

An Epidemiological Approach of Hydrocephaly Parameters in Duhok Province

Sa'ad M S M Alsufi, M.B.Ch.B., M.Sc.*

*Assistant Lecturer, Technical institute, Duhok, Kurdistan Region, Iraq

المستخلص

الهدف: اجريت هذه الدراسة للتعامل مع اهمية وتأثير مختلف المتغيرات والتي يمكن ان تؤثر في حدوث مرض استسقاء الرأس.

المنهجية: اجريت منهجية مقطعية عرضية واستمرت اربعة اشهر وشملت ٨٩ عينة عشوائية متتالية جمعت من مركز الكشف المبكر لعوق الاطفال في مدينة دهوك وشملت جميع الحالات المشخصة من كلا الجنسين والتي راجعت المركز المذكور للفترة من الاول من كانون الثاني ١٩٩٨ ولغاية الثلاثين من كانون الاول ٢٠٠٨ واستعين بسجلات المرضى المتوفرة في المركز المذكور للحصول على المعلومات المطلوبة.

النتائج: يعد مرض استسقاء الرأس مشكلة صحية في محافظة دهوك (اقليم كردستان العراق)، ولاتزال الكثير من جوانبه غامضة لحد الان. وأشارت النتائج الى ان نسبة الاصابة بين الذكور هي الاعلى ٥٣,٩%، وان اعلى نسبة من الاصابات تحدث في فصل الصيف ٤٢,٧%، وان نسبة فئة المرضى الذين تتراوح اعمارهم بين ٧-١٠ سنوات كانت الاعلى ٥٥,١%، وان نسبة الاطفال المرضى المولودون لابوين تربطهما صلة قرابة تبلغ ٥٧,٣% وان امهات المرضى اللاتي تتراوح فئة اعمارهن بين 26-35 سنة سجلن اعلى نسبة ٥٦,٢%، وان نسبة ولادات المصابين التي حدثت في المستشفيات ٨٥,٤%، وان مدينة دهوك سجلت اعلى نسبة للاصابات ٦١,٨%، وان نسبة الولادات الطبيعية للمصابين كانت الاعلى ٨٣,١%، واخيرا بلغت نسبة الحالات ذات الاسباب المبهمة ٣٩,٣%.

التوصيات: اوصت الدراسة بانشاء وحدات للتحري عن حالات مرض استسقاء الرأس في كافة مستشفيات الامومة والطفولة في محافظة دهوك وعدم تشجيع الزواج بين الاقارب.

Abstract:

Objective(s): This study was conducted to deal with the importance and effect of various variables which might have influence in hydrocephaly occurrence.

Methodology: A retrospective design was performed and continued for 4 months. It included 89 non-randomized consecutive samples collected from the Early Detection of Childhood Disabilities Center (E.D.C.D.C.) Duhok. The population involved was the entire cases of both sexes that attended the centre during the period from 1st.Jan, 1998 to 30th. Dec. 2008 with final diagnosis of hydrocephaly. Patients' records from the centre were used to collect data.

Results: Hydrocephaly has been recognized as a public health problem in Duhok province, Iraqi Kurdistan region, many aspects of which still remain unclear. The results indicated that males mainly suffer (53.9%), highest occurrence of hydrocephaly cases occur in summer (42.7%), patients aged 7-10 years were the highest (55.1%), consanguinous parents constitute (57.3%), mother's age group of 26-35 years had the highest occurrence (56.2%), deliveries conducted in hospitals (85.4%), Duhok city showed the highest incidence (61.8%), normal deliveries were the highest (83.1%) and finally idiopathic cases were (39.3%).

Recommendations: It is highly recommended to establish hydrocephaly screening units in all maternity hospitals in Duhok province and discouragement of consanguineous marriages.

Keywords: Hydrocephaly, children, Duhok

Introduction:

Hydrocephaly is a congenital or acquired disorder in which an excessive amount of cerebrospinal fluid (CSF) is present within cerebral ventricles^[1].

It is also known as hydrocephalus which is derived from the Greek words “hydro” meaning water and “cephalus” meaning head^(2, 3, 4, 5, 6). It affects approximately 1 in every 500 children⁽²⁾. It is believed to occur in about 1.5 per 1,000 births⁽⁴⁾. Hydrocephalus affects one in every 1000 live births, making it one of the most common developmental disabilities, According to the NIH website, there are an estimated 700,000 children and adults living with hydrocephalus, and it is the leading cause of brain surgery for children in the United States⁽⁵⁾.

Hydrocephalus is believed to occur in approximately in one to two of every 1000 live births. The incidence of adult onset hydrocephalus is unknown^(5, 6).

