Incidence Rate of Musculoskeletal Congenital Anomalies of Neonates in Muthanna Province From 1/1/2008 to 1/1/2009

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الخلاصة

إن الهدف الأساسي من هذه الدراسة هو معرفة نسبة التشوهات الخلقية للجهاز الهيكلي والعظمي عند الأطفال حديثي الولادة في محافظة المثنى للفترة من 2008/1/1الى 2009/1/1 .حيث تم إحصاء (218) من حالات التشوه الخلقي الولادي في مستشفى الحسين التعليمي ومستشفى الولادة والأطفال التعليمي .لقد أظهرت نتائج الدراسة أن نسبة هذه التشوهات هي (7%) أي سبعة لكل ألف نسمة وهي نسبة عالية مقارنة بمثيلتها في الدول العربية المجاورة والدول الأجنبية (4– 6%) وزيادة هذه النسبة يرجع إلى أسباب عديدة منها تلوث الجو بمخلفات الحروب والإشعاعات والمواد الكيمائية المختلفة ، والعوامل الوراثية ، وعدم السيطرة على الإمراض التي تصيب الحامل ، وسوء استعمال الأدوية خلال الحمل وعدم استعمال مادة الفولك أسد . كما حصلنا في هذه الدراسة على نسبة عالية من الخصوبة وهي (47%) وتعتبر نسبة أعلى مما هو مثبت في دول العالم (15–25%) ،تم التوصل إلى زيادة نسبة التشوهات في مدينة السماوه عنها في مدينتي الرميثه والخضر، كما تم معرفة تأثير بعض العوامل على نشوء هذه التشوهات مثل عمر إلام ، وتاريخ عائلتها ودرجة القرابة من زوجها وكذلك عدد ولاداتها ، ونمو الجنين والإمراض المصابة بها أثناء الحمل وإمكانية تحملها إلى الأشعة السينية أو الإشعاعات الناتجة من تلوث الجو بمخلفات الحروب أو المواد الكيماوية المختلفة وكذلك استعمال مادة الفولك أسد التي تساهم في منع تشوهات الأنبوب العصبي وكذلك تأثير العوامل الوراثية . تم فحص الأطفال حديثي الولادة وإرسالهم للفحوصات المختبرية والإشعاعية كالأشعة العادية ، والسونار ، وأشعة المفراس .

تم الحصول على (35) حالة من جدري الماء والحصبة الألمانية ، و(28) حالة من مرض (داء القطط) ، و(25) حالة من داء السكري وحالتين من الصرع المزمن وحالتين من أمراض الغدة الدرقية .

Abstract

The aim of this study is to know the incidence rate of musculoskeletal congenital anomalies in Muthanna province at the period of 1/1/2008 to 1/1/2009 . The study compromised (218) live birth neonates (1 day – 1 year) of musculoskeletal congenital anomalies at Hussein Teaching and obstetric and pediatric teaching hospitals . The overall incidence of various types of musculoskeletal congenital anomalies was (0.7 %) (7 per 1000) , and this is high incidence in comparison with the other countries .The fertility rate was (47 %) and this is a good rate .The study showed high incidence of musculoskeletal congenital anomalies in Samawa city than Rumaitha and Khidher cities . The study revealed (35) cases due to chicken pox and German Rubella , (28) cases due to toxoplasmosis , (25) cases due to diabetes mellitus , (2) cases associated with the epilepsy and (2) cases due to thyroid diseases . The mothers were interviewed regarding the age , family history , consanguinity , parity , maturity of fetus , history of maternal disease , history of exposure to ionizing radiation or chemical agent and use of folic acid . The neonate was examined and sent for some investigations (e.g. radiograph , ultrasound , computerized tomographic scan and some lab. Investigations) .

Introduction

Definition :

congenital anomaly is an abnormality of structure , function or body metabolism that is present at birth and results in physical or mental disability , or is fatal [1] .

Etiology [2] :

A- Genetic / Chromosomal (15 %) : Numerical or structural or mutant genes (e.g. Down Syndrome , Turner Syndrome) , this is due to chromosomal abnormalities and aging hormonal imbalance due to increase follicular stimulating hormone and testosterone .

B- Environmental causes (10 %) :

1- Infectious agents :
   a- Rubella (German measles) .
   b- Cytomegalo virus .
   c- Herpes simplex virus .
   d- Varicella (Chicken pox) .
   e- HIV / AIDS . f- Toxoplasmosis . g- Syphilis
2- Ionizing radiation .
3- Chemical agents (Drugs) .
   a- Thalidomide . b- Aminopterin .
   c- Anticonvulsants drugs (phenytoin).
   d-Antipsychotic drugs (phenothiazine & lithium) .
   e- Antianxiety drugs (meprobamate & diazepam) .
   f- Anticoagulants drugs (warfarrin) .
   g-Antihypertensive drugs (angiotensin converting enzyme (ACE) inhibitors) (e.g. Enalpril , Captopril) .
   h- Others (Aspirin , Tetracycline , Sulfonamides) .
   i- Recreational drugs (Alcohol , Cigarettes Smoking) [3] .
4- Hormones (oral contraceptive , androgenic agents) .
5- Environmental chemicals (mercury , lead) .
6- Maternal disease :
   a- Diabetes mellitus . b- Thyroid diseases .
   b- Epilepsy .
   c- Phynelketonurea .
7- Nutritional deficiencies : folic acid & multi vitamins (e.g. VB1 (Thimine) and VB6 (Pyridoxine)) .
   ❖ Folic acid is important for nerve cells development and for myelination of their axons , so it should be used (3 – 6) months prior to pregnancy and within first (14) weeks of pregnancy to prevent neural tube defects (anencephaly) and open neural tube

C- Multifactorial (genetic & environmental) (25 %) .

D- Idiopathic (unknown causes) (50 %) .

