



Journal Homepage: - www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI: 10.21474/IJAR01/5941
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/5941>



RESEARCH ARTICLE

KNOWLEDGE OF THE IMPORTANCE OF FOLIC ACID IN THE PREVENTION OF NEURAL TUBE DEFECTS IN BUTEMBO TOWN, DEMOCRATIC REPUBLIC OF CONGO.

Muhindo Valimungighe Moise¹, Alexandre Amini Mitamo² and Ahuka ona Longombe³.

1. Catholic University of Graben, Medicine Faculty, Department of Surgery in Teaching Clinic of Graben.
2. Catholic university of Graben, Student in Medicine Faculty.
3. Professor of Surgery, University of Kisangani and CEPROMAD.

Manuscript Info

Manuscript History

Received: 02 October 2017
 Final Accepted: 04 November 2017
 Published: December 2017

Key words:-

Knowledge, folic acid, prevention, neural tube defects.

Abstract

Introduction: Neural tube defects (NTDs) are congenital malformations resulting from a problem of neural tube closure, at an early stage in the development of the human embryo. Numerous studies have established that these malformations, although multifactorial, are correlated with low intakes of folic acid. These studies also mentioned that the additional intake of folic acid in the periconceptional period reduces the risk. The objective of this study was to assess the level of knowledge of women and caregivers on the importance of folic acid in the prevention of Neural Tube defects.

Methods: it was about a prospective and participative cross-sectional study covering the period from January 15 to March 30, 2016. 400 women and caregivers were concerned with the study, and among them only 300 responded to the questionnaire.

Results: 280 respondents (93.3%) were knowledgeable about folic acid. Attendance of pregnant women in preventive activities led to knowledge of folic acid in 65.7%. 9.6% of people we surveyed know the ideal period of administration of folic acid to prevent NTDs. Only 17.85% of our respondents know the importance of folic acid in preventing NTDs. The knowledge depended on the profession of respondents: 100% of surveyed caregivers know the NTDs.

Conclusion: Caregivers are more informed than other people about the importance of folic acid in preventing NTDs. The prenatal consultation (PNC) has played a leading role in the knowledge of folic acid. On this basis, a preventive treatment by taking the folic acid in periconceptional period is strongly recommended to prevent this malformation.

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Introduction:-

Congenital malformations of the central nervous system such as spina bifida, encephalocele and hydrocephalus constitute a public health problem [1].

According to WHO estimates, birth defects caused about 260 000 deaths worldwide in 2004 (about 7% of all neonatal deaths). The most common serious congenital disorders were malformations of the heart, the neural tube and Down syndrome [2].

Corresponding Author:- Muhindo Valimungighe Moise.

Address: Catholic University of Graben, Medicine Faculty, Department of Surgery in Teaching Clinic of Graben.

These malformations are most often responsible of important psychomotor and sphincteric sequel requiring multidisciplinary care. The management involves adapted reception structures to facilitate social and professional integration [1].

The neural tube is the part of the embryo that will form the brain and spinal cord. Anomalies occur when the neural tube does not close completely during the first weeks of pregnancy [3].

Numerous studies have established that these malformations, even if they are multifactorial, are correlated with low intakes of folic acid [4, 5].

Folic acid, or folate, is a group B vitamin. It is essential for the normal development of the spine, brain and skull of the child, especially during the first weeks of pregnancy.

Studies have shown that folic acid; once administered orally prior to conception and during the early stages of pregnancy, plays a role in the prevention of neural tube defects [5]. This is the reason why, in 2000, the State secretariat for Health issued recommendations on the usefulness of folic acid for women as soon as pregnancy is considered. [4]

Etiologically, several factors have been implicated in the occurrence of defects on the neural tube. According to Lemire quoted by ROBERT, these factors act for certain malformations during neurulation, it means between the first 30 days of gestation and the closure of the posterior neuropore. But others say it is in the period after neurulation. In several developed countries, the prevalence of neural tube defects has been reduced by prevention through genetic counseling and folic acid uptake in the periconceptional period, precision of antenatal diagnosis, and legalization of therapeutic abortion. [1].

