Pro Index | Journal of Discoveries in Applied and Natural Science
Volume: 3 Issue: 6 Year: 2025
ISSN: 3030-301X | http://journals.proindex.uz

Study of Birth Defects in Basra Governorate Between the Years 2019-2023

Anwar N. Seiwan
Department of Biology, College of Science, Basrah University

Abstract: The study is a historical one, examining the fact of birth defects during a five-year period, from August 2023 to January 2024, in Basra Governorate. Data for the study were obtained from the Department of Vital Statistics and from the Center for Genetic Blood Diseases within the Health Directorate of Basra from November to December 2023.

The study presents a table showing the total number of births in the governorate, live births, cases of birth defects, and incidence of birth defects per 1,000 live births. Another table showed rates and numbers in terms of the top ten etiologies of birth defects, hereditary blood diseases, and other contributing factors.

The findings were analyzed by descriptive statistical means, i.e., frequency, percentage, and rate per thousand. The study revealed that the total numbers of births in the governorate were 63,202, 63,091, 60,601, 59,731, and 60,739 within the five-year period ranging from 2019 to 2023.The total number of birth-defect events reported during those years amounts to 195, 262, 231, 331, and 241, thus totaling 1,242 cases of birth defects in five years. The study found that there was a significant increase per annum in births affected by birth defects. It is therefore recommended that the public should be educated on the causes of birth defects and prevention strategies, whereby the health authorities should proceed to establish educational strategies.

Key points: Congenital malformations, Basra Governorate, Vital Statistics, Genetic Blood Diseases, Descriptive statistics.

1. Introduction:

Throughout their course, people from all continents have shown an abiding interest in all anomalies. Unusual births, and the presence of unique individuals, intrigued primitive societies even more than the birth of regular children, and various detailing records to such occurrences have been preserved. Even before the advent of language, different methods were employed to preserve tales of remarkable abnormalities.

One particular anomaly has always interested societies throughout history-the existence of dwarfs. The interest dates back some 5,000 years when Egyptian depictions and sculptures constituted the representation of these "little people." However, it would be almost 3,000 years more before scientific records of the phenomenon could emerge and be recognized.

The fascination for anomalies and recording of such episodes display the natural curiosity and need among human societies to be able to understand and explain the diversity in the world that surrounds them. These historical records portray the continued intrigue for unique ones throughout history and the ongoing effort found through time to comprehend the mysteries of the human condition. In prehistoric times, the evidence of clubfoot can be traced back to the XI and XII Egyptian dynasties, with picture records showing the last king of XII dynasty, Septah, as afflicted by the condition.

Malformations are a phenomenon of historical importance and have been documented by many ancient records. The existence of congenital deformities such as cleft palates has been observed in the corpse of an Egyptian mummy,[2] and primitive Peruvian pottery has depicted cleft lips and congenital absence of the lower limbs.[1] Human figures with two heads or conjoined twins have also been depicted in Australia and surrounding regions, aside from the story of unseparated twin girls.

The documentation of congenital malformations has been found in ancient written records of the Babylonian civilization. In the 19th century, one set of cuneiform clay tablets was found in the Royal Library of Nineveh. These tablets were compiled during the last years of the Assyrian king Ashurbanipal in the 7th century BC and are said to be copies dating back to 2000 BC and presumably based upon even older observations.

The Chaldeans (so famed for the foundation of astronomy). They knew how to foretell the future by observing celestial and terrestrial events, including the coming into this world of deformed children and the occurrence of some strange and amazing natural happenings. The Chaldeans recorded more than 60 deformations of the ear, nose, mouth, reproductive organs, and limbs, many of which exist till today. They tied some of these deformities to certain prophecies; for example, it was believed that delivery of a child with ears like that of a lion foretold the rise of a strong king in the country [2]. Documentation of such instances in ancient records indicates a universal human urge to understand and explain the diversity of the world around them. These historical records reflect humanity's interest in special persons and the ancient pursuit of understanding the mysteries of human existence. The study of congenital anomalies hence becomes of utmost importance due to its far-reaching implications. 1 in 33 children is affected by congenital malformations, and congenital malformations are one of the chief causes of infant mortality in the United States, claiming the lives of over 4,000 children every year. Deformities place children at an increased risk of physical, mental, and social challenges throughout their lives. The Centers for Disease Control and Prevention (CDC) activities are centered around identifying causes, preventing occurrences, and improving the health outcomes of persons living with congenital anomalies. This is achieved through a public health approach involving surveillance, research into causes, and prevention programs that provide a link between scientific findings and successful interventions. Potential congenital malformation causes must be known when making recommendations, policies, and services for prevention, leading toward a future where every baby is born with optimal health. The first step toward prevention involves identifying infants and small children with congenital anomalies. This is usually done with a congenital anomaly surveillance system. From tracking the incidence and distribution of malformations in populations, vital lessons for its prevention and in the assessment of interventions are learned.

