

Chilean Primary Health Workers' Knowledge About Folic Acid Supplementation for the Prevention of Neural Tube Defects

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To the Editor:

The prevalence of NTD-affected births in Chile was 1.7 per 10,000 births until 1999 [Cortés et al., 1999]. In recognition of the need to decrease the risk of NTD, a fortification program was initiated in Chile in 2000. Since mandatory fortification of wheat flour with folic acid (FA) in Chile, the rate of NTD has reduced by 40% [Hertrampf and Cortés, 2004].

In 2003, the Chilean Health Ministry recommended the following: (1) all women of reproductive age should consume 0.4 mg of FA daily as a prevention standard to decrease the risk of having a baby with NTD; and (2) all women of reproductive age who have had a baby with major malformations (especially with an NTD) or who take teratogenic drugs (e.g., valproic acid) should consume 4–5 mg of FA daily for 3 months before planning a pregnancy and during the first 12 weeks of gestation in order to avoid recurrence of the condition.

Moreover, the Chilean Health Ministry indicated that it was necessary to give FA supplements to childbearing women at risk of having a child with an NTD, when they do not take an adequate prevention dose through fortification or when they need doses to prevent recurrence, because the usual Chilean diet is not able to provide the optimal dose in these cases [Ministerio de salud de Chile, 2003].

In Chile, there were no population-wide educational campaigns about FA, and there were no studies about the knowledge and/or awareness of health workers about FA or its association with the prevention of birth defects.

We conducted a study in a group of primary public wealth workers from the Metropolitan Region of Chile to evaluate their knowledge about FA supplementation to prevent NTD.

This cross-sectional study was approved by the Ethics Review Committee, Hospital Clínico Universidad de Chile.

Subjects

Participants were recruited from 28 primary public health care centers from the Metropolitan Region of Chile. In this region live half of the inhabitants of Chile, approximately eight million people.

Though initially the sample was non-random and opportunistic, there was random selection among those physicians who were present at the health institution at the time of distribution of the questionnaires; this decreases the bias of response.

For the determination of the sample an alpha error of 5% was used and a margin of estimation error of 5%.

We used a self-administered and anonymous questionnaire. The instrument consisted of two parts: the first part contained information about socio-demographic characteristics of the health workers and the second part about FA supplementa-

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tion recommended to the patient by the health workers and specific questions about FA national health recommendations.

Health Worker. Defined as someone with a health professional degree, midwife or medical doctor who work in a primary public health care center of the Metropolitan Region of Chile in the Women's Health Care Program.

Adequate Folic Acid Supplementation Knowledge. Defined as prescribing tablets of 5 mg FA daily 3 months before and 12 weeks after conception if women were at high-risk of having a child with an NTD (women who receive anticonvulsants drugs, had an NTD, had a child with an NTD or major malformations, or had a first degree relative with an NTD), and 1 mg FA daily during this same period if the women were not at high-risk of having a child with a NTD. These quantities of FA were chosen because in Chile there are only tablets of 1 mg or 5 mg of FA.

Statistical Analyses

A database was created in EXCEL and statistical analyses were conducted using programs available in the STATA 7.0. Paired *t*-tests were conducted to compare folate prescriptions. Chi-squared analysis was used to identify associations between categorical variables. Chi-squared test of homogeneity and Pearson correlation was used when was necessary. Descriptive statistics were used to describe health workers' awareness of folate. All tests were conducted at the $P < 0.05$ level of significance and were two-tailed when appropriate.

One hundred and ninety-one health workers were recruited between August and September, 2004. Among the participants there were: 46.6% midwives, 46.1% general physicians, 4.7% pediatricians, and 2.6% obstetrician-gynecologists. Females made up 65.4% of the sample and most (71.2%) of the participants were 31 years or more. Of the interviewees, 60.7% were married and 39.3% were single. Health workers' socio-demographic characteristics are summarized in Table I.

Of the participants, 98.4% indicated that they had received information about FA offered by a university (54.5%), Metropolitan Health Service (24.6%), both of these (4.7%), and by mass media or medical journals (14.6%).

Of the participants, 25.2% always prescribed FA supplementation to their patients of childbearing age, 33.5% almost always recommended it, 31.4% sometimes recommended it, and 9.9% never recommended it.

Specifically, 85.9% knew that FA was able to prevent congenital malformations; 58.5% were unaware of the correct FA doses that reduce the incidence of NTD; 62.3% were unaware of the correct FA doses that prevent the recurrence of

TABLE I. Socio-Demographic Characteristics of Health Workers

Characteristic	N	%
Sex		
Female	125	65.4
Male	66	34.6
Age (years)		
30 or more	55	28.8
31–35	22	11.5
31–40	36	18.8
41–45	32	17.8
46–50	24	12.6
51–55	14	7.3
56–60	4	1.6
61 or more	4	1.6
Marital status		
Married	116	60.7
Single	75	39.3
Have children	123	64.3
Medical degree		
Chilean	146	76.4
Other	45	23.6

NTD; 43.9% were unaware of the correct period for FA supplementation for the prevention of NTD.

Only 5.1% of health worker interviewees demonstrated adequate knowledge about FA supplementation for the prevention of NTD, so 94.9% demonstrated inadequate knowledge.

On the other hand, most of the interviewees (52.9%) considered that all women of childbearing age in Chile had to receive FA supplementation, 16.2% answered that the population that would most benefit from FA supplementation in Chile was women who were in the high-risk group for NTD.