In France, the prevalence of neural tube closure defects (spina bifida and mostly anencephaly) is close to one birth per thousand live births and medical terminations of pregnancy, which corresponds to seven hundred pregnancies per year [4].

In addition, these defects occur in 95% of cases with no NTDs history. The risk is multiplied by ten in case of history. These abnormalities are serious. They can cause death at birth or after a few days of life for anencephaly. A part from that, they can lead to disabilities whose severity depends on the severity of the attack for spina bifida [4].

In Canada, since 1998, efforts to reduce NTDs have been made mandatory for folic acid enrichment of white flour, pasta and cornmeal. [5] In the same country, the number of NTD cases at birth decreased from 11.6 per 10,000 live births in 1989 to 7.5 per 10,000 total births (live births and stillbirths) in 1997 [6].

A study made by the Public Health Agency of Canada found that the supplementation of food in folic acid has been associated to the decrease of the incidence of NTD at 78% [7].

Malformations of the neural tube concern also African countries. In Cape Town in South Africa, their prevalence rates fluctuated between 1.74 and 0.63 per 1,000 births [8]. They are frequent in Niamey with very high mortality. The overall mortality rate is 20.25% and the morbidity rate is 86.82%, one month after the operation [1].

In the DRC, Longombe in his specialization dissertation presented in Lubumbashi found that out of a total of 66,492 live births observed in the Katanga / Lubumbashi health district for 8 years, 449 cases of congenital malformations were diagnosed. This represented a malformation rate of 0.67%. These defects affected the central nervous system in 51% and the limbs in 13.1% [9].

Considering the above data and the fact that Butembo town, located in DRC, is not spared from NTDs, a reality that accompanies African communities around the world, a survey on knowledge of the importance of folic acid in the prevention of neural tube defects in Butembo town was done.

The objective of this study was to assess the level of knowledge of women and caregivers on the importance of folic acid in preventing NTDs.

Material and methods:-

Study site:

Our study was carried out in the Democratic Republic of Congo, in North Kivu District precisely in Butembo town in its four respective communes: Kimemi, Mususa, Bulengera and Vulamba.

Butembo town is located to the East of the Democratic Republic of Congo, in North Kivu District. It extends between the rural areas of Lubero and Beni. It is limited by the community of Baswagha and Bashu. It is located at 29 ° 17 'East longitude and 8 ° North latitude. It has 710,801 inhabitants. (Annual report of the town hall of Butembo 2014)

Patient:

Our study population consisted of 710,801 inhabitants, including 400 respondents: Women and caregivers found in the town of Butembo, of whom only 300 responded to the questionnaire.

Methods:-

This was a cross-sectional and participatory study covering the period from 15 January to 30 March 2016.

Were included in our study, all women and caregivers residing in our study site and present during our data collection period.

Our study excluded women and caregivers not residing in our study area or residing in our study area but absent during the data collection period.

A previously tested survey questionnaire containing the parameters (age, utility of folic acid, knowledge of folic acid) was used to collect the data.

To select the districts we had proceeded by a random sampling (drawing without resumption in the urn). The stratification was done like this:

$$\text{Stratum 1} = 225010 \div 710801 = 0.3165$$

$$\text{Stratum 2} = 184654 \div 710801 = 0.2597$$

$$\text{Stratum 3} = 203425 \div 710801 = 0.2861$$

$$\text{Stratum 4} = 97712 \div 710801 = 0.1374$$

Hence a communal distribution as follows:

1. Stratum 1 = $0.3165 \times 400 = 127$
2. Stratum 2 = $0.2597 \times 400 = 104$
3. Stratum 3 = $0.2861 \times 400 = 114$
4. Stratum 4 = $0.1374 \times 400 = 55$

Table I:- Sample Distribution by Stratum

Commune	Number	Sample
Bulengera	225 010	146
Kimemi	184 654	105
Mususa	203 425	73
Vulamba	97 712	76
Total	710 801	400

Our data were processed by Microsoft Office Word 2007 and analyzed by Epi Info version 3.5.4 (July 30, 2012)

Our study did not present ethical problems especially as our results were numeral, under anonymity and this search respects the Helsinki code.

