age. It encompasses cellular and molecular anomalies, inborn metabolic retardation, and both large and tiny deformities. Genetic, chromosomal, environmental, multi-factorial, and unidentified etiological agents can create congenital deformities. Surrounding conditions are responsible for greater birth abnormalities and genomic aspects make up 20% of the chances. For instance, it is observed that being subjected to medications, specific environmental pollutants, and alcohol consumption are examples of ecological teratogensthatnegativelyanddisruptively impact theembryo[1]. Defects in organ or body morphogenesis during pregnancy are known as congenital malformations, and they can be identified either prenatally or postnatally. They are recognized as the primary global cause of child mortality[2].

Contributing factors that may work alone or in combination to cause morphological changes or functional abnormalities in neonates are known as risk factors for CAs. These factors may include heredity, exposure to physical, chemical, or biological dangers, or other maternal factors. Preterm birth, limits on intrauterine growth and stillbirth are among the unfavorable perinatal outcomes that they are frequently linked to. The primary risk factors for birth abnormalities, according to epidemiological research include, maternal age over 35, parity, pregnancy mode, pregnancy type (singleton or multiple) and concurrent maternal disease[3].

The causes of various congenital deformities vary, and many congenital anomalies still have unidentified reasons.

1. **Genetic disorders:** A mutation or alteration in one or more genes might result in difficulty with how they function, similar to Fragile X syndrome.
2. **Chromosomal abnormalities**: A chromosome or a portion of a chromosome may be absent in some situations. For example, turner syndrome occurs when a

female is devoid of an X syndrome.

3. **Infectious diseases:** Pregnant women who contract specific contamination increase their chance of giving birth to a kid with birth abnormalities. Pregnancy-related Zika virus infection has been bound to microcephaly, a fetal condition characterized by an abnormally tiny brain and skull.
4. **Risk to drugs and chemical substances during pregnancy:** Congenital abnormalities can result from predisposition, as demonstrated by the infants whose mothers took Thalidomide. Additional instances include being exposed to harmful substances like hydrocarbons and rubella, often known as German measles[4].

The following procedures should be included in the clinical evaluation of a child born with an abnormality, which starts with a thorough history and physical examination. Ethnicity, age, gravidity, parity, miscarriages, stillbirths, pregnancy-related complications, history of prescription drug use, exposure to toxic agents at work or elsewhere, illicit drug and other substance abuse, fever or serious illness, vaccination status, and consanguinity are all important aspects of a parent's complete medical history. A comprehensive physical examination that should include a full evaluation of each organ system, such as the skin, extremities, and spinal column, as well as the craniofacial profle for dysmorphology. The placenta and umbilical cord's histological characteristics. The execution of certain diagnostic tests that are tailored to the case and chosen based on the findings of the history and physical examination[5].

In this context, the current study aims to evaluate the frequency of congenital defects and their contributing factors in newborn delivered to a hospital. The main objectives include determining the common congenital anomalies and estimating the underlying causes correlated with hereditary anomalies.

MATERIALS AND METHODS

Learning Site:

This was a multi-centered study conducted in the neonatology departments of various hospitals.

Investigational Design:

A prospective observational study design was followed.

Enquiry Duration:

6 months

Inclusion Criteria:

After obtaining informed written consent from the mothers,allthenewborns whojoinedthe neonatology department throughout the time of study were included.

Exclusion Criteria:

- Themothersarepresentincriticalhealth conditions.
- Motherswhorefusetodivulgethedetailsoftheir neonatesarenotincluded.

Source of Data:

- Parents of the newborns
- Throughthemedicalhistory.

Study Tool:

Demographic information of parents, obstetric history of the mother, demographic history of the neonate, neonatal history, presence of consanguinity, and identification of congenital anomaly.

Study Method:

The mothers of newborns were interviewed, and information was gathered from health records. To collect the information, mothers were questioned using a standard survey, taken from the WHO birth defect surveillance tool.

After a physical investigation, a pediatrician confirmed the diagnosis. ICD-10 codes were used to classify the cases.

Statistical Analyses:

All the data collected was analyzed by using SPSS software version 29.0. Chi-square test and Odds Ratio were applied. To identify the prevalence andrisk factors, a p-value 0.05 was considered to be statistically significant.

