

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

Ali Taha Hassan Al-Azzawi

AliT.20121@gmail.com

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الخلاصة:

بالرغم من أن أضرار التيار الكهربائي قليلة الحدوث ومن الممكن تجنبها، إلا أن عواقبها خطيرة جدا قد تصل إلى الموت .

أجريت دراسة راجعة على (33) مصاب متعرض لأضرار التيار الكهربائي في محافظة بابل ولمدة (15) شهرا، للفترة (كانون الثاني 2006- آذار 2007)، معتمدين على سجلات ردهة الحروق لمستشفى الحلة التعليمي والتقارير التشريحية للطبابة العدلية في بابل، أخذين بنظر الاعتبار : نوع الضرر، مقدار الفولتية ، الإصابات الرضية المصاحبة، مدى تعلق الإصابة بالمهنة، العمر، الجنس، موضع مدخل ومخرج التيار، والجهد الاسعافي والإنعاشي المقدم في ردهات الطوارئ.

معدل الوفيات في محافظة بابل من جراء أضرار التيار كان مرتفعا جدا (93'93%)، مقارنة بالدراسات الدولية (3-15%).

من الضروري أن يألف الطبيب المعالج أعراض الموت الظاهري عند المتعرضين لأضرار الكهرباء والذي بالإمكان معالجته باستخدام وسائل الإنعاش المتوفرة (القلبي والرئوي) حتى ولو كان وصول الضحية متأخرا.

Abstract:

Background: Electrical injuries, though uncommon and largely preventable ,they usually have serious consequences including death .

Objectives: To study the pattern of electric injuries, and recognize the factors that increase their mortality so that we can reduce it .

Materials & Methods :A retrospective study of sever electrically injured cases in Babil Governorate during a period of 15 months, from January 2006 to March 2007 (included) was carried out. From the records of the burn wards of Hilla Teaching General Hospital and the autopsy records of Forensic Pathology Department of Babil Health Directorate, sever electrically injured victims were retrospectively studied according to the type of electric injury, the voltage, associated secondary traumatic injury and whether it is work related or not. The age ,sex , location of entry and/or exit of the electric current and the emergency resuscitative measures applied in the Emergency Departments (EDs)were considered.

Results:.. The total number of electrically injured victims (both hospitalized and non hospitalized) were 33, 30(90.9%) cases due to contact with low voltage, 2(6.7%) due to high voltage and 1 (3.3%) due to lightning strike. Out of 28 cases for whom cardiopulmonary resuscitation was indicated, only in 14(50%) cases ,its application was recorded in the cards of Emergency Departments .

Conclusions: The mortality rate following electrocution ,in Babil, was 93.93% which is too high in comparison with the international studies rate of 3-15% .

Key words :Burns, ,Electric injuries ,Apparent death. Cardiopulmonary resuscitation .

Introduction: Patients with electric injury present a significant challenge . Possible mechanisms of injury include electrical disruption of cardiac rhythm and breathing , burns of several types, and inhalation of gases from fires. Mechanical trauma may come from electric arc blast, explosion of gases, falls, and strong muscle contractions

1 Contact with alternating current at 60 cycles per second (the frequency used in most US household and commercial sources of electricity) may cause tetanic skeletal muscle contractions, preventing self-release from the source of the

electricity and thereby leading to prolonged characteristics regarding age, sex, place of exposure². The extent of tissue damage in injury and whether work related or not, the electric burns is not indicated by the extent mechanism of electric injury, voltage, entry of cutaneous injury; extensive internal and exit wounds of electric current, any damage can cause intravascular fluid loss secondary traumatic injury, the description of and hypotension^{3,4}. The heart is sensitive to the applied resuscitative measures, if any, also to electrical injury⁵, while the nervous system was considered. For those who died, the cause system is highly sensitive⁶. Central of death from the autopsy records was nervous system involvement can present considered.

with amnesia, loss of consciousness, confusion, anxiety, coma or injury to the respiratory center with resulting respiratory arrest^{7,8}.

Obstetric consultation should probably be obtained in all pregnant patients reporting electrical injury, regardless of any symptomatology at the time of presentation⁹.

Both lightning and electrical trauma often cause multiple trauma, including injury to the spine¹⁰. They should be treated as trauma patients, with special attention given to cervical spine immobilization¹¹. Deaths caused by electrical injury are usually VF (low voltage), a systole (high voltage), or respiratory arrest from interruption of the central respiratory center⁵.