It most often occurs in children, but may also occur in adults and the elderly⁽⁷⁾. No clear racial differences in congenital hydrocephaly risk are recognized. It can be detected prenatally by ultrasonography. A woman who has had one child with congenital hydrocephaly has a recurrence risk of 1-5% of having another affected child, and if the hydrocephaly is associated with an inherited disorder, then the risk is higher⁽⁸⁾.

The aim of this study is to describe the various epidemiologic features of hydrocephaly and to find the new possible risk factors associated with hydrocephaly in Duhok province.

Methodology:

Study samples were collected from early detection of childhood disabilities center (E.D.C.D.C.), Duhok, Iraqi kurdistan, which is situated in Dohuk city, and a retrospective study design was performed and continued for 4 months from (10th. March 2009 till 10th. July 2009). The target population involved in this study was the entire cases who attended the centre during the period from (1st.Jan.1998 to 30th.Dec.2008) with a final diagnosis of

hydrocephaly and all were from Dohuk province. Their number was (89).

Patients records from (E.D.C.D.C.), Duhok, were used to collect information about hydrocephaly patients which included gender, location of birth, patient's age group, season of birth, parent's consanguinity, mother's age group, type of delivery conducted, geographical distribution and recorded etiology.

Data Analysis:

Data entry and tabulation were conducted in computer using Microsoft Office 2003; the analysis was done using SPSS Version 15.0 for Windows, descriptive statistics was done.

Results and Discussion:

A-The effect of gender

This current study revealed that males suffer more from hydrocephaly (48=53.9%) compared to females (41=46.1%) as shown in fig. (1).

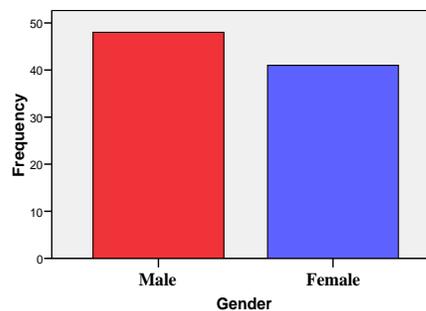


Fig.1: Distribution of Hydrocephaly Cases by Gender

This result is identical to a previous study in (Austin, Texas) that reported predominance of hydrocephaly among males⁽⁸⁾.

B-The effect of season of birth

Highest occurrence of hydrocephalus cases was in summer (38=42.7%), than in winter (29=32.6%), in autumn (15=16.9%) and finally lowest in spring (7=7.9%) respectively as shown in fig. (2).

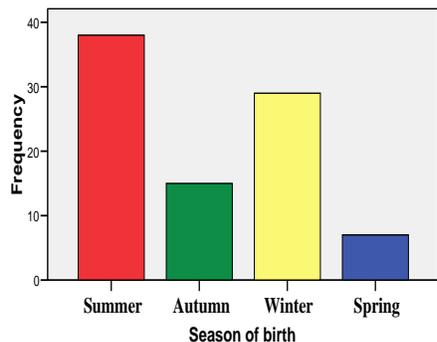


Fig. 2: Distribution of Hydrocephaly Cases by Season of Birth

It is worthy to state that no researcher in Duhok province has mentioned yet the possible importance of this parameter which is being investigated for the first time.

However, study of Austin, Texas concluded that there does not appear to be any seasonal variations in congenital hydrocephaly prevalence⁽⁸⁾.

C-The effect of age (Patient's age group)

The study revealed that patients aged 7-10years were the highest (49=55.1%), patients aged >11years were (23=25.8%), those aged 3-6years were (15=16.9%) and finally those aged 0-2years were (2=2.2%) respectively as shown in fig. (3).

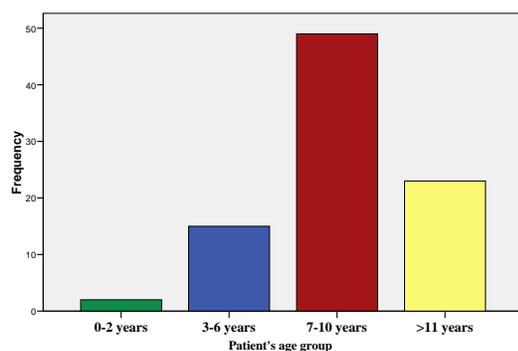


Fig. 3: Distribution of Hydrocephaly Cases by Patient's Age Group

This result is almost identical with what Fallon and Nurmi stated that neurological manifestations of hydrocephalus don't appear until early or late childhood or even early adulthood⁽⁶⁾.

D-The effect of parent's consanguinity

Highest rate of hydrocephaly was in patient's born to consanguineous parents which constitute (51=57.3%), non-consanguineous parents constitute (38=42.7%) as indicated in fig. (4).