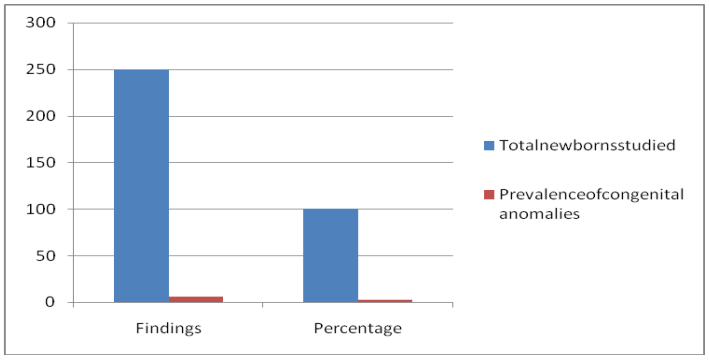
RESULTS

Table-1: Overview of neonates studied

Parameter	Findings	Percentage
Total newborns studied	250	100
Prevalence of congenital anomalies	6	2.4

Table 2: Categorization of congenital abnormalities in neonates

Anomaly type	Gender	n	Percentage	Typeofbirth	ICD-10code
Talipesfoot	Male [4]	4	1.6	Live	Q66.02[left]
Clubfoot	Female[1]	1	0.4	Live	M21.541[right]
Fetal anencephaly	Male [1]	1	0.4	Stillbirth	Q00.0



As shown in the Figure 1, the prevalence of congenital anomalies was found to be 2.4% among 250 newborns studied.

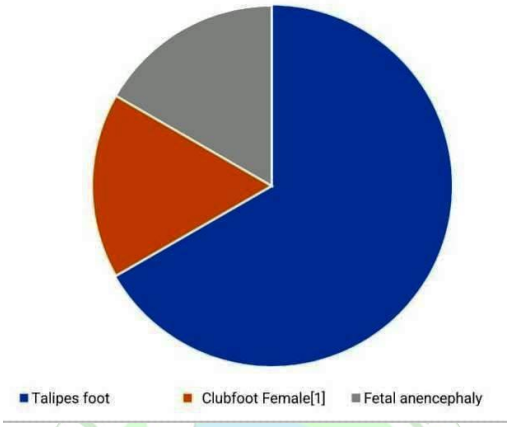


Figure-2: Categorization of number of congenital defects

As shown in Figure-2, there are three reported congenital anomalies in which Talipes foot is the most common with four live births of three male and one female. Another anomaly reported is fetal anencephaly.

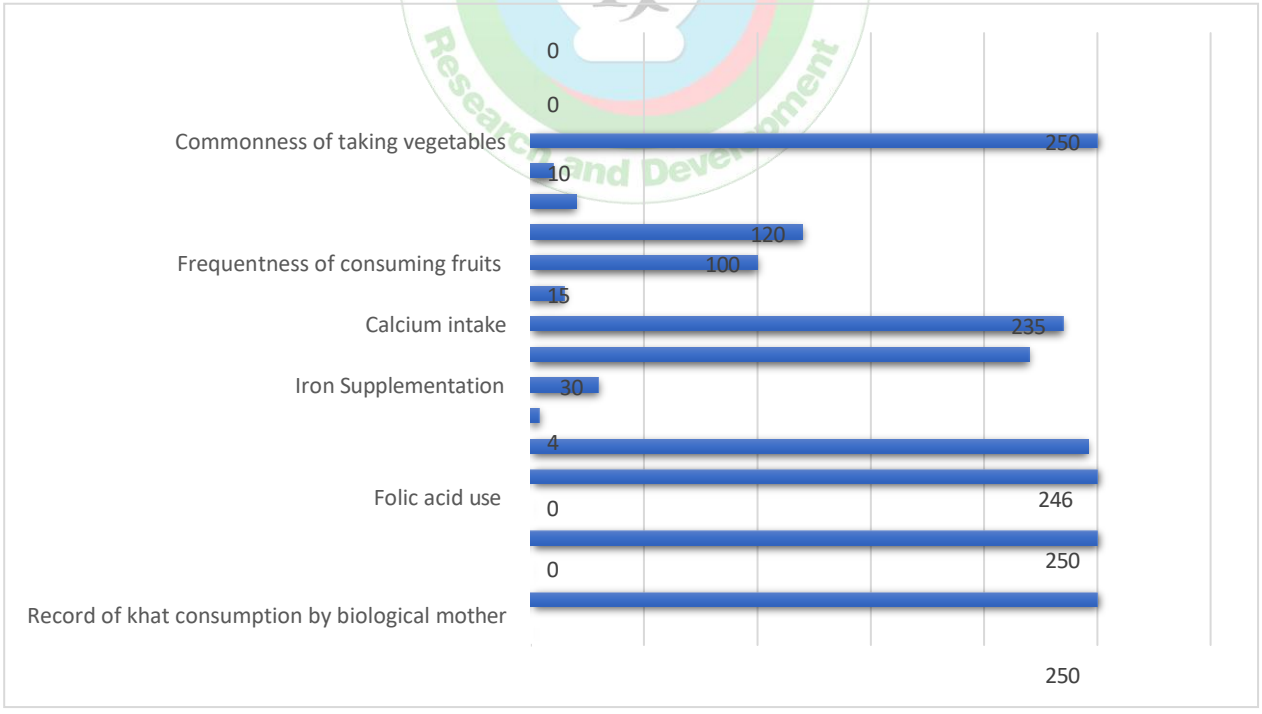


Figure-3: Patterns of nutritional and lifestyle characteristics participating mothers

Figure-3 interprets that inadequate folic acid supplementation can result in neural tube defects and inadequate supplementation of iron can cause developmental delays, also poor consumption of calcium supplements can result in impairment in foetal bone development.

