Preconception – Budapest II.

Folic acid and prevention of preterm birth – a population-based study

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Introduction

Periconceptional folic acid or
folic acid-containing multivitamins
are recommended for prospective pregnant women
to prevent neural-tube defects

Introduction

Periconceptional:

1-3 months before conception
3 months after conception (first trimester)

Question:

Is it worth continuing vitamin supplementation after the first trimester of pregnancy?

Objective of the study

Evaluation of pregnancy/birth outcomes:

gestational age at delivery;
rate of preterm birth

birth weight;
rate of low birth weight

after vitamin supplementation during pregnancy and in the third trimester of pregnancy

Material of the study

Hungarian Case-Control Surveillance of Congenital Abnormalities.

Only **controls:** newborns without birth defects selected from the National Birth Registry and matched to cases with congenital abnormalities.

Study groups

1. Folic acid (FA) alone (3.0 – 9.0 mg, mean 5.6 mg)
2. Folic acid containing multivitamins (MV) (FA: 0.1 – 1.0 mg, mean 0.8 mg)
3. Multivitamins without FA (excluded)
4. MV + FA (FA: 3.0 + 0.7 = 3.7 mg)
5. Reference group: pregnant women without FA and/or MV supplementation

Methods

Comparison of pregnant women with vitamin supplementation and the reference group

Collection of exposure data

a) Prenatal care logbook (prospective and medically recorded)

b) Questionnaire (maternal retrospective information)

c) Validation studies

Results: basic data

Study groups	FA alone	MV	MV+FA	Total	Reference
No.	**19,334**	694	1,441	21,469	16,308
Medically recorded No. (%)	12,922 (66.8)	381 (54.9)	710 (49.3)	14,013 (65.3)	—
Maternal age, mean	25.4	27.0	25.9	25.5	25.5
Birth order, mean	1.7	1.6	1.7	1.7	1.8
High SES, %	41.2	42.0	41.2	41.4	38.2

SES: socioeconomic status

Results: supplementation during pregnancy

Pregnancy outcomes	FA alone	MV	MV+FA	Reference
Gestational age (wk)	39.5	39.4	**39.7**	39.2
+	0.3	0.2	**0.5**	—
p*	<0.001	0.08	<0.001	—
Birth weight (g)	3,287	**3,332**	3,327	3,257
+	30	**75**	70	—
p**	<0.001	<0,001	0.11	—
Preterm birth (%)	7.9	6.3	**5.1**	11.2
-	3.3	4.9	**6.1**	—
OR (95% CI)***	0.69 (0.64-0.74)	0.54 (0-40-0.74)	0.47 (0.33-0.54)	—
Low birth weight (%)	5.5	5.3	**5.1**	6.0
-	0.5	0.7	**0.9**	—
OR (95% CI)***	0.95 (0.87-1.04)	0.88 (0.63-1.23)	0.90 (0.71-1.15)	—

*adjusted for maternal age and SES, birth order
**adjusted for maternal age and SES, birth order, gestational age
***adjusted for maternal age and SES, birth order, pregnancy complications

Results: supplementation in the third trimester

Pregnancy outcomes	FA alone	MV	MV+FA	Reference
Gestational age (wk)	**39.7**	39.3	**39.7**	39.2
+	**0.5**	0.1	**0.5**	–
Birth weight (g)	3,296	3,329	**3,336**	3,257
+	39	72	**79**	–
Preterm birth (%)	**5.3**	7.0	**5.0**	11.2
-	**5.9**	4.2	**6.2**	–
Low birth weight (%)	5.3	**4.8**	5.3	6.0
-	0.7	**1.2**	0.7	–

Conclusions

1. Gestational age is more sensitive for (high dose of) folic acid and trimester dependant
2. Birth weight is more sensitive for multivitamins – no trimester dependency
3. Fetal growth promoting effect of vitamins is limited (30-75g)
4. Preterm birth preventive effect of (high dose of) folic acid is important
5. In the study about 50% of preterm birth was preventable by high doses of folic acid in the third trimester

Hypothesis

1. Pregnant women with vitamin supplementation have a higher SES, better preconceptional and/or antenatal care, healthier lifestyle and other favourable health-related behaviour

2. Folate demand is increased during pregnancy, particularly after 5th month, and it may associate with hyperhomocysteinemia related placental vasculopathy

Final conclusions:

Two major causes of perinatal mortality/morbidity are preterm births and birth defects

Certain part of these pathological conditions is preventable by folic acid