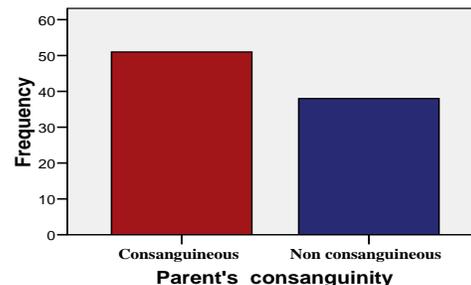


Fig. 4: Distribution of Hydrocephaly Cases by Parent's Consanguinity

This is the first study to be done in Duhok province, and it may be due to wide spread of consanguineous marriage in our region in both urban and rural communities followed by non-consanguineous marriage. This result matches a previous study which concluded that hydrocephaly rates have been reported to be higher with consanguineous parents. Heredity may play a role in this regard⁽⁸⁾.

E-The effect of mother's age group

Mother's age group of 26-35years had the highest occurrence (50=56.2%), age group of 36-45 years was (26=29.2%), age group of 16-25 years was (11=12.4%) and finally the age group of >45 years was only (2=2.2%) as revealed in fig. (5).

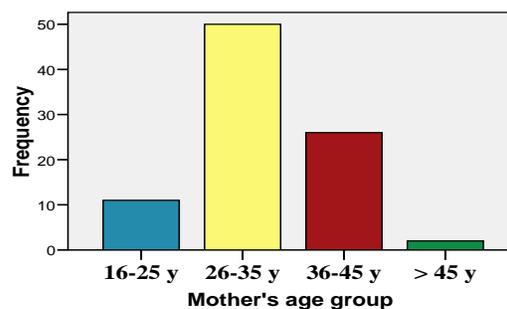


Fig.5: Distribution of Hydrocephaly Cases by Mother's Age Group

This result requires further studies by

other fellow researchers in Duhok province. However one study showed that young maternal age was associated with a higher risk of hydrocephaly and attributed the cause to the fact that younger mothers are not subjected to prenatal testing to the same extent as older mothers, leading to younger mothers carrying an affected infant to term ⁽⁸⁾.

F-The effect of location of birth

Deliveries conducted in hospitals constitute the highest rate (76= 85.4%), while those delivered at home with help of midwives were much lower (13=14.6%) as revealed in fig. (6).

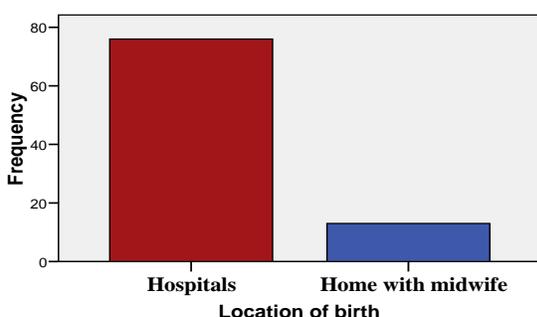


Fig. 6: Distribution of Hydrocephaly Cases by

Location of Birth

This shows clearly the wide-spread approach of pregnant women in our region to be delivered at hospitals rather than being delivered at home with help of midwives. The haste with which deliveries are conducted at hospitals, lack of enough experience of both medical and paramedical staff may be the cause behind the high rate of hydrocephaly in hospitals deliveries. No one has mentioned yet the possible effect of this possible parameter.

G-The effect of geographical distribution

Highest group of hydrocephaly cases was in Duhok city (55=61.8%), then in Akre city (9=10.1%), in both cities of Zaweeta and Sumail (6=6.7%), in both cities of Zakho and Amedy (5=5.6%), finally in Atrush city (3=3.4%) in order of frequency as revealed in tab. (1).

Table 1. Distribution of Hydrocephaly Cases by Geographical Distribution

Geographical distribution	Frequency	Percent
Duhok	55	61.8
Sumail	6	6.7
Zakho	5	5.6
Zaweeta	6	6.7
Akre	9	10.1
Amedy	5	5.6
Atrush	3	3.4
Total	89	100.0

The effect of etiology

Idiopathic cases were the highest (35=39.3%), spina bifida (15=16.9%), multi-factorial causes (11=12.4%), incorrect embryogenesis (8=9%), delayed developmental milestones (6=6.7%),

traumatic head injury, epilepsy and neurological disorders (3=3.4%) each, However, one study found a reduction in hydrocephaly risk with higher altitudes ⁽⁸⁾.

