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Neural Tube Defects Incidence, Risk Factors and Perinatal Outcome

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ABSTRACT

Background :- Neural tube defects are congenital malformation resulting from complete or partial of the neural tube to close in developing embryo, anencephaly and spina bifida, comprising the vast majority of NTDs. NTDs substantially are contributing to morbidity and mortality, particularly in infancy and childhood.

Aims:- to explore the incidence of NTDs among Yemeni women attending Al-Thawra hospital Sanaa as well as to determine the risk factors and perinatal outcome.

Methods: this was a prospective descriptive study of NTDs in Al-Thawra general hospital in Sanaa -Yemen, conducted over a period of one year from 1st January to 31th December . 66 women who delivered a baby with NTDs . The data were collected by using a questionnaire, interviewing all women who were pregnant with a fetus with NTDs and those who diagnosed after delivery to have a baby with NTDs, all data were check it, the most information collected, summarized and analyzed .

Results : - there were 11986 deliveries of which 66 women were delivered a baby with NTDs. The overall incidence was 0.55%. The age of patients ranged from 17-45 years, the highest percentage of NTDs was found among the age 20-29 years. There were 56 patients (84.8%) delivered a baby with NTDs were from urban area, whereas 10 (15.2%) were from rural area. The lowest parity was primigravida (22.7%) and the highest was 5 and above. Most of the patient 52(78.8%) delivered a baby with NTDs at gestational age <37 weeks, whereas 14(21.2%) were delivered at 37 weeks or more. All women who delivered a baby with NTDs did not receive folic acid supplementation before pregnancy. Consanguineous marriage found in 5(7.6%) .

Conclusions and Recommendations: The incidence of NTDs was not very high, this mostly due to improve maternity services, anencephaly was the most common type. In most cases of NTDs no risk factor was identified. First trimester folic acid supplementation can decrease the prevalence. Women who had medical disease such as diabetes or epilepsy, the disease should be controlled, and drugs should be reassessed before pregnancy.

Key words: NTDs–Incidence–Consanguineous–Congenital

1 INTRODUCTION:

Neural tube defects are congenital malformation resulting from complete or partial of the neural tube to close in developing embryo, anencephaly and spina bifida, comprising the vast majority of NTDs. NTDs substantially are contributing to morbidity and mortality, particularly in infancy and childhood [1]. NTDs is multifactorial with well-defined environmental, genetic pharmacological factors implicated. Each year, approximately 4.000 births that involve NTDs as well as other defects result in miscarriage or still birth [2, 3].

Anencephaly is a fatal congenital developmental abnormality involving upper parts of neural tube that develop between day 22 to 25^{th} of fetal life. Approximately 60% fetuses die before birth and none survives beyond two weeks postnatally [4]. The over all incidence is 1 per 1000 births, with considerable variation throughout the world. The incidence is highest in Northern Ireland, Wales and Scotland. the birth prevalence of these conditions had defined substantially over the past 60 years due to better medical care [5]. NTDs produce dysfunction of many organs including the

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skeleton, skin and genitourinary tract, in addition to peripheral and central nervous systems. Hydrocephalus develops in the majority cases [6]. Prevention is even more desirable than accurate prenatal diagnosis there is now, after some years of uncertainty, compelling evidence that periconceptual folic acid supplementation, at a dose of 4 mg daily and starting before pregnancy, will decrease the risk of fetal NTDs in pregnancies who known to have already had an affected baby [7].

In republic of Yemen, little is known about incidence and risk factors of NTDs. therefore, we conducted this study to explore the incidence of NTDs among Yemeni women attending Al-Thawra hospital Sanaa as well as to determine the risk factors and perinatal outcome.

2 METHODOLOGY:

Study design: - this was a prospective descriptive study of NTDs in Al-Thawra general hospital in Sanaa -Yemen, conducted over a period of one year from 1^{st} January to 31th December.

Study setting: the obstetric unit in Al-Thawra Modem general hospital in Yemen in Sanaa.

Population: 66 women who delivered a baby with NTDs.

Data collection: the data were collected by using a questionnaire, interviewing all women who were pregnant with a fetus with NTDs and those who diagnosed after delivery to have a baby with NTDs, all data were check it , the most information collected, summarized and analyzed.

Study variables: The variables that have been studied were the following :- Age of the mother in years, residency , parity (# of deliveries that mother had before), gestation age(duration of pregnancy in weeks) , gender of the baby and type of NTDs (Anencephalus is mean a failure of the fusion of cranial end of the neural tube resulting in exposure of malformed brain) and (Spina bifida is result from failure of posterior vertebral arch to fuse) , family history of NTDs , folic acid supplementation before pregnancy , mode of delivery and neonatal outcome.

3 RESULTS:

During the study period, there were 11986 deliveries of which 66 women were delivered a baby with NTDs. The overall incidence was 0.55% Table 1.

