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Chapter 3

Folic acid knowledge and use in a multi-ethnic pregnancy cohort: the role of language proficiency

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Abstract

Objective

To investigate the role of language proficiency as determinant of folic acid knowledge and use in a multi-ethnic pregnancy cohort.

Design

Prospective cohort study.

Setting and population

Pregnant women from Amsterdam attending obstetric care for their first antenatal visit. Number approached: 12 373 women, response rate: 67% (8266 women aged 14–49 years). Ethnicity was based on the country of birth: the Netherlands, Surinam, Antilles, Turkey, Morocco, Ghana, other non-Western, and other Western countries.

Main outcome measures

Knowledge about and use of folic acid supplements in pregnancy as elicited in a multilingual questionnaire, as well as determinants of these in ethnic groups separately.

Results

Both periconceptional folic acid use and knowledge were significantly lower among Ghanaian, Moroccan, Turkish, and other non-Western women than among women born in the Netherlands or other Western countries. Language proficiency in Dutch was a major determinant of knowledge in all ethnic groups with a mother tongue other than Dutch [adjusted odds ratios (OR): Western 3.2, non-Western (all countries combined) 7.5], while educational attainment was of secondary importance. Knowledge in turn was the strongest determinant of use (adjusted OR: Western 17.4, non-Western 27.0).

Conclusions

Periconceptional folic acid supplement use among women born in non-Dutch-speaking non-Western countries is low, reflecting a lack of knowledge that is determined by the inability to speak and understand the language of the country of residence. Measures to tackle this problem include the provision of linguistically appropriate information via ethnic health advisors, and language courses integrating health education for immigrants.

Introduction

The benefits of prenatal care for a healthy pregnancy and subsequent birth outcome are generally acknowledged.[1,2] Inadequate prenatal care has been associated with an increase in adverse events, including perinatal morbidity[3] as well as perinatal and neonatal mortality.[4,5] Despite this awareness and political efforts to reduce inequalities in health care in many Western countries,[6,7] inadequate prenatal care such as a late initiation of care and a lower uptake of screening is still observed, especially in ethnic minority groups.[2,8,9]

Racial and ethnic disparities in health care utilisation, in general, have been related to numerous factors. These include the cultural competence of care providers, i.e., the extent to which they are aware of "foreign" cultural health beliefs, as well as patients' social class, educational level, insurance provision, level of acculturation, and language proficiency.[10-13] The latter aspect – the ability to speak and understand the language of the country of residence – may be crucial, as it affects one's health care utilisation in different ways. Being sufficiently fluent enables one (1) to find his or her way within the health care system; (2) to obtain and understand (written) information on health matters, directly and indirectly (e.g., advertisements, product information); and (3) to communicate with the health care provider (and vice versa).[14,15]

An important aspect of prenatal care is the use of folic acid supplements, as supplementation is an effective and proven measure to prevents birth defects.[16] In various European countries, publicity campaigns to increase awareness about the vitamin have been implemented since the 1990s.[16] Although the campaigns were aimed at all women in the reproductive age, studies suggest that particularly women from ethnic minority groups did not benefit.[17,18] The present study aimed to identify the role of language proficiency, among other factors, as determinant of folic acid knowledge and use in a multi-ethnic pregnancy cohort in the Netherlands.

Methods

We used data from the Amsterdam Born Children and their Development (ABCD) study. The ABCD study is a prospective cohort study, aimed at examining the relationship between maternal lifestyle and psychosocial conditions during pregnancy and the child's health at birth as well as in later life. Between January 2003 and March 2004, pregnant women living in Amsterdam were invited to enrol in the ABCD study at their first antenatal visit to participating obstetric care providers (general practitioners, midwives and hospital gynaecologists; overall participation rate 96%). All approached women (12 373) were registered by way of a form covering personal data such as name, address, date of birth, and country of birth. After 2 weeks, a questionnaire, covering sociodemographic data, obstetric history, lifestyle, dietary habits, and psychosocial factors, was sent to the pregnant woman's home address as given