Table 2. Distribution of Hydrocephaly Cases by Recorded Etiology

Etiology	Frequency	Percent
Incorrect Embryogenesis	8	9.0
Multi-factorial causes	11	12.4
Idiopathic	35	39.3
Delayed developmental milestones	6	6.7
Spina Bifida	15	16.9
Traumatic head injury	3	3.4
Epilepsy	3	3.4
Neoplasia, Solid tumors	1	1.1
Prenatal Infection	2	2.2
Cerebral palsy mixed	2	2.2
Neurological disorders	3	3.4
Total	89	100.0

Prenatal infection and cerebral palsy mixed (2=2.2%) and finally neoplasia, solid tumors were only (1=1.1%) respectively as revealed in tab. (2).

This result is similar to other results obtained by other fellow researchers worldwide with differences in percentages (1,2,4,5,6,7,8,9,10,11,12,13,14,15)

From the current study we conclude the following: Males with hydrocephaly were found to be higher than females. Seasons may play a role in hydrocephaly occurrence, being especially highest during summer. Patients aged 7-10 years were the highest. Consanguineous parents were seen to be more related with hydrocephaly than non-consanguine group. Patients born to mothers aged 26-35 years were found to be highest with hydrocephaly cases. Hydrocephaly cases were found to be highest in deliveries conducted at hospitals. Highest rate of hydrocephaly cases was in Duhok city. Highest rate of mothers of surveyed hydrocephaly patients were delivered normally, finally Idiopathic cases were the highest.

Recommendations:

1. Regular prenatal care is important to reduce risk of premature labor which places baby at risk of hydrocephalus.
2. Children's immunizations should be kept up to date. Vaccines that prevent some types of meningitis should never be ignored.
3. All newborn infants with positive family history of hydrocephaly must be examined carefully. Then the role of family physician in examining, early diagnosis and referral.
4. Health education of mothers about signs & symptoms of hydrocephaly.
5. All suspected cases should be examined by x-ray, CT Scan & MRI.
6. Further studies concerning hydrocephaly should be continued and never be ignored by fellow researchers.

References:

1. McMillan, J. A.; DeAngelis, C. D.; Feigin, R.D. and Warshaw, J. B.: *Developmental defects, Hydrocephaly, chapter 396, Osaki's Pediatrics, Principles and Practice*, 3rd. Edition, Lippincott Williams & Wilkins, Philadelphia, Pennsylvania, U.S.A., 1999, P.1906 -1908.

2. WWW. ninds. nih.gov: **Hydrocephalus Fact Sheet, National Institute of Neurological Disorders and Stroke**, U.S.A., April, 2009, P.1-5 (internet).
3. WWW. healthnewsflash.com: **What is hydrocephalus**, 2009, P. 1-5 (internet).
4. WWW.hydroassoc.org: **What is hydrocephalus**, 2009, P. 1-5 (internet).
5. WWW.en.wikipedia.org/wiki:**Hydrocephalus**, June 2009, P. 1-9 (internet).
6. Fallon, L. F. and Nurmi, D. L.: Neurological Disorder, **Hydrocephalus** ,WWW. Answers .com, 2009, P. 1-22 (internet).
7. Kaneshiro, N, K. and Zieve, D.: **Medical Encyclopedia, Hydrocephalus**, WWW. nlm. nih. gov/medlineplus/ency. Jan. 2008, P. 1-4 (internet).
8. WWW.dshs.state.tx.us.com, **Department of State Health Services, Birth Defect Risk Factor Series**, Austin, Texas,: Hydrocephaly, March, 2007, P. 1-6 (internet).
9. Behrman, R. E.; Kliegman, R. M. and Jenson H. B.: **Congenital Anomalies of Central Nervous System, Hydrocephalus**, chapter 585.11, Nelson Textbook of Pediatrics, 17th. Edition, W.B. Saunders company, U.S.A. 2002, P. 1989-1992.
10. Todres, I. D.; Fugate, J.H. and Medearis, D.N.: **Neurological Problems, Hydrocephaly**, Chapter 12.2, Critical Care of Infants and Children, 1st. Edition, U.S.A., 1996, P. 760-762.
11. WWW.hydrocephalus.org, **Facts about Hydrocephalus**, 2007, P. 1-4 (internet).
12. Avery, M. E. and First, L. R.: **Pediatric Hydrocephalus, pediatric Medicine**, 2nd. Edition, Williams & Wilkins, Baltimore, Maryland, U.S.A., 1994, P. 382-386.
13. Fanaroff, J. **Hydrocephalus Overview**, WWW.health.Allrefer.com, Cleveland, OH, U.S.A., Jun, 2009, P. 1-2 (internet).
14. WWW.hhs.gov, **Hydrocephalus, U.S.A.**, April, 2009, P. 1-4 (internet).
15. WWW.Ohiohealth.com, **Health Topics, Hydrocephalus**, U.S.A. Dec. 2007, P. 1-3 (internet).