Results:-

Table II:- Distribution of women and caregivers according to circumstance of receipt of information, utility and time of administration of folic acid

VARIABLE	Frequency, N = 280	Percentage
Circumstances of receipt of information		
If yes, seen for the first time		
At the antenatal consultation	184	65,7
At the hospital	85	30,4
At the pharmacy	11	3,9
Utility of Folic Acid		
Preventing other diseases	230	82,15
Preventing NTDs	50	17,85

Administration time to prevent ATN		
During pregnancy	242	86,4
Before conception	27	9,6
At the birth of the child	8	2,9
Not required	3	1,1

Table III:- Distribution of women and caregivers based on parity and knowledge of folic acid

	Yes	No	Number (%)
Knowledge of folic Acid			
Women	253(90,35)	20	273 (91)
Caregivers	27(9,65)	0	27 (9)
Total	280(93,3)	20	300 (100)
Parity			
0-1	63	13	76 (25,33)
2-3	150	7	157 (52,33)
>3	67	0	67 (22,33)
Total	280	20	300 (100)

Table IV:- Distribution of women and caregivers by age, residence and neural tube anomalies

VARIABLES	Frequency, N = 300	Percentage
Class of age		
16 – 20	18	6
21 – 25	69	23,0
26 – 30	69	23,0
31 – 35	44	14,7
36 – 40	30	10,0
41 – 45	27	9,0
46 - 50	19	6,3
51 – 55	10	3,3
56 - 60	5	1,7
61 and over	9	3,0
Communal residence		
Bulengera	121	40,3
Kimemi	80	26,7
Mususa	48	16,0
Vulamba	51	17,0
Neural tube defects		
Spina bifida	35	11.66
Anencephaly	6	2
Encephalocele	3	1
Myelomeningocele	2	66.66
Other	16	5.33
Nothing to report	238	79.3

Table V:- Distribution of women and caregivers according to their level of education and profession

	Number	Total number	Percentage
Level of study			
Have never studied	0	29	0
Primary	6	37	16,21
Secondary	100	156	64,1
University	50	78	64,1
Total	156	300	52
Profession			
Caregivers	27	27	100
Teacher	11	16	68,75
Student / pupil	17	25	68
None	31	65	47,69
tailor	10	21	47,6

State Agent	6	14	42,8
Cultivator	8	19	42,1
Housewife	30	73	41,09
Merchant	15	40	37,5
Total	155	300	100

Discussion:-

The level of knowledge of folic acid by women and caregivers is 93.3% in Butembo town. Women accounted for 90.35% and caregivers 9.65% of the sample. This frequency was found in the course of our investigations. It is similar to the one found in 2013 by Bitzer J. in a study carried out in Europe in 18 countries out of 22,925 women concerning the knowledge of folic acid in which 70% of women knew Folic acid [10]. This is not different from the one conducted in 2014 by Salgues and colleagues found that 36% of their population of study never heard of folic acid. Only 66% of them know this vitamin [11]. From Maher and Keriakos's study, we learned that nearly 98% of women stated that they had heard of folic acid [12]; while Bener and colleagues found in Qatar in Saudi Arabia, 53.7% [13].

This difference can be explained by the period of study and region differences: in fact, the knowledge on folic acid and sensitization strategies increases year after year.