Midwives and obstetrician-gynecologists had more knowledge about FA than general physicians and pediatricians (P -value < 0.01). Also, there were significant differences between knowledge level and participant sex (P -value < 0.01). Considering the great proportion of midwives are women, this group show higher knowledge in this survey.

We found a significant association among interviewees, where they obtained their medical degree and their knowledge level ($P < 0.01$); health workers with a medical degree obtained in Chile had a higher awareness about FA supplementation.

There were no significant differences between knowledge level and participant age (P -value 0.19), marital status (P -value 0.56), Metropolitan Health Service (P -value 0.7), or source of FA education (medical journals, mass media, university, Metropolitan Service) (P -value 0.6).

The study findings showed an inadequate knowledge about FA supplementation for the prevention of NTD in primary public health workers in the Metropolitan Region of Chile. This is the first study concerning this topic in Chile, but results coincide with studies carried out in 1997 by the US Centers for Disease Control and Prevention (CDC), where lack of knowledge about benefits of FA was observed among health service providers [Center for Disease

Control and Prevention, 1999]. Also, a large number of Puerto Rican health workers were unaware of the recommended daily dose of FA supplementation [Miranda et al., 2003].

It is important to point out that 29.3% of the primary health workers who participated in this study indicated that they had attended the training offered by their Metropolitan Health Services, which could be one of the reasons for the participants' lack of or failure to obtain information about FA, especially in older interviewees. Previous experiences in other countries have demonstrated lower levels of physicians trained by their Health Departments, Miranda et al. [2003] reported that only 13.2% of their interviewees had attended the training offered by the state although it has been offered for 7 years in Puerto Rico.

There were a large number of participants (95%) who were unaware of the adequate FA supplementation, which is much higher than others studies where 60% (Puerto Rico) or 30% (CDC) were unaware of the recommended FA supplementation [Cortés et al., 1999; Hertrampf and Cortés, 2004]. This finding could be related to the short time period since the Chilean National Recommendation about FA supplementation (only 1 year) and because there are not any national campaigns for the promotion of FA intake in women of childbearing age as there are in UK, Canada, USA, and Puerto Rico [Bonin et al., 1998; Center for Disease Control and Prevention, 1998, 2002].

In the present study, women demonstrated better knowledge than did men. This is concurrent with results reported by a Puerto Rican team where they suggested that one possible explanation is that these women had already had the experience of supplementing their own diets with FA [Miranda et al., 2003].

There was no significant association between health workers' age and their knowledge in our results. There are mixed results previously reported about this item by other authors [Power et al., 2000; Miranda et al., 2003].

Although inadequate knowledge was observed, some health workers (25.2%) always recommended FA supplementation to their patients, which was similar to Puerto Rican physicians but different from CDC data [Center for Disease Control and Prevention, 2002; Miranda et al., 2003].

Obstetrician-gynecologists and midwives had higher knowledge than other medical doctors, which is probably due to their target population, but it is necessary that general physicians and pediatricians know about FA supplementation because they could provide care for women of childbearing age in their Metropolitan Health Services.

This study has some bias because it was non-random and opportunistic and since it was performed in a specific area of Chile (Metropolitan Region) and only in 28 primary public health care centers. Although the results of this study cannot be applied to the entire population of health workers in Chile, these findings reinforce the importance of developing new strategies that promote the participation of physicians in training about FA. These trainings could be offered in Chile by Universities or Metropolitan Health Services as periodic courses to offer up-to-date information about NTD and FA supplementation.

Public campaigns to educate health workers in Chile on this important topic could contribute to the national fortification program by further reducing the NTD rate, especially in women of childbearing age who are in the high-risk group for NTD since the usual Chilean diet is not able to provide recommended doses of FA to prevent the recurrence of NTD.

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REFERENCES

- Bonin M, Bretzlaff J, Therrien S, Rowe B. 1998. Knowledge of periconceptional folic acid for the prevention of neural tube defects. *Arch Fam Med* 7:438–442.
- Center for Disease Control and Prevention. 1999. Knowledge and use of folic acid by women of childbearing age—United States, 1995 and 1998. *MMWR* 48:325–327.
- Center for Disease Control and Prevention. 1998. Use of folic acid-containing supplements among women of childbearing age—United States, 1997. *MMWR* 47:131–134.
- Center for Disease Control and Prevention. 2002. Folic acid and prevention of spina bifida and anencephaly 10 years after the US public health service recommendation. *MMWR* 51(RR13): 1–3.
- Cortés F, Mellado C, Hertrampf E, Alliende A, Castillo S. 1999. Frecuencia de los defectos de cierre del tubo neural en las maternidades públicas de Santiago durante el año. *Rev Med Chile* 129:277–284.
- Hertrampf E, Cortés F. 2004. Folic acid fortification of wheat flour: Chile. *Nutr Rev* 62(6 Pt 2):S44–S48.
- Ministerio de salud de Chile, editors. 2003. *Guía Perinatal*. Santiago: MINSALUD.
- Miranda A, Dávila R, Gorriñ J, Montes de Longo I. 2003. Puerto Rican primary physicians' knowledge about folic acid supplementation for the prevention of neural tube defects. *Birth Defects Res (Part A): Clin Mol Teratology* 67:971–973.
- Power ML, Holtzman GB, Schulkin J. 2000. Knowledge and clinical practice regarding folic acid among obstetrician-gynecologist. *Obstet Gynecol* 95:895–898.