

Original Research

Knowledge of folic acid and counseling practices among Ohio community pharmacists

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ABSTRACT*

Objective: To determine knowledge of folic acid use for neural tube defect (NTD) prevention and counseling practices among community pharmacists registered in Ohio.

Methods: A cross-sectional study was performed on a random sample (n=500) of community pharmacists registered with the Ohio Board of Pharmacy and practicing in Ohio. A survey previously used by researchers to assess folic acid knowledge and practices among samples of other healthcare provider groups in the United States was adapted with permission for this study. The final tool consisted of 28 questions evaluating the knowledge, counseling practices, and demographics of respondents. The cover letter did not reveal the emphasis on folic acid, and surveys were completed anonymously. The university institutional review board deemed the study exempt.

Results: Of the 122 pharmacists who completed the survey, 116 (95.1%) knew that folic acid prevents some birth defects. Twenty-eight (22.9%) responded that they "always" or "usually" discuss multivitamins with women of childbearing potential, and 19 (15.6%) responded that they "always" or "usually" discuss folic acid supplements. Some gaps in knowledge specific to folic acid were revealed. While 63.1% of pharmacists selected the recommended dose of folic acid intake for most women of childbearing potential, 13.1% could identify the dose recommended for women who have had a previous NTD-affected pregnancy. Respondents identified continuing education programs, pharmacy journals/magazines, and the Internet as preferred avenues to obtain additional information about folic acid and NTD.

Conclusion: This study represents the first systematic evaluation of folic acid knowledge and counseling practices among a sample of pharmacists in the United States. As highly accessible healthcare professionals, community pharmacists can fulfill a vital public health role by counseling women of childbearing potential about folic acid intake. Educational materials may be beneficial in augmenting knowledge of folic acid and facilitating patient education.

Keywords: Pharmacists. Health Knowledge, Attitudes, Practice. Professional Practice. Health

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promotion. Folic Acid. Neural Tube Defects. United States.

CONOCIMIENTO SOBRE EL ACIDO FÓLICO Y PRACTICA DE CONSEJO ENTRE LOS FARMACÉUTICOS COMUNITARIOS DE OHIO

RESUMEN

Objetivo: Determinar el conocimiento del uso de ácido fólico para prevención de defectos del tubo neural (NTD) y las prácticas de consejo entre los farmacéuticos comunitarios registrados en Ohio.

Métodos: Se realizó un estudio transversal en una muestra aleatoria (n=500) farmacéuticos comunitarios registrados en la Junta de Farmacia de Ohio y que ejercían en Ohio. Se adaptó para este estudio con permiso, una encuesta previamente utilizada por investigadores para evaluar el conocimiento y las prácticas con ácido fólico entre muestras de otros profesionales de la salud en los Estados Unidos. El instrumento final comprendía 28 preguntas que evaluaban el conocimiento, las prácticas de consejo, y la demografía de los respondientes. La carta de presentación no revelaba el énfasis en el ácido fólico y los cuestionarios fueron completados anónimamente. La comisión de investigación institucional consideró el estudio exento de requisitos.

Resultados: De los 122 farmacéuticos que completaron el estudio, 116 (95,1%) sabía que el ácido fólico prevenía algunos defectos congénitos. 28 (22,9%) respondió que "siempre" o "normalmente" hablaba de los multivitamínicos con las mujeres con posibilidad de embarazo, y 19 (16,6%) respondió que "siempre" o "normalmente" hablaban de los suplementos de ácido fólico. Se revelaron algunas lagunas en conocimientos específicos sobre el ácido fólico. Mientras que el 63,1% de los farmacéuticos seleccionó la dosis recomendada para la ingesta de ácido fólico en una mujer con posibilidad de embarazo, el 13,1% pudo identificar la dosis recomendada para mujeres que habían tenido un embarazo previo afectado por NTD. Los respondientes identificaron los programas de formación continua, las revistas y periódicos farmacéuticos, e Internet como los medios preferidos para obtener información adicional sobre el ácido fólico y los NTD.

Conclusión: Este estudio representa la primera evaluación sistemática de los conocimientos y prácticas de consejo sobre ácido fólico en una muestra de farmacéuticos en los Estados Unidos. Como profesionales altamente accesibles, los farmacéuticos comunitarios pueden tener un papel vital en la salud pública aconsejando a las mujeres

con posibilidades de embarazo sobre la ingesta de ácido fólico. Los materiales educativos pueden ser benéficos para aumentar el conocimiento del ácido fólico y facilitar la educación de los pacientes.

