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Congenital Anomalies among Children: Knowledge and Attitude of Egyptian and Saudi Mothers

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Abstract
A congenital anomaly is defined as any abnormality of physical structure found at birth or during the first few weeks of life; or any irreversible condition exiting in a child before birth. The aim of the current study was to assess Egyptian and Saudi mothers' knowledge and attitude regarding congenital anomalies among children as well as to detect the differences between Egyptian and Saudi mothers' knowledge and attitude. A descriptive comparative research design was utilized in the study. A convenient sample of 100 Egyptian and 100 Saudi mothers wasparticipated in the study. The study was conductedin the pediatric surgical wards and pediatric surgery outpatients' clinics in both Cairo University Specialized Pediatric Hospital and King Fahad University Hospital in Al Khobar,in Saudi Arabia.The data were collected using structured interview schedule developed by the researchers it contained three parts; the first one related to sociodemographic characteristics of mothers and their children; the second one composed of mothers' knowledge about congenital anomalies and the third one concerned with mothers' attitude. The study's results revealed that more than three quarters of Egyptian mothers had satisfactory level of knowledge regarding congenital anomalies among children compared to fifty one percent of Saudi mothers. The highest percentages of both Egyptian and Saudi Mothers expressed negative attitude regarding congenital anomalies among children.There was highly statistically significant difference between Egyptian and Saudi mothers' level of knowledge regarding congenital anomalies among children. While, there was no statistically significant difference between Egyptian and Saudi mothers' general attitude regarding congenital anomalies among children. The study results recommended that health promotion programs should be directed to premarital counseling and preconception reproductive health and primary prevention of congenital anomalies.
Key words:Congenital anomalies - Egyptian and Saudi mothers- knowledge and attitude

1-Introduction

Congenital anomaly was defined as ''a permanent change produced by an intrinsic abnormality of development in a body structure during prenatal life. .A congenital anomaly may be viewed as a physical, metabolic, or anatomic deviation from the normal pattern of development that is apparent at birth or detected during the first year of life ***(Schroeder, 2013)***. It was reported that congenital anomalies occur in 3% of all infants worldwide. Congenital anomalies including structural malformations, chromosomal abnormalities and metabolic disorders are becoming the most important cause of perinatal mortality ***(Fida et al., 2007).***Congenital anomalies have been known and recognized for centuries. It is a stimulating problem for research study because of the high frequency of their occurrence and the devastating effect they may have on the child and his/her family. It contributes a significant proportion of perinatal and infant morbidity and mortality. Approximately 50% of all congenital anomalies, however, cannot be assigned to a specific cause ***(Wright, et al., 2013)***.Considering the elimination or control of some infectious diseases; congenital anomalies areincreasingly playing a major role in the mortality and morbidity of children. On the other hand, treatment and rehabilitation of these morbid children is difficult and costly***(Abdi-Rad, Khoshkalam&Farrokh-Islamlou, 2008)***.

Based on ***WHO report (2012)***, about 3 million fetuses and infants are born each year with major congenital anomaly worldwide. ***Shawky and Sadik (2011)*** emphasized that the impact of the congenital anomalies on the fetus and newborn infant is great as they are responsible for 495,000 deaths worldwide. The great majority of these deaths occurred during the first year of life and thus contributes mostly to infant mortality rate. Several large population based studies place the incidence of major congenital anomalies at about 2–3% of all live births.It account for 15–30% of all pediatric hospitalizations and they exert a proportionately higher health care cost than other hospitalizations i.e. they impact a significant burden to families and society. ***Taboo (2012)*** highlighted that the actual numbers of children with congenital anomalies vary from country to country; it was reported to be as low as 1.07% in Japan and as high as 4.3% in Taiwan. Congenital anomalies account for 2% in England, 1.49% in South Africa and 3.65% in India. The reason for the regional difference of congenital

anomalies might be attributed to the many factors, such as: maternal risk factors, environmental exposures, ecological, economical, and ethnic and other factors.

Analysis of the available epidemiological data clearly indicates thathereditary disorders and congenital anomalies are rapidly becoming a major public health concern in Egypt. The prevalence of congenital and genetic disorders among infants and young children in Egypt is estimated to range from 2.8% in urban areas in metropolitan governorates to 8.4% in rural areas in Upper Egypt ***(Abd-Al Raouf, 2008)***. ***Alshehri (2005)*** reported that in Saudi Arabia, the incidence of major congenital anomalies accounted for 22.7 per 1000 live births. The high frequency of congenital anomalies might have resulted from common consanguineous marriages, which led to the preservation of rare mutations kept in a genetically homogenous population. According to the latest WHO data published in April 2011, congenital anomalies deaths in Egypt reached 2.41% of total deaths, ranked as 28 in the world. Furthermore, congenital anomalies deaths in Saudi Arabia reached 2.92% of total deaths, and ranked as 37 in the world. Based on***Egypt Health Profile (2012),*** in Egypt, infant mortality rate due to congenital anomalies is about 15% of all infant deaths (24/1000).

The causes of congenital anomalies are divided into four broad categories, genetics, environmental, multifactorial and unknown. A genetic cause is considered to be responsible in as many as 10–30% of all congenital anomalies, environmental factors in 5–10%, multifactorial inheritance in 20–35% and unknown causes were responsible for 30–45% of cases***(Shawky&Sadik, 2011)***. On the same context, ***Ahmed et al. (2011)*** concluded that the majority of congenital anomalies, 40% to 60%, are unexplained. ***Taboo (2012)*** added that risk factors like infectious agents, chemical compounds, radiation, use of medication, maternal metabolic diseases, multiple births, maternal life event stress, prematurity, occupational exposure are associated with higher congenital anomalies.Furthermore, low schooling and low socioeconomic status in the population are other factors which are highly relevant.

Congenital anomalies are more frequent among resource constrained families and countries. It is estimated that about 94% of serious congenital anomalies occur in middle- and low-income countries, where mothers are more susceptible to macronutrient and micronutrient malnutrition and may have increased exposure to any agent or factor that induces or increases the incidence of abnormal prenatal development, particularly infection. Advanced maternal age also increases the risk of some chromosomal abnormalities including Down syndrome.Maternal infections such as syphilis and rubella are a significant cause of congenital anomalies ***(WHO, 2012; Othman, 2013).***Consanguinity increases the prevalence of rare genetic congenital anomalies and nearly doubles the risk for neonatal and childhood death, intellectual disability and serious birth anomalies in first cousin unions***(Tayebi, Yazdani&Naghshin, 2010).*** Moreover, ***Sullivan (2010)***documented that iodine deficiency, folic acid insufficiency, overweight, or conditions like diabetes mellitus are linked to some congenital anomalies. For example folic acid insufficiency increases the risk of having a newborn with neural tube defects.Maternal exposure to pesticides, drugs, tobacco and certain chemicals during the early pregnancy, and high doses of radiation increase the risk of having a baby with congenital anomalies. Working or living near or in waste sites, smelters, or mines may also be a risk factor.

