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Prevalence Rate and Risk Factor of Spina Bifida at Maternity and Obstetrics Hospital in Karbala City

معدل الانتشار وعوامل الخطورة لداء السنسنة المشقوقه في مستشفى النسائية والتوليد في محافظة كربلاء المقدسة

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Abstract:

Objective: Reduction of folic acid (a type of vitamin-B) during pregnancy may cause a neural tube defect (NTD) called **spina bifida**. The purpose of this study was to determine the prevalence rate of spina bifida and its relation to folic acid, intake during pregnancy, and other factors like parents' relative degree and radiation.

Methodology: Cases of spina bifida (n=18) and control subjects (n=16) from Maternity and obstetrics hospital at Karbala city were included. Mothers of newborns with **spina bifida** were interviewed by the researcher to collect some information on consuming folic acid and some demographic variables.

Results: Relative degree of parents was a significant factor to **spina bifida** ($X^2_{(34,2)}$ = 6.013, P= 0.04). No significant correlation was found between **spina bifida** and exposing to radiation during pregnancy. A significant correlation was found between having neonate with **spina bifida** and consuming folic acid during pregnancy ($X^2_{(34,2)}$ = 11.900, P= 0.003).

Conclusions: Women who had not taken folic acid during the first trimester of their pregnancy were more likely to have a neonate with **spina bifida**.

Recommendations: Health centers efforts should be focused on educating pregnant women on hazardous of some factors (such as radiation and misuse of drugs) on their babies' health.

Keywords: Spina bifida; Folic acid, Pregnancy.

الخلاصة :

قلة حمض الفوليك (نوع من فيتامين بي) خلال فترة الحمل ربما قد يؤدي الى حدوث خلل او عيب في الانبوب العصبي وهذه الحالة تدعى بالسنسنة المشقوقة. ان الهدف من هذه الدراسة هو لتحديد معدل انتشار السنسنة المشقوقة وعلاقتها بحمض الفوليك وبعض العوامل الأخرى.

تصمصم الدراسة: نوع الدراسة هي دراسة الحالة_والمرض وقد تم جمع 18 حالة سنسنة مشقوقة و 16 طبيعية للمقارنة حيث تم جمع العينات من مستشفى النسائية والتوليد في مدينة كربلاء المقدسة.

النتائج: هناك علاقة وثيقة بين مستوى قرابة الوالدين وحدوث السنسنة المشقوقة حيث وجد هنالك فرق معنوي واضح (X2 (34,2) = 6.013, P= 0.04). توجد علاقة وفرق معنوي عالي بين تناول حمض الفوليك وحدوث السنسنة المشقوقة X2 (34,2) = 11.900 ، قيمة P = 0.003

الاستنتاجات: النساء اللواتي لم يتناولن حمض الفوليك اسد خلال فترة او قبل الحمل يكونن اكثر عرضة لانجاب أولاد مصابين بالسنسنة المشقوقة.

التوصيات: مراكز الرعاية الصحية الاولية يجب ان تركز جهودها حول تعليم وتثقيف النساء باهمية تناول حمض الفولك وما يمكن ان يحدث للجنين في حالة غياب حمض الفولك اسد او قلته في جسم الام.

Introduction:

Spina bifida is a type of neural tube defect (NTD) as a result of a reduction in folic acid (a type of vitamin-B) [1]. The neural tube is a structure that consists of brain, spinal cord, and tissues that enclose them [1]. The neural tube forms during the first trimester of pregnancy [2]. In neonate with spina bifida, neural tubes fail to grow causing abnormality in spinal cord and spin bones' [3]. Physical and intellectual disabilities may happen as a result of spina bifida [4]. Disabilities may differ in severity from baby to another depends to the size, site of defect, and the affected part of the spinal cord [1]. Myelomeningocele, Meningocele, and Spina Bifida Occulta are the most common types of spina bifida [1].

Numerous risk factors may lead to spina bifida. Folic acid was found to be highly correlated to neurological defect, especially spina bifida [5]. Exposed to radiation, drugs, chemicals, nutrition status, and genetic determinants are factors that related to spina bifida [3]. Spina bifida is considered among the most common forms of neurological disorders that cause morbidity and mortality in USA [4]. In Iraq, the incidence rate of spina bifida was 2.2/1000 in 2008 [5].

This congenital anomaly has noticed in Karbala City- Iraq, still ambiguous and leads to increase the rate of morbidity and mortality among infants [5]. The aim of this study was to detect the prevalence rate of spina bifida and its relation to folic acid and other factors such as parents relative degree and exposure to radiation during pregnancy.

Methodology:

From October, 2014 to May, 2015, eighteen neonates with spina bifida were selected as cases in this study. All cases were hospitalized at Maternity and Obstetrics Hospital at Karbala city. Mothers of spina bifida's babies were interviewed by the researcher. Information on folic acid and some demographic information were collected. Duration of taking folic acid, exposed to radiation, parent's relative degree, education and career of mother, delivery type, and mother's age were reported by mothers of neonates. Sixteen healthy neonates were selected in this study for a comparison purpose as control subjects. Same information (which were needed for cases) were collected from mothers of control neonates.

Intake of folic acid was defined as taking supplement folic acid during the first trimester of pregnancy or a month before the last menstrual [6]. Mothers in case and control groups were classified into three groups based on the consumption of folic acid: never intake, intake during the first trimester, and intake for more than four months.

