

Comparison between the Incidence of Congenital Abnormalities amongst Newborns in Gaza Strip One Year before the 2008-2009 War on Gaza and One Year after the 2008-2009 War on Gaza

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Abstract

Aim: We sought to compare the incidence of congenital abnormalities among newborns in Gaza between 2008 and 2009, aiming to establish whether the war in Gaza increased the dangers of congenital abnormalities.

Method: This is a retrospective study which is based on a data kept in the archives of the Neonatal Intensive Care Unit (NICU) and gynecology department at Shifa Hospital in Gaza. live newborns, who admitted to the NICU admissions with congenital abnormalities, are included in the study.

Results: In 2008 there were 14,722 deliveries, 1,080 of them were admitted to NICU. Among them there were 113 newborns with congenital abnormalities 1%. In 2009 there were 15,717 deliveries, 1,218 NICU admissions, and 157 with congenital abnormalities. While the number of births has increased 7% in 2009, the number of admissions to NICU has increased 12% and the number of congenital abnormalities amongst newborns admitted in NICU has increased by 39%. The incidents of congenital abnormalities admitted to NICU amongst live newborns have increased by 30% (95% CI=1,02 to 1,66, p=0,03).

Conclusions: Congenital abnormalities in Gaza have significantly increased in 2009. The underlying cause is unknown but it may be due to the war on Gaza or other many factors. it would need further studies.

Keywords: Congenital abnormalities, Births, Neonatal intensive care unit, Gaza strip.

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Introduction

Congenital anomalies are also known as birth defects, congenital disorders or congenital malformations. Congenital anomalies can be defined as structural or

functional anomalies (e.g. metabolic disorders) that occur during intrauterine life and can be identified prenatally, at birth or later in life⁽¹⁾.

Teratology is the study of birth defects, deviations from normal development resulting from prenatal or perinatal influences. Half of

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all patient- hospital stay due to chronic illness result from congenital anomalies. The medical costs of the care of children with birth defects are high \$13 annually in the united states. Small part of congenital abnormalities occurs as a result of avoidable causes as consanguineous marriage^(2,3).

Congenital abnormalities represent a global problem documented almost all over the world. Abnormal embryological development causes death of the newborn on delivery or shortly after birth. Permanent disability and lifelong health problems may affect survivors^(1,4, 5, 6,7). The etiology of congenital anomalies is multiple factors chiefly: 1) Chromosomal abnormalities, the risk increases relating to mother age, which is higher in high income countries as north America and Europe, 2) Exposure to teratogenic substances such as radiations, chemicals such as drugs (contraceptives and isotretin), diseases (Epstein bar virus), diseases (diabetes), it is higher in low income countries and it is aggravated in war (third world countries), 3) social factors e.g consanguineous marriage, 4) lack of antenatal diagnosis leading to voluntary pregnancy termination: access to both antenatal diagnosis and pregnancy termination services is higher for the most affluent groups in the high income countries.

The incidence of congenital abnormalities is low in developed countries. In regions such as Gaza it is unknown. In the third world countries, the risk of congenital abnormalities have multiple etiology e.g drug misuse in the first trimester of pregnancy, consanguineous marriage, women age and exposure to harmful materials such as depleted uranium and white phosphorous bombs used in chemical warfare^(6,8,9,10,11,12). Recent research performed

in Gaza revealed that the weapons used during the war from 27/12/2008 until 17/1/2009 contained substances teratogenic to humans and produces dangerous levels of water and soil contamination⁽¹³⁾.

Aim of study

The aim of this study is to determine if the war in Gaza 2008/2009 has increased the risk for developing congenital abnormalities amongst Gaza newborns.

Methodology

This was a historical design using archived data from the NICU and gynecology department of Shifa Hospital in Gaza.

This study analyzes data on the number of live births, number of stillborn babies, NICU admissions, number of congenital abnormalities among neonates admitted to NICU, affected organs, and living area of the parents collected over a two-year period (01-01-2008 until 31-12-2009); summary data for 2006 and 2007 were also obtained for comparison.

The data was collected, tabulated and analyzed with spss version 13.

Results:

The total number of live births has increased by 7%, from 14,722 in 2008 to 15,717 in 2009. The number of NICU admissions has increased by 13%, from 1,080 in 2008 to 1,218 in 2009 (RR=1,06, 95% CI=0,98 to 1,14, p=0,18). The number of congenital abnormalities among children admitted in the NICU has increased by 39%, from 113 in 2008 to 157 in 2009: the incidence rate of congenital abnormalities admitted to NICU amongst live newborns has increased by 30% (95% CI=1,02 to 1,66, p=0,03).