Sallout, et al. (2008) and Tomatır, et al. (2009) mentioned that major congenital anomalies were divided according to the system involved (cranial, neural tube defect, face and neck, thoracic, cardiac, ventral wall defects, gastrointestinal tract, genitourinary system or musculoskeletal). The fetuses were diagnosed as having either isolated anomalies (only one system involved) or complex anomalies (two or more systems involved). In addition structural anomalies are considered to be major when are visible to inspection, the rest of them are considered occult. ***Disease Control Priorities Project (2008)*** documented that common congenital disorders account for approximately 25 percent of these defects such as congenital heart diseases and neural tube defects.

Primary prevention seeks to ensure that individuals are born free of congenital anomalies by being conceived normally and not being damaged in the early embryonic period. Services for the primary prevention of congenital malformations include basic reproductive health approaches, which should be part of established women's, maternal, newborn, and child health services in all middle- and low-income countries These include: family planning; optimizing women's diets; detecting, treating, and preventing maternal infections; optimizing women's health through the control of such diseases as insulindependent diabetes mellitus and epilepsy; and pre-conception screening for common recessive disorders.Avoiding exposure to hazardous environmental substances, improving vaccination coverage, and increasing and strengthening education to health staff and others interested in promoting congenital anomalies prevention greatly help in the reduction of it***(Disease Control Priorities Project, 2008)***.According to ***WHO (2012)***, the early detection of congenital anomalies include; preconception screening is used to identify persons at risk for specific disorders or at risk for passing one on to their children. Antenatal screening includes screening for advanced maternal age, Rhesus blood group incompatibility, and carrier screening. Newborn screening includes clinical examination and screening for hematological, metabolic, and hormonal disorders. Screening as well as early detection of congenital anomalies

can facilitate life-saving treatments and prevent the progression towards some physical, sensory and intellectual disabilities. On the other hand, in a study conducted by ***Al-Gazali,Hamamyand Al-Arrayad (2006)***highlighted that services for the prevention and control of genetic disorders in the Arab countries are restricted by certain cultural, legal, and religious limitations, such as the cultural fear of families with genetic diseases being stigmatized within their community and the legal restrictions on selective termination of pregnancy of an affected fetus.

The dramatic decreases in infant mortality due to improvement in the control of infections and malnutrition related disorders, chronic disabling conditions are an emerging challenge facing developing and industrialized nations. Most children who are born with major congenital anomalies and survive infancy are affected physically, mentally or socially and can be at increased risk of morbidity due to various health disorders. The birth of a child with major anatomical congenital anomalies might alter family functioning in several ways. Parents have to abandon their expectations of a healthy child and have to cope with the painful experience of raising a severely ill child, either temporarily or life-long these circumstances place a heavy financial, emotional and family burden on parents ***(Van Eijk, Honig-Mazer&Doosje, 2011)***.Parents of children with congenital anomalies face many problems, including multiple surgical interventions, long neonatal hospitalization, and often uncertainty about future quality of life. The burden of congenital anomalies is ancient but not inevitable. This premise, whether articulated or not, is shared by the many professionals- surgeons, clinicians, epidemiologists, researchers, nurses- working to improve the outcomes and lessen the impact of congenital defects in the population. From an epidemiologic and population-based perspective, which is the focus of this contribution, the burden of congenital anomalies can be decreased through two main approaches—primary prevention among those at risk, and improved survival among those affected ***(Mazer, et al., 2008)***.

The pediatric nurse has a unique opportunity to influence that child's physical and emotional health. Nurses have a crucial role in education, treatment, research, and support of children with congenital anomalies and their families to help them learn to live with the defect and attain optimal health ***(James, Nelson &Ashwill, 2013)***. Managing a congenital anomaly requires an individualized approach to the child and parent's emotional, as well as physical, requirements. Nurses should include families in the care of their children, accompanying and helping them to establish a more affective connection with their children. Thus, professionals have stimulated parents to talk to their babies, touch them, and bring objects from home that are significant to children, and care for their hygiene and feed them ***(Helwick, 2012)***.

2-Significance of the study

Congenital anomalies affect approximately 1 in 33 infants and result in approximately 3.2 million birth defect-related disabilities every year ***(WHO, 2012).*** Itconstitutes a serious medical problem worldwide. This is particularly true in the Arab World; where a unique combination of social, cultural, and environmental factors has led to the preponderance of such genetic afflictions ***(Centre for Arab Genomic Studies, 2012)***.Theevidences suggest that congenital disorders are responsible for a major proportion of infant mortality, morbidity, and handicap in Arab countries. .Available data suggest that genetic and congenital disorders are more common in Arab countries than in industrialized countries; recessively inherited disorders account for a substantial proportion of physical and mental disabilities among children.The population of the Arab countries is characterized by large family size, high maternal and paternal age, and a high level of inbreeding with consanguinity rates in the range of 25-60% in some Arab communities.The recognition of mothers' knowledge and attitude about congenital anomalies' causes or risk factors can help nurses and health care professions to develop their strategies and to identify the start point to meet the environmental and cultural challenges that are largely affect the development of congenital anomalies. Hopefully, through such understanding that more efficient measures will be developed to prevent these severe, costly, often deadly defects.

3-Aim of the study

The aim of the current study has three folds:

1. To assess Egyptian and Saudi mothers' knowledge regarding congenital anomalies among children.
2. To assess Egyptian and Saudi mothers' attitude regarding congenital anomalies among children.
3. To detect the differences between Egyptian and Saudi Mothers' knowledge and attituderegarding congenital anomalies among children.

4-Research Questions

The study results answer the following research questions:

1. What are the Egyptian and Saudi mothers' knowledge regarding congenital anomalies among children?
2. What are the Egyptian and Saudi mothers' attitude regarding congenital anomalies among children?
3. Are there any differences between Egyptian and Saudi Mothers' knowledge and attitude regarding congenital anomalies among children?

5-Subject and Methods

5-1-Research Design:

A descriptive, comparative research design was utilized to answer the current study's research questions.

5-2-Settings:

Mothers were selected from pediatric surgical wards and pediatric surgery outpatient clinics of Cairo University Specialized Pediatric Hospital (CUSPH) and King Fahad University Hospital in Al Khobar, Kingdom of Saudi Arabia (KSA).

5-3-Study sample:

A convenient sample of 200 mothers (100 Egyptian and 100 Saudi mothers) was included in the study. Mothers who participated in the study should have child with any type of congenital anomalies regardless the age and gender of the child.