on above-mentioned registration form with the request to return it by prepaid mail. The questionnaires were in Dutch, but were accompanied by an English, Turkish, or Arabic translation depending on the woman's country of birth. Turkish- and Arabic-speaking women with reading difficulties or illiteracy were invited to contact one of a group dedicated trained female interviewers for oral administration. With these supportive measures, the study group enhanced participation of all women, regardless of Dutch language proficiency, educational level, or ethnic origin. Questionnaires were returned by 8266 women (response rate 67%). Approval for the study was obtained from the Medical Ethical Committees of participating hospitals and the Registration Committee of Amsterdam.

In the questionnaire, the knowledge about and use of folic acid supplements were assessed by two questions: "Have you ever read or heard about the use of folic acid by women planning to become pregnant?" and "Have you taken folic acid, either as a single supplement or as part of a multivitamin supplement, before or during your pregnancy?".[19] Women who had not taken supplements were additionally asked to select their main reason for nonuse: (1) I do not know anything about folic acid, (2) I did not know anything about folic acid until I got pregnant, (3) I object against using anything during my pregnancy, (4) I was pregnant sooner than expected, and (5) other reason(s).

Ethnicity was based on the woman's self reported country of birth. Subclassification was based on native language and cultural background, separating the Dutch-speaking countries [the Netherlands, Surinam, and the Netherlands Antilles (including Aruba)] from the countries with a mother tongue other than Dutch, and separating within the latter group the non-Western countries (Turkey, Morocco, Ghana, and other non-Western countries) from the Western countries (not specified).[20] Language proficiency was addressed by questioning how well one could understand Dutch, with responses classified into three categories: (1) does not speak Dutch at all or only with great difficulty (low proficiency), (2) speaks Dutch with some difficulty (intermediate proficiency), (3) speaks Dutch without difficulty (high proficiency). Information on other possible determinants, previously associated with folic acid knowledge or use,[21-24] included pregnancy intention, measured by questioning whether the respondent had wanted to become pregnant (yes/ no); previous pregnancy experience (parity 0/ parity ≥1); educational attainment (years of education after primary school: 0–5/ 6–10/ ≥11 years); and age (≤24/ 25–29/ 30–34/ ≥35 years).

Statistical analyses were conducted using SPSS version 11.5.2 for Windows in a subgroup of 8050 women for whom data on determinant and outcome variables were complete. We first compared all ethnic groups with respect to their language proficiency, folic acid knowledge, and folic acid use, using chi-square tests. We subsequently determined the independent explanatory factors for folic acid knowledge using forward stepwise regression analyses for the combined Western and non-Western ethnic groups (P for inclusion: <0.05, P for exclusion: >0.10). Potential factors were age, education, previous pregnancy experience, pregnancy intention, and proficiency in Dutch. All analyses were repeated to determine the independent

factors explaining folic supplement use. In these analyses, folic acid knowledge was included as potential determinant, as we expected this a prerequisite for folic acid use. Adjusted odds ratios (OR) are reported as the index of association.

Results

Between ethnic groups, significant differences existed in Dutch language proficiency, folic acid knowledge, and folic acid use (**Table 3.1**). While 58% of the women born in Western countries were able to speak and understand Dutch, less than half of the women born in non-Western countries were (Turkey 32%, Morocco 44%, Ghana 26%, and other non-Western countries 34%, $P < 0.001$). Knowledge about periconceptional use of folic acid was most prevalent among women born in the Netherlands (95%) and other Western countries (86%) and least prevalent among women born in non-Dutch, non-Western countries (Ghana 28%, Turkey 34%, Morocco 40%, and other non-Western countries 48%, $P < 0.001$). Similarly, periconceptional use of folic acid supplements was highest among women born in the Netherlands (86%) and other Western countries (78%) and lowest among women born in Ghana (21%), Morocco (24%), Turkey (25%), and other non-Western countries (41%) ($P < 0.001$). For all foreign-born women, both Western and non-Western, the main reason given for not taking folic acid was not having (prior) knowledge about this vitamin. For women born in the Netherlands, the main reasons were the timing of pregnancy (pregnant sooner than expected) and the absence of (prior) knowledge.