Material and Methods: The severely electrically injured patients who reached any hospital within Babil Health Directorate during a period of 15 months from Jan. 2006 to March 2007 were retrospectively studied. The severe electric injured cases involved the cases that required hospitalization or those who died following electric injuries. The data were obtained from the case files of burn wards, and the autopsy records which also keep the ED cards of the referring health center or hospital. Data were analyzed by descriptive statistics. The patient

Results: The total number of severely electrically injured victims in our study was 33, male to female ratio was 1.75 : 1. The hospitalized patients were 3 (9.09%), 2 improved after surgical management (skin grafting in one, the other required upper limb amputation; in addition to skin grafting), 1 died; the cause of death was septicemia. The dead victims from the non-hospitalized group were 30 (90.91%) and represented those who reached the hospital or primary health center dead or apparently dead. Among dead victims following electric injuries – as shown in the table, children within 12 years of age were 10 (32.258%), the remaining victims were adolescents and adults. None of the victims was 50 years or above. All the electrical injuries occurred at home; none happened at a working place. In 18 (58.06%) cases, the site of entry and/or exit wound(s) of the electric current were through the upper limbs. Viewing the ED cards indicated that 14 (50%) only obtained resuscitative measures on arrival, the time period of resuscitation was not pointed to in the records. 29 (93.54%) of the electrically injured died due to contact with low voltage while one victim died following both lightning strike and high-voltage exposure (3.22%) for each. According to

autopsy records, cardiopulmonary arrest was the primary cause of death in 90% of the dead victims and no secondary trauma contributed to the mortality of any victim was found.

Serial no.	Age in years	Sex	Hospital Admission or ED resuscitation	Voltage: High(H) Low(L)	Site of current Entrance or Exit wound	Medical Saving Measures
1	4	F	ED resuscitation-	Low-voltage	Rt. hand	Nil
2	22	M	=	=	Rt .upper limb	I.V.F, D C
3	28	M	No	=	Right hand	Nil
4	3	M	=	=	abdomen	Nil
5	5	M	=	=	Lt. hand	Nil
6	17	M	=	=	Lt. hand	Nil
7	17	M	ED resuscitation	=	Rt. hand	D C
8	24	M	No	=	Rt. hand	Nil
9	12	M	No	=	Rt. hand	Nil
10	18	M	ED resuscitation	=	unknown	D C
11	4	F	No	=	Lt. hand	Nil
12	28	M	=	=	Rt. hand	Nil
13	33	M	ED resuscitation	=	Lt. chest	I.V.F
14	3	F	ED resuscitation	=	Rt. hand	I.V.F, D C
15	30	M	No	=	abdomen	Nil
16	31	F	ED resuscitation	=	Rt. hand	I.V.F, D C
17	17	F	No	=	Lt. hand	Nil
18	42	M	=	=	Lt. shoulder	Nil
19	26	F	=	=	Lt. hand	Nil
20	29	M	ED resuscitation	=	Upp. limb	I.V.F, D C
21	6	F	No	=	Rt. hand	Nil
22	38	M	ED resuscitation	=	unknown	I.V.F, D C
23	29	F	=	=	Lt. foot	I.V.F, D C
24	1	M	=	=	Head	I.V.F
25	20	M	=	=	unknown	I.V.F, D C
26	3	F	=	=	unknown	I.V.F
27	47	F	=	=	Rt. Upp. limb	I.V.F, D C
28	26	F	=	=	Abdominal wall	I.V.F, D C
29	3	F	No	=	unknown	Nil
30	25	M	Hospitalized	High-voltage	Upper & lower extremities	I.V.F and analgesia (on presentation, no cardiopulmonary arrest)
31	17	M	Autopsy	Lightning	Unknown	The victim was charred & dead .

A table shows the dead victims ,their ages, gender , whether hospitalized or just ED primary survey ,type of voltage, entry or exit of the current wound ,description of resuscitative measures .

Discussion: Brain death is the absence of clinical brain function when the proximate cause is known and demonstrably irreversible ¹² . Prior to diagnose brain death, conditions; like electric shock injury , and drugs that simulate brain death have to be excluded and drug levels measured to ensure that there is no reversible cause for coma .Moreover; metabolic and endocrine disturbances must have been excluded as the cause for the continuation of

unconsciousness . The assessment of brain stem functioning should be performed by 2 physicians of not less than 5 years registration and at least one of them should be a consultant ¹³.