Table 1. Compare the incidence of congenital abnormality between 2008 and 2009 (P-value 0,03)

Year	Present	Absent	Live Births	Incidence	Lower	Higher
2008	113	14609	14722	0.0077	1.02	1.66
2009	157	15560	15717	0.0100		
	139%		0.067	P- value = 0,03		

Table 2. Compare the NICU admission between 2008 and 2009 (P- value 0,18)

year	Present	Absent	Live Births	Incidence	Lower	Higher
2008	1080	13642	14722	0.073	0.98	1.14
2009	1218	14499	15717	0.077		
	113%		107%	P- value = 0,18		

Table 3. Comparison between the incidence rate of congenital abnormalities in the years 2006, 2007, 2008 and 2009

Year	2006	2007	2008	2009
Births	15606	14658	14722	15717
Congenital abnormalities	134	141	113	157
Incidence rate of congenital abnormalities	0,0085	0,0096	0,0076	0,01

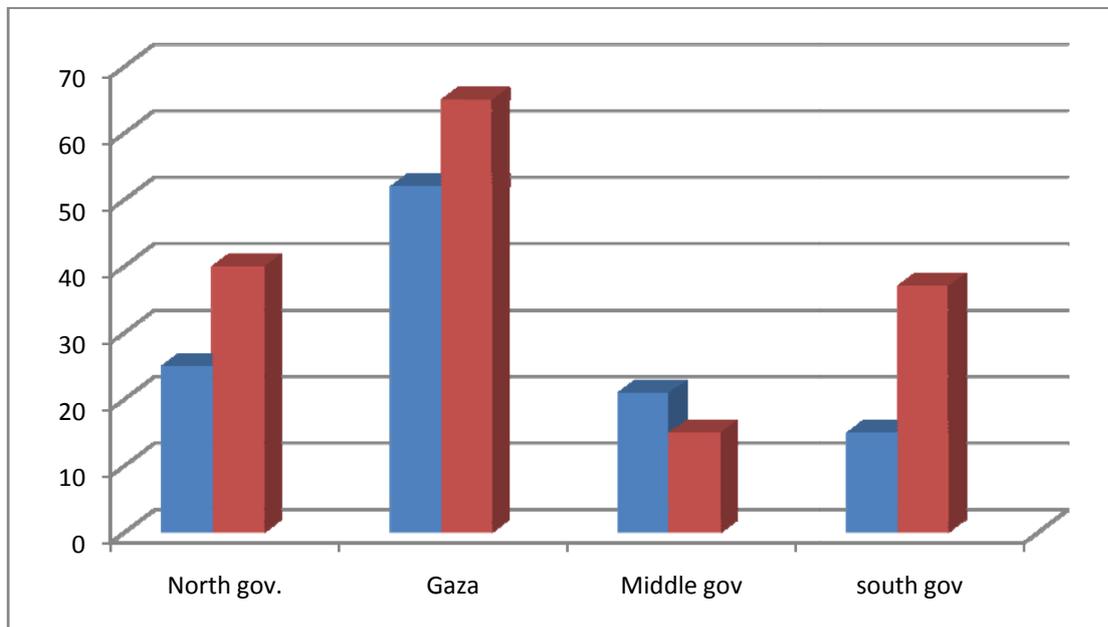


Figure 1: Distribution of congenital abnormality according to the governorate with comparison between 2008 (blue coloured) and 2009 (red coloured columns)

Table 4. Compare incidence rate of congenital abnormalities in the years 2008 and 2009 according to governorate

Year	North gov	Gaza	Middle gov.	South gov
2008(incidence rate)	22%	46%	19%	13%
2009(incidence rate)	25%	41%	10%	24%

Table 5. Compare monthly incidence rate of congenital abnormalities in the years 2008 and 2009

year	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
2008	7	5	10	10	10	11	9	11	11	9	11	9
2009	16	10	13	9	11	13	15	20	15	13	12	10
Increase rate %	128	100	30	(9)	10	18	66	81	36	44	9	11

Discussion:

The relationship between war and increased incidence of congenital abnormalities in newborns has been studied in different areas of the world^(14,15,16,17,18,19). For instance, after World War II researchers conducted studies to ascertain the effect of radiations and weapons on health outcomes. They discovered strong correlations between radiation of nuclear weapons and the increase in congenital malformations, and weak babies with delayed health problems such as diabetes, autism, learning disabilities, low birth-weight, and cancer⁽²⁰⁾. A significant increase in congenital abnormalities was also found among children born from veterans of the gulf war. Studies performed in Iraq concluded that there was an increase in the percentage and emergence of congenital abnormalities following the war⁽²¹⁾. Abushaban *et al* conducted a study on the effect of gulf war on congenital heart disease in newborns before and after war. This study revealed an increase in the number of congenital heart disease after war⁽²²⁾. In Norway, researchers have found that the people working in the Norwegian missile torpedo boats are at high risk of having

children with congenital abnormalities⁽²³⁾. As mentioned in the introduction, congenital anomalies have different etiology. In Gaza, which is part of the third world with special situation as a war zone, the occurrence of congenital anomalies is related to exposure to teratogenes material and socioeconomic situation. In this study we try to compare the incidence of congenital anomalies one year before and after the war on Gaza.

The presence of congenital abnormalities in newborns may be directly determined by a special situation such as circumstances of war or natural disasters^(12,14,15,16). Congenital abnormalities pose a real problem for the society with high psychosocial impact on the family, adverse influence on the quality of life of families, and also pose expensive treatment and rehabilitation costs.