Exposed to radiation was defined as whether mothers had x-ray during their first trimester of pregnancy while they did not knowing of being pregnant [7].

Results and Discussion:

Chi- square test was used in this study in order to detect the relationship between spina bifida with folic acid and some other demographic factors. Descriptive statistics have been used to describe some demographic information as shown in Table 1.

Table1: Showing the demographic characteristics of the study sample (N= 34)

Category	Sub category	Sample		X^2	*P* value
		Case	Control		
Mother age in Years	18-25	7	4	21.523	0.05
	25-30	5	4		
	30-35	1	8		
	35-40	3	0		
	40-45	2	0		
	Total	18	16		
Delivery Type	Single	16	14	0.016	0.90
	Twins	2	2		
	Total	18	16		
Mother's work	Employee	5	1	2.701	0.10
	Does not work	13	15		
	Total	18	16		

Mothers' age was found to be related to the case of spina bifida ($\boldsymbol{X^2}_{(34,\ 5)}$ = 21.523, *P* = 0.05); in other words, the youngest the mother the higher the chance to having neonate with spina bifida. About 40 % (n = 7) of cases were their mother aged less than 25 years; and that might be due to their low knowledge about the importance of taking folic acid during their pregnancy. Horn and his colleagues show a similar finding to this study [8]. Furthermore, young mothers are more likely to be less care about health of their newborn due to dropping of their experiences and self- efficacy [8,9].

Most of cases (88.8%) were a single neonatal. This means there is no correlation with the type of delivery($X^2_{(34,\ 2)}$ = 0.016, *P* = 0.9). Some studies prof that twins are more likely to have NTD than single birth [10, 11]; however, this study shows an opposite outcome. All twins cases (n=2, 11.1%) were first births, their mothers had not taken folic acid during pregnancy.

Being out of home due to work purposes does not affect women from intake their daily folic acid. Statistical analysis shows no significant correlation between mothes' work and having a neonate with spina bifida ($X^2_{(34,\ 2)}$ = 2.701, *P* = 0.100). However, contact with others may lead to increase knowledge [12] regarding the importance of consuming folic acid during the first trimester of pregnancy [6, 13].

Table2: Stating parents' relative degree among cases and controls

Sample	Parents' relative degree			X^2	*P* value
	First N (%)	Second N (%)	Third N (%)		
Case	11(32.5)	6 (17.6)	1 (2.9)	6.013	0.049
Control	2 (5.9)	1 (2.9)	13 (38.2)		
Total	13 (38.4)	7 (20.5)	14 (41.4)		

Table two shows that 61% (n = 11) of cases were children of parents in first- relative degree. A significant correlation was found between Parents' relative degree and case of spina bifida ($X^2_{(34, 3)}$ = 6.013, *P* = 0.049). Parents' relativity has a huge impact on child health. Parents' relativity increases the risk of having babies with not only neurological defects, but also genetic diseases [14].

Table 3: Explaining the exposed to radiation during pregnancy of cases and controls' mothers.

Sample	Exposed to Radiation		X^2	*P* value
	Exposed N (%)	Not Exposed N (%)		
Case	14 (41.1)	4 (11.9)	4.030	0.045
Control	16 (47)	0 (0)		
Total	30 (88.1)	4 (11.9)		

Chi- square test shows a notable correlation between spina bifida and mothers' exposed to radiation. 77.8 % (n= 14) of cases were their mother exposed to radiation during their pregnancy (see Table 3). Mothers who had a history of exposing to radiation are more likely to have neonates with neurological defects [15]. Exposed to radiation during pregnancy is too dangerous and may lead to serious problems for the fetus [16, 17].

Table 4: Illustrating the duration of consuming folic acid amonf cases and controls' mothers

Sample	Duration of intake Folic Acid			X^2	*P* value
	Never intake	Less than 3 months	More than 3 months		
Case	12 (35.5)	5 (14.7)	1 (2.9)	6.013	0.049
Control	2 (5.9)	7 (20.5)	7 (20.5)		
Total	14 (41.4)	12 (35.2)	8 (23.4)		

A significant correlation was found between consuming folic acid and the case of spina bifida with $X^2_{(34, 2)}$ = 11.900, p value < 0.05= 0.003. A little more than third of participants (35.5%) were their mothers never intake folic acid neither before nor during their pregnancy (see Table 4). This finding was corresponding to the findings of other researches were done before [14, 18, 19]. Previous studies showed the importance of folic acid in preventing NTDs [20]. A systematic review concludes a vivid shrinking in incidence rate of NTDs after mandating folic acid fortification in United States [7, 20]. Based on this result, folic acid is too important to be taken by females who are at the stage of pregnancy or planning to be pregnant. Attributable to the importance of consuming folic acid during the first trimester of pregnancy, United States mandates folic acid fortification [21, 22].

Conclusions:

Folic acid is too important to be taken by females who are at the stage of pregnancy or planning to be pregnant. Women who had not taken folic acid during their first trimester of pregnancy were more likely to have a neonate with **spina bifida**.

Recommendations:

Health centers efforts should be focused on educating pregnant women on hazardous of some factors (such as radiation and misuse of drugs) on their babies' health. Same studies should be done with increasing the sample size. Moreover, a cohort study should be done by health agencies to get more concrete results.

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