In our study ,we divided the victims into 3 groups according to the voltage of the power source or lightning bolt to which the victims were exposed. This division is important because treatment by emergency team differs for each group ^{3,14}. The 1st group ; exposed to low voltage ,were 30, the 2nd group ;exposed to high voltage was 1, the 3rd group ; lightning strike ,also one victim .In our study ,non of the injuries was work related while the literature stated that electrical injuries are the 4th leading cause of traumatic work related deaths⁷.Also the male to female ratio(1.75 :1) is less compared to other studies such as Nigerian burn center study ¹⁵ (4.8:1)while in Canadian burn care the ratio was 23.39: 1 ¹⁶;the increased females rate of electric injuries in Babil was attributed to the shortage of the main electric power which, in turn , obliged their involvement in changing the source of electric power frequently at home particularly when the males are outdoors during the day time. Hanumadass ML and colleagues, in reviewing 113 cases of electrical burns during 10 years ,they found low-voltage electrical burns in 73 per cent. All 113 patients survived. They attributed this to early transfer of patients to the Burn Unit, aggressive fluid resuscitation, continuous haemodynamic and metabolic support, and early surgical intervention ¹⁷ . Children constituted 10(32.25%) among the victims which is comparable with other studies ³. The primary cause of death in 28 cases was

cardiopulmonary arrest which is comparable to literature findings in the immediate death in persons who have sustained an electrical injury ¹⁸. The mortality in our study was too high (93:93%) if compared to that of Nigerian's which was 12.5 % ¹⁵. In the E.D ,the managing doctor should realize that electric injury may be a cause of coma ,apnea and fixed pupils ¹³ . Following electric or lightning injury ,irritation of the anterior chamber can cause miosis, Horner's syndrome or mydriasis can be mistaken as a fixed – pupil which also may result from transient autonomic instability leading to early termination of resuscitation efforts ¹⁹ .

A few cases in our study were conveyed to the hospital late because some people believe that death following electrocution is irremediable .In spite of late arrival of the victim and the interval before the resuscitation attempt is prolonged, resuscitative efforts should be attempted for extended periods of time as it may be effective in reviving the victim ²⁰. Finding a normal pulsation in an electrically or lightning injured victim following a period of CPA(cardiopulmonary arrest) , even without application of resuscitative attempt, should not make us to believe that resuscitation is no longer required .The literature assures that in many cases intrinsic cardiac automaticity may spontaneously restore organized cardiac activity ²¹ . Aggressive persistent resuscitative efforts are indicated for all victims, especially those with spontaneous cardiac rhythms & prolonged apnea or coma ¹⁹ . Ventilatory support may be required for several hours, but even in

these cases , there is potential for full recovery ²². Full support should be continued until cerebral function can be assessed ²³..

A mortality of 93.9% resulting from low voltage injuries was found in our study while the literature states that ' in general, therapy for low-voltage and lightning injury is supportive and involves cardiac resuscitation for the more seriously injured and supportive care for the less severely injured ²⁴. An average of 2 cases loss monthly due to electric injury in Hilla

Conclusions: A mortality rate of 93.93% following electrocution ,in Babil, was too high compared to the range reported by the international studies. To prevent electrical accidents, the society should practice a conscious use of electricity and change the building codes that require a ground plug for all home outlets. If someone faces an electrically injured victim, he must transfer him to the near-by hospital early, even if the victim appears dead. The clinicians should be familiarized with the tendency of electrocution victims to apparent death presentation which may be reversible if immediate and prolonged

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Governorate was concluded . The mortality in our study was too high (93:93%) if compared to that of USA and Nigeria which were 3-15% and 12.5 % respectively ^{25,15} .The high mortality could be contributed to either improperly attempted ,short - timed CPR or to non- resuscitating the victims with the belief that they were irremediable and dead ; shortage of familiarity with apparent death presentation among such cases . The latter was assured through noticing autopsy reports and ED cards which indicated that 14(50%) of the dead cases received no CPR .

Cardiopulmonary resuscitation are started even if the victim reaches the hospital late or dead .

We recommend : 1 -Upgrading of ED of our hospitals through provision of advanced medical equipments required in performing CPR (Cardiopulmonary resuscitation) ,in addition to ,improving the training of emergency teams .

2- International rules should be applied in signing death certificates by a medical committee after diagnosing brain death rather than clinical death only.

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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

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 calcaneovalgus	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

Table (1)

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

No.	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 calcaneovalgus	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

- Amelia of right upper limb
- Congenital absence of radius & ulnar bones
- Klippel – Feil syndrome
- Polydactyly of fingers & toes
- congenital dislocation of left knee
- Congenital absence of fingers & toes
- Polydactyly of toes
- Congenital absence of fingers
- Syndactyly of fingers & toes
- Congenital Deformities of vertebral column
- Congenital absence of toes
- Congenital flatfoot
- Congenital scoliosis
- Achondro plasia
- Congenital dislocation of right hip
- Congenital dislocation of left hip
- Polydactyly of both hands
- Bilateral congenital dislocation of hip
- Right equinovarus (club foot)
- Meningocele
- Left club foot
- Bilateral club foot
- Spina bifida
- Arthrogryposis multiplex congenita
- Congenital dislocation of the right knee
- Congenital Fusion of lower limbs (mermaid)
- Bilateral congenital calcanuovalgus
- Congenital sacrococcygeal teratoma
- Radial & ulnar club hand