According to the data analysis there were an increase in incidence of these in the year 2009. The incidence of congenital anomalies had increased significantly during 2009 compared to 2008, while NICU admission did not increase significantly. The data in shows

that 2009 have the highest incidence rate among the years 2006-2009. Comparing birth rate and congenital anomaly rate between 2009 and 2008 we find that 2009 was higher. This means that the incidence of congenital anomalies rate is higher than 4% in birth rate. The underlying cause may be the war or may be due to faulty reporting prior to the war.

Our findings show that there was a statistically significant increase in the incidence of congenital abnormalities amongst newborns in Gaza in 2009. This increase in the incidence rate didn't include births occurred at home and not reported to the hospitals, in our study we review only births occurred in the hospitals. Congenital anomalies were diagnosed by the clinician.

The underlying cause of this increase was not studied in detail but it seems that, this increase may have been related to the exposure of the pregnant mothers to teratogenic materials released by weapons during war directly or indirectly due to contaminated water or food. These toxic and teratogenic materials were found in Gaza especially in areas which were targeted by the highest numbers of missile attacks and were intensively bombed during the 2008 war as in border areas including northern and eastern part of Gaza strip^(7,9,13).

The border areas: South, Northern Gaza which were under the highest attacks during war have the highest incidence rate 90% in 2009. Also the results in shows that Gaza city has the highest incidence rate, which could be due to previous invasions and shelling in addition to the fact that Gaza city has the highest population in Gaza strip which makes the percentage of such anomalies higher than

other cities (nearly half of Gaza strip people live in Gaza city).

The highest incidence of congenital abnormalities were found in babies born in January 2009 (the areas with such anomalies where targeted by Israeli intensive aggressions one year prior to that date), then the incidence rate declined in February to start increasing again in July, August and September, 8-9 months after the war then declined again (table 5). This may reflect the fact that mothers in their first trimester of pregnancy - which is a critical period for embryonic development - were exposed to a high concentration of harmful and toxic materials. Another cause which also may be related to the war is the high psychological stress and tension to which newly pregnant women were exposed during the war and its effect on pregnancy follow up during this period.

Conclusion

The results obtained in this study provide compelling evidence that congenital abnormalities rose after the assault on Gaza in 2008.

The year 2009 represented the highest rate of congenital abnormalities between the years 2006-2009. The majority of congenital abnormalities distributed in Gaza and north Governorate which exposed to the highest number of attacks. The underlying cause for such congenital abnormalities is unknown but likely to be multi factorial. The direct effect of the war including the exposure to weapons containing teratogenic materials on the embryogenic development, as well as the indirect effects of war on the psychosocial quality of life of Gazan residents may be one

of the main causes of congenital abnormalities seen among newborns in Gaza. The indirect effects may be a result from poverty, malnutrition, low quality primary health care services. Due to these factors some pregnant women take drugs without consultation to gynecologist which increased incidence of

congenital abnormalities. According to this study congenital anomalies in Gaza ranges from 0,07-1%. The last war launched on Gaza could be the main factor behind the increase of congenital abnormalities amongst newborn in 2009, but this needs further investigation and researches in the future.

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مقارنه حدوث تشوه خلقي بين حديثي الولادة في قطاع غزة سنة قبل وسنة بعد الحرب على غزة عامي 2008 و 2009

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الملخص

الهدف: مقارنة حدوث تشوه خلقي بين حديثي الولادة في عامي 2008 و 2009 بهدف استيضاح هل كانت الحرب تزيد من خطر تشوه الأجنة.

الطريقة: هي دراسة تاريخية بناء على البيانات الموجودة في قسم العناية المركزة للخدج وقسم النساء والولادة في مستشفى الشفاء بغزة. وضمت هذه الدراسة فقط المواليد الأحياء الذين دخلوا العناية المركزة للخدج ولديهم تشوه أجنة.

النتائج: أظهرت النتائج أن عدد المواليد عام 2008 هو 14722 منهم 1080 ادخلوا العناية المركزة بينهم 113 لديهم تشوه خلقي بينما عام 2009 شهد 15717 ولادة منهم 1218 ادخلوا العناية المركزة للخدج بينهم 157 لديهم تشوه خلقي. وقد لوحظ أن معدل الزيادة في الولادة كانت 7% عام 2009، بينما هناك زيادة بمقدار 12% لمن ادخلوا العناية المركزة للخدج، و39% زيادة في تشوه الأجنة، وكذلك فإن نسبة من ادخلوا العناية المركزة للخدج أحياء هو 30% وأثبتت هذه النسبة أنها ذات دلالة إحصائية 0,03 وفترة الثقة 95%.

الخلاصة: أثبتت الدراسة وجود زيادة في نسبة حدوث تشوه الأجنة في غزة عام 2009، السبب في هذه الزيادة غير محدد وقد يكون بسبب الحرب وربما لأسباب أخرى مما يتطلب المزيد من البحث والدراسة.

الكلمات الدالة: تشوه الأجنة، حديثي الولادة، العناية المركزة للخدج، قطاع غزة.