Palabras clave: Farmacéuticos. Conocimientos, Actitudes y Práctica en Salud. Ejercicio Profesional. Promoción de la Salud. Ácido Fólico. Defectos del Tubo Neural. Estados Unidos.

INTRODUCTION

As a significant cause of morbidity and infant mortality, neural tube defects (NTD) such as spina bifida and anencephaly represent a worldwide public health concern.¹ Globally, NTD affect more than 300,000 pregnancies annually; approximately 3,000 of those occur in the United States (U.S.).¹ Data have shown that 50-70% of NTD are preventable by daily folic acid intake of 400 micrograms (mcg) in the month prior to conception and in early pregnancy.² Given that most women do not obtain sufficient amounts of folic acid through diet alone and the rate of pregnancy unintendedness in the U.S. is high, daily supplementation is advised.³ Common options for supplementation available in the U.S. include multivitamins containing 400 mcg of folic acid or folic acid tablets.

Despite public health campaigns to raise awareness about this need, surveys performed by the March of Dimes, a non-profit organization focused on improving mother and child health, continue to show a lack of knowledge and folic acid use among women in the U.S. For example, only 11% of women surveyed knew that folic acid needed to be taken before pregnancy. In addition, 39% of women of childbearing potential reported use of daily multivitamins or folic acid supplements. Although 33% of women had heard of folic acid from a healthcare provider, 89% indicated that they would use supplementation if recommended to do so by a healthcare provider.⁴ Community pharmacists can fulfill a vital public health role by counseling women of childbearing potential on the importance of daily folic acid intake.

Studies in several countries including the Netherlands, United Kingdom, Germany, Australia, and Japan have examined pharmacists' knowledge of folic acid and counseling practices⁵⁻¹¹; however, to our knowledge, no such studies have been performed in the U.S. The purpose of this novel study was to determine knowledge of folic acid and counseling practices among a sample of community pharmacists registered in the state of Ohio.

METHODS

A cross-sectional study was designed to determine current knowledge and counseling practices among community pharmacists in Ohio. A survey that had been previously used by researchers at the National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention (CDC) and the March of Dimes to

assess folic acid knowledge and practices among samples of U.S. obstetricians/gynecologists, family/general physicians, physician assistants, nurse practitioners, certified nurse midwives, and registered nurses was adapted with permission from the authors for use in this study.¹² The final survey tool consisted of 20 multiple-choice questions assessing knowledge and practices regarding folic acid and 8 demographic questions to collect characteristics about survey responders. The survey questions were entered into Qualtrics™ software for survey distribution and data collection. The survey was pilot-tested by 10 community pharmacists registered in Ohio and 5 pharmacy practice faculty at Ohio Northern University who had professional experience in community pharmacy. Feedback was collected from the pilot survey participants to assess face validity as well as any technical issues regarding the online survey. The pilot testing resulted in no change to the content of any question; two minor technical issues were reported and subsequently resolved.

A list of pharmacists registered in Ohio at the time of the study was requested from the Ohio State Board of Pharmacy. Within the database, all pharmacists reported to practice at a community pharmacy (including large chain, small chain, and independent practice locations) in Ohio were identified. The pharmacists who completed the pilot test were removed from the database, and a sample of 500 pharmacists was randomly selected utilizing an online random number generator.

An e-mail containing a cover letter describing the survey as assessing counseling practices regarding nutrition (so as not to reveal the emphasis on folic acid) and link to the online survey was sent to the sample of 500 pharmacists. Reminder e-mails encouraging the completion of the survey were sent at one, two and three weeks after the initial email. The survey closed after 1 month. No incentives were offered for survey participation. Surveys were completed anonymously, and data were analyzed with descriptive statistics utilizing PASW version 18.0 for Windows and Microsoft Excel 2010 for Windows. Associations between demographic characteristics (gender, education) and counseling practices were calculated using the chi-square test. The Ohio Northern University Institutional Review Board deemed the study as exempt.