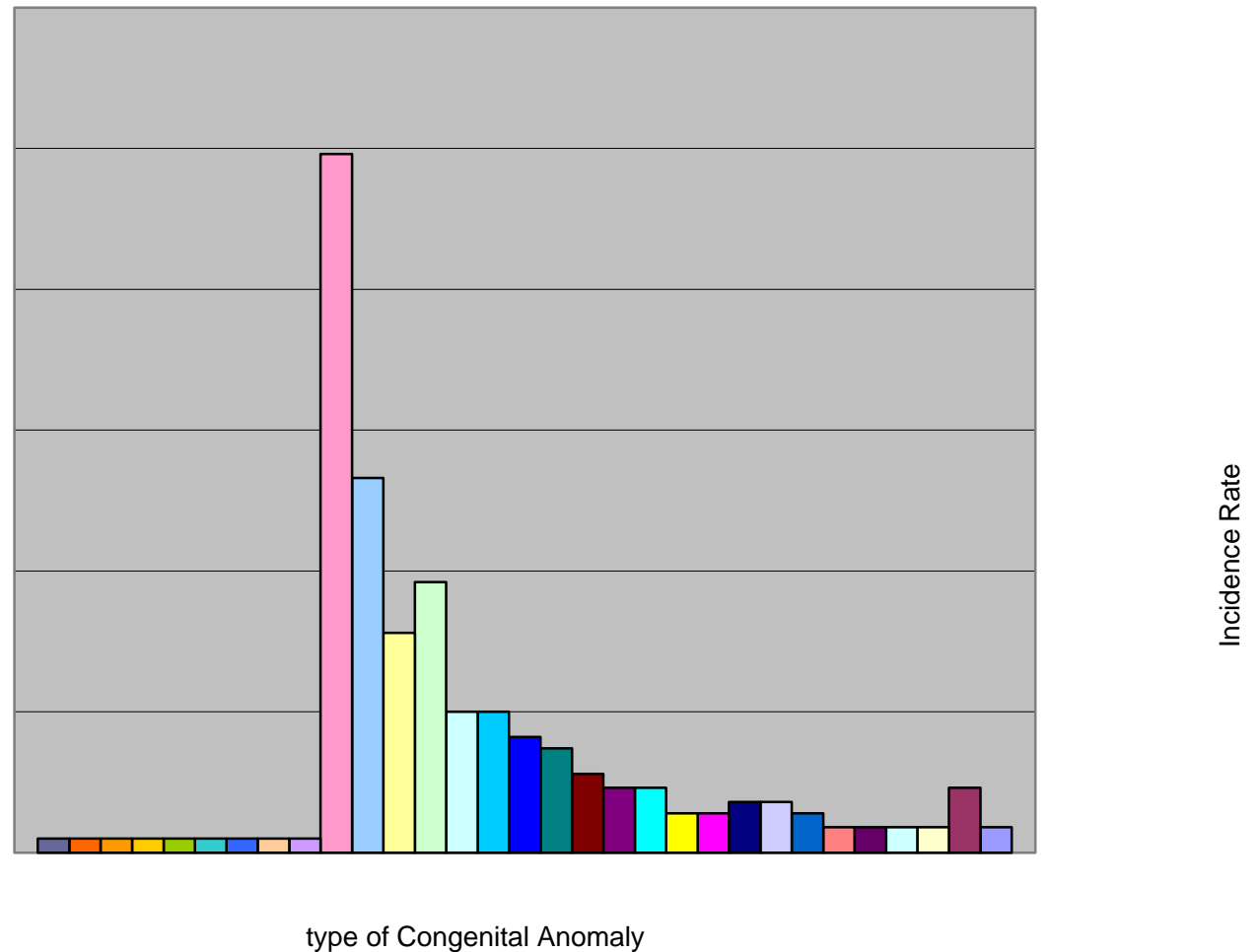


diagram (1) : illustrate the incidence rate of congenital anomaly