5-4-Ethical Consideration:

For ethical considerations, mothers' oral approval was obtained to participate in the study after explaining to them the aim of the study, its benefits, duration of the study and the data collection tools. They were assured about confidentiality; as well they informed that they can withdraw at any time from the study. Cultural differences were considered in dealing with mothers' attitude regarding congenital anomalies among their children.

5-5-Data collection tool:

-Structured interview schedule:developed by the researchers after extensive review of related recent literature; it composed of three main parts:

Part I: It involve 17 questions related tosociodemographic characteristics of mothers such as nationality, age, level of education, occupation, number of children and consanguinity….etc. It includes questions pertinent to history of previous pregnancies. It comprised of questions related to the child affected with congenital anomalies such as age, gender, rank in the family and type of congenital anomaly.

Part II: Itcontained 48 questions to assess mothers' knowledge about congenital anomalies'causes, types, diagnostic measures and control and preventive strategies.

Part III: It consisted of 20 statements to assess mothers'attitude regarding congenital anomalies.Likert type-scale of three continuums was used to assess the mothers' attitude: it consisted of 3 items {agree (3), disagree (2) and indifference (1)}. The general attitude was calculated as follows. The mean of agreement answer for each item was considered as a positive attitude while, disagree considered as a negative attitude, and indifference was considered as neutral attitude.

Scoring system: For knowledge; each correct response took one score with a total score of 48 represent 100%. Total knowledge's score of less than 50%considered as unsatisfactory level of knowledge. While score of 50% and more considered as satisfactory level of knowledge.

5-6-Tool Validity and Reliability:

The content of the data collection tool was submitted to a panel of 9 experts (5 from Egypt and four from KSA) in the field of pediatric nursing and medical genetics to test the content validity. Modifications of the tools were done according to the panel judgment on clarity of sentences, appropriateness of content and sequence of items. Reliability was applied by testing twenty Egyptian and Saudi mothers, reliability coefficients' alpha between questions was 0.74.

-7-Data Collection Procedures:

An official permission was obtained from the official personnel in CUSPH in Egypt and King Fahad University Hospital in KSA to conduct the study and collect the necessary data. Simple explanation was given to them about the nature of the study, its aims, benefits and study data collection tools. Each mother was interviewed individually after explaining the purpose and of the study. The time needed for each mother to answer the structured interview schedule and attitude sheet ranged from 25 -35 minutes depending upon the understanding and response of the mothers. Waiting areas in the outpatients clinics were the place where interview took place, while the bed side was the place in the inpatients surgical wards.Data were collected during the period from December 2011 to the end of June 2012 (9 months). The data collection process has been in a parallel manner, data was gathered in Egypt and KSA at almost the same time.

5-8-Pilot Study:

A pilot study was carried out on 10 Egyptian mothers as well as 10 Saudi mothers to test the clarity and feasibility of questions and to estimate the time required for the interview. Clarification and some modifications were done especially with regard to simplify some expressions and statements to commensurate with the Egyptian and KSA vocabularies. The pilot study sample was excluded from the total sample.

6-Statistical analysis of data:

A compatible personal computer (PC) was used to store and analyze data. The Statistical Package for Social Studies (SPSS), version 11.0 was used. Data were coded and summarized using mean, standard deviation and

crosstabs for quantitative variables, and percent for qualitative variables. Comparison was performed using simple paired t-test to compare the mean of the total score of knowledge among Egyptian and Saudi mothers, and Chi-square was used to detect the difference between the Egyptian and Saudi mothers' general attitude toward congenital anomalies in children. Correlation among variables was done using Pearson correlation coefficient. Selected sociodemographic characteristics of mothers in both groups were such as age, level of education, occupation; number of children affected with congenital anomaly and children diagnosis were subjected to correlation analysis to investigate the strength of relationship between them and level of knowledge and expressed attitude of mothers. The p-value <0.05 and p-value <0.001 was used as the cut of value for statistical significance.

7-Results

The results of the current study proved that 53% and 41% respectively of Egyptian and Saudi mothers aged from 20 to less than 30 years. Thirty eight percent of Egyptian mothers had secondary school education compared to 64% for Saudi mothers. The highest percentages of Egyptian and Saudi mothers were housewives (60% & 74% respectively). The mean of previous pregnancies among Egyptian mothers was 2.14±1.1 times increased to 3.99±1.8 times among Saudi mothers. The rate of consanguinity was obviously higher among Saudi mothers represented 92% of them this percentage decreased to 49% among Egyptian mothers. Consanguinity from the first degree has been found among 71.1% and 78.3% respectively of Egyptian and Saudi mothers (Table 1).

As regards the characteristics of children with congenital anomalies, it was evident from the study results that the vast majority (92% & 95% respectively) of both Egyptian and Saudi mothers had one child affected with congenital anomaly. More than two thirds (67%) of children of Egyptian mothers who had congenital anomaly were males compared to 78% for children of Saudi mothers.It is clear from figure (1) that, 27% of children of Egyptian mothers had central nervous system (CNS) congenital anomalies such as spina bifida and hydrocephalous flowed by 22% of them had genitourinary tract (GUT) congenital malformations as hypospadias, congenital vesicoureteral junction obstruction and exstrophy of the bladder. On the same context, an equal percentage (24%) of children of Saudi mothers had CNS congenital anomalies and gastrointestinal tract (GIT) malformations as Hirschsprung's disease, pyloric stenosis, cleft lip and imperforated anus. It was evident from the same table that 11% and 10% respectively of children had multiple congenital anomalies.

In relation to Egyptian mothers' knowledge pertinent to factors contributing to congenital anomalies among children, table (2) highlighted that 63% and 53% respectively of them agreed that exposure to bacterial and viral infections during pregnancy may resulting in congenital malformations among fetuses. The majority of them (83%) affirmed that consanguinity was one of the most common contributing factors in transferring genetic malformations. Pregnancy at an early or late age, exposure to radiation and medications misuse during pregnancy were main causes of congenital anomalies as replied by 68%, 63% and 56% respectively of Egyptian mothers.

It was evident from the same table that 82% of Saudi mothers confirmed that consanguinity was one of the most common contributing factors in transferring genetic malformations. The highest percentage of Saudi mothers (52%, 53% & 55% respectively) assured that exposure to radiation, smoking and medications misuse during pregnancy were the chief factoring that lead to congenital anomalies. Magic and envy are likely to be the cause of congenital malformations from the viewpoint of 53% of Saudi mothers.