The age of patients ranged from 17-45 years, the highest percentage of NTDs was found among the age 20-29 years, 29 patients in the age 30-40 years and 13 (19.7%) in the age <20 years. There were 56 patients (84.8%) delivered a baby with NTDs were from urban area, whereas 10 (15.2%) were from rural area. In this table shows the lowest parity was primigravida (22.7%) and the highest was 5 and above. the most cases of NTDs were found in grand multiparas 5 and above presented in 29 patients (44%) followed by para 22(33.3%). Most of the patient 52(78.8%) delivered a baby with NTDs at gestational age <37 weeks, whereas 14(21.2%) were delivered at 37 weeks or more. All women who delivered a baby with NTDs did not receive folic acid supplementation before pregnancy. Also, in this table shows 36(54.5%) of pregnant women were delivered by induction of labor, 24(36.4%) were delivered by spontaneous vaginal delivery. Concern to consanguineous marriage found in 5(7.6%) and 61(92.4%) had no consanguinity Table 2.

NTDs was found higher in female babies 44(66.7%) whereas male babies. also, most of births were still born 46(69.7%) and a live birth were 20(30.3% Table 3

The table shows that the majority of cases 74.3% had no risk factors of NTDs, while 25.7% had a risk factor, including maternal hyperthermia during the 1^{st} trimester , family history of NTDs , previous history of NTDs and maternal diabetes Table 4

4 DISCUSSION:

In this study, there was a total of 11986 deliveries of which 66 had NTDs. The overall incidence was 5.5 per 1000 deliveries, the rate is higher than that in the earlier studies, one of these studies conducted in Jordan [8] and the incidence of NTDS was 2.9 per 1000 deliveries, other study conducted in Bahrain [9] and the average incidence was 0.95 per 1000 deliveries. Whereas a study in Iran [10], found the incidence of NTDs was 3.12/1000 deliveries and in Turkey [11], the incidence was 1.5/1000 deliveries. Our study showed that 43.9% of NTDs were in the age group 20-29 years, 27.3% of age 30-40 years, 19.7% of less 20 years . a study done by Nili etal [12], found that NTDs is common in maternal age les than 18 years and in Jordan [13] the authors found that the NTDs were common between 25-35 years. And a study in Iran [14], the authors found the NTDs were common in age >35 years.

In this study the most patients who delivered a baby with NTDs were from urban area 84.8% and 15.2% from rural area. Because this study was restricted to Al-Thawra general hospital and most of patients come from Sanaa city and other neighboring cities. A study in Iran[14] found NTDs was common in rural area 63%. And a study in China [15], the prevalence of NTDs in rural area 44.3/10000 was 3 times higher than urban 14.4/10000, this may be due factors such as high population growth rate and socioeconomic factors. Our study showed that 44% of NTDs were in grand multipara followed by para which represented 33.3%. similar trends found in Jordan [13]. For folic acid supplementation, all patient not receive folic acid and similar trends found in Iran[14] and a study in Ireland [16], the number of NTDs was 87 cases of these 7-case had intake the folic acid prior to conception between 2 weeks and 6 months and 14 cases use the folic acid after conception between 6 weeks of conception and 9 months. The incidence of NTDs was higher in female 66.7%, similar trend observed by the authors in Pakistan [17].

Our study showed consanguineous marriage found in 7.6% and this percentage was lower than the percentage in the study in Jordan [13], the author found 70% had a consanguinity. The possibility that consanguinity could be

Table 1. Incidence of NTDs in Obstetric unit in Al-Thawra hospital in Sanaa

Total number of deliveries	Deliveries without NTDs		Deliveries with NTDs	
	Frequency	%	Frequency	%
11986	11920	99.45%	66	0.55%

Table 2. Distribution of studied sample according to some of variables

Variables	Frequency	%
Age groups		
<20 years	13	19.7
20-29	29	43.9
30-40	18	27.3
>40	6	9.1
Residency		
Urban	56	84.8
Rural	10	15.2
Parity		
0	15	22.7
1-4	22	33.3
5 and above	29	44.0
Gestational age		
Less than 37 weeks	52	78.8
37 weeks or more	14	21.2
Folic acid supplementation		
Yes	0	0
No	66	100
Mode of delivery		
Spontaneous vaginal delivery	24	36.4
Induced labor	36	54.5
Cesarean section	6	9.1
Consanguinity		
Yes	5	7.6
No	61	92.4

Table 3. Distribution of studied sample according to gender and perinatal outcome

	Frequency	%
Gender of baby		
Male	22	33.3
female	44	66.7
Perinatal outcome		
A live birth	20	30.3
Still birth	46	69.7