Our study showed that 100% of caregivers in Butembo town knew the folic acid, and most of women got the information on folic acid utility at the antenatal consultation: 65.7% of respondents. Bener and colleagues found that the common information source in folic acid were physicians (63.4%), followed by Newspaper/magazine/books (21.7%) [13]. In the United Kingdom, Maher and Kariakos found that midwives and general practitioners constituted the main source of information on folic acid [12].

These three findings are similar. In fact, caregivers are the principal source of information on folic acid, for they are the one who conduct antenatal consultations. ANC is a very important step in the management of the pregnancy. This means that it deserves priority in primary health care. From the above findings, we observe that pregnant women who attend prenatal services are more likely to know folic acid.

We found that only 9.6% of the study population knew the ideal period of folic acid administration to prevent NTDs. This finding is different from the results of Salgues and colleagues who found in Haute-Garonne in Toulouse, in 2014 that 18 % of women were aware of the benefits of the folic acid as well as the ideal period of its administration. [11]. Maher and Kaiakos in United of Kingdom, found that 40% of women knew that Folic acid is to take before pregnancy so as to prevent NTDs. [12]. Bener and colleagues in Qatar discovered that higher educated women were more informed about the ideal period of folic acid intake. [13].

17.85% of our respondents know the importance of folic acid in the prevention of neural tube defects, in which caregivers occupy 100%. This result is different from that found in 2000 by POCHE Anne-Flore in Paris in a Weekly Epidemiological Bulletin which found that 29.4% of women knew the importance of folic acid in the prevention of NTD [4]. Maher and Kariakos found in 2014 in the United Kingdom, 42 to 50% of women who know the medical condition folic acid protects against [12], and the team of Bitzer found 40% of women who know the benefits of the above vitamin. [10]. From these results, we found that the lowest proportion is found in Butembo, whereas, the other findings are alike. These gaps are made clear by the fact that in developed country, several studies have already been conducted on the importance of folic acid in preventing NTDs, thus, the population can accede easily to the information: press, radio, television...

It is also clear from our work that 100% of caregivers know about NTDs. This is endorsed in the sense that two studies cited above had shown that caregivers constituted the main source of information on the importance of folic acid [12, 13].

In our work, academics were 78 (26% of registered cases) ;those of secondary level were 156 (52%), followed by those of the primary school level who represented 12.3% and those who have never studied represented 9.7%.

In our survey, we found that the level of studies is not a factor associated with folic acid intake, whereas it is related to be a factor in the literature [4].

Bener and colleagues in their survey concluded to the existence of a certain association between the education of the mother and the awareness of folic acid [13]. In the United States of America, in 2004; L.T.W. Of Jong-vanden Berg and his team quoted by POCHE Anne-Flore et al showed that women taking folic acid were twice as likely to have a high level of education as those who did not take [4]. In 2006, S.L. Carmichael quoted by POCHE Anne-Flore et al showed that women not taking folic acid were four and a half times more low-educated than those taking them. [4]

It is clear from our work that secondary school level and pauciparous women have a high knowledge of folic acid with 53.57% of total knowledge. POCHET Anne-Flore and colleagues found in France, 38.2% of primiparas, in a study evaluating the folic acid intake by pregnant women eleven years after the national recommendations. [4]

Conclusion:-

It emerges from this work that, in the city of Butembo, despite the high level of awareness of folic acid by women, only 17.85% of them know the importance of folic acid in preventing neural tube defects and 90.4% of the study population do not know the ideal period of administration of folic acid to prevent NTDs. Thus, a sensitization on the benefits of folic acid remains important, insisting on the ideal period of its intake.

Acknowledgements:-

Authors are thankful to the authorities of all the four communes of the city of Butembo for their cooperation during the data collection. They are also thankful to women and caregivers who agreed to answer the questionnaires that were given to them.

Funding:-

The author A.A. Mitamo was funded by the Else-Kroene-Fresenius-Stiftung through the BEBUC Scholarship System (www.foerderverein-uni-kinshasa.de).

Conflict Of Interest:-

Authors have declared that no competing interests exist.

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