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

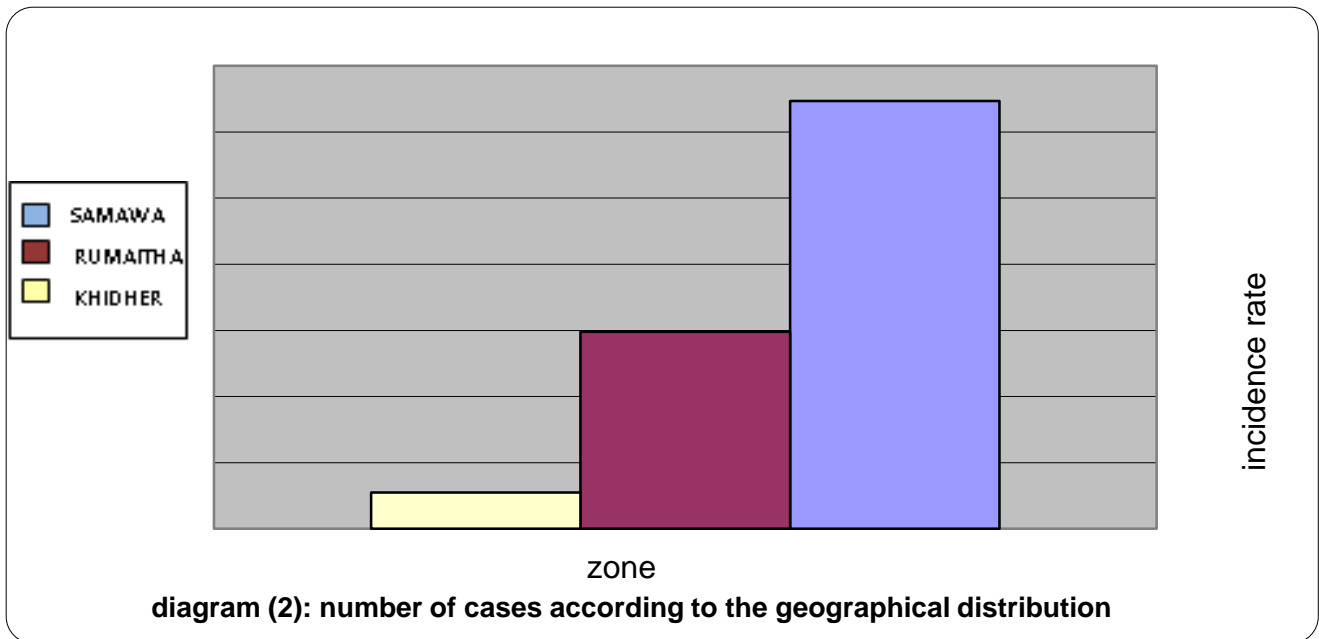