Apparently, table (3) demonstrated that 86% and 92% respectively of Egyptian mothers agreed that premarital examination and avoidance of consanguinity may have a major role in control and prevention of congenital anomalies. The majority (84%, 87% & 90% respectively) of them affirmed that avoidance of exposure to radiation during pregnancy, avoid taking drugs during the first trimester of pregnancy without obstetrical consultation and minimize exposure to emotional stress during pregnancy were may decrease the incidence of congenital anomalies.Furthermore, the same table proved that 67% of Saudi mothers confirmed that premarital examination may minimize occurrence of congenital anomalies. Avoidance of consanguinity may decrease the incidence of congenital malformations according to 62% of Saudi mothers. Control and prevention of congenital anomalies can be achieved through avoidance of exposure to radiation during pregnancy, folic acid administration and calcium during early pregnancy, minimize exposure to emotional stress and prompt treatment of reproductive tract infection based on 82%, 77%, 69% and 67% respectively of Saudi mothers.

It was cleared from table (4) that more than three quarters (76%) of Egyptian mothers had satisfactory level of knowledge regarding congenital anomalies among children compared to 51% of Saudi mothers. The mean of the total score of knowledge among Egyptian mothers was 31.01± 13.1 in comparison to 22.91±5.47 with regard to Saudi mothers. There was statistically significant difference between the mean of the total score of knowledge of Egyptian and Saudi mothers (p= >0.001).

It was apparent from table (5) that Egyptian and Saudi mothers aged from 20 to less than 30 years had higher scores and satisfactory level of knowledge regarding congenital anomalies in children than other age

groups (39% & 20% respectively). On the same context, Egyptian and Saudi mothers who had secondary school education had higher scores and satisfactory level of knowledge than other level of education (28% & 32 respectively). Furthermore, the highest percentage (41%) of Egyptian mothers who achieved high scores and satisfactory level of knowledge were housewives. On the other hand, 39% of Saudi mothers who had lower scores and unsatisfactory level of knowledge were housewives.

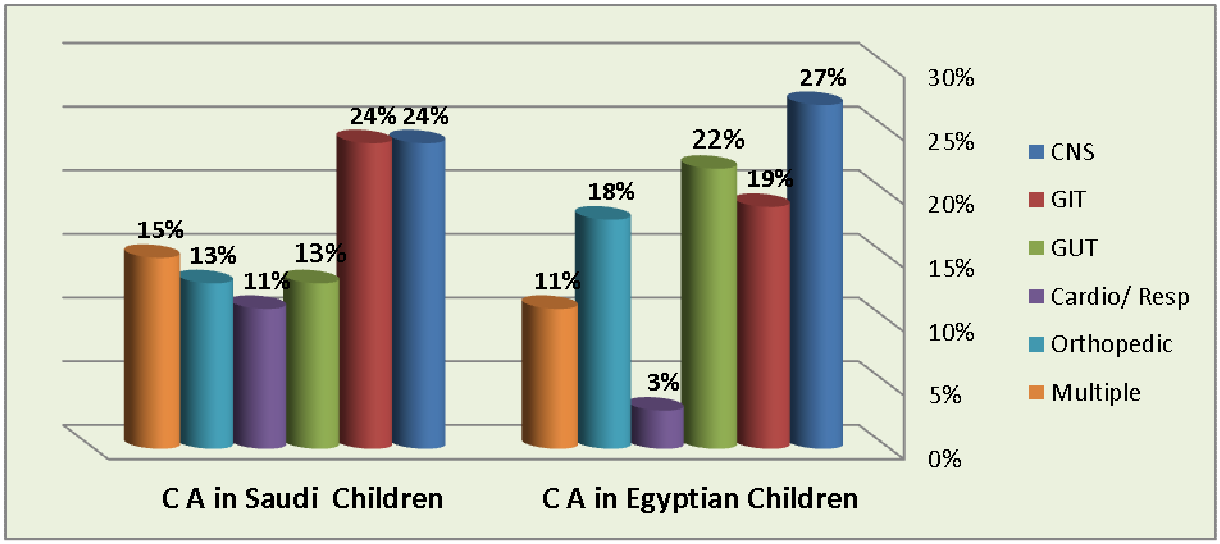
Concerning Egyptian and Saudi mothers' attitude regarding congenital anomalies among children, table (6) highlighted that, 89% and 82% respectively of them agreed that congenital anomalies occur during the first trimester of pregnancy and 93% and 83% respectively of them agreed that it increased by consanguinity. Congenital anomalies cost the family and the community according to 70% and 53% respectively of Egyptian and Saudi mothers. Congenital anomalies adversely affect the child relationship with his\her peer based on the opinion of 66% and 53% respectively of them. Congenital anomalies give rise to a sense of shame and inferiority based on 58% of Egyptian mothers; on the contrary, 52% of Saudi mothers didn't agree. The highest percentages (47% & 50% respectively) of Egyptian and Saudi mothers agreed that congenital anomalies have negative impact on the self-esteem of the child. A relatively high percentage (43%) of Egyptian mothers didn't agree that congenital anomalies have negative impact on self-esteem of parents while, 47% of Saudi mothers agreed.

As regards comparison between Egyptian and Saudi mothers' general attitude regarding congenital anomalies among children, table (7) indicated that the highest percentages (77% & 72% respectively) of both Egyptian and Saudi mothers expressed negative attitude. There was no statistically significant difference was detected between Egyptian and Saudi mothers' general attitude regarding congenital anomalies among children ($p= <0.05$).The study results revealed that, there were no statistically significant correlation between Egyptian and Saudi mothers' level of knowledge, and general attitude regarding congenital anomalies among children and their sociodemographic characteristics ($p= <0.05$).

Table (1): Socio-demographic Characteristics of Egyptian and Saudi Mothers in Percentage Distribution

Items	Egyptian Mothers (N=100)		Saudi Mothers (N=100)	
	NO	%	NO	%
Age in years:				
-Less than 20 years	25	25	8	8
-20-less than 30 years	53	53	41	41
-30-less than 40 years	15	15	41	41
-40 years and more	7	7	10	10
Level of education:				
-University education	14	14	28	28
-Secondary school education	38	38	64	64
-Just read and write	31	31	3	3
-Illiterate	17	17	5	5
Mothers' occupation:				
-Work outside home	40	40	26	26
-House wife	60	60	74	74
Number of previous pregnancies:				
-1-3	92	92	41	41
-4-6	8	8	52	52
-More than 6	0	0	7	7
Mean± SD	2.14±1.1		3.99±1.8	
Presence of consanguinity:				
Yes	49	49	92	92
No	51	51	8	8
Degree of consanguinity:				
-First degree	35	71.1	72	78.3
-Second degree	9	18.6	17	18.4
-Third degree	5	10.2	3	3.3

Figure (1): Types of Congenital Anomalies according to Body System among Children of Egyptian and Saudi Mothers



CA= congenital anomalies

Table (2): Percentage Distribution of Egyptian and Saudi Mothers' Knowledge regarding Factors Contributing to Congenital Anomalies among Children