Prevention [1] :

1- Strategies to reduce the incidence of genetic diseases include [4]:
   (a) public education, specifically about the role of consanguineous marriages and the correction of religious misconceptions .
   (b) providing premarital counseling services, family-oriented carrier screening, and family planning services.
   (c)improving preconception and prenatal care to include prenatal diagnostic services.
   (d) augmenting genetic services resources to include the human as well as lab components.
   (e) neonatal screening for metabolic disorders .
   (f) providing preimplantation genetic diagnosis services .
   (g) establishing databases of cases of genetic diseases .
   (h) establishing ethical and religious guidelines for prenatal genetic diagnosis and for termination of pregnancies complicated by fetal genetic diseases or malformations.
2- Iodine supplementation to eliminate bone deformities .
3- Folic acid supplementation to decrease incidence of neural tube defects .
4- Avoidance of drugs with teratogenic effect during all stages of pregnancy.
5- Control of diabetes mellitus and other maternal disease during pregnancy
6- Pre-pregnancy immunization against Rubella .

7- Prenatal diagnosis and subsequent termination of effected pregnancy as well as in Utero and treatment prenatal detected musculoskeletal congenital anomalies .
8- Improving postnatal management and decreasing or avoiding neonatal complications .

Patients & Methods

A (218) live births neonates of musculoskeletal congenital anomalies were collected at Hussein Teaching Hospital and obstetric and pediatric teaching hospital , the mothers were interviewed regarding their ages , address , parity , family history , consanguinity , maturity of fetus , history of maternal disease , history of exposure to ionizing radiation or chemical agent and use of folic acid . The neonate was examined and sent for radiograph , ultrasound , computerized tomography and some lab investigation such as erythrocyte sedimentation rate . The incidence of each congenital anomaly was detected and the overall of congenital anomaly in Muthanna Province was recorded . The fertility rate was detected . Comparison of the results according to the geographical distribution was done . Comparison of the results with the other Arabian & foreign countries was applied .

Results

A (218) live birth neonate with the musculoskeletal congenital anomalies were compromised in Muthanna Province at the period from 1/1/2008 to 1/1/2009 and the results were as follow :

1- Table (1) shows the relationship of musculoskeletal congenital anomalies with the different factors in Muthanna province .
2- Table (2) shows the incidence of each congenital anomaly in Muthanna province .
3- Table (3) shows increase incidence of musculoskeletal congenital anomalies in Samawa city than Rumaitha and Khidher cities .
4- Table (4) shows the incidence rate of some musculoskeletal congenital anomalies in comparison with some foreign countries .
5- Table (5) illustrate the comparison of the overall incidence of skeletal congenital anomalies in Muthanna province with other countries .
6- Table (6) illustrate increase the incidence of skeletal congenital anomalies among (36 – 40) years age group of pregnant women .
7- Diagram (4) illustrate increase the incidence of skeletal congenital anomalies in pregnant women with the family history .
8- Diagram (5) illustrate increase the incidence of skeletal congenital anomalies according to consanguinity .
9- Diagram (6) shows increase the incidence of skeletal congenital anomalies in pregnant women with increase parity .
10- Diagram (7) illustrate increase the incidence of skeletal congenital anomalies in an immature neonates .
11- Diagram (8) illustrate increase the incidence of skeletal congenital anomalies among pregnant women who were not use folic acid during pregnancy.
12- Diagram (9) illustrate the incidence of skeletal congenital anomalies according to sex which showed no major difference among males and females .
13- The study revealed (35) cases due to chicken pox and German Rubella , (28) cases due to toxoplasmosis , (25) cases due to diabetes mellitus , (2) cases associated with epilepsy and (2) cases due to thyroid diseases .

Discussion

❖ This study compromised (218) cases of live births with musculoskeletal congenital anomalies in Muthanna Province . The overall incidence of musculoskeletal congenital anomalies in Muthanna Province was (0.7 %) (7 per 1000) and this is a higher rate in comparison to the world wide rate , which is about (4 – 6 per 1000) and this is may be due to [5] :

1- Air pollution [1] .
2- Exposure to the chemical agents (wars) .

3- Exposure of the pregnant women to the ionizing radiation (5) cases .
4- Bad antenatal care (120) cases .
5- Abuse of drugs during pregnancy (30) cases .
6- Uncontrolled maternal disease (35) cases chicken pox and German Rubella , (28) cases toxoplasmosis , (25) cases due to diabetes mellitus , (2) cases associated with the epilepsy and (2) cases due to thyroid diseases .
7- Deficiency of folic acid and multivitamins [1] , which is (181) cases .
8- Low social education (168) cases .
9- Genetic and chromosomal defects [6] in some families (199) cases have family history and (131) cases occur in relatives.
10- Defect in the immunization at pre-pregnancy especially against Rubella (102) cases .

- The fertility rate in Muthanna Province was (47 %) which is a good rate in comparison with the (15 – 25 %) worldwide [7] .
- In table (3) there was increase in the incidence of skeletal congenital anomalies among Samawa city population (141) cases rather than Rumaitha city (65) cases and Khidher city (12) cases , and this is maybe due to :
  1- No dependable accurate ultrasound equipment in Rumaitha and Khidher cities .
  2- No maternal education or regular antenatal care surveillance for doing fetal anomaly scan at 18 – 20 week to exclude fetal congenital anomalies .
- Table (6) & Diagram (3) illustrates increase the incidence rates of skeletal congenital anomalies among (36 – 40) years age group [5] of the pregnant women (70) cases .
- Diagrams (4 & 5) illustrates increase the incidence rates of skeletal congenital anomalies occurs commonly in relatives (131) cases and in those who have a family history (199) cases of such anomalies .
- Diagram (6) illustrate increase the incidence rate of skeletal congenital anomalies among multigravida (175) cases and this is due to increase maternal age .
- Diagram (7) illustrate increase the incidence rate of skeletal congenital anomalies among an immature neonate (200) cases .
- Diagram (8) illustrate increase the incidence rate of skeletal congenital anomalies among pregnant women who were not use folic acid (181) cases .
- Diagram (9) illustrate that there is no significant difference in sex ratio among different types of musculoskeletal congenital anomalies , some types commonly affected males such as congenital club foot (63 : 41) (male : female) , while in case of congenital hip dislocation females are more affected than males (10 : 18) (male : female) and these results are correlated with standard values .