For all ethnicities with a mother tongue other than Dutch, knowledge of folic acid was strongly associated with language proficiency (**Table 3.2**). In the Western ethnic group, women with a high proficiency in Dutch were 3.2 times more likely [95% confidence interval (CI) 1.9–5.3] to have knowledge about folic acid than women with a low proficiency. In the non-Western ethnic group, women with a high proficiency in Dutch were even 7.5 times more likely (95% CI 5.8–9.7) to have knowledge about folic acid than women with a low proficiency. The second important factor determining folic acid knowledge in the non-Western group was educational attainment (high versus low educational level: OR 5.2, 95% CI 3.6–7.5). Exploration of country-specific determinants (see supplementary tables) showed that the main result – proficiency in Dutch as primary determinant – applied for all countries but one. For Ghanaian women, educational level was a more prominent explaining factor, with a secondary role for language proficiency (Table S3.1).

Knowledge of folic acid was by far the strongest determinant of folic acid supplement use in all the ethnic groups (**Table 3.2** and Table S3.2). In the Western group, women who had heard or read about folic acid were 17.4 (95% CI 10.1–29.8) times more likely to have taken folic acid supplements than women who had no folic acid knowledge. In the non-Western group this ratio was 27.0 (95% CI 19.9–36.7). In addition, women in both groups

Table 3.1 Language proficiency, folic acid knowledge, folic acid use, and reasons for nonuse*

	Dutch-speaking			**Non-Dutch-speaking**				
	Netherlands (n = 5038)	Surinam (n = 438)	Netherlands Antilles (n = 93)	Turkey (n = 325)	Morocco (n = 558)	Ghana (n = 187)	Other non-Western (n = 694)	Other Western (n = 717)
Proficiency in Dutch (%)								
Low	0	1	1	43	33	45	38	23
Intermediate	0	1	8	25	23	29	27	19
High	100	98	91	32	44	26	34	58
Folic acid knowledge (%)								
No	5	25	29	66	60	72	52	14
Yes	95	75	71	34	40	28	48	86
Folic acid use (%)								
No	14	49	40	75	76	79	59	22
Yes	86	51	60	25	24	21	41	78
Main reason for not using folic acid (%)								
Do not know anything about folic acid	16	36	46	72	58	81	71	38
Did not know anything about folic acid until pregnancy	21	18	27	8	8	5	12	18
Object against using anything during pregnancy	9	12	12	9	14	3	5	8
Was pregnant sooner than expected	33	19	6	6	9	6	7	18
Other	21	16	9	5	11	5	6	18

** Figures may not add up to 100% exactly because of rounding up errors.*

delivering their first child were more likely to take folic acid supplements than primi- and multiparous women. All influence of Dutch proficiency was mediated by knowledge as we found no associations between language proficiency and folic acid use in the country-specific analyses (Table S3.2) and only a very weak remnant effect in the combined analysis for the non-Western group.

Discussion

From this unselected community-based multi-ethnic cohort study, three important findings emerge. First, the use of folic acid supplements is disturbingly low among pregnant non-Western women. Second, the use of folic acid is determined primarily by knowledge about folic acid. Finally, the key factor for knowledge about folic acid in both Western and non-Western ethnic groups is language proficiency. These results imply that inadequate use of folic acid supplements among women born in non-Western countries is the result of a language-mediated knowledge gap.

In agreement with results from previous smaller studies in the Netherlands and the UK,[17,18] we observed the lowest use of folic acid supplements among women born in non-Western countries. Cultural and religious beliefs have been associated with an inclination to use traditional (herbal) remedies and a reluctance to use prescribed medicines or follow medical advice,[25,26] which may explain lower usage of folic acid among foreign-born pregnant women. However, this explanation seems unlikely in this population as, overall, only 9% of the foreign-born women indicated that her reason for nonuse was a reluctance to use anything during pregnancy. In contrast, more than 70% of these women indicated the lack of (prior) knowledge as her main reason for not having taken folic acid supplements.