RESULTS

One hundred twenty-two pharmacists responded to the survey, yielding a 24.4% response rate; see Table 1 for selected demographic characteristics. Pharmacy practice settings represented among respondents included independent pharmacy (n=25; 20.5%), chain pharmacy (n= 56; 45.9%) and grocery store/mass merchandiser (n=34; 27.9%). Sixty-two (50.8%) reported their site was located in a suburban area, with the remaining pharmacists specifying a practice site in an urban (31.1%) or rural (17.2%) area.

One hundred sixteen (95.1%) correctly identified that folic acid can prevent some birth defects. Those

Table 1. Demographic characteristics of survey respondents (n=122)

	Characteristic	n(%)*
Gender	Male	55 (45.1)
	Female	65 (53.3)
Years in practice as a registered pharmacist	Fewer than 10 years	20 (16.4)
	10-19 years	34 (27.9)
	20-29 years	27 (22.1)
	30 years or more	41 (33.6)
Education/Training	Bachelor of Science-Pharmacy	102 (83.6)
	Doctor of Pharmacy	20 (16.4)
	Post-graduation education or training (e.g., residency, certifications)	7 (5.7)
Employment Status	Full-time	97 (79.5)
	Part-time	22 (18.0)
	Retired	3 (2.5)

* Percentages may not total 100 due to either missing data points or multiple answers selected.

who selected the correct response to this question were asked in a follow-up question to type in a free text box which specific birth defects can be prevented with adequate folic acid intake. Seventy pharmacists provided answers that could be classified as NTD, spina bifida, and/or anencephaly. An additional three responders indicated cleft palate. The remaining pharmacists either answered "don't know," "not sure," or skipped the free text box.

Of the 122 survey responders, 41 (33.6%) correctly identified that approximately 50% of all pregnancies in the U.S. are unintended. Eighty-five pharmacists (69.7%) knew the optimal timing of folic acid intake to reduce the risk of NTD. Seventy-seven (63.1%) correctly selected 400 mcg as the amount of folic acid a typical woman of childbearing potential should consume daily, with an additional 26 (21.3%) selecting 600 mcg. Only 16 (13.1%) knew that the recommended daily dose of folic acid (4 milligrams or 4 mg) for a woman who has had a previous pregnancy affected by NTD.

Forty-nine pharmacists (40.2%) correctly recognized orange juice as a food source of folic acid. Forty-four (36.1%) incorrectly indicated that blueberries are a good source of folic acid. Sixty-seven respondents (54.9%) knew that most grain products in the U.S. are fortified with folic acid. Finally, 75 pharmacists (61.5%) accurately responded that most women of childbearing potential do not receive adequate amounts of folic acid through diet.

Pharmacists were asked to indicate how often they discussed multivitamin or folic acid supplements with female patients of childbearing potential. Twenty-eight (22.9%) responded that they "always" or "usually" discuss multivitamins with these patients, and 19 (15.6%) responded that they "always" or "usually" discuss folic acid supplements. The remaining pharmacists indicated that they "occasionally" or "never" discussed these topics with women of childbearing potential. There were no statistically significant differences in counseling practices between male and female pharmacists or between those with a Bachelor of Science degree and a Doctor of Pharmacy degree. The most commonly selected reasons for not discussing multivitamin or folic acid supplements with patients was "time constraints", either for the pharmacist or

patient (n=68); "not sure how to initiate counseling with patients about nutritional supplements" (n=27); and "other healthcare providers are likely talking to patients about nutritional supplements" (n=22); multiple responses were permitted.

Thirty-six pharmacists (29.5%) recalled exposure to information about folic acid in the past year. Answers obtained via a free text box revealed that 8 pharmacists had learned about folic acid through continuing education programs; 1 specified Beyaz® (drospirenone/ethinyl estradiol/levomefolate), an oral contraceptive tablet containing folic acid available in the U.S. Each survey participant was also asked to specify the most effective means to receive information about folic acid and preferred resources to share this information with patients (Table 2).