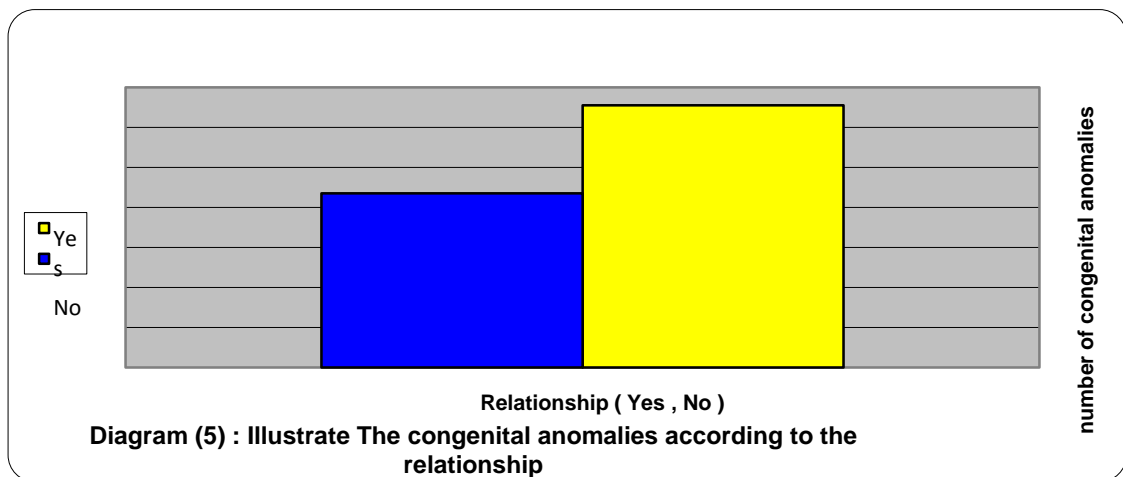
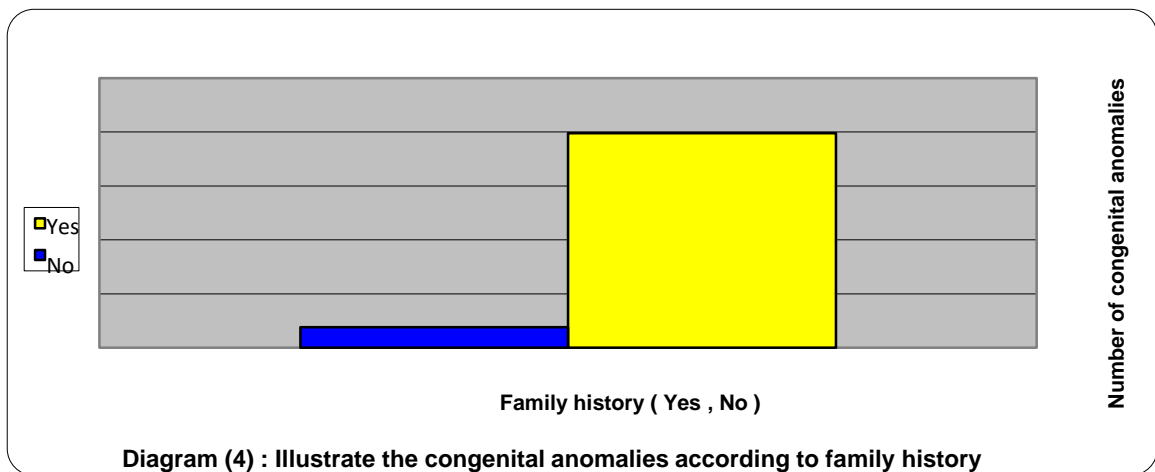
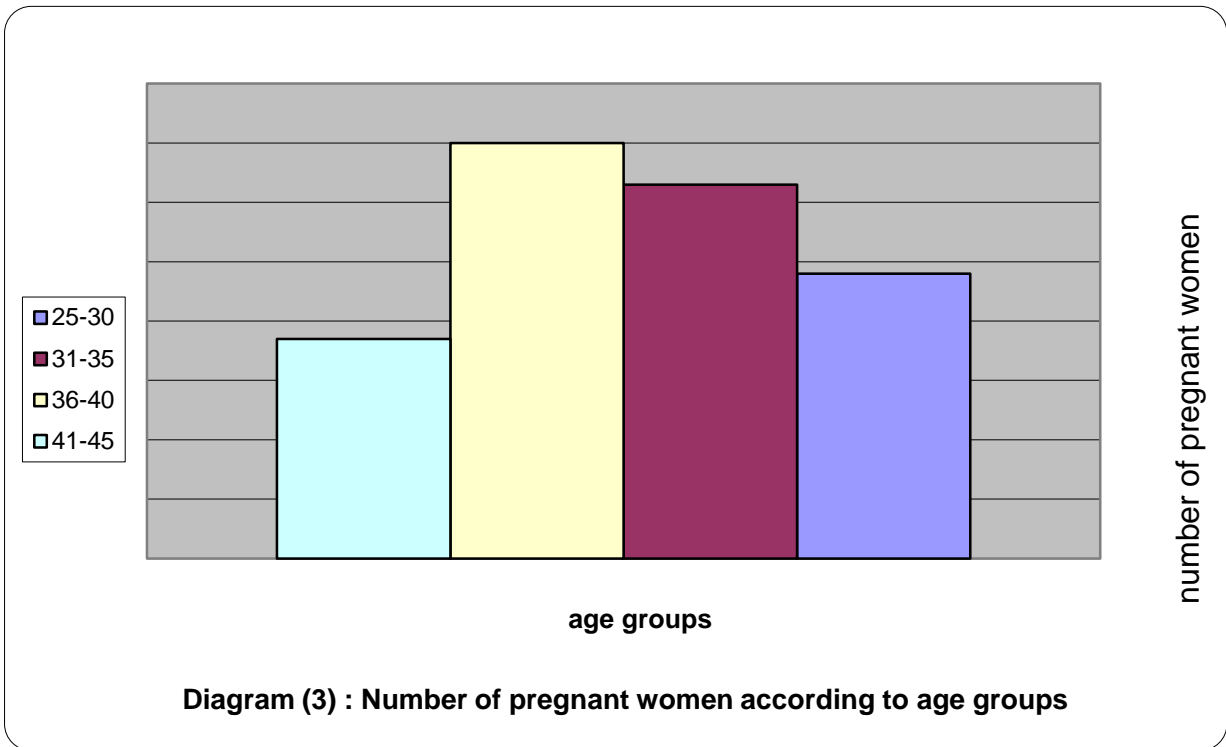