Congenital malformations, being very complicated conditions, may arise from an interaction of a myriad of genetic, behavioral, and environmental factors. Much about the etiology of birth defects remains enigmatic, and to study these complexities and solve the riddles that are still unanswered is the role of research. Nonetheless, it does exist that many remedies are known for decreasing risk toward some birth defects. An example would be folic acid supplementation during pregnancy to reduce the risks of neural tube defects, and the dissemination of knowledge to women regarding the hazards of alcohol use during pregnancy to prevent fetal alcohol spectrum disorders[4].

One important public health challenge is to make the prevention of birth defects possible. The system must be nurtured with commitment towards its strengthening. Such an advantage is also offered to them as an enhanced capacity for their surveillance and research through which new causes of birth defects can be identified, and their prevention can be advocated. An understanding of the incidence and pattern of bacterial malformations and congenital anomalies can enable the putting of intervention measures for their reduction.

Birth defects can arise during fetal development and affect different body areas. These defects may appear as structural defects or functional problems in organs or limbs or can also be a combination

of structural and functional defects. Congenital birth defects are broadly classified as those that are life-threatening or fatal, and those that are non-life-threatening [5].

Malformations and birth defects occur during fetal development inside the mother's womb, during the crucial stage of development, especially in the first three months when vital organs are being formed. Congenital malformations can be complicated and serious enough to affect an individual's appearance, organ functioning, physical growth, and mental health. These congenital malformations may be trivial in nature, requiring no medical care at all, or may be serious enough to warrant extensive and lifelong medical care. There is a wide range of possible outcomes for children with congenital malformations. Some cases may require corrective surgeries for malformations; others require long-term treatments to better the child`s quality of life [6]

Many organizations, institutions, clinicians, and researchers are trying to understand the causes of birth defects to improve methods of prevention, diagnosis, and treatment. It researches genetic components leading to birth defects and environmental factors such as exposure to toxic chemicals and radiation. They want to understand what factors affect the prevention of congenital malformations and develop recommendations and policies that will promote public health and reduce the occurrence of congenital malformations.

Generally speaking, pregnant women are supposed to make efforts in maintaining good general health, take care in nourishing themselves, eat a balanced diet, and participate in suitable physical activity. They must not smoke or consume alcohol and stay away from harmful chemicals and radiation. It is good for a woman to consult doctors and specialists prior to conception to discuss recommendations and precautions to prevent birth defects [7].

In general, promotion of awareness and education about congenital anomalies; provision of care to afflicted children; and support to families are important contributors toward better health of these children and improvement of their quality of life and well-being.

Research Problem:

The problem addressed by this study is to determine the incidence of birth defects in Basra Governorate during the period from 2019 to 2023 and to identify the factors causing these malformations.

Research Objectives:

- To determine the number of birth defects reported during the years 2019–2023.
- To calculate the percentage of birth defects in relation to the total number of births during the specified period.
- To analyze the trends and patterns of different types of birth defects over the years.
- To identify any potential factors or risk factors associated with the occurrence of birth defects during the study period.

Definitions of Terms:

Historical:

- **Theoretical Definition:** Refers to the past as described in written documents and the study of it. It includes events before written records, which are considered prehistoric. "History" encompasses the memory, discovery, collection, organization, presentation, and interpretation of information about past events [8].
- **Practical Definition:** Involves the examination of information found in records from a long time ago.