Contributing Factors	Egyptian Mothers (N=100)				Saudi Mothers (N=100)			
	Yes		NO		Yes		NO	
	NO	%	NO	%	NO	%	NO	%
Exposure to bacterial infection during pregnancy	63	63	37	37	33	33	67	67
Exposure to viral infection during pregnancy	53	53	47	47	40	40	60	60
Pregnant mother with chronic diseases	54	54	46	46	21	21	79	79
Pregnant mother with acute anemia and malnutrition	52	52	48	48	51	51	49	49
Environmental pollution	45	45	55	55	20	20	80	80
Consanguinity	83	83	17	17	82	82	18	18
Pregnancy at an early or late age	68	68	32	32	30	30	70	70
Exposure to radiation during pregnancy	63	63	37	37	52	52	48	48
Smoking during pregnancy	48	48	52	52	53	53	47	47
Medications misuse during pregnancy	56	56	44	44	55	55	45	45
Other factors such as envy and magic	38	38	62	62	53	53	47	47

Table (3): Percentage Distribution of Egyptian and Saudi Mothers' Knowledge regarding Control and Prevention of Congenital Anomalies among Children

Items	Egyptian Mothers (N=100)				Saudi Mothers (N=100)			
	Yes		NO		Yes		NO	
	NO	%	NO	%	NO	%	NO	%
Premarital examination	86	86	14	14	67	67	33	33
Avoidance of consanguinity	92	92	8	8	62	62	38	38
Minimize environmental pollution	81	81	19	19	37	37	63	63
Adequate nutrition during pregnancy	83	83	17	17	60	60	40	40
Vaccination against infectious diseases as German measles	83	83	17	17	48	48	52	52
Obstetrical consultation in the case of desire in pregnancy at late age (35 – 40 years old)	33	33	67	67	35	35	65	65
Treatment of reproductive tract infection before pregnancy	24	24	76	76	34	34	66	66
Avoid exposure to radiation during pregnancy	84	84	16	16	82	82	18	18
Avoid taking drugs during the first trimester of pregnancy without obstetrical consultation	87	87	13	13	42	42	58	58
Taking folic acid and calcium during early pregnancy	50	50	50	50	77	77	23	23
Proper antenatal follow-up	71	71	29	29	54	54	46	46
Prompt treatment of the chronic diseases of the pregnant mother	83	83	17	17	60	60	40	40
Minimize exposure to emotional stress during pregnancy	90	90	10	10	69	69	31	31
Prompt treatment of reproductive tract infection before pregnancy	41	41	59	59	67	67	33	33

Table (4): Comparison between Egyptian and Saudi Mothers' Mean Total Score of Knowledge regarding Congenital Anomalies among Children

Level of Knowledge	**Egyptian Mothers (N=100)**		**Saudi Mothers (N=100)**		**t-test**	**P value**
	NO	%	NO	%		
Satisfactory	76	76	51	51	5.99	>0.001
Unsatisfactory	24	24	49	49		
Mean ± SD	31.01± 13.1		22.91±5.47			

Table (5): Egyptian and Saudi Mothers' Level of Knowledge According to their Socio- demographic Characteristic

Items	**Egyptian Mothers (N=100)**				**Saudi Mothers (N=100)**			
	Satisfactory		**Unsatisfactory**		**Satisfactory**		**Unsatisfactory**	
	NO	**%**	**NO**	**%**	**NO**	**%**	**NO**	**%**
Mothers' age:								
-Less than 20 years	20	20	5	5	4	4	4	4
-20-less than 30 years	39	39	14	14	20	20	21	21
-30-less than 40 years	11	11	4	4	18	18	23	23
-40 years and more	6	6	1	1	9	9	1	1
Mothers' level of education:								
-University education	11	11	3	3	15	15	13	13
-Secondary school education	28	28	10	10	32	32	32	32
-Just read and write	23	23	8	8	1	1	2	2
-Illiterate	14	14	3	3	3	3	2	2
Mothers' occupation:								
-Work outside home	35	35	6	6	17	17	10	10
-House wife	41	41	18	18	34	34	39	39

Table (6): Percentage Distribution of Egyptian and Saudi Mothers' Attitude regarding Congenital Anomalies among Children

Items	Egyptian Mothers (N=100)						Saudi Mothers (N=100)					
	Agree		Disagree		Indifference		Agree		Disagree		Indifference	
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
Congenital anomalies occur during the first trimester of pregnancy	89	89	5	5	6	6	82	82	3	3	15	15
It increased by consanguinity	93	93	5	5	2	2	83	83	11	11	6	6
It can be prevented easily	62	62	36	36	2	2	24	24	51	51	25	25
It cannot be prevented	61	61	35	35	4	4	43	43	39	39	18	18
It can be treated if detected early	66	66	28	28	6	6	54	54	27	27	19	19
It cost the family and the community	70	70	22	22	8	8	53	53	29	29	18	18
It affect the emotional stability of the parents	51	51	34	34	15	15	39	39	36	36	25	25
It affect the parents' relationship with each other	44	44	38	38	18	18	40	40	34	34	26	26
It affect the relationship of parents and their healthy children	43	43	39	39	18	18	42	42	47	47	11	11
Methods of early detection of congenital anomalies are limited	17	17	78	78	5	5	34	34	35	35	31	31
Methods of early detection of congenital anomalies are available	75	75	18	18	7	7	47	47	28	28	25	25
Frequent childbearing increase the incidence of congenital anomalies	54	54	42	42	4	4	42	42	48	48	10	10
The society does not help families of children with congenital anomalies to adapt	59	59	36	36	5	5	37	37	41	41	22	22
The society and individuals must co-operate to control congenital anomalies	66	66	27	27	7	7	62	62	18	18	20	20
Frequent childbearing reduces the incidence of congenital anomalies	32	32	56	56	12	12	25	25	49	49	26	26
Congenital anomalies give rise to a sense of shame and inferiority	58	58	31	31	12	12	44	44	52	52	4	4
It adversely affect the child relationship with his\her peer	66	66	24	24	10	10	53	53	31	31	16	16
Congenital anomalies reduce the mother's desire to another pregnancy	52	52	32	32	16	16	49	49	19	19	32	32
Congenital anomalies have negative impact on the self-esteem of the child	47	47	36	36	17	17	50	50	25	25	25	25
Congenital anomalies have negative impact on self-esteem of parents	38	38	43	43	19	19	47	47	32	32	21	21

Table (7) Comparison between Egyptian and Saudi Mothers' General Attitude regarding Congenital Anomalies among Children

General Attitude	Egyptian Mothers (N=100)		Saudi Mothers (N=100)		X^2	P value
	NO	%	NO	%		
Positive	12	12	18	18	2.57	<0.05
Negative	77	77	72	72		
Neutral	11	11	10	10		

8-Discussion

A descriptive comparative research design was utilized to assess Egyptian and Saudi mothers' knowledge and attitude regarding congenital anomalies among children. In relation to mothers' age the study's results evident that the highest percentage of Egyptian and Saudi mothers were aged from 20 to less than 30 years, this result was confirmed by***Taboo(2012)*** who studied the prevalence and risk factors of congenital anomalies in Mosul city, Iraq and found that the percentage of congenital abnormalities increased significantly at age (20-24) years as detected in more than one third of the mothers. On the other hand,***Shawkyand Sadik(2011)*** in a recent Egyptian study indicated that more than half of the studied children with congenital anomalies were for mothers aged more than 35 years old. A burgeoning literature has also demonstrated that age extremes at pregnancy time are a risk factor in having child with congenital anomalies.