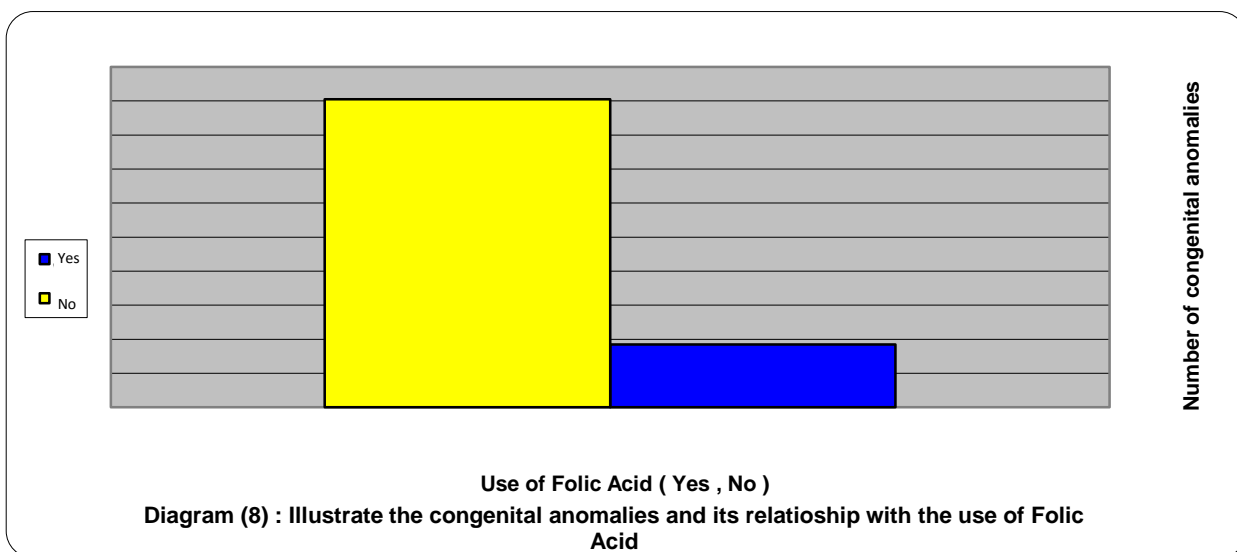
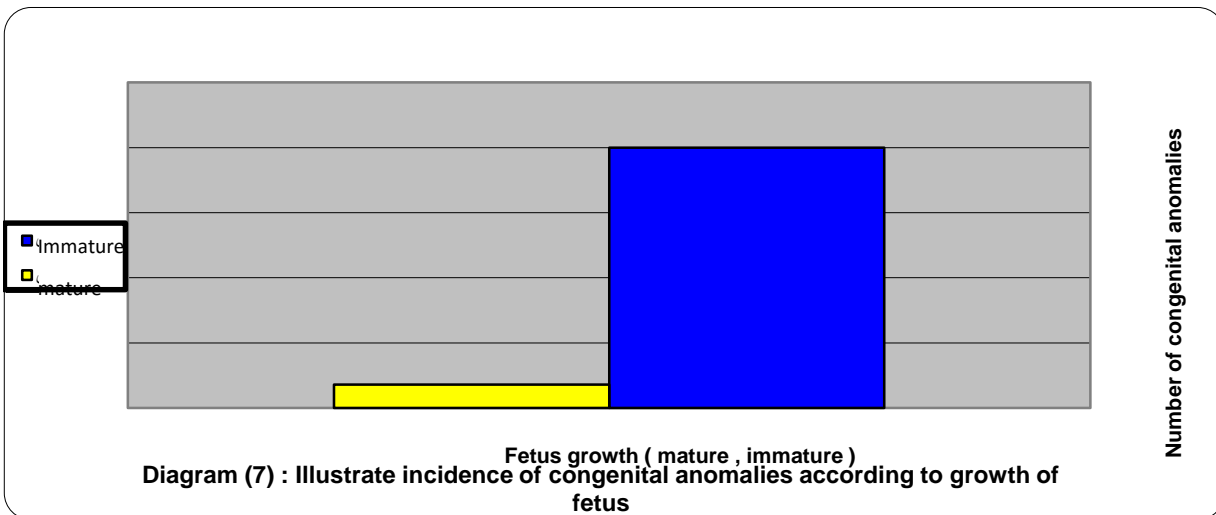
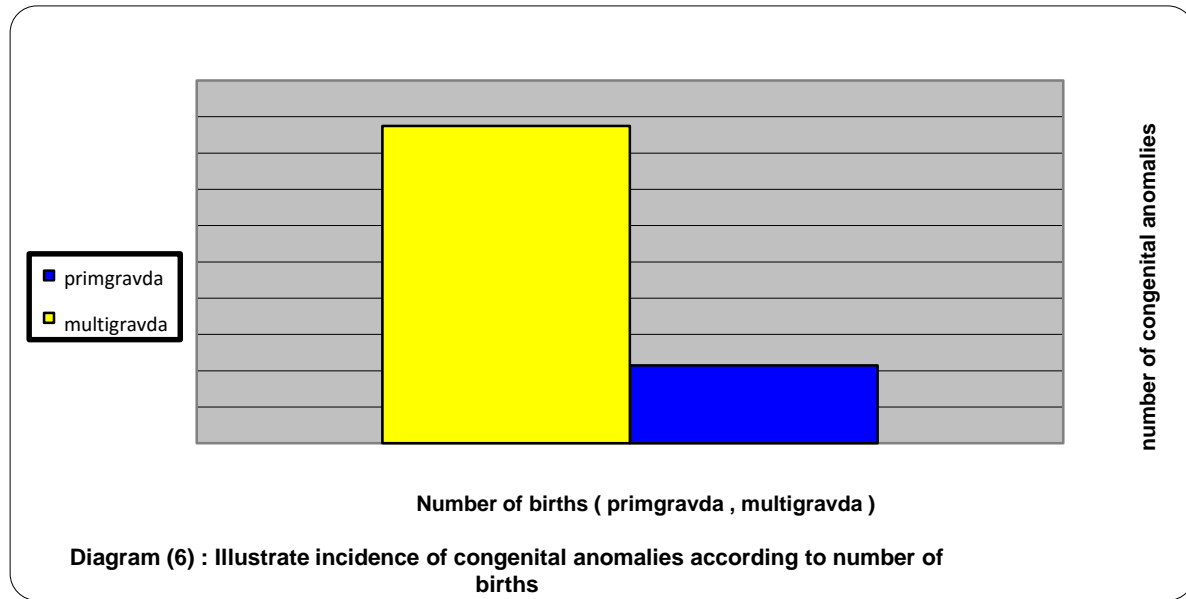
diagram (2): number of cases according to the geographical distribution

