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Frequency of reported cases of developmental dysplasia of the hip in Kurdistan region/Iraq

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Abstract

Background and objectives: Developmental dysplasia of the hip (DDH) incidence and prevalence varies with ethnicity and geographic location. In Iraq, especially in the Kurdistan Region, this information is not yet clear. This study aimed to find the total number of reported DDH cases and to estimate the incidence and prevalence.

Methods: This cross-sectional study collected data from three governmental places of national sources of database (child disabilities centers, General Directory of Health, and General Directory of Statistics) in the three governments of Kurdistan Region/Iraq (Erbil, Sulaymania, and Duhok). The data included: the number of reported cases of DDH, live births, and population for each year and each government separately. The incidence was calculated by dividing the number of DDH cases per 1000 live births for each year, and prevalence by dividing all the cases of DDH per 1000 of population for each year. Then the average (mean) incidence and prevalence of each government was calculated. Finally, the average (mean) incidence and prevalence for the whole region (the three governments together) were calculated.

Results: The required data from the determined sources were available for the last 25 years (1998-2022). The total number of reported cases of DDH during this period was 44972 cases. The average incidence of DDH cases in Kurdistan Region/Iraq was 18.2 cases per 1000 live births per year, the highest -22.9- in the Duhok government and the lowest -13.8- in the Erbil government. The average prevalence of DDH cases among the population in the region was 4.65 per 1000 in the last 25 years (the highest -8.93- in the Duhok government, and the lowest -2.35- in the Sulaymania government).

Conclusion*:* The incidence of DDH cases in the Kurdistan region in the last 25 years was 18.2 cases per 1000 live births per year and the prevalence was 4.65 cases per 1000 of the population. The highest incidence and prevalence were reported in the Duhok government.

Keywords: Developmental dysplasia of the hip; Frequency; Incidence; Prevalence; Kurdistan Region; Iraq.

Introduction

The Developmental Dysplasia of the Hip (DDH) is defined simply as an abnormal development of the hip joint which includes both osseous (such as acetabulum and the proximal femur) and surrounding structures (like labrum, capsule, ligaments, muscles, tendons, and vessels). It includes a wide range of abnormalities, starting from dysplasia to frank dislocation.[1-6] It is an important cause of childhood disability and if persists into adolescence and adulthood period may result in lots of medical problems like limb length discrepancy, abnormal gait, postural scoliosis, back pain, increased rate of degenerative diseases of the hip and knee joints.[2,7]

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Even with treatment (whether non-operative or operative), the outcome is not free from complications like a vascular necrosis, re-displacement of the femoral head, infection with the stiffness of the hip joint, and injury of surrounding structures.[8]
Although this disorder is considered an uncommon medical problem, in the orthopedic field it is common and forms a large portion of pediatric orthopedic practice.[2,4,7,9]
The incidence and prevalence of DDH cases have different variations depending on the variable taken during observation. Example, type of DDH (dislocation, subluxation, dysplasia); age of patient (at birth, at 6 weeks of life, late presentation after first year of life, neglected till adulthood); method of diagnosis (clinical examination, ultrasound, radiograph); ethnicity (Caucasian, Negros,..); geography (USA, UK, …) and even cultures within the same country.[2,4,5,7,10-14]
Based on geography and ethnicity, the reported incidence and prevalence of DDH cases show a wide range from 1–78 per 1000 live births.[15,16] In Chinese and African newborns, it is 1/1000 live births and on the other hand, it is 188.5/1000 in the Manitoba district of previous Yugoslavia. According to the American Academy of Pediatrics, the overall relative risk of DDH incidence in children is 11.5/1000 live births, 4.1/1000 in boys and 19/1000 in girls.
In the Middle East, the reported incidence also showed some variation (3.17/1000 in the United Arab Emirates, 3.1 to 4.9/1000 in Saudi Arabia, 6/1000 in Iran, 13.6/1000 in Turkey,…).[18,21] In Iraq, especially in the Kurdistan Region, this information is not yet clear.
This study aimed to establish a base on the frequency of DDH cases in the Kurdistan Region of Iraq which consists of three governments: Erbil, Sulaymania, and Duhok. The objectives were to find a quantitative value to be used as an estimate for DDH cases in the population living in this region. This was done by finding the number of reported cases of DDH in these governments, and assessing the incidence and prevalence of these cases for each government separately and for the whole region.

Methods

Type of study and approvals

The study was a cross-sectional study. It was done according to the Strengthening the Reporting of Observational studies in Epidemiology (STORBE) criteria for the observational cross-sectional studies. The approvals to conduct this study were gained from the Scientific Committee of the College of Medicine/University of Duhok, and the Research Ethics Committee of the General Directorate of Health in the Duhok governorate (reference number 02072019-4).

Settings and Source of Data

The data was collected from the following places in the three governments: the special centers for childhood disabilities (these centers receive, register, treat, and follow up on these cases until they are cured and being discharged), the General Directorates of Health, and the General Directorates of Statistics. All these places were governmental and their data are considered official national databases. The data recruitment was done from February to October 2023. The collection of data was done for all the available data in these places.