Theoretically, a change towards a healthier behaviour – in this case folic acid supplement use – is preceded by awareness of the problem.[27] Our data supports this view: we found knowledge to be the major determinant of use in both non-Western and Western groups. Interestingly, in both groups, a previous pregnancy experience influenced folic acid use, but not knowledge, in an negative way. In general multiparous women may be less inclined to adopt healthy behaviour than nulliparous women if they can rely on successful past experiences, i.e., the delivery of a healthy child. Previous studies in different ethnic populations have indeed observed a lower attendance and uptake of prenatal care among multiparous women.[28,29]

Knowledge of periconceptional folic acid use, reflecting a woman's comprehension of health education, depended on two factors: proficiency in the dominant language and educational attainment. Logically, being unable to (fully) understand the language of the country of residence makes it difficult or even impossible for one to absorb health information conveyed in that language. A mass media campaign in the dominant language will therefore be ineffective in educating ethnic minority groups.[30] More is to be expected from integrating

regel 1 regel 2 regel 3 regel 4 regel 5 regel 6 regel 7 regel 8 regel 9 regel 10 regel 11 regel 12 regel 13 regel 14 regel 15 regel 16 regel 17 regel 18 regel 19 regel 20 regel 21 regel 22 regel 23 regel 24 regel 25 regel 26 regel 27 regel 28 regel 29 regel 30 regel 31 regel 32 regel 33 regel 34 regel 35 regel 36 regel 37 regel 38 regel 39

Table 3.2 Determinants of folic acid knowledge and use in ethnic groups with a mother tongue different from Dutch: forward regression analysis

	Knowledge				**Use**			
	Western (n = 717)		Non-Western (n = 1764)		Western (n = 717)		Non-Western (n = 1764)	
Determinants	Percent with knowledge	OR*	Percent with knowledge	OR	Percent with use	OR	Percent with use	OR
Proficiency in Dutch								
Low	76	1	21	1	72		16	1
Intermediate	83	1.7 (0.9–3.0)	31	1.5 (1.2–2.0)	73		25	1.3 (0.9–1.9)
High	92	3.2 (1.9–5.3)	69	7.5 (5.8–9.7)	83		50	1.6 (1.2–2.2)
Age (years)								
≤24	67	0.7 (0.3–1.5)	31		47	0.4 (0.2–0.8)	21	0.8 (0.5–1.1)
25–29	79	1	42		73	1	29	1
30–34	90	2.4 (1.3–4.2)	50		83	1.3 (0.8–2.4)	41	1.8 (1.3–2.5)
≥35	91	2.4 (1.3–4.5)	39		83	1.6 (0.8–2.9)	31	1.4 (0.9–2.2)
Education (years)								
0–5	71	1	29	1	57	1	20	1
6–10	88	2.2 (1.2–3.8)	48	1.9 (1.5–2.4)	81	2.0 (1.1–3.5)	36	1.3 (1.0–1.8)
≥11	91	2.4 (1.3–4.5)	71	5.2 (3.6–7.5)	84	1.8 (1.0–3.4)	62	2.4 (1.6–3.7)
Pregnancy experience								
Parity ≥ 1	87		39		73	1	6	1
Parity = 0	86		43		81	2.1 (1.4–3.4)	36	2.1 (1.6–2.8)
Pregnancy intention								
No	76		28	1	66		20	
Yes	87		43	1.7 (1.2–2.5)	79		32	
Folic acid knowledge								
No					25	1	6	1
Yes					87	17.4 (10.1–29.8)	66	27.0 (19.9–36.7)

** OR and 95% CI; presented only for determinants that are significantly associated with the outcome variable, adjusted for the other significant determinants.*

information about pregnancy and prenatal care in naturalisation or language courses for immigrants, an approach which also takes into account the additional barrier of educational background. Generally, higher educated women benefit more from health education than lower educated women.[24] It is plausible that women who attained a higher educational level actively search for information, rather than passively wait for it to be provided. A similar attitude may explain the connection between folic acid knowledge and pregnancy intention. Women intending or planning to conceive may be more preoccupied with pregnancy-related health issues.