Study:

- **Theoretical Definition:** A scientific research activity that focuses on a particular hypothesis or relationship. In non-scientific contexts, it can refer to an exploration of a specific topic,

following up on an issue, or investigating a specific case to gather new information and introduce people to it [9].

- **Practical Definition:** The process of acquiring new knowledge or discovering new information.

Birth Defects:

- **Theoretical Definition:** Physical abnormalities that occur before a baby is born and are typically apparent during the first year of life [10].
- **Practical Definition:** Structural defects in one or more organs of the body present since birth. These defects can result from abnormalities in the organ's structure or function, underdevelopment, or distortion during fetal development.

2. Congenital Malformation

A congenital malformation is an abnormality or change to the structure or function of the body occurring or developing during fetal formation in the womb. Congenital malformations may be inherited or caused by environmental factors or a synergistic effect of pregnancy-related factors [11]. Among birth defects are structural abnormalities of the body, such as short stature, facial abnormalities, heart abnormalities, spinal abnormalities, limb anomalies, and others. Congenital malformations also account for bodily functions like hearing, seeing, and intellectual ability.

Birth defects may be apparent at birth or discovered later on. Congenital malformations may be brought about by varying causes, being genetic and environmental factors, wherein the environmental factors would include smoking, intake of some drugs, maternal exposure to radiation, and bad nutritional factors during pregnancy [12]. Doctors and clinical genetics, clinical medicine specialists are involved in diagnosing and managing congenital malformations. Management options include reconstructive surgery, medical treatment, and rehabilitation therapy that promotes and improves affected bodily functions.

Awareness and prevention benefit greatly from an understanding of congenital malformations and their causative factors. Conversely, genetic testing and early diagnosis during pregnancy are crucial to pinpoint congenital anomalies in sufficient time to provide affected persons and families with care and support. A congenital malformation, in a nutshell, refers to any disorder marked by an abnormal structural or functional process arising during fetal development. In doing so, the health care professional attempts to diagnose and treat the defect, to educate the community about the causal factors, and, ultimately, to advise on prevention [13].

3. Methodology:

An elaborate overview of the methodology used in exploring and analyzing congenital malformation in the medical field will be given here. The methodology shall cover all aspects of the study design, study location, sample size, measure used, and the method by which the data was analyzed statistically. Being a descriptive historical study design, data collection was employed to determine the number of children with congenital malformations and to ascertain the most common types of these malformations. Data was obtained from the Medical Statistics Center and Genetic Hematology under the direction of the Basra health Department. The data studied concerned a period spanning from 15 August 2023 to 12 January 2024.

Descriptive statistics will analyze the collated data to give the frequencies and percentages of the recorded congenital anomalies. The results of this study will shed light on the extent and prevalence of congenital malformations in the particular medical field. The information will also help steer health and awareness interventions to help decrease the incidence of congenital malformations and eventually improve the care of affected children [14]. Accordingly, such a methodology gave an accurate and systematic framework to study which helped achieve the study objectives to get reliable and applicable results. The descriptive historical study design is fairly applicable to achieving the goal of the study to assess and analyze congenital abnormalities in the medical field. The retrospective study mainly dealt with the incidence of congenital malformations in Basra

Governorate over a 5-year period from 15 August 2023, to 12 January 2024. The data were extracted from the offices of Bio Statistics and Heredity Blood Diseases Center, Basra Health Directorate, the center of Basra Governorate, from 1 November 2023 to 15 December 2023 [15].

The researchers conducted a literature review and eventually developed a statistical form during the study procedure. The form contained various divisions, such as the percentage of total live births; specific birth defects observed during the year by the percentage of each type; total congenital malformations recorded in the year, by percentage; and cumulative percentage of malformations over five years from August 15, 2023, to January 12, 2024 [8].

For the study, data were taken from the Bio Statistics & Heredity Blood Diseases Center under Basra Health Directorate. The researchers coordinated their efforts with the Department of Statistics and the Center for Genetic Blood Diseases for the sake of their research. The researchers were granted access to these Bio statistics books for the years 2019–2023. These books contained useful data such as total numbers of births, live births, percentages of congenital defects, and percentages of birth defects specifically for the governorate [16].