Table 3: Development and nutritive attributes of mothers

Parameter	Class	Frequency
Recordofsmokingby mother	Yes No	0 250
Folicaciduse	Yes No	246 4
Iron Supplementation	Yes No	30 220
Calciumintake	Yes No	235 15

Table 4: Evaluation of exposure related to congenital defects

Riskfactor	Countof anomalies	Percentage of anomalies
MaternalAge[>35years]	2	0.8
Sjogren'ssyndrome	1	0.4
MaternalhistoryofTalipesfoot	1	0.4
Rh Incompatibility	1	0.4

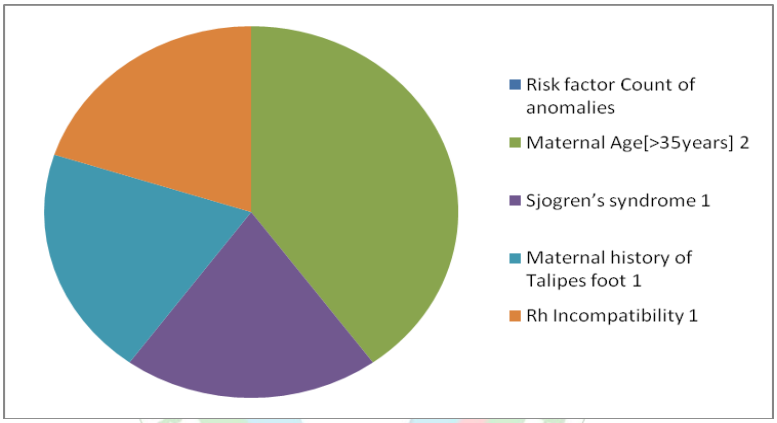


Figure 4: Distribution of maternal risk factors contributing to congenital anomalies

As shown in Figure-4, maternal age above 35 years was the most common risk factor associated with congenital anomalies, followed by Sjogren syndrome, talipes, and Rh incompatibility.

Table 5: Association between risk of congenital anomalies and respondent characteristics

Characteristics	Odds Ratio	p-value
Gender	4.242	0.155
History of abortions	4.019	0.092
Risk factors	8.024	0.015

From the Table-5, Male gender has a significantly higher risk of congenital anomalies compared to female gender (OR=4.242, p-value=0.155). The maternal history of abortions pose a significant risk for development of congenital anomalies (OR=4.019, p-value=0.092). The presence of risk factors shows a trend towards the higher risk of congenital anomalies (OR=8.024, p-value=0.015).

DISCUSSION

The present multi-centered experiential research was performed at various hospitals. Data was collected from people whosoever met the criteria for eligibility to analyze the frequency and corresponding threats for birth malformations.

Out of the 754 delivered neonates, 31 had overt (external) abnormalities. The findings indicate that 4.1% of people had birth defects overall[6](Bekalu Getachew et al. 2018). According to our exploration, out of 250 delivered neonates, 6(2.4%) had congenital anomalies. There was a significant association of maternal chronic illness, genetic conditions with congenital anomalies. Also, idiopathic causes were responsible for congenital deformations in our study. The determinants tied to genetic defects in our study were found to be Sjogren's syndrome (0.4%), Rh incompatibility (0.4%), the material history of left Talipes foot (0.4%), and maternal age > 35 years (0.8%).

The main findings of the study revealed that 31 out of 754 delivered neonates had obvious abnormalities. Thus 4.1% of people had overt congenital abnormalities overall.

According to this study, congenital anomalies were significantly associated with chronic illness in 14.3% of mothers prior to conceptial[6] (Getachew Bekalu et al. 2018). Similarly we found a substantial association between congenital abnormality and maternal chronic disease.

The study's primary conclusion included a correlation between congenital abnormalities and maternal chronic disease during pregnancy[7]. (Jemal et al. 2021) and our study also included a correlation between maternal chronic illness i.e., Sjogren's syndrome and congenital anomaly.

The key finding of the research demonstrated that the incidence of serious birth defects was substantially correlated with the mom's history of abortion[2] (Hayelom et al. 2021). Likewise, we found a link between the past experience of abortions with newborn defects and the mother's age (>35 years).

CONCLUSION

Congenital malformations are identifiable at prenatal or postnatal stages and are defects of the morphogenesis of the body or organs during pregnancy. They are recognized as the primary global cause of child mortality.

In our analysis, we disclosed that the commonness of congenital anomalies wasconfirmedas6outof 250 delivered neonates, i.e., 2.4%. The hazards pertinent to inherited anomalies were found to be Sjogren's syndrome (0.4%), Rh incompatibility (0.4%), maternal history of left talipes foot (0.4%), and idiopathic causes (1.2%).

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