Concerning mothers' level of education, it was found thatmore than one third of Egyptian mothers had secondary school education compared to less than two thirds of Saudi mothers. This result suggested higher literacy rate among Saudi mothers than Egyptian mothers. On the same line, the ***Egypt Demographics Profile (2012)*** assured that, the literacy rate among females was 63.5% compared to 59.4% in 2010. So efforts of governmental and non-governmental organizations should continue to focus on female' education because low levels of literacy, and education in general, can impede the economic development of a country in the current rapidly changing, technology-driven world, this of course will reflect positively on the health care system as a whole. On the same line, ***Saudi Arabia Demographics Profile (2012)*** indicated that the literacy rate among females was 81.3%. As regards mothers' occupation, the study results proved that the highest percentages of Egyptian and Saudi mothers were housewives; this result may couldaffecting the maternal health and follow up care during pregnancy as well as the information gaining methods. Similarly, an Egyptian study conducted by ***Ahmed et al. (2011)*** whoinvestigate the risk factors for fetal congenital anomalies among pregnant women at Cairo, and indicated that 93% of pregnant women were housewives.

The mean of previous pregnancies was higher among Saudi mothers than among Egyptian mothers. The study results were contradicted with ***Saudi Arabia Demographics Profile (2012)***whichreported that the total fertility rate was 2.26 children born/ Saudi woman. Similarly, ***Egypt Demographics Profile (2012)*** documented that the total fertility rate was 2.94 children born/ Egyptian woman. The current study's results illustrated that the rate of consanguinity was obviously higher among Saudi mothers compared toEgyptian mothers. According to ***Alshehri (2005)*** several publications indicated that consanguineous marriages in Saudi Arabia are high (60%) and this has provided a background in which these genetic disorders are increasing. The researcher believed that tribal, religious and cultural issues are more controlling and attributed to congenital anomalies in Arab countries.As regards consanguineous marriages in Egypt, a study conducted by ***Shawky et al. (2011***) they explored the frequency and socio-economic determinants of consanguinity in Egypt using a cross-sectional approach which included 10,000 unselected couples and they found that consanguineous marriage is still high in Egypt (35.3%), especially among first cousins (86%).On the same line, ***Ahmed et al. (2011)*** assessed the risk factors for fetal congenital anomalies among pregnant women at Cairo University Hospitals and found that 44% of the pregnant women had first degree consanguinity.

Alshehri (2005); Abdi-Rad, Khoshkalam and Farrokh-Islamlou(2008);Tomatır et al. (2009);Shawky and Sadik, (2011) and Al Bu Ali et al. (2011) concluded that the incidence of congenital anomalies are higher among male than female children. In addition, ***Othman (2013)*** indicated that the incidences of congenital malformation were slightly more in male with female: male ratio of 1:1.9.The results of the current study were in accordance to the above mentioned empirical evidences and demonstrated that the vast majority of both Egyptian and Saudi mothers had one child affected with congenital anomaly and the highest percentage of them were males.

It was evident in the results of the current study that the highest percentage of children of Egyptian mothers had CNS congenital anomalies such as spina bifida and hydrocephalous followed by GUT malformations as hypospadias, congenital vesicoureteral junction obstruction and exstrophy of the bladder. On the same context, just less than one quarter of children of Saudi mothers had CNS congenital anomalies and GIT malformations as Hirschsprung's disease, pyloric stenosis, cleft lip and imperforated anus.Moreover, empirical evidence and previously cited studies in Egypt and Saudi Arabia concludedthat CNS congenital anomalies were the commonly presented birth defects among children ***(Shawky&Sadik, 2011; ElKoumi, Al Banna&Lebda, 2013)***. Furthermore,***Othman (2013)*** found the same phenomenon; on the other hand,***Alshehri (2005)*** found that CNS anomalies came the second after GIT anomalies. Concerning to the rank of GIT and GUT congenital anomalies in both Egyptian and Saudi studies there is no constant presentation so sometimes GIT congenital anomalies come the first and another times come as the second, however the current study results was corresponded with the previous studies in both Egypt and Saudi Arabia.From the obstetriciansprospective,***Ahmed et al. (2011)*** indicated that fetal congenital malformation categorized as renal, CNS, musculoskeletal then cardiovascular congenital anomalies.

In relation to Egyptian mothers' knowledge pertinent to factors contributing to congenital anomalies among children, it was highlighted that the maximum percentage of them agreed that exposure to infections during pregnancy may resulting in congenital anomalies among fetuses.The same explanation was mentioned by ***Taboo (2012)***who found that reported toxoplasmosis, cytomegalovirus, rubella and herpes virus is among risk factors for congenital anomalies in Mosul city, Iraq. The majority of the Egyptian mothers affirmed that consanguinity was one of the most common contributing factors in transferring genetic traits of congenital anomalies. Similarly, ***Ahmed et al. (2011)*** concluded that positive consanguinity, family history for congenital anomalies, previous child with a congenital anomaly, consuming drugs during pregnancy, living near industrial source and exposure to infections during pregnancy, were the most common risk factors associated with congenital anomalies.Pregnancy at an early or late age, exposure to radiation and medications misuse during pregnancy were the main causes of congenital anomalies as reported by a relatively high percentages of Egyptian mothers. These results were in accordance with ***Shawky and Sadik (2011)***who emphasized that among the maternal risk factors for congenital malformation in Egypt were multiparty age of the mother above 35 years at conception, maternal illness especially diabetes , fever and common cold and exposure to pollutants. In a recent study by ***Rychtarikova et al. (2013)*** concluded that the age of mother can be associated with congenital anomalies of the child, and that maternal characteristics other than age have also should be considered.