Type of data (eligibility)

The data collected from the mentioned place included: the registered number of DDH cases, the registered number of live births, and the registered number of populations in the government. The data was collected for each year and for each government separately. The present study didn't include either the criteria and methods for diagnosis of DDH in these centers or the grade or severity of pathology.

Bias

The process of data collection was done from the national records without direct

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contact with the patients. The data recruitment from these records was done for the years preceding the year of study conduction (2023). The collection of data was done by the two authors separately. The collected from both authors were then matched together before being inserted into the computer for further analysis. When a mismatch of data was found between them, a combined revisit was arranged to the source of data, and results were double-checked.

Study size

The complete study size was arrived and the process of data collection was ended when all the required available data (number of reported cases of DDH, live births, and population) from the determined sources were completed.

Data analysis

The collected data was admitted into the computer and statistical analysis was done through the Windows Office Excel software program, version 18.2306.1061.0 (Microsoft Corporation, Redmond, Washington, USA, 2019). The analysis was done to calculate the incidence and prevalence by using the following formulae.[22]

- Incidence =(number of new DDH cases per year / total number of live births) X 1000 for each year
- Prevalence = (number of DDH cases old and new per year / total number of population) X 1000

For the incidence, the reported cases of DDH and the reported live births of the same year were used in the mentioned formula. For the prevalence, all the reported cases of DDH of the same year added to those of the previous years were used with the population of the same year. The analysis was done for each government and each year separately. Then the average (mean) incidence and prevalence of each government was calculated. Finally, the average (mean) incidence and prevalence for the whole region (the three governments together) were calculated.

Results

The required data to achieve the objectives of the present research (number of DDH cases, live births, and population) from the determined sources were available for the last 25 years (1998-2022). The total number of DDH cases reported in the Erbil government during that period was 10612 cases (Table 1) and 10479 cases in the Sulaymania government (Table 2). In the Duhok government, the reported cases of DDH during the same period were 23881 cases (Table 3). So, the total number of reported cases of DDH during the period from 1998 to 2022 was 44972 cases.

The average incidence of DDH cases in Kurdistan Region/Iraq was 18.2 cases per 1000 live births per year, the highest -22.9- in the Duhok government and the lowest -13.8- in the Erbil government. The average prevalence of DDH cases among the population in the region was 4.65 per 1000 in the last 25 years (the highest -8.93 - in the Duhok government, and the lowest -2.35- in the Sulaymania government) (Table 4).

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Table 1 Data of Erbil government

Year	DDH cases	Live Births	Population	Incidence	Prevalence
1998	123	32831	1122545	3.7	0.11
1999	134	25922	1186083	5.2	0.22
2000	187	41927	1278520	4.5	0.38
2001	564	43595	1279955	12.9	0.79
2002	674	42925	1281390	15.7	1.31
2003	-	38814	1313159	-	-
2004	-	40192	1344928	-	-
2005	-	39510	1376697	-	-
2006	-	38207	1415244	-	-
2007	-	37574	1454871	-	-
2008	735	40391	1495607	18.2	1.62
2009	1205	41765	1706182	28.6	2.12
2010	188	40061	1755606	4.7	2.17
2011	637	43873	1805313	14.5	2.46
2012	937	43192	1855226	21.7	2.9
2013	1004	52203	1905970	19.2	3.35
2014	881	56474	1957486	15.6	3.71
2015	888	48618	2009637	18.2	4.06
2016	179	43425	2062380	4.1	4.04
2017	588	39544	2113391	14.9	4.22
2018	-	33696	2162509	-	-
2019	538	16308	2209569	32.9	4.28
2020	323	32937	2254422	9.8	4.34
2021	439	42325	2296747	10.4	4.45
2022	88	43719	2340466	2	4.41

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Table 2 Data of Sulaymania government

Year	DDH cases	Live Births	Population	Incidence	Prevalence
1998	2	15948	1285760	0.16	0
1999	18	18279	1325526	0.98	0.06
2000	16	16381	1366521	0.97	0.03
2001	29	15926	1408785	1.8	0.05
2002	45	17012	1452356	2.6	0.08
2003	391	15560	1497274	25.1	0.33
2004	448	17661	1543581	25.4	0.61
2005	592	18772	1591321	31.5	0.97
2006	493	19510	1640537	25.3	1.24
2007	681	20091	1691275	33.9	1.61
2008	731	20132	1743583	36.3	1.97
2009	722	21392	1784853	33.8	2.34
2010	602	21937	1825311	27.4	2.61
2011	716	23350	1866677	30.7	2.94
2012	791	26680	1908874	26.9	3.29
2013	638	29195	1951818	21.9	3.54
2014	647	31931	1995439	20.3	3.79
2015	242	32607	2039685	7.4	3.83
2016	305	29302	2084492	10.4	3.89
2017	406	27774	2129794	14.6	3.99
2018	498	26038	2175523	19.1	4.14
2019	486	27248	2221622	17.8	4.28
2020	201	26632	2268050	7.5	4.28
2021	391	27213	2295263	14.4	4.39
2022	358	27271	2322534	13.1	4.49