Conclusion

This study showed a high incidence of congenital anomalies among population of Muthanna province and this requires the needs to establish preventive programs such as good antenatal care , prevention of air and water pollution , pre-pregnancy immunization , good nutrition for pregnant women , good educational programs , genetic and chromosomal screening of pregnant women especially of those with family history , control of maternal disease and improving postnatal management to reduce neonatal complications

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Congenital Anomaly	Incidence Rate %							
	Mexico	United Kingdom	China	South Africa	Australia	India	U.S.A	Iraq Muthanna
Equino Varus	-	1.60	-	-	-	2.5	1.3	0.33
Congenital hip dysplasia	-	2.60	-	-	-	2.5	1.5	0.1
Polydactyly of fingers	-	4.85	-	-	-	2.5	2.4	0.035
Syndactyly of fingers	-	2.37	-	-	-		-	0.01
Limb reduction	6.10	3.13	5.15	4.16	3.70	0.5	0.4	0.032
Radial club hand	-	0.015	-	-	-	-	-	0.0032
Ulnar club hand	-	0.004	-	-	-	-	-	0.0032
Spina bifida	13.90	0.95	7.26	13.40	3.38	2.0	0.6	0.0032
Scoliosis	-	0.5	-	-	-	-	-	0.016
Achondro plasia	-	2.5	-	-	-	-	-	0.02

Table (4)

Incidence of some congenital anomalies in comparison with some foreign countries

Country	Incidence Rate
U.S.A	0.4 %
England	0.05 %
Australia	0.05 %
Japan	0.07 %
India	0.23 %
Jordan	0. 16 %
Kuwait	0.9 %
Iraq (Muthanna)	0.7 %

Table (5)

The overall Incidence of skeletal congenital anomalies in comparison with other countries

Table (1)

The relationship of congenital anomalies with the different factors in Muthanna province

No.	Variable Name (type of congenital anomaly)	Number	Family history		Relationship		No. of births		Fetus growth		Folic Acid		Sex		Total
			No	Yes	No	Yes	Prim.	Multi	Immature	Mature	Yes	No	Male	Female	
1	Amelia of right upper limb	2	0	2	0	2	0	2	2	0	0	2	2	0	
2	Congenital absence of radius & ulnar bones	5	0	5	1	4	1	4	5	0	0	5	5	1	
3	Klippel – Feil syndrome	2	0	2	1	1	0	2	2	0	0	2	0	2	
4	Polydactyly of fingers & toes	2	0	2	2	0	0	2	2	0	0	2	0	2	
5	congenital dislocation of left knee	2	0	2	2	0	0	2	2	0	0	2	0	2	
6	Congenital absence of fingers & toes	2	0	2	0	2	1	1	2	0	0	2	0	2	
7	Polydactyly of toes	3	0	3	2	1	0	3	3	0	0	3	2	1	
8	Congenital absence of fingers	4	0	4	1	3	0	4	4	0	0	4	2	2	
9	Syndactyly of fingers & toes	4	0	4	0	4	0	4	4	0	1	3	4	0	
10	Congenital Deformities of vertebral column	3	1	2	0	3	0	3	3	0	1	2	1	2	
11	Congenital absence of toes	3	0	3	0	3	0	3	3	0	0	3	3	0	
12	Congenital flatfoot	5	2	3	2	3	0	5	2	3	1	4	3	2	
13	Congenital scoliosis	5	1	4	1	4	2	3	5	0	0	5	1	4	
14	Achondro plasia	6	0	6	5	1	5	1	4	2	3	3	2	4	
15	Congenital dislocation of right hip	8	0	8	0	8	3	5	8	0	2	6	4	4	
16	Congenital dislocation of left hip	9	0	9	3	6	2	7	7	2	2	7	2	7	
17	Polydactyly of both hands	11	3	8	3	8	1	10	11	0	1	10	7	4	
18	Bilateral congenital dislocation of hip	11	2	9	5	6	0	11	10	1	4	7	4	7	
19	Right equinovarus (club foot)	21	3	18	8	13	6	15	21	0	3	18	10	11	
20	Meningocele	17	1	16	4	13	3	14	15	2	1	16	4	13	
21	Left club foot	29	0	29	15	14	7	22	29	0	6	23	18	11	
22	Bilateral club foot	55	5	50	32	23	12	43	47	8	11	44	35	19	
23	Spina bifida	1	0	1	0	1	0	1	1	0	0	1	0	1	
24	Arthrogryposis multiplex congenita	1	0	1	0	1	0	1	1	0	0	1	1	0	
25	Congenital dislocation of the right knee	1	0	1	0	1	0	1	1	0	0	1	1	0	
26	Congenital Fusion of lower limbs (mermaid)	1	0	1	0	1	0	1	1	0	0	1	0	1	
27	Bilateral congenital calcanuovalgus	1	1	0	0	1	0	1	1	0	1	0	0	1	
28	Congenital sacrococcygeal teratoma	1	0	1	0	1	0	1	1	0	0	1	0	1	
29	Radial & ulnar club hand	1	0	1	0	1	0	1	1	0	0	1	0	1	
30	Congenital absence of right hand	1	0	1	0	1	0	1	1	0	0	1	1	0	
31	Congenital dislocation of the right shoulder	1	0	1	0	1	0	1	1	0	0	1	0	1	
Total /		218	19	199	87	131	43	175	200	18	37	181	112	106	