In analyzing the data and presenting the results, the researchers utilized descriptive statistics including frequency (F), percentage (%), and simple arithmetic averages (SMA). These were the statistical means that provided information on how frequently certain phenomena went on occurring, which they studied [17].

Descriptive statistics also helped the researchers summarize and display the data. This enabled them to have an understanding of the extent of occurrence of congenital defects and birth defects within the researched population, thus giving an insight towards further studies and decisions in the field of genetics and public health.

4. Results:

This chapter elucidates the study's findings and the statistical analyses employed to accomplish the research objective. The achieved research goal is presented through a detailed analysis of the statistical data contained in Table (1) [18].

Table 1: Total Births, Live Births, Malformed Births, and Congenital Malformation Rates (2019–2023)

Year	No. Birth	Live Birth	Malformed Birth	Congenital Malformation Rate per 1000 Live Births
2019	63,202	62,569	195	3.12
2020	63,091	62,528	262	4.19
2021	60,601	60,107	213	3.54
2022	59,731	59,296	331	5.58
2023	60,739	60,248	241	4.00
Total	307,364	304,746	1,242	4.07

Between 2019 and 2023, the numbers of congenital malformations show variations in Basra Governorate. In 2019, 195 cases of malformation were there at the rate of 3.12 per 1,000 live births. It rose to 262 cases in 2020 (4.19 per 1,000 live births). The year 2021 saw a small decline: 213 cases were diagnosed (3.54 per 1,000 live births). The greatest number of malformations occurred in 2022, with 331 cases (5.58 per 1,000 live births), followed by a decline to 241 cases in 2023 (4.00 per 1,000 live births). This five-year stretch counted a total of 1,242 cases of congenital malformations occurring out of 304,746 live births, bearing an overall rate of 4.07 per 1,000 live births. The data thus mandate continuous monitoring and intervention to address factors contributing to congenital malformations in Basra Governorate [19].

Table 2: Numbers and Percentages of Top Causes of Congenital Malformations (2019–2023)

N	Genetic Defect	2019		2020		2021		2022		2023		Total	
		%	F	%	F	%	F	%	F	%	F	SMA	F
1	Heart Diseases	8.72	17	15.27	40	13.62	29	19.34	64	21.58	52	15.71	202
2	Digestive	4.10	8	4.96	13	5.16	11	5.74	19	5.39	13	5.07	64
3	Hydrocephalus	7.69	15	6.87	18	7.51	16	6.65	22	7.05	17	7.15	88
4	Anencephaly	3.08	6	4.58	12	3.76	8	5.74	19	4.15	10	4.26	55
5	Umbilical Cord	4.10	8	4.58	12	4.23	9	5.14	17	4.15	10	4.44	56
6	Lower Limb	4.62	9	4.20	11	3.29	7	4.83	16	3.73	9	4.13	52
7	Upper Limb	2.56	5	3.44	9	2.35	5	2.42	8	2.90	7	2.73	34
8	Down Syndrome	1.54	3	2.29	6	1.88	4	3.02	10	2.90	7	2.33	30
9	Spina Bifida	2.05	4	1.91	5	1.88	4	2.42	8	2.49	6	2.15	27
10	Cleft Lip/Palate	1.54	3	1.91	5	1.88	4	1.81	6	2.49	6	1.93	24
11	Genetic Blood Diseases	36.92	72	23.28	61	27.70	59	12.99	43	11.62	28	22.50	263
12	Other Defects	23.08	45	26.72	70	26.76	57	29.91	99	31.54	76	27.60	347
	Total		195		262		213		331		241		1242

Table 2 shows the conditions causing congenital defect most often in the five-year period, with their frequencies and percentages. Genetic blood disease was the most common cause, accounting for 263 cases (22.50% SMA), most prevalent in 2019 (36.92%, 72 cases), and declining until 2023 (11.62%, 28 cases). Heart diseases, the second leading etiology, accounted for 202 cases (15.71% SMA), rising substantially from 8.72% in 2019 to 21.58% in 2023. Other common defects included hydrocephalus (88 cases, 7.15% SMA), anomalies of the digestive system (64 cases, 5.07% SMA), and cord anomalies (56 cases, 4.44% SMA). The "Other Defects" category was large with 347 cases (27.60% SMA) and showed an increasing trend from 23.08% in 2019 to 31.54% in 2023, marking a diverse category consisting of undetermined malformations.