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Table 3 Data of Duhok government

Year	DDH cases	Live Births	Population	Incidence	Prevalence
1998	217	16175	682122	13.4	0.32
1999	455	22875	705400	19.9	0.95
2000	598	27586	729473	21.7	1.74
2001	716	30963	754367	23.1	2.63
2002	830	29537	780110	28.1	3.61
2003	940	30503	806732	30.8	4.65
2004	1083	31152	870074	34.8	5.56
2005	1359	36474	897916	37.3	6.9
2006	980	37632	926650	26	7.74
2007	975	40094	956302	24.3	8.52
2008	1179	44775	984991	26.3	9.47
2009	1130	46931	1171228	24.1	8.93
2010	1099	45146	1212375	24.3	9.54
2011	1114	48687	1253642	22.9	10.11
2012	1035	46744	1294909	22.1	10.58
2013	1257	52499	1336945	23.9	11.19
2014	1715	62745	1379677	27.3	12.09
2015	1644	67393	1423116	24.4	12.87
2016	1242	57738	1467197	21.5	13.33
2017	918	52214	1511859	17.6	13.55
2018	855	46019	1557021	18.6	13.71
2019	823	42012	1602623	19.6	13.83
2020	500	42511	1648611	11.8	13.75
2021	667	43360	1691971	15.4	13.79
2022	550	42880	1734851	12.8	13.77

Table 4 Average incidence and prevalence in the three governments of Kurdistan Region/Iraq

Government	Incidence	Prevalence
Erbil	13.8	2.68
Sulaymania	17.9	2.35
Duhok	22.9	8.93
Total average	18.2	4.65

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Discussion

The results of the present study showed that the incidence and prevalence of DDH cases (18.2 cases per 1000 live births per year, 4.65 cases per 1000 of population) in the Kurdistan Region of Iraq is slightly higher than the neighbor countries in the Middle East region.[18-21] The people living in this region are mainly of Kurds nation from Aryan descent. This gives the possibility of a genetic predisposition but it can't be proved because to date no study conducted in the region to confirm this issue. In general, most (84.3%) DDH cases of mild-to-moderate degree (Graf 2A to 2C) can resolve without treatment in early infancy provided the hips of babies are left free for movements.[23,24] Tight lower limb swaddling is now recognized as an important risk factor for DDH because the immature hips may remain deficient without further development.[25,26] The habit of this type of swaddling continues to be a cultural tradition in nursing care of newly born babies in the Kurdistan Region of Iraq which may give another explanation for the relatively high incidence of DDH cases.

Duhok government showed the highest level of incidence and prevalence among the governments of the Kurdistan region of Iraq. The people living in the Duhok region are mainly Kurmanji (Badinan) speaking tribes in comparison to Soran-speaking tribes which occupy the Erbil and Sulaymania governments.[27] The highest incidence and prevalence may be attributed again to genetic predisposition but till now not been proven due to a lack of studies in this field. In addition to that, the reporting process of DDH cases in both Erbil and Sulaymania governments faced some obstacles in some years during the period when this study recruited its data. This may be a relative explanation for the lower incidence of DDH cases in these two governments in comparison to the Duhok government. Although these years were not included during the calculation of the measurements of the present study, inadequate and deficient reporting usually predisposes to lesser estimates.

Limitations of the study

The sampling for incidence was not done in hospitals that receive live births and the sampling for prevalence was not done neither randomly nor stratified within the population. The data of the present study was recruited (the sampling) from the specialized centers in the three governments that deal with such cases. However, not all cases of DDH visit these centers because some of them are managed in the private sector which is deficient in adequate reporting of the cases. The number of these cases was not included during the estimation of the measurements for the present study. In addition, some cases may circulate between the centers and may end with double reporting. Therefore, the estimated numbers of incidence and prevalence obtained from the date of the present study do not reflect the actual one but may be near to it, as these centers are the only proven sources for reporting these cases. Therefore, the authors of the present study chose the term frequency rather than incidence and prevalence for the title of this study.

The recruited data showed deficiency in certain years and variation in the reported cases between some years as in Sulaymania government before and after 2003, possibly due to change of the security situation in the region.

The present study didn't include the criteria and methods for diagnosis of DDH in these centers nor the grade or severity of pathology because it was beyond the scope of the aim and objectives of the study.

Generalizability

The external validity of the present study results is to provide an estimate for DDH cases in the Kurdistan Region from the statistical point of view and for the health authority. It will provide complimentary information if future similar studies are done in the rest of Iraq.

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Conclusion

The incidence of DDH cases in the Kurdistan region in the last 25 years was 18.2 cases per 1000 live births per year and the prevalence is 4.65 cases per 1000 of the population. The highest incidence and prevalence were reported in the Duhok government.

Competing interests

The authors declare that they have no competing interests.

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