o.	Variable Name (type of congenital anomaly)	Number	Incidence Rate %
1	Amelia of right upper limb	2	0.90%
2	Congenital absence of radius & ulnar bones	5	2.30%
3	Klippel – Feil syndrome	2	0.90%
4	Polydactyly of fingers & toes	2	0.90%
5	congenital dislocation of left knee	2	0.90%
6	Congenital absence of fingers & toes	2	0.90%
7	Polydactyly of toes	3	1.40%
8	Congenital absence of fingers	4	1.80%
9	Syndactyly of fingers & toes	4	1.80%
10	Congenital Deformities of vertebral column	3	1.40%
11	Congenital absence of toes	3	1.40%
12	Congenital flatfoot	5	2.30%
13	Congenital scoliosis	5	2.30%
14	Achondro plasia	6	2.80%
15	Congenital dislocation of right hip	8	3.70%
16	Congenital dislocation of left hip	9	4.10%
17	Polydactyly of both hands	11	5%
18	Bilateral congenital dislocation of hip	11	5%
19	Right equinovarus (club foot)	21	9.60%
20	Meningocele	17	7.80%
21	Left club foot	29	13.30%
22	Bilateral club foot	54	24.80%
23	Spina bifida	1	0.50%
24	Arthrogryposis multiplex congenita	1	0.50%
25	Congenital dislocation of the right knee	1	0.50%
26	Congenital Fusion of lower limbs (mermaid)	1	0.50%
27	Bilateral congenital calcanuovalgus	1	0.50%
28	Congenital sacrococcygeal teratoma	1	0.50%
29	Radial & ulnar club hand	1	0.50%
30	Congenital absence of right hand	1	0.50%
31	Congenital dislocation of the right shoulder	1	0.50%
Total /		218	

Table (2)
The incidence of congenital anomalies in Muthanna province

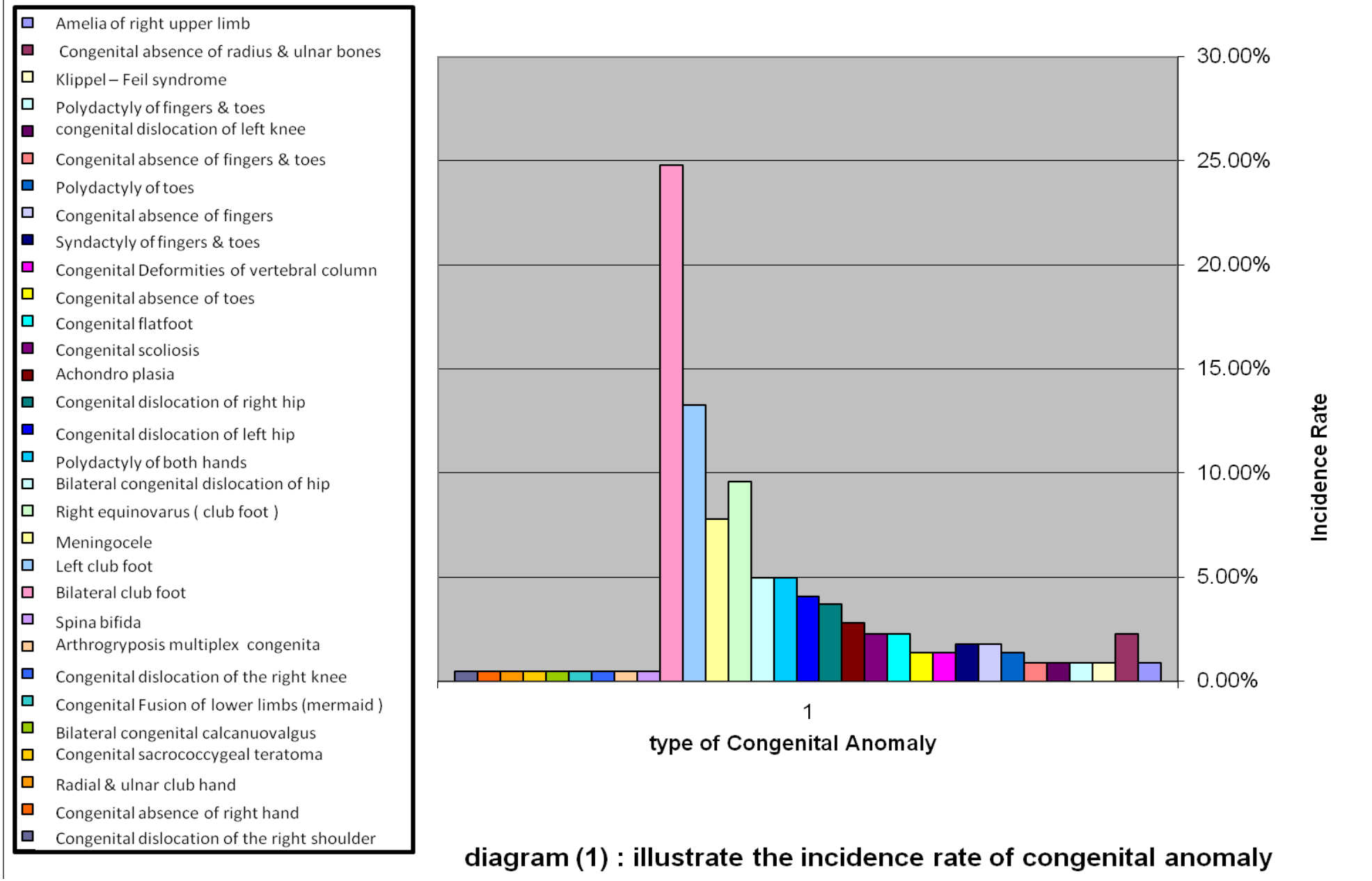

diagram (1) : illustrate the incidence rate of congenital anomaly

No.	Zone	Cases	Rate %
1	Samawa	141	64.70
2	Rumaitha	65	29.80
3	Khidher	12	5.50
Total /		218	

Table (3)