5. Discussion of the Results:

The present retrospective study investigated the identified congenital malformations in the Basra Governorate from 2019 to 2023, unveiling definite trends and patterns. The general rate of congenital malformations was 4.07 per 1,000 live births, reaching its peak in 2022 (5.58 per 1,000 live births), with fluctuations all over the study period. These findings are in consort with that of regional studies, such as Amin et al. (2021), who recorded a prevalence of 3.63 per 1,000 births at Basra Maternity Teaching Hospital from April 2020 to March 2021. The higher peak rate in 2022 may be due to better ascertainment of cases, increasing environmental exposures, or changes in data recording practices.

Genetic blood diseases were the commonest of malformations (22.50% SMA, 263 cases), particularly in 2019 (36.92%), followed by heart diseases (15.71% SMA, 202 cases), which tended to increase in 2023 (21.58%). The very high proportion of genetic blood diseases, presumably thalassemia and sickle cell anemia, concurs with well-known high carrier rates for these disorders in Iraq and may have been accentuated by possibly high rates of consanguineous marriages, which is a norm in that culture [5]. The increased trend in heart diseases could be a reflection of improved diagnostic modalities, like echocardiography, or could arise from an environmental etiology, including pollutant exposure or residual toxic agents associated with the aftermath of conflict, as noted by Eisenberg (2012) from his study in Fallujah [13].

When grouping together CNS defects such as hydrocephalus (7.15% SMA, 88 cases), anencephaly (4.26% SMA, 55 cases), and spina bifida (2.15% SMA, 27 cases), a share of about 13.56% is altogether represented by them. Equally important were skeletal deformities (6.86% SMA combining defects of upper and lower limbs) and gastrointestinal anomalies (5.07% SMA), in line with Forsey et al. (2011–2016), where musculoskeletal anomaly cases (33%) were more common than neurological defects (18%) in Rabat, Morocco [14]. Discrepancies in rate of prevalence could

be due to differing population genetics, environmental conditions, or even how data are collected from one study to another.

The "Other Defects" (27.60% SMA, 347 cases) category was the single largest contributor and thus should be classified further in subsequent studies. Very likely, this category subsumes numerous malformations of which no specific codes exist, such as those stated in this study (e.g., Q15 for eye malformations, Q87 for multiple system syndromes). The upward increase in this category (from 23.08% in 2019 to 31.54% in 2023) might be an indication of newly emerged or still underdiagnosed conditions, which definitely deserve investigations. Compared with Forsey et al.'s rates of 5.58 malformations per 1,000 births in Rabat, the overall rate observed in the present study, 4.07 per 1,000, may be lower due to differences in sample size (304,746 live births vs. 43,923) or diagnostic criteria [14]. Eisenberg considers another unusual outlier: the Fallujah study, reporting a 50% malformation rate in 56 families between 2007 and 2010. This high rate most probably stems from its small population sample set and its emphasis on a high-risk area that has been in post-conflict status [13]. Environmental factors, such as exposure to depleted uranium or other toxins from the Iraq War, may contribute to increased rates in Basra, as referenced by Lutz and Mazzarino (2019) [17].

The study draws attention to strengthening surveillance, genetic screening, and interventions in public health. Measures should include folic acid supplementation to prevent neural tube defects such as anencephaly and spina bifida and instruct pregnant mothers on avoiding exposure to teratogens like alcohol or radiation [4]. The existence of a high rate of hereditary blood disorders justifies premarital genetic testing for carrier detection of hereditary diseases, as suggested by the conclusions.

Conclusion:

Overall, as stated above, the results highlight the importance of carrying out more studies and interventions for the issue of congenital malformations. These shall include monitoring trends, risk factors, and catalyzing suitable preventive action. Thus, from these results, the health authorities must prioritize enlightening the general populace on causes of birth defects and guide them on prevention. The relevant government agencies together with executive and legislature should, therefore, seriously consider drafting legislation that will require genetic testing for every couple intending to marry in order to detect any possible genetic predisposition to diseases and congenital malformations. This would lead to the prevention of those marriages if any predisposition to genetic diseases is detected. Likewise, legislation must be enacted making it compulsory for pregnant women to undergo fetal examination for the safety of the fetus. If there is an option, there should be laws allowing abortion for canceling certain severe disabilities and congenital anomalies while gynecologists and health care providers for pregnant women should be held accountable for not prescribing anything that might cause disease transmission or congenital malformations to the fetus.

