

Original paper

A Five Years Retrospective Study of Congenital Anomalies at Karbala City, Iraq

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Abstract

B **ackground:** Congenital anomalies are one of the commonest causes of disability in the world but the data from community –based studies originating from developing countries are scanty.

Objectives: To study the frequency and distribution patterns of congenital anomalies in Karbala city, Iraq during five years and to find any related aetiological factor for congenital anomalies occurrence.

Materials & Methods: It is a retrospective study includes all appearant congenital anomalies in newborns during January2011-December2015.

The data were collected from the neonatal care unit admission register & a specific register of recording congenital anomalies according to ICD-10(International classification of diseases &related health problems-10th revision) that's introduced by WHO.

The data were collected at the Karbala teaching hospital for pediatric where majority of sick newborns care occurs in this city. Variables were represented in a frequency tables & column charts.

Results: The total enrolled cases of congenital anomalies in five years were 327 that's form 9.19% of total admission to the neonatal care unit in our hospital(3586) ,the highest percentage were anomalies of the cardiovascular system(29.36%) followed by the gastrointestinal system(27,83%) then the musculoskeletal system (13.76%) and the least percentage was of cutaneous system(1.83%).

Individually, there was a fluctuating increment in overall prevalence during the study period, but the highest numbers in 2014 & the least in 2012.

Higher percentages for the urban residency, 18-35 years old maternal group, families of positive consanguinity, & multipara's mothers.

Conclusions& recommendations: preponderance of the malformations of the cardiovascular system despite the underestimation of them due to delayed exhibition of symptoms so there are a great benefit from screening for a hidden congenital heart anomalies., I invite all countries for searching congenital anomalies & I recommend encouragement of higher education researchers to study genetic specialty & preventive health services as our country really required such services in addition to proper preparation of health care staffs.

Keyword: Congenital anomalies, retrospective study, neonatal care unit, Karbala, Iraq

Introduction

Birth defects are abnormality of physical body structures usually found nataly or during the early few weeks of lifetime, or determined as any irreversible disorder presents in a child before birth in which there is sufficient aberration in the standard

number, size, morphology, position or innate character of any part, organ, cell or cell contents to document its description as odd ^(1, 2). Some of these flaws are categorized as major and may require surgical interference and/or cause death of the infant. Others are classified as minor, which are significantly harmful to the class

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of life and fitness of the patient. However, this classification is somewhat vague, as some minor defects can be associated with a hidden major anomalies. This association could be 3% in patients having single defect, 10% in those having dual, and 20% in patients having more than three abnormalities⁽³⁾ Birth flaws may leads to lacking or partial absence of an anatomical portion or variation of its normal shapes. Major structural anomalies ensue in 2-3% of lived birth infants. An additional 2-3% are recognized in paediatric by 5 years age⁽⁴⁾. Many works shows that inherited malformations contribute greatly to prenatal death and postnatal physical defects^(5,6). Most of congenital anomalies (40-60%) have unknown aetiology⁽⁷⁾ But It has been valued that around 15-25% are due to documented genetic cause (chromosome and single gene causes), 8-12% are due to environmental reasons (maternal-correlated illnesses, drug or chemical contacts) and 20-25% are owed to multifactorial heritage⁽⁸⁾. The delivery of a baby with major malformations, whether discovered antenatally or not, induces a sensitive emotional parental reaction⁽⁹⁾. Many works have been conducted to found the distribution design and the association of different peril factors with the rate of birth defects^(5,6, 10,11). The congenital anomalies has a huge effect thats extended into adulthood putting a dense burden on patients, family and health care^(12,13). There are insufficient records presently available on the epidemiology of heritable disorder, the request for genetic facilities ,the quality , use and fate of genetic services in developing nations⁽¹⁹⁻²³⁾.

The aim of study is to determine the frequency & distribution pattern of congenital defects existing at Karbala teaching hospital for pediatric in Karbala city, Iraq & to find any related factor for congenital anomalies occurrence.

Materials and Methods

This was a retrospective observational descriptive study shows the frequency and pattern of distribution of congenital anomalies, the survey was enrolled during a five years period from 1-1 -2011 to 31 -12- 2015 at neonatal care unit in Karbala teaching Hospital for pediatric, Karbala city; Iraq. This hospital is a host to patients from all portions of Karbala city. Information regarding patients was obtained from some families & some from patients records after permissions. Patients who have at least one birth defect were included. The kind of defect was taken from the patient files registration according to the ICD-10. The questionnaire was divided into data of the children & data of their parents. The data includes gender, residence, maternal age, history of intrauterine exposure to fever, drug & radiation, consanguinity, parity, previous history of congenital anomalies for the same couple, antenatal care history & chronic maternal diseases. Variables were denoted in a frequency tables (Word-2010) and column charts (Excel-2010).