Incidence of congenital anomalies according to the geographical distribution

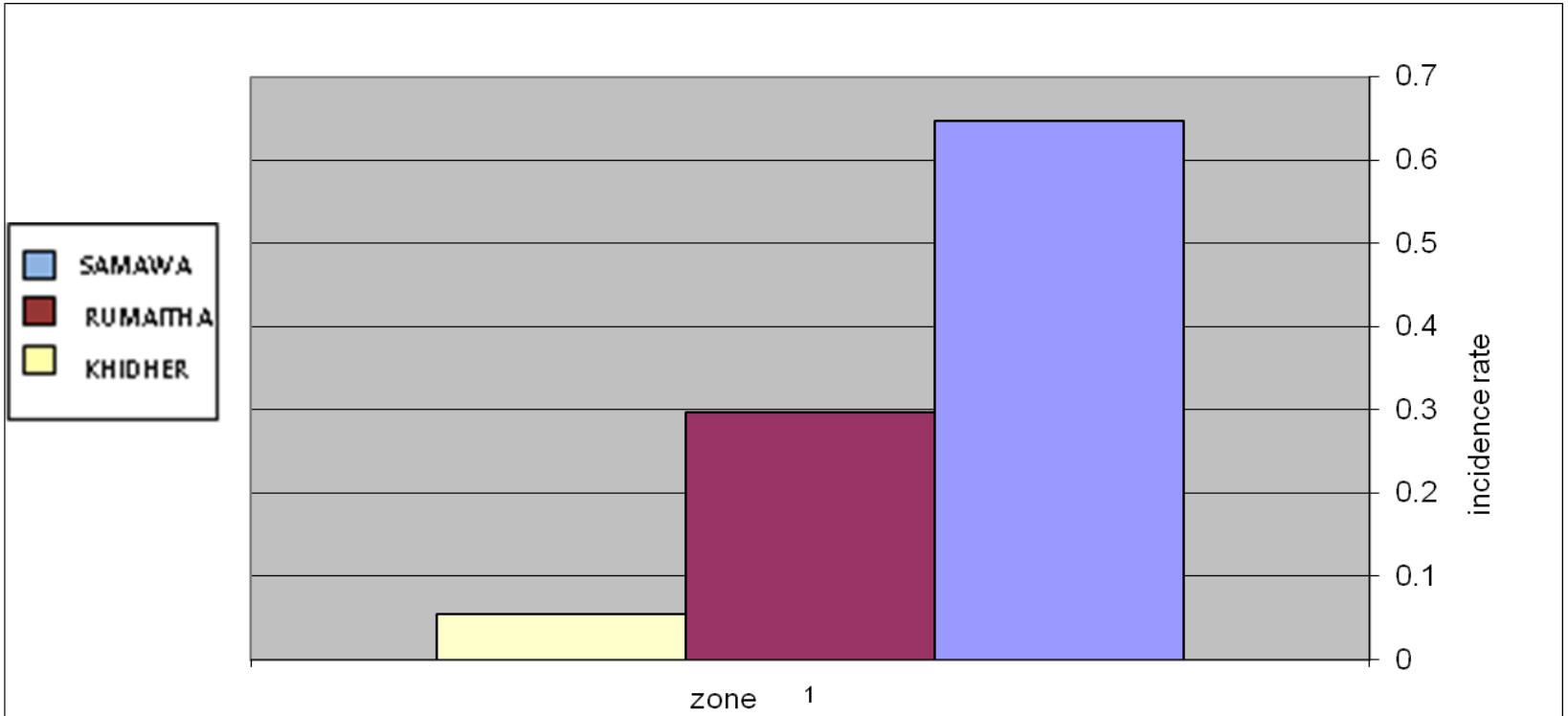

diagram (2): number of cases according to the geographical distribution

Age groups of pregnant women	No. of pregnant women
25-30	48
31-35	63
36-40	70
41-45	37
Total /	218

Table (6)