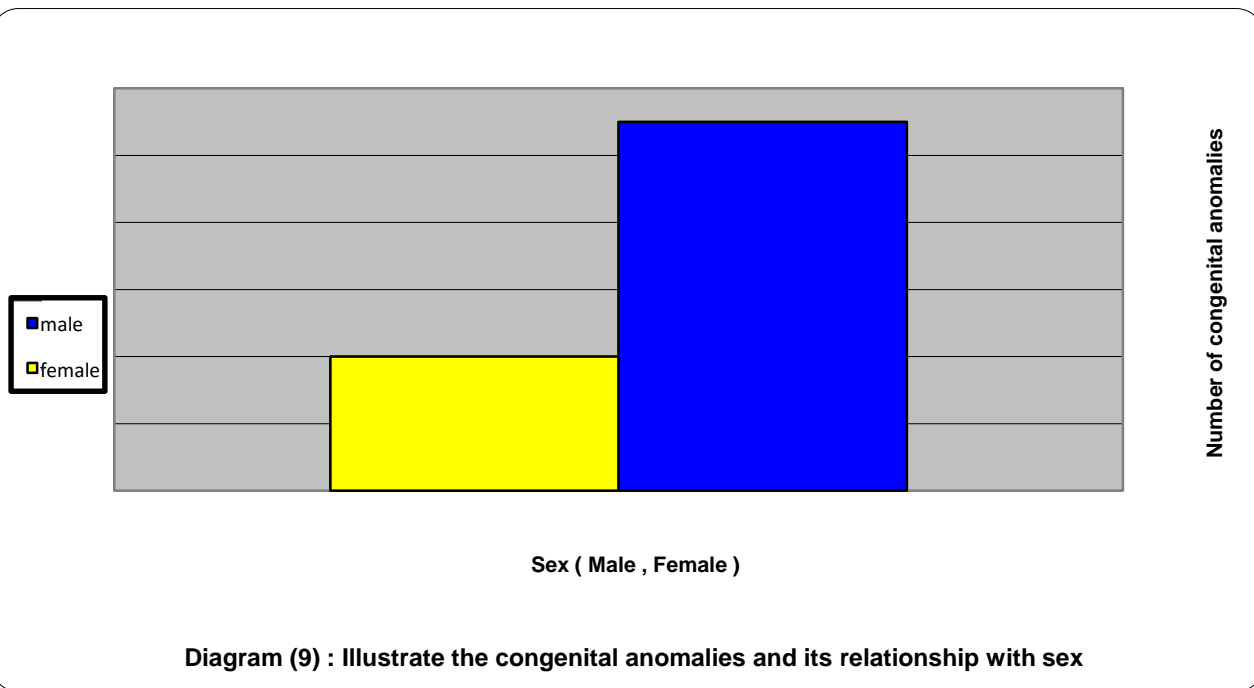
Age groups of pregnant women	No. of pregnant women
25-30	48
31-35	63
36-40	70
41-45	37
Total /	218

Table (6)

Illustrate the age groups of pregnant women







- 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 %

$$= 218/31206 \times 100 \%$$

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

$$= 166753 / 354047 \times 100 \%$$

$$= 47.1 \%$$