Regarding to Saudi mothers' knowledge about factors contributing to congenital anomalies among children,it was found that more than eighty percent of them replied that consanguinity is the most predominant cause of congenital anomalies. This result was supported by ***Fadel (2008)*** who studied the strategies to decrease the incidence of genetic disorders in Arab countries and indicated that the most common form of intermarriage is that between first cousins, particularly paternal firstcousins. In addition,more than half of the Saudi mothers assured that exposure to radiation, smoking and drug abuse during pregnancy were the chief causes that lead to congenital anomalies; these results were supported by***Feda et al. (2007).*** Furthermore,magic and envy are likely to be the cause of congenital malformations from the standpoint of more than half of Saudi mothers.The researchers own observation and experience supporting this ethnic and cultural perception of Saudi women. Meanwhile,***Fadel (2008)*** indicated that several factors contribute to the increased incidenceof genetic disorders. Despite its linguistic, religious, and cultural cohesion, the Arab region is richin ethnic diversity.

It is evident from the current study's that the highest percentages of Egyptian and Saudi mothers reported that premarital examination and avoidance of consanguinity may have a major role in control and prevention of congenital anomalies. In addition,the majority of them affirmed that avoidance of exposure to radiation during pregnancy, avoid taking drugs without obstetrical consultation and minimize exposure to emotional stress during pregnancy and treatment ofreproductive tract infection may decrease the incidence of congenital anomalies.***Fadel, (2008)*** suggested strategy to decrease the incidence of genetic disorders in Arab countries including health education about the exposure prevention, premarital counseling and examination, preimplantation genetic diagnosis and preconception and prenatal care. On the same context,***Kurinczuk et al. (2010) and WHO (2012)*** concluded that childhood rubella immunization, screening and treatment forsyphilis during pregnancy, periconceptionalfolic acid supplementation for the prevention of neural tubedefects. On an individual level, optimizing the management of women at higher risk,for example, for women who are diabetic orepileptic, is the ideal approach to minimizing the risks of anomalies.

The current study's results revealed that more than three quarters of Egyptian mothers had satisfactory level of knowledge regarding congenital anomalies among children compared to more than fifty percent of Saudi mothers. There was statistically significant difference between the mean of the total score of knowledge of Egyptian and Saudi mothers. This result may be related to the advanced role of prenatal follow up, and health education programs provided for Egyptian pregnant women.In addition,it also could be related to the distribution of genetic counseling services in many governorates in Egypt such as Cairo, Giza, and other 5 centers like Alexandria, Port Saied,Sharquia, El Meniaand Assuit***(Abd-Al Raouf, 2008)***.

Concerning Egyptian and Saudi mothers' attitude regarding congenital anomalies among children, it was evident that, the highest percentage of them agreed that congenital anomalies occur during the first trimester of pregnancy, in this context,***Othman (2013)*** indicated that the process of development of a child from a fertilized egg involves many complicated steps that may go wrong to cause a defect or difference.The highest percentages of Egyptian and Saudi mothers confirmed that congenital anomalies cost the family and the community.The same explanation was mentioned by ***Miller,Adam and Ledbetter(2010)*** who concluded that clinical genetic testing, including chromosome analysis, is a standard practice for patients with multiple congenital anomalies. The researchers added that not only the cost of screening but the cost is life-long for the family and the community.

Previous studies by ***Antshel et al. (2005) and Pinquart (2013) have*** shown that children with chronic illness and congenital anomalies had negative self-concept, self-esteem as wellas body image alterations. Therefore, psychosocial interventions for children with congenital anomalies should be offered for children with

reduced self-esteem. The current study results were in accordance with the above mentioned evidence and demonstrated that the maximum percentages of Egyptian and Saudi mothers agreed that congenital anomalies have negative impact on the child's self-esteem and give rise to a sense of shame and inferiority.The results of the study showed that there is a contradiction between the point of view of mothers in both Egypt and KSA about the impact of the birth of a child with congenital distortions on self-esteem of parents. In the same approach,***Van Eijk,Honig-Mazer and Doosje(2011)***concluded that although parents of children with congenital anomalies face many challenges, in the long run they seem capable of coping effectively with the situation of having a severely ill child. It appears that a mentally and physically healthy parent is able to cope with the situation of having a child with congenital anomaly.

Clearly, thestudy's results indicated that the highest percentages of both Egyptian and Saudi mothers expressed negative attitude toward congenital anomalies, and there was no statistically significant difference between the general attitudes among mothers in both groups. However, regardless of their etiology or frequency of occurrence in the general population, every congenital anomaly is a disturbing, unsettling experience for parents. The birth of a defective child has a profound effect on the family. Parents go through some of the stages of grief: shock, denial, sadness, anger, self-pity, adaptation, and reorganization. ***Fadel (2008)*** indicated that the Arab family, whether Muslim or Christian, generally speaking has strong faith in God. Muslims believe that disease is God's will.

9-Conclusion

It was concluded from the current study' resultsthat CNS disorders were the commonest frequent congenital anomalies followed by GIT disorders and GUT disorders among children of both Egyptian and Saudi mothers. Consanguinity, exposure to radiation, drug misuse, infections and emotional stresswere the most predominant contributing factors for congenital anomalies. The highest percentages of Egyptian and Saudi mothers agreed that premarital examination and avoidance of consanguinity as well as avoidance of exposure to radiation during pregnancy and minimize exposure to emotional stress during pregnancy may have a major role in control and prevention of congenital anomalies. The study findings also concluded that the total mean score of knowledge about congenital anomalies was higher among Egyptian than Saudi mothers. There was statistically significant difference between the mean of the total score of knowledge of Egyptian and Saudi mothers. The highest percentage of both Egyptian and Saudi mothers expressed negative attitude toward congenital anomalies. There was no statistically significant difference was detected between Egyptian and Saudi Mothers' general attitude regarding congenital anomalies among children.

10-Recommendations

Based on the current study's results the following recommendations were suggested:

- Premarital examination and screening for consanguineous and non-consanguineous marriages is an essential element in prevention of major and minor congenital anomalies among children.
- Antenatal care and screening is very important for suspecting and early detection of congenital anomalies.
- Collaborative efforts are needed to develop and conduct health promotion programs that directed to women reproductive health,female nutrition and vaccination in Arabcountries.
- Preventive strategies to control congenital anomalies should be adopted at a national level, with development of regional and international collaboration.
- The nurse should provide information/education, continuous care, support, and genetic counseling through team approach to mothers of children with congenital anomalies according to their actual need assessment to cope with illness and its related stressors.
- Defining the ethical, legal, religious, and cultural factors in formulating genetic servicesis mandatory.
- Strengthening researches and studies on etiology, diagnosis and prevention of congenital anomalies among children should be encouraged

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12-References

1- Abd- Al Raouf, R. (2008): Genetic services in Egypt: current situation and needs assessment. *Institute of Postgraduate Childhood Studies*. Ain Shams University Cairo Egypt.