Illustrate the age groups of pregnant women

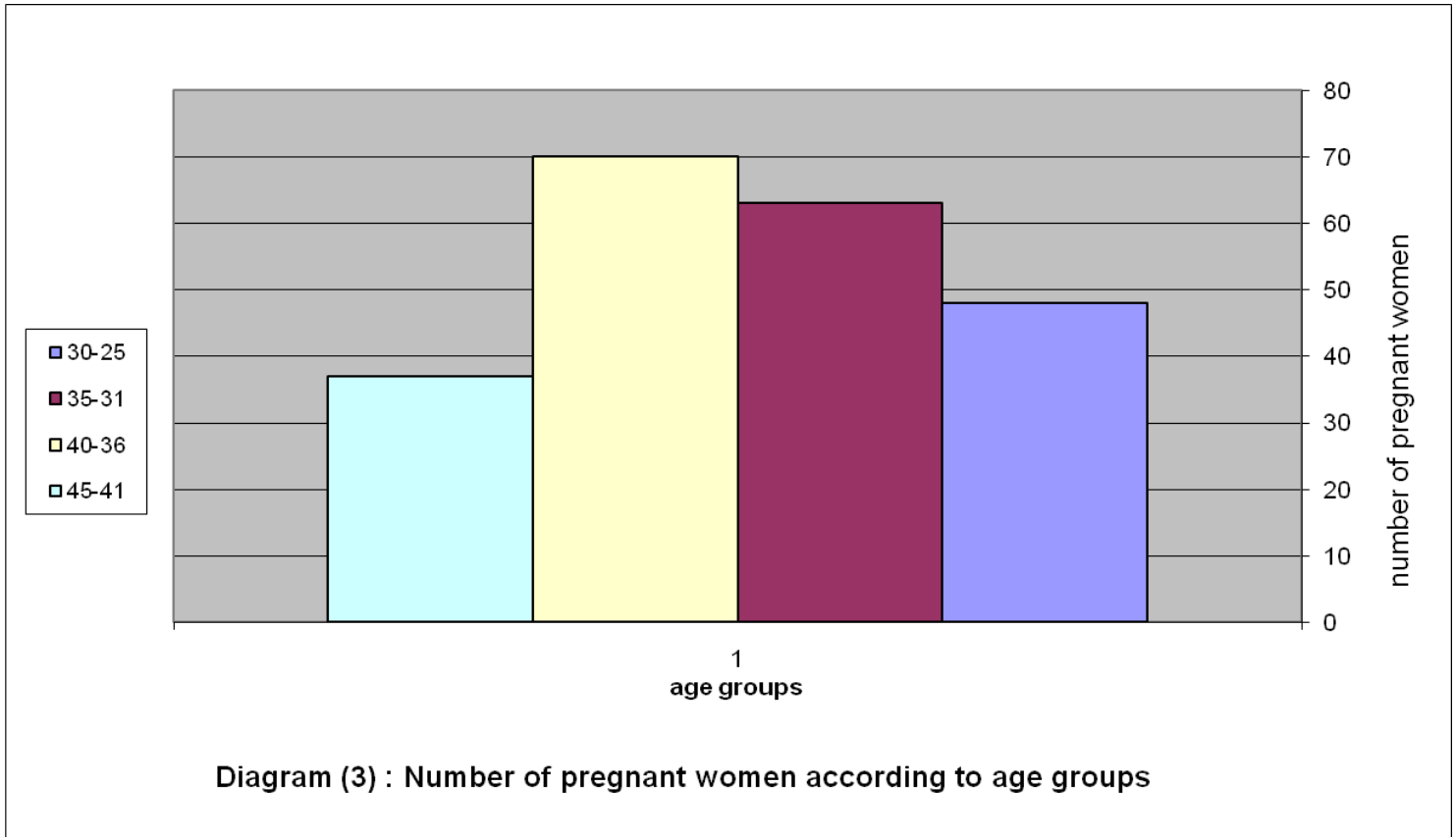

Diagram (3) : Number of pregnant women according to age groups

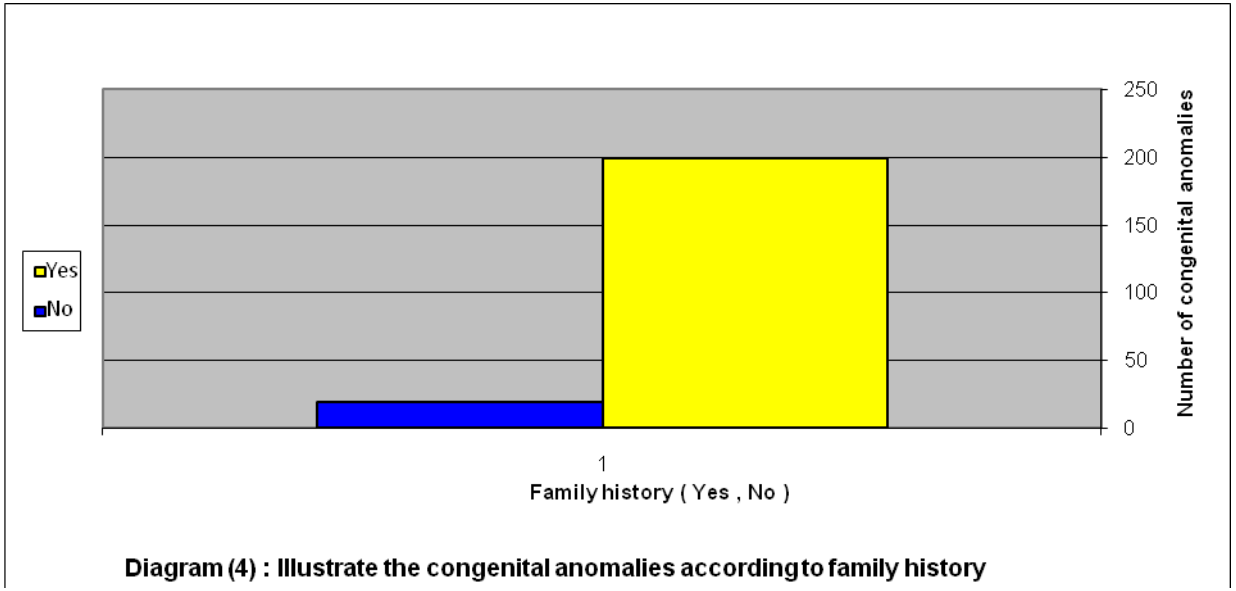

Diagram (4) : Illustrate the congenital anomalies according to family history

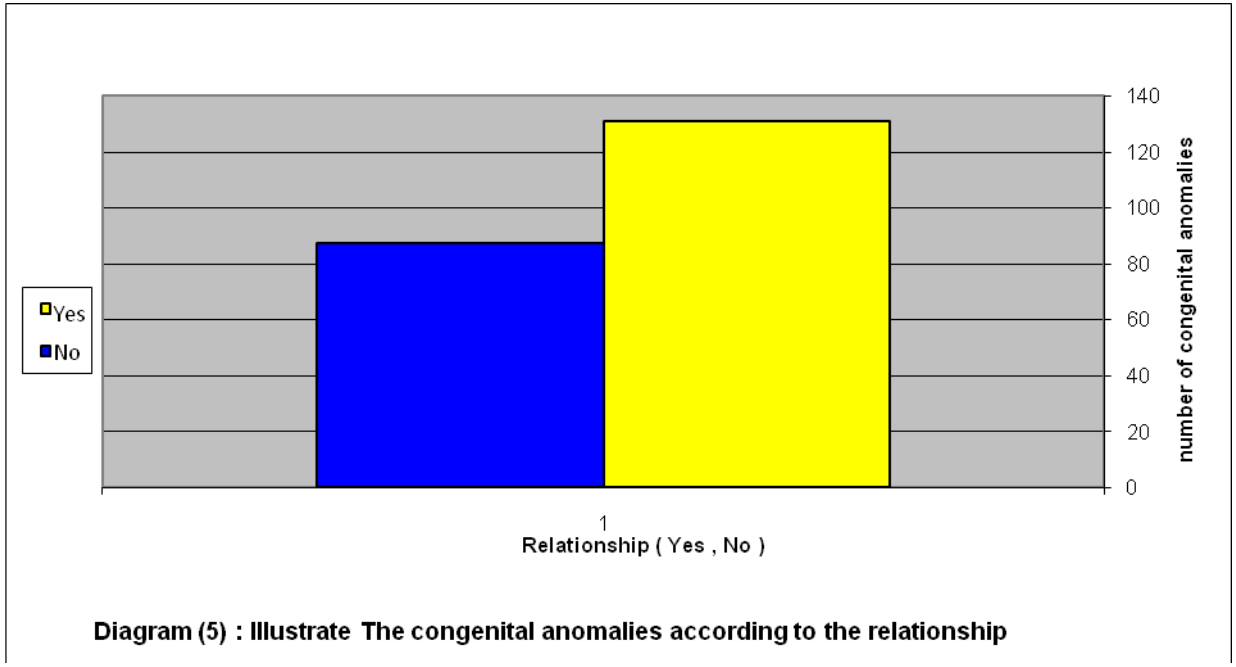