DISCUSSION

The results of this survey show that while over 95% of community pharmacists in this sample knew that folic acid can prevent some birth defects, many are not actively discussing multivitamin or folic acid supplementation with their patients. The results also reveal some gaps in knowledge specific to folic acid. For example, while many pharmacists selected the recommended dose of folic acid intake for most women of childbearing potential, fewer

Table 2. Preferred folic acid resources reported among survey respondents (n=122)

Most effective means of communication for you to receive information about folic acid	
Method	n(%)*
Continuing education program	100 (82.0)
Pharmacy magazine	60 (49.2)
Pharmacy journal	57 (46.7)
Internet	43 (35.2)
Pharmacy conference	27 (22.1)
Pharmacy association	17 (13.9)
Preferred resources to promote folic acid intake with female patients of childbearing potential	
Resource	n(%)*
Brochures	89 (73.0)
Internet	42 (34.4)
Posters	36 (29.5)
Articles	32 (26.2)
None	10 (8.2)

* Percentages may not total 100 due to multiple answers selected.

than 15% could identify the dose recommended for women who have had a previous NTD-affected pregnancy.

About 18% of the pharmacists in our sample indicated that they "occasionally" or "never" speak to female patients of childbearing potential about folic acid or multivitamins because they believe other health care providers are likely doing so. However, only 33% of women surveyed by the March of Dimes reported receiving information on folic acid from their healthcare provider; sources of information on folic acid varied by age, with only 12% of women aged 18-24 years reporting a healthcare provider.⁴ Community pharmacists are highly accessible, and therefore ideally situated to educate women on the importance of folic acid supplementation. Continuing education programs, pharmacy journals/magazines, and the internet were most often selected by the responders as effective means to provide them information about folic acid. Given the time constraints reported by the community pharmacists, aids such as brochures, posters, or information available via the internet may be helpful in facilitating patient education. Educational resources should be developed and distributed to community pharmacists to augment knowledge of folic acid and to promote counseling to women of childbearing potential.

This study represents the first systematic evaluation of folic acid knowledge and counseling practices among a sample of pharmacists in the U.S. The survey tool used in this study was adapted from a survey conducted in 2002-2003 that evaluated the knowledge of other U.S. healthcare provider groups.¹² Compared to those study results, this sample of community pharmacists had comparable knowledge that folic acid can prevent some birth defects. While none of the healthcare provider groups assessed in the 2002-2003 study demonstrated complete knowledge of folic acid¹², the community pharmacists in this sample reported fewer correct answers for some questions and fewer counseling interventions. For example, fewer than 25% of community pharmacists in this study self-reported "always" or "usually" counseling female patients about multivitamins or folic acid supplements; in the 2002-2003 study, 65% of providers in obstetrics/gynecology settings and 50% of providers in the family/general medicine settings self-reported "always" or "usually" counseling female patients on multivitamins or folic acid.¹²

Although over 100 community pharmacists responded to the survey, a limitation to this study is the response rate. The design of the survey and the use of the cover letter were intended to minimize responder bias. There is limited information available regarding the survey non-responders; however, it appears that the responder demographics were similar to the demographics of the random sample. The proportion of women responding to the survey (53.3%) was somewhat higher than the proportion of women in the selected sample (45.4%). Likewise, the proportion of respondents indicating a practice setting of an independent pharmacy (20.5%) was slightly higher

than the registered practice site of all pharmacists in the random sample (13.2%). Finally, the sample of community pharmacists was drawn from the state of Ohio. It is not known whether the results of this survey are generalizable to pharmacists practicing in other states.

Studies to assess pharmacists' awareness of folic acid for the prevention of NTD and practices to promote folic acid among female patients have been performed in other countries. Several were performed in the mid-1990s in Germany, Australia, the United Kingdom, and the Netherlands, not long after the data showing the potential for folic acid to reduce the risk of NTD were widely recognized.⁵⁻⁸ It is not known whether the results of these studies are still indicative of current practice in these regions. More recent studies have surveyed pharmacists in the Netherlands, Germany, and Japan; while knowledge of folic acid has improved over time, opportunities to increase awareness among pharmacists and to support their counseling efforts remain.⁹⁻¹¹

CONCLUSIONS

Community pharmacists have a fitting role in preventive medicine due to their relationships with their patients and accessibility. It is imperative that community pharmacists recognize their important role in informing the public about health, wellness, and primary prevention, including the need for folic acid intake to prevent NTD. Understanding community pharmacists' knowledge of folic acid, barriers to counseling women of childbearing potential, and resources anticipated to be helpful is essential for them to embrace this opportunity. With access to educational and patient counseling materials, community pharmacists will be well-positioned to fulfill an unmet need and raise awareness about this issue.

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CONFLICT OF INTEREST

There are no conflicts of interest and no funding was provided for this research.

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