Some limitations of our study should be acknowledged. Despite the generally high participation among ethnic groups, some response bias may still exist to the disadvantage of illiterate and very poorly educated women. If present, however, our prevalence rates of folic acid use and knowledge are an overestimate of the real figures, which in turn emphasises the importance of our findings. We are aware that the advantages attached to measuring language proficiency by self-report are counterbalanced by the possibility of a positive response tendency. Again, this does not alter our conclusions as the observed associations would then be an underestimate of the real associations. Finally, although our study population allowed us to investigate the role of language barriers, we were not able to investigate other cultural factors and barriers on top of language. However, in *post hoc* analyses (results not shown) we observed that folic acid knowledge and use was higher among second generation women (born in the Netherlands), than among first generation women (born elsewhere). These findings imply a minor role of culture: second generation ethnic minority groups, who are educated in the Netherlands, are generally proficient in the Dutch language but only semi-adapted to the Dutch culture, as shifts in cultural orientation and behaviours are gradual and cross generations.[31] The observed reasons for nonuse, as well as the similarity in findings across ethnic groups, additionally indicate that the role of cultural and religious beliefs in this population is not a major one.

In summary, our findings suggest that the primary obstacle for foreign-born (in particular non-Western women) in receiving proper prenatal care – here reflected in the knowledge about and use of folic acid supplements – is the inability to speak and understand the language of the country of residence. Health promotion campaigns addressing these women therefore require linguistically appropriate, easily accessible information. Anticipating this, maternal and child health centres in the Netherlands have introduced ethnic health advisors: specially trained women of foreign origin who educate and inform women from similar ethnic backgrounds in their own language. From a more general perspective, the language education that the Dutch Government has recently made mandatory for all new immigrants is a promising approach, particularly when it integrates information on (prenatal) health and health care.

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Supplementary tables

Table S3.1 Determinants of folic acid knowledge in a multicultural group of pregnant women: forward regression analysis

	Netherlands (n = 5038)	**Surinam (n = 438)**	**Netherlands Antilles (n = 93)**	**Turkey (n = 325)**	**Morocco (n = 558)**	**Ghana (n = 187)**	**Other non-Western country (n = 694)**	**Other Western country (n = 717)**
Determinants	OR[#]	OR	OR	OR	OR	OR	OR	OR
Proficiency in Dutch								
Low	Not offered*	Not offered	Not offered	1	1	1	1	1
Intermediate				2.0 (1.0–4.2)	1.0 (0.6–1.9)	1.5 (0.7–3.5)	1.8 (1.2–2.7)	1.7 (0.9–3.0)
High				16.0 (8.2–31.1)	7.8 (4.8–12.6)	3.7 (1.6–8.4)	7.3 (4.9–11.1)	3.2 (1.9–5.3)
Age (years)								
≤24	0.4 (0.3–0.6)	0.4 (0.2–0.8)		1.0 (0.5–1.9)				0.7 (0.3–1.5)
25–29	1	1		1				1
30–34	3.0 (1.9–4.6)	1.0 (0.5–2.1)		2.6 (1.2–5.7)				2.4 (1.3–4.2)
≥35	2.2 (1.4–3.4)	0.8 (0.4–1.7)		0.6 (0.2–1.7)				2.3 (1.3–4.5)
Education (years)								
0–5	1	1	1		1	1	1	1
6–10	3.0 (2.2–4.0)	4.2 (2.6–7.0)	5.4 (1.6–18.5)		2.0 (1.3–3.0)	2.4 (1.2–5.0)	1.7 (1.1–2.4)	2.2 (1.2–3.8)
≥11	8.7 (5.5–13.8)	9.2 (2.7–31.2)	4.8 (1.4–16.4)		2.6 (1.1–6.2)	11.9 (2.8–51.3)	4.7 (2.8–7.7)	2.4 (1.3–4.5)
Pregnancy experience								
Parity ≥ 1								
Parity = 0								
Pregnancy intention								
No	1	1						
Yes	2.1 (1.4–3.1)	2.0 (1.1–3.7)						

[#] Odds ratio and 95% confidence interval; presented only for determinants that are significantly associated with the outcome variable, adjusted for the other significant determinants.