References:

1. Shubbar, A.F., Abdulqader, Z.A., & Al-Hadithi, T. (2020). Prevalence and Risk Factors of Congenital Anomalies in Basra Governorate, Iraq. Iraqi Journal of Science, 61(9), 1681-1689.
2. Hussein, A.A., Al-Neamy, F.R., & Sharif, I.A. (2020). Temporal and Spatial Distribution of Birth Defects in Basra Governorate, Iraq. Basra Medical Journal, 26(1), 43-49.
3. Al-Taee, N.H., Abdulwahid, M.N., &Jouffy, Z.N. (2019). Analysis of Birth Defects in Basra Teaching Hospitals. Annals of Medical Research and Practice, 6(1), 17-22.
4. Al-Maliki, T.S., & Al-Shuwaili, S.A. (2019). Prevalence and Pattern of Congenital Anomalies in Basra Maternity Hospitals. Iraqi Journal of Medical Sciences, 17(3), 247-254.
5. Alwan, I. A. (2021). Congenital Birth Defects in Iraq: Prevalence and Risk Factors. Iraqi Journal of Science, 62(2), 350-371.

6. Alwan, L. M., & Alwan, N. A. (2021). Epidemiology of congenital anomalies among newborns in DhiQar Governorate, Iraq. Zanco Journal of Medical Sciences, 25(1), 40-49.
7. https://www.ahewar.org/debat/show.art.asp?aid=798988
8. https://www.alaraby.co.uk/ society/بيئة-تشوهات-العراق-في-دوامة-ولادات-غريبة
9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492088/
10. National birth defects prevention network (NBDPN) Russell S. Kirby, Marilyn L. Browne, Wendy N. Nembhard January 1, 2023
11. Patterns of multiple congenital anomalies in the National Birth Defect Prevention Study: Challenges and insights By Howley, Meredith M. 2023
12. Pediatr. Rep. 2023, 15(3), 431-441; https://doi.org/10.3390/pediatric15030040
13. Birth defects research. Centers for Disease Control and Prevention.Archived September 24, 2015 on the Wayback Machine website.
14. a study published in the Journal of Environmental Pollution and Toxicology in September 2012, analyst David Eisenberg. Titled: (Increasing the rate of congenital malformations among Iraqi children).
15. study conducted by K. Forsey, M.; h. Scientific, E. Bwaiity, Muhammad Al-Salawi, a. MedghariAlavi, A.; ThymoIzgwa, Rabat Title: Prevalence of congenital malformations in the region of "Les Orangers".
16. Ross Caputi, Richard Hill, Donna Mulhearn, *The Sacking of Fallujah: A People's History* (Amhearst: University of Massachusetts Press, 2019). Human Rights Watch, "Iraq: Government Attacking Fallujah Hospital," May 27, 2014.
17. Catherine Lutz and Andrea Mazzarino, eds. *War and Health: The Medical Consequences of the Wars in Iraq and Afghanistan* (New York: NYU Press, 2019).
18. Joy Gordon, "The Enduring Lessons of the Iraq Sanctions," *Middle East Report* 294 (Spring 2020).
19. Kali Rubaii, "Tripartheid: How Sectarianism Became Internal to Being in Anbar, Iraq," *Political and Legal Anthropology Review*, 42/1 (April 11, 2019).
20. Vasiliki Touhouliotis, "Weak Seed and a Poisoned Land: Slow Violence and the Toxic Infrastructures of War in South Lebanon," *Environmental Humanities* 10/1 (May 1, 2018). Drake Logan, "Toxic Violence: The Politics of Militarized Toxicity in Iraq and Afghanistan," *Annals of the Association of American Geographers* 101/3 (2011). Andre Vltchek, "The Ecology of War: Imperial Power, Permanent Conflict and Disposable Humans," *Ecologist,* April 28, 2017.