Table 4. Distribution of studied sample according to risk factor of NTDs

Risk factor	Frequency	%
Family history of NIDs	2	3
Maternal diabetes	3	4.5
Maternal hyperthermia during 1st trimester	8	12.1
Previous history of NIDs	4	6.1
No risk factor	49	74.3

a risk for NTDs in population require further researches. In this study 78.8% of patients were delivered at gestational age les than 37 weeks mostly by induction of labor while 21.2% were delivered at 37 weeks or more. The maternal hyperthermia during the 1^{st} trimester is the most risk factor occurs in 12.1% of cases and a study done it in Goargia [18], the number of NTDs was 385 of these 31 reported having 2 day or longer episode of flu with fever from I month before and through 3 months after. Previous reproductive history of NTDs occur in 6.1% of cases, other study which was conducted in Tehran [12], the recurrence rate was 3-4%. Our study showed that the family history of NTDs occur in 3% of cases and a study in Turkey [11], the author found that the history of NTDs occur in 1.04%. and for maternal diabetes, in our study found only in 4.5% of cases and in Sudan[19] [19], the author found the diabetes in 9% of cases. 30.3% of NTDs were live born and 69.7% were still born and the cause of this high percentage due to the most cases of NTDs was anencephaly which is incompatible with live, and in a study in United Arab Emirates [20], the au-

thors reported the number of NTDs was 34 cases of these only 3 cases were still born. Other study in Turkey [11], the authors found that the incidence of still born among NTDs was 27.1% and in America [21], the number of NTDs was 148 of this number 26 case was still born. [22]

5 CONCLUSIONS AND RECOMMENDATIONS:

The incidence of NTDs was not very high, this mostly due to improve maternity services, anencephaly was the most common type. In most cases of NTDs no risk factor was identified. First trimester folic acid supplementation can decrease the prevalence. Women who had medical disease such as diabetes or epilepsy, the disease should be controlled, and drugs should be reassessed before pregnancy. Antenatal care must be started as early as possible to help in early detection for those women at high risk for developing NTDs.

REFERENCES

[1] D1 W, M M, K H, M OD, M G. Reproductive factors, subfertility, and risk of neural tube defects: a case-control study based on the Oxford Record Linkage. Study Register Am J Epidemiol. 2000 11;9(823-8).

[2] Cherian A, Seena S, Bullock RK, Antony A. Incidence of neural tube defects in the least-developed area of India: A population-based study. The Lancet. 2005;366(9489):930–931. Available from: https://doi.org/10.1016/S0140-6736.

[3] Behrman RE, Kliegman R, Jenson H, editors. B. Nelson textbook of pediatrics;.

[4] Behrman HBJRE, editor. Philadelphia, Pa.: Saunders, c2004;.

[5] Council on Ethical and Judicial Affair, A M A, JAMA;273:1614.

[6] Mohammed M I. 2000;21:2.

[7] Annals of Saudi Medicine. 2001;21(1-2).

[8] Whitfield CR, Dewhurst J. Dewhurst's Textbook of Obstetrics and Gynecology for Postgraduates;.

[9] Abou heija . NTDs in patient delivered at the orinces bade teaching hospital in north Jordan. JBMS;2(83-7).

[10] Arrayed SSA. Epidemiology of congenital abnormalities in Bahrain. EMHJ - Eastern Mediterranean Health Journal. 1995;1:248–252.

[11] Neural Tube Defects in Native Fars Ethnicity in Northern Iran. Golalipour MJ;3(116-23).

[12] I U, E L, C U. The incidence and risk factors of neural tube defects in Izmir, Turkey: a nested case-control study. Mandiracioğlu A. 0;1:46–3.

[13] Nili MJF. Risk factors for neural tube defects: a study at university-affiliated hospitals in Tehran. Archives of Iranian medicine. 2006;.

[14] Aqrabawi HE. Incidence of neural tube defects among neonates at King Hussein Medical Centre. Jordan EMHJ - Eastern Mediterranean Health Journal. 2005;11:4–819. Available from: http://www.who.int/iris/handle/10665/117010.

[15] Epidemiology of neural tube defects in northern Iran, 1998-2003. EMHJ - Eastern Mediterranean Health Journal. 2007;13(3):560–566. Available from: http://www.who.int/iris/handle/10665/117283.

[16] Slattery ML. the epidemiology of NTDs . A review of dietary intake and related factors as etiologic agent. AJOE; 1999.

[17] McCauleyEmail author, A Shahwan and S Dockeray Prevalence of neural tube defects in Ireland 2001–2002, was the folate media campaign effective. M;.

[18] S SFT. Prevalence and management of anencephaly at Divisional Headquarter Hospital Faisalabad. Pak J Med Sci;18:302–5.

[19] Birth defects Res;.

[20] Nugud A, Arbab M, Osman TM. Pattern of neural tube fusion defects in Sudan. Saudi Med J;2003(24).

[21] Al Hosani H1, Salah M, Abu-Zeid H, Farag HM, Saade D. The National Congenital Anomalies Register in the United Arab Emirates. East Mediterr Health J;2005:11–4.

[22] J EMVGMSLHMDMSS. Samuels Karen Todoroff Gladys Block. Understanding the increased risk of neural tube defect-affected pregnancies among Mexico-born women in California: immigration and anthropometric factors. Pediatric and Perinatal Epidemiology;2006(20):219–230.