Diagram (5) : Illustrate The congenital anomalies according to the relationship

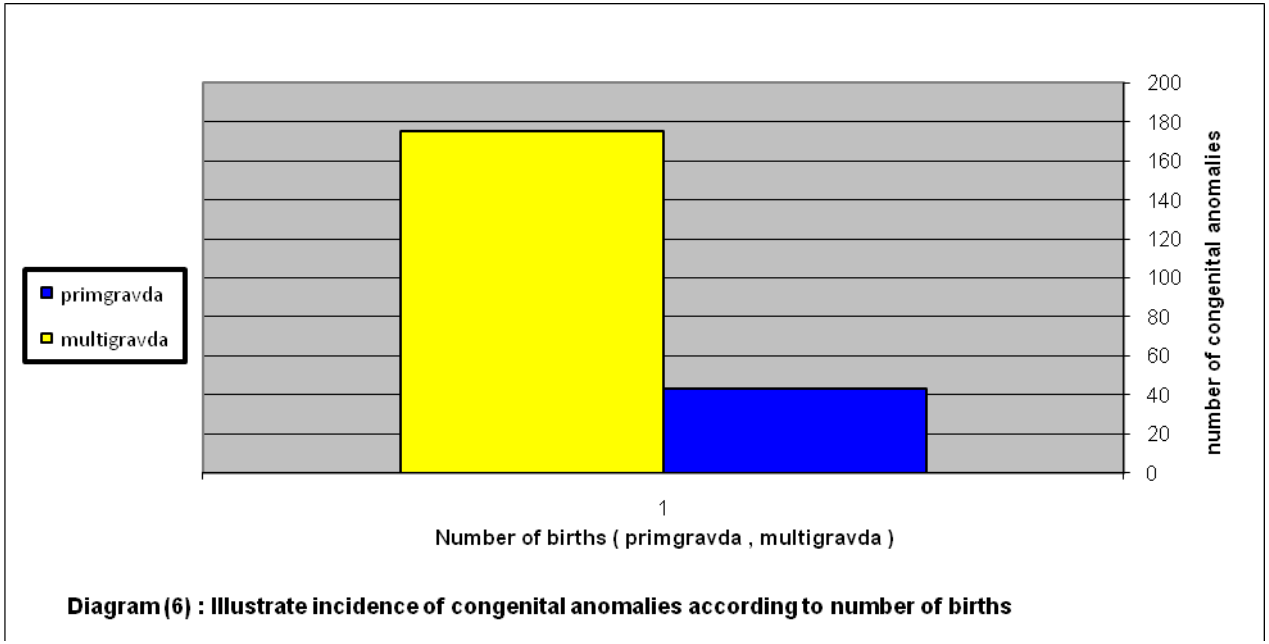

Diagram (6) : Illustrate incidence of congenital anomalies according to number of births

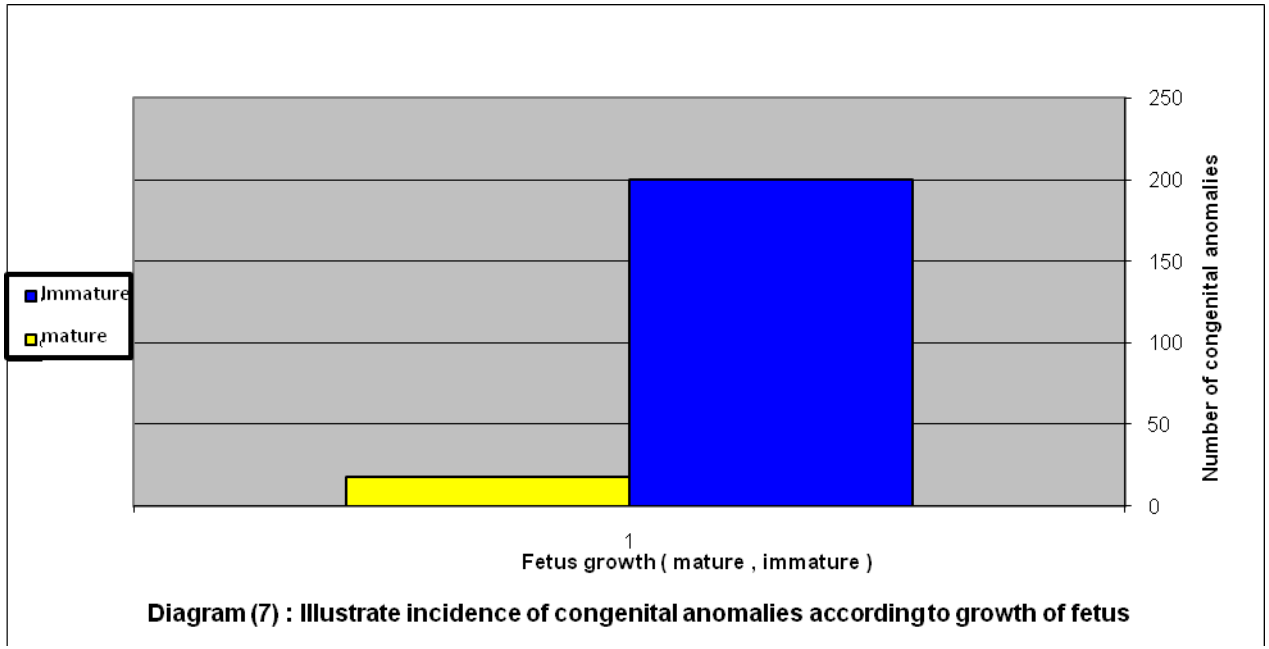

Diagram (7) : Illustrate incidence of congenital anomalies according to growth of fetus