Results

Out of 3586 admitted neonates to the NCU in this study period, 327 congintal anomalies were diagnosed (9.11%) i.e the rate is 91/1000 admitted lived neonates.

Regarding gender; 166 ((50.76%) males & 161(49.24%) females.

Among these anomalies, the CVS was the most commonly affected and accounted for 29.36% followed by the GIT (27.83%) then the MSS (13.76%), CNS (13.15%), unclassified anomalies (includes uncategorized cases at diagnosis and those cases which includes more than one system but not grouped alongside with any known genetic/chromosomal abnormality) (11.32%), UGS (2.75%) & the least occurrences was that of CS(1.83)as shown in table 1 & figure 1.

Individually, there was a flactuating increment in overall prevalence during the study period, the highest number in 2014&

the least one in 2012 as shown in table 2 & figure 2, 3.

There were a higher frequencies in males than females but not so significant differences (50.76 Vs 49.24%), more in families of urban residency than rural (69.11 Vs 30.89%), more in 18-35 years old maternal age group (64.35%), while those of >35 years (19.88%) & the least (15.59%) for mothers <18 years old, more in neonates of intrauterine exposure to fever (19.88%), drugs (14.67%) & radiation (2.14%), more frequency in positive consanguinity than negative (57.8 Vs 42.20%), & more in multiparus mothers than uniparus (76.76 Vs

23.24%), but no increment in frequencies for the products of mothers attending irregular antenatal care, chronic maternal diseases or previous congenital anomalies for products of the same couples as shown in table 3.

GIT=gastrointestinal tract, CNS=central nervous system, CS=cutaneous system, CVS=cardiovascular system, MSS=musculoskeletal system, UGS=urogenital system, Unclassified=uncategorized cases at diagnosis and those cases which includes more than one system but not grouped alongside with any known genetic/chromosomal abnormality.

Table 1. Frequency & percentage of congenital anomalies.

Anomalies	Frequency	Percentage
GIT	91	27.83
CNS	43	13.15
CS	6	1.83
CVS	96	29.36
MSS	45	13.76
UGS	9	2.75
Unclassified	37	11.32
Total	327	100

Table 2. Numbers of congenital anomalies according to the systems & years.

Anomaly	2011	2012	2013	2014	2015
GIT	10	5	17	40	19
CNS	10	4	18	6	5
CS	1	1	1	1	2
CVS	22	13	23	17	21
MSS	12	10	8	9	6
UGS	1	1	1	2	4
Unclassified	10	7	1	6	13
Total	66	41	69	81	70

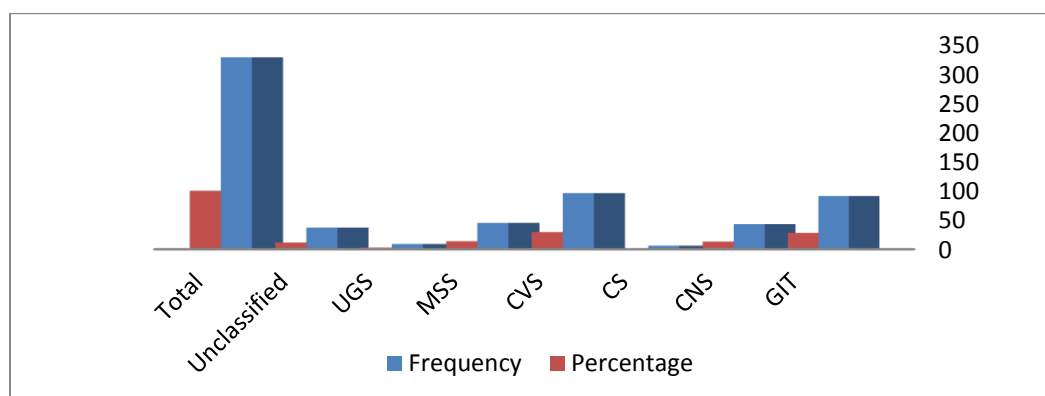


Figure 1. Distribution of anomalies according to systems.