** Not offered as possible determinant in the regression analysis as the Netherlands, Surinam, and Netherlands Antilles have Dutch as official native language.*

regel 1 regel 2 regel 3 regel 4 regel 5 regel 6 regel 7 regel 8 regel 9 regel 10 regel 11 regel 12 regel 13 regel 14 regel 15 regel 16 regel 17 regel 18 regel 19 regel 20 regel 21 regel 22 regel 23 regel 24 regel 25 regel 26 regel 27 regel 28 regel 29 regel 30 regel 31 regel 32 regel 33 regel 34 regel 35 regel 36 regel 37 regel 38 regel 39

regel 1 regel 2 regel 3 regel 4 regel 5 regel 6 regel 7 regel 8 regel 9 regel 10 regel 11 regel 12 regel 13 regel 14 regel 15 regel 16 regel 17 regel 18 regel 19 regel 20 regel 21 regel 22 regel 23 regel 24 regel 25 regel 26 regel 27 regel 28 regel 29 regel 30 regel 31 regel 32 regel 33 regel 34 regel 35 regel 36 regel 37 regel 38 regel 39

Table S3.2 Determinants of folic acid supplement use in a multicultural group of pregnant women: forward regression analysis

	Netherlands (n = 5038)	**Surinam (n = 438)**	**Netherlands Antilles (n = 93)**	**Turkey (n = 325)**	**Morocco (n = 558)**	**Ghana (n = 187)**	**Other non-Western country (n = 694)**	**Other Western country (n = 717)**
Determinants	OR[#]	OR	OR	OR	OR	OR	OR	OR
Proficiency in Dutch	Not offered*	Not offered	Not offered					
Low								
Intermediate								
High								
Age (years)								
≤24	0.5 (0.4–0.7)						0.6 (0.3–1.2)	0.4 (0.2–0.8)
25–29	1						1	1
30–34	1.9 (1.5–2.5)						2.6 (1.5–4.4)	1.3 (0.8–2.4)
≥35	1.8 (1.4–2.4)						1.6 (0.8–3.0)	1.6 (0.8–2.9)
Education (years)								
0–5	1			1				1
6–10	1.6 (1.2–2.0)			3.2 (1.5–6.7)				2.0 (1.1–3.5)
≥11	2.0 (1.5–2.7)			6.9 (1.7–28.1)				1.8 (1.0–3.4)
Pregnancy experience								
Parity ≥ 1	1	1			1		1	1
Parity = 0	2.5 (2.0–3.0)	1.8 (1.2–2.8)			2.1 (1.3–3.4)		2.5 (1.6–4.0)	2.1 (1.4–3.4)
Pregnancy intention								
No	1	1						
Yes	3.2 (2.3–4.4)	2.1 (1.1–3.9)						
Folic acid knowledge								
No	1	1	1	1	1	1	1	1
Yes	13.1 (9.5–18.2)	13.5 (7.2–25.3)	10.9 (3.8–31.8)	38.1 (17.2–84.5)	18.4 (10.8–31.4)	22.2 (9.0–54.6)	42.0 (25.7–68.6)	17.4 (10.1–29.8)

[#] Odds ratio and 95% confidence interval; presented only for determinants that are significantly associated with the outcome variable, adjusted for the other significant determinants.

** Not offered as possible determinant in the regression analysis as the Netherlands, Surinam, and Netherlands Antilles have Dutch as official native language.*

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