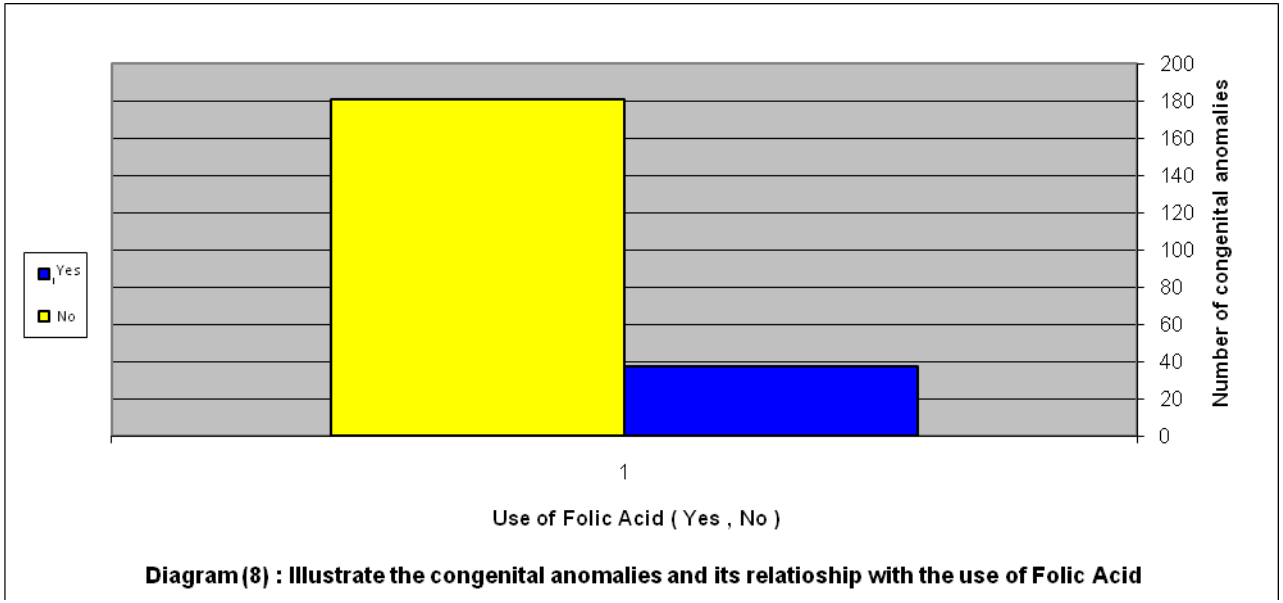

Diagram (8) : Illustrate the congenital anomalies and its relatioship with the use of Folic Acid

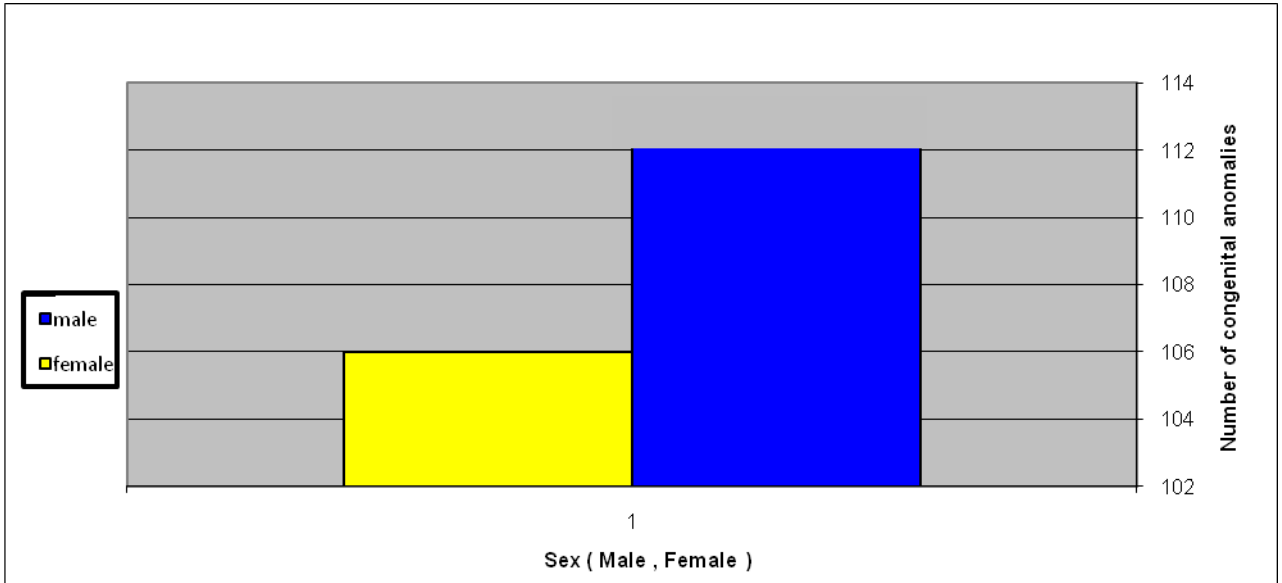

Diagram (9) : Illustrate the congenital anomalies and its relationship with sex

- **Number of population of Muthanna province for a year 2008 = (357722) Male and (354047) Female .**
- **Number of births in Muthanna province for a year 2008 = (31498) , live births (31206) , still births (292)**
- **Number of females at the age of fertility for a year 2008 = (166753)**
- **The percentage rate of congenital anomalies for a year 2008 = number of congenital anomalies / number of live births x 100 %**

  = 218/31206 x 100 %

  = 0.7 %
- **The percentage rate of fertility for a year 2008 = number of women at fertility age / number of the whole women x 100 %**

  = 166753 / 354047 x 100 %

  = 47.1 %