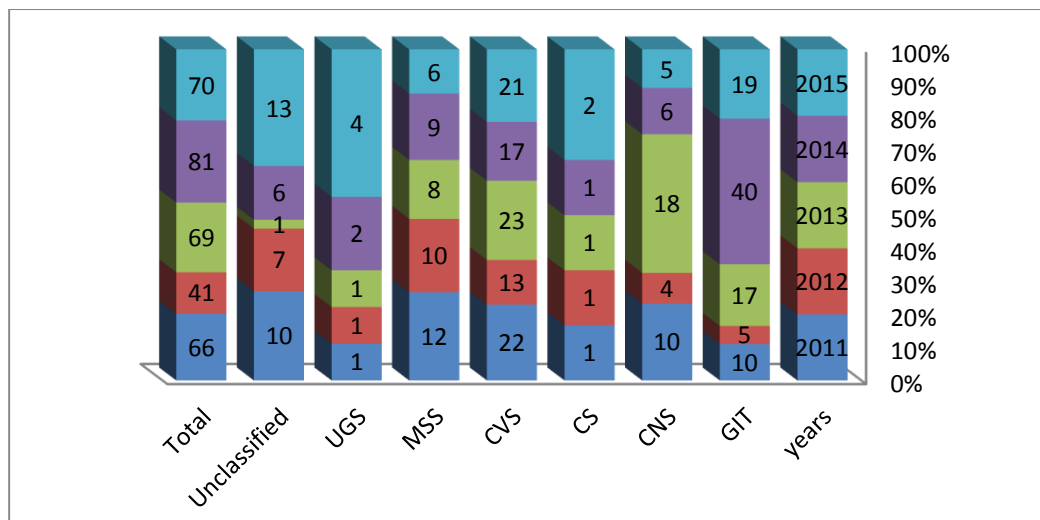


Figure 2. Distribution of anomalies according to years.

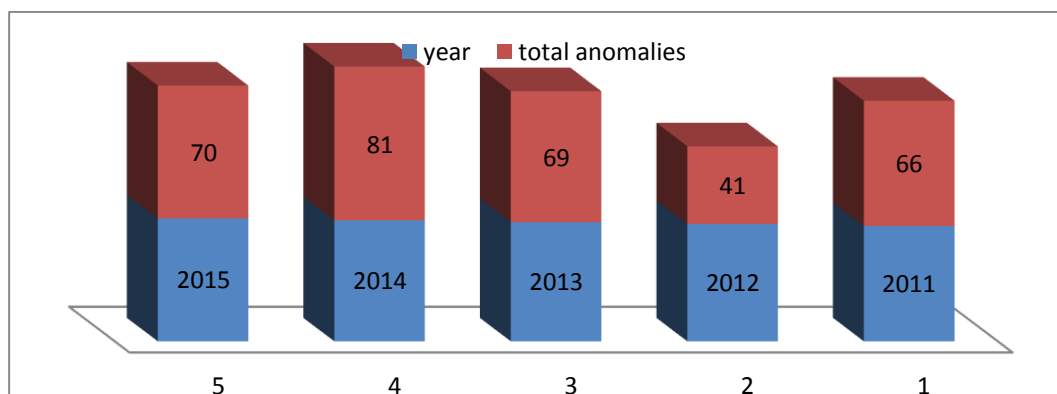


Figure 3. Total numbers of anomalies according to years.

Table 3. Risk factors for congenital anomalies.

Variables		Total	Percentage
Gender	Male	166	50.76
	Female	161	49.24
Residence	Urban	226	69.11
	Rural	101	30.89
Maternal age	<18year	51	15.59
	18-35 year	211	64.53
	>35 year	65	19.88
History of intrauterine exposure to:	Fever	65	19.88
	Drug	48	14.67
	Radiation	7	2.14
Consanguinity	Postive	189	57.8
	Negative	138	42.20
Parity	uniparus	76	23.24
	Multiparus	251	76.76
Pervious history of congenital anomalies	Postive	28	8.56
	Negative	299	91.44
Antinatal care	Regular	168	51.38
	Irregular	159	48.62
Chronic maternal diseases(HT,DM,Asthma)	Postive	30	9.17
	Negative	297	90.83

Discussion

The study was occurred in a single hospital location which does not actually represent the percentage throughout the country. This is one of few studies on the epidemiology of congenital malformations in Iraq. I attempt to make it as extensive as possible. A three hundred twenty seven newborn among 3586 lived admitted to our hospital neonatal care unit i.e 9.11% & this mean 91/1000 admitted lived birth; this percentage is higher than that recorded in other similar studies done by researching members in many hospitals in Iraqi cities.^(24,25,26,27,28,29,30)

From these results it's obvious that the rates of congenital defects in Iraq are much higher than the prior studies so each city in Iraq especially after multiple battles and occupation needs to comprehensive assessments in an epidemiological studies to define the hazards behind these results.