2- Abdi-Rad, I., Khoshkalam, M., &Farrokh-Islamlou, H. (2008):The Prevalence at Birth of Overt Congenital Anomalies in Urmia, Northwestern Iran; *Arch Iranian Medical Journal*; 11 (2), 148 – 151.
3- Ahmed, A., Abd el Kader, S., Abd El Hamid, A., &Gaafar, M. (2011): Assessment of risk factors for fetal congenital anomalies among pregnant women at Cairo University Hospitals. *Journal of American Science*;7-(12)
4- Al Bu Ali, W., Magdy, B., Hassan, A., Al Moghannum, S., & Ibrahim, H. (2011): Risk factors and birth prevalence of birth defects and inborn errors of metabolism in Al Ahsa, Saudi Arabia. *The Pan African Medical Journa*l, 8-14.
5- Al-Gazali, L., Hamamy, H. & Al-Arrayad, S. (2006): Genetic disorders in the Arab world, *British Medical Journal*; September.
6- Alshehri, M. (2005): Pattern of major congenital anomalies in southwestern Saudi Arabia; *Bahrain Medical Bulletin*; 27 (1), 1-6.
7- Antshel, K., Conchelos, J., Lanzetta, G., Fremont, W. &Kates, W. (2005): Behavior and corpus callosum morphology relationships in velocardiofacial syndrome;*Psychiatry Research*; 3, 235-45.
8- Centre for Arab Genomic Studies (2012): Available at www.cags.org., accessed at 24/6/2013.
9- Disease Control Priorities Project, (2008): Controlling birth defects: reducing the hidden toll of dying and disabled children in low-income countries. Available at www.dcp2.org, accessed at 28/8/2013.
10- Egypt Demographic Profile (2012): Available at www.indexmundi.com/ Egypt. Accessed at 20/78/2013.
11- Egypt Health Profile (2012): Infant mortality rate. Available at www.indexmundi.com, accessed at 23/8/2013.
12- El Koumi, M., Al Banna,E., A. &Lebda, L. (2013): Pattern of congenital anomalies in newborn: a hospital-based study; *Pediatric Reports*; 5(5), 20-23.
13- Fadel, H. (2008): Strategies to decrease the incidence of genetic disorders in Arab countries. *Journal of the Islamic Medical Association of North America*; 40, 98-103.
14- Fida, N., Al-Aama, J., Nichols, W. &Alqahtani, M. (2007): A prospective study of congenital malformations among live born neonates at a University Hospital in Western Saudi Arabia. *Saudi MedicalJournal*; 28 (9), 1367-1373.
15- Helwick, C. (2012: Role of the nurse specialist in the management of fetal congenital anomalies. The OB/GYN Nurse. Available at www.theobgynnurse.com, accessed at 29/5/2013.
16- James, S. R., Nelson, K. A. &Ashwill, J. W. (2013): Nursing Care of Children: principles and practice, 4th ed. London: Elsevier, (pp.231-239).
17- Kurinczuk, J., Hollowell, J, Boyd, P., Oakley, L., & Ron Gray, P. (2010): The contribution of congenital anomalies to infant mortality. Peter Brocklehurst, National Perinatal Epidemiology Unit, University of Oxford. Available at www.npeu.ox.ac.uk/ accessed at 22/7/2013.
18- Mazer, P., Gischler, S., Koot, H.,Tibboel,D.,Dijk, M. &Duivenvoorden, H. (2008): Impact of a child with congenital anomalies on parents (ICCAP) questionnaire; a psychometric analysis. *Health and Quality of Life Outcomes*; 6 (1), 102-112.
19- Miller, D., Adam, M. & Ledbetter, D. (2010): Consensus statement: chromosomal microarray is a first-tier clinical diagnostic test for individuals with developmental disabilities or congenital anomalies. *American Journal of Human Genetics*; 86 (5), 749-764.
20- Othman, G. (2013): The Prevalence and types of congenital anomalies in newborn in Erbel, Iraq. *Medical Journal of Islamic World Academy of Sciences*; 21(1), 31-34.
21- Pinquart, M. (2013): Self-esteem of children and adolescents with chronic illness: a meta-analysis. *Child Care Health Development*; 39 (2), 153-161.
22- Rychtarikova, J., Gourbin, C.,Sipek, A. &Wunsch, G. (2013). Impact of parental ages and other characteristics at childbearing on congenital anomalies.*Demographic Research*; 28 (5), 137-176.
23- Sallout, B., Al Hoshan, M.,Reham, A., Attyyaa, A., Abdelmane, A. & Al Suleimata, A. (2008): Antenatal diagnosis, prevalence and outcome of major congenital anomalies in Saudi Arabia: a hospital-based study. *Annals Saudi Medical Journal*; 28(4), 272-276.
24- Saudi Arabia Demographic Profile (2012): Available at www.indexmundi.com/ KSA. Accessed at 20/78/2013.
25- Schroeder, H. (2013). Congenital anomalies. Available at www.healthline.com, accessed at 23/8/2013.
26- Shawky, R. &Sadik, D. (2011): Congenital malformations prevalent among Egyptian children and associated risk factors. *The Egyptian Journal of Medical Human Genetics*; 12, 69-78.
27- Shawky, R.,El-Awady, M.,Elsayed, S. & Hamadan, G. (2011). Consanguineous matings among Egyptian population. *Egyptian Journal of Medical Human Genetics*; 12 (2), 157-163.
28- Sullivan, S. (2010): Birth defects and the maternal diet. Available at www.everydayhealth.com, accessed at 20/8/2013.

29- Taboo, Z. (2012): Prevalence and risk factors for congenital anomalies in Mosul City. *The Iraqi Postgraduate Medical Journal*; 11 (2), 458-470.
30- Tayebi, N., Yazdani, K. &Naghshin, N. (2010): The prevalence of congenital malformations and its correlation with consanguineous marriages. *Oman Medical Journal*; 25 (1), 37-40.
31- Tomatır, A., Demirhan, H., Sorkun,H., Koksal, F., Ozerdem, C. &Çilengir, N. (2009): Major congenital anomalies: a five-year retrospective regional study in Turkey. *Genetics and Molecular Research*; 8, 19-27.
32- Van Eijk, S., Honig-Mazer, P. &Doosje, S. (2011): Psychosocial resilience in parents of children with congenital anomalies: A prospective longitudinal study. Unpublished Master Thesis, Department of Clinical and Health Psychology. Utrecht University, Netherlands.
33- WHO (2012): Congenital anomalies. Available at www.who.int/mediacentre, accessed at 20\8\2013.
34- WHO report (2011): Congenital anomalies in Egypt and Saudi Arabia. Available at www.worldlifeexpectancy.com, accessed at 22/8/2013.
35- Wright, S., Corry, S., Whibley, O., Malik, P., McKinney, P. &Parslow, R. (2013). Risk factors for congenital anomaly in a multiethnic birth cohort: an analysis of the Born in Bradford study. *Lancet*; 3 July.

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