As well as this high statistics picture is against the result of the survey by WHO/MOH on 11 September 2013 – which is a study conducted in eighteen localities in Iraq to assess the prevalence of congenital anomalies in the country⁽³¹⁾ which is argued by a international research by prof Souad Al-Azzawi who prove that the surveys were designed to deny and contradict reports and articles written and published by specialists teams in hospitals and organizations of the Iraqi Ministry of Health i.e not to detect any actual prevalence in Congenital anomalies or its relationship with definite environmental risk influences⁽³²⁾

The highest percentage was that of cardiovascular system (29.36%) followed by the GIS (27.83%) then the skeletal system (13.76%), central nervous system (13.15%) while the unclassified cases includes (11.32%), the genitourinary system (2.75%) & the least recorded congenital defect was that of cutaneous system (1.83%) which is disagree with other studies in Al-Anbar⁽³³⁾, Basra⁽³⁴⁾, Erbil⁽³⁵⁾, Duhok⁽³⁶⁾, Baghdad⁽³⁷⁾ &

Diwania⁽³⁸⁾ which show the predominance of central nervous system defects but agree with the study in which the congenital heart diseases were reported as the most commonly affected system in EUROCAT area⁽³⁹⁾

The current study findings shows different system predominance from other similar studies in other countries which found the CNS anomalies as the highest anomalies percentage (31.1%) followed by cleft lips and palates, MSS and lastly the chromosomal anomalies^(14,15), while in a studies done in Al Bahrain the MSS has the peak prevalence after that the GUS^(17,40).

The possible explanations for the highest prevalence for these defects were the notification for the more obvious defects at birth more carefully rather than the other defects⁽¹⁶⁾ plus different geographical, environmental & genitic exposures.⁽⁴¹⁾

The gender of the neonate not affect the prevalence of congenital anomaly as there in no significant statistical differences between males and females (166 males and 161 females) and this findings agree with many other studies^(14,18).

Certain anomalies such as CS have been under estimated in our study. Their low percentage may be due to shying from hospital visit due to social considerations.

There was an increment in total prevalence throughout the study period, the highest number in 2014 & the least in 2012, this may be related to the complex relation between the recognized & un recognized genetic, environmental exposure (such as bombs & explosions) & socio-cultural variables.

More recorded anomalies in urban resident than rural in the present study may be related to better health awarness in urban area & thus specialists consultations while poor health education plus other social causes leads to neglecton of these childs.

A higher percentages in 18-35 years old maternal age group (64.35%) & the least (15.59%) in <18 years age group is comparable with the results of others which show increased risk with increased

maternal age⁽⁴²⁾ but disagree with Dutta *et al.*⁽⁴³⁾ which documents insignificant association.

Also more anomalies in neonates with intrauterine exposure to fever(19.88%), drugs(14.67%) & radiation (2.14%) as maternal fever may be due to TORCH infection, many drugs & radiation has teratogenic effects.⁽⁸⁾

Beside that there were a higher frequency in positive Consanguinity than negative (57.8 Vs 42.20%) which agree with researches which found that the Consanguinity is an important aspect to increase the risk of congenital anomalies.^(44,45,46)

Finally this study shows more cases in multiparus mothers than uniparus & this is consistent with other studies which indicates a positive relation between the congenital anomalies & the birth order which may be due to the increased rate of mutation after the 3rd pregnancy compared to the first and second plus a higher maternal age⁽⁴⁷⁾

Despite all trials done to guarantee the maximum number of cases inclusion, a certain percentage could not be got and thus not included in the study because they referred to private clinics for treatment or not reached doctors at all.

Conclusions & recommendations

The commonest congenital anomalies in Karbala in these 5 years are, consequently, CVS, GIT, MSS, CNS, unclassified, UGS & CS. percentage of affected individuals has been found to be greater than in other similar studies. The main factors that influence the incidence can be gathered into maternal, socioeconomic, heritable & environmental factors.

There was a fluctuated numbers of congenital anomalies among the study time but generally there's a gradual increment in prevalence over the years so there is a real need for further studies to find the causes of that fluctuation.

Preponderance of the malformations of the cardiovascular system despite the

underestimation of these anomalies due to delay presentation of symptoms so I recommend:

1-Screening for a hidden congenital cardiac anomalies in all newly delivered neonates

2- All Iraqi cities searching for congenital anomalies prevalence & distribution pattern.

3- Encouragement of higher education researchers to study genetic specialty & preventive health services as our country in real requirement for such services in addition to proper preparation of health care staffs.

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