



## Healthy Diet and Pregnancy

Is the focus on proper nutrition during pregnancy a recent concept? Actually, not at all. Even in the Old Testament in the book of Judges, chapter 13, we find a description of the first prenatal visit. Manoach's wife was sterile and did not have any children. The angel of the Lord appeared to her and said: "You are barren and childless, but you are going to become pregnant and give birth to a son. Now see to it that you drink no wine or other fermented drink and that you do not eat anything unclean. You will become pregnant and have a son..."

Since then, some people eat to live or survive; others live to eat — eating too much or too poorly. Food education begins at birth and never stops. From the time a woman decides to get pregnant until her child is born, nutritional management is a significant component that contributes to better fertility and fewer obstetrical, neonatal and paediatric complications... it's the endless circle of life.

Pregnancy doesn't start at the moment of conception; it begins well before! Preconception nutritional management is crucial. Take folic acid, for example: the recommended dose is 400 mg each day starting at least one month — or even up to two months — before a woman becomes pregnant. According to a perinatal study conducted in 2010, only 10% of women had taken the recommended dose. Optimising nutritional intake should continue until the child is two years old, which is 1,000 days.

The authors of this journal show that by adopting a suitable dietary management plan, it's always possible to reduce obstetrical complications, from conception to birth — it's never too late.

In Tehran, Iran, S. Ziaei's team has shown a potential reduction in early pregnancy loss through more balanced micronutrition. In Australia, even motivated pregnant women who thought they were eating healthy still fell significantly short of recommended intakes. Finally, in Norway, a comparison of two patient groups, one with an active nutritional management plan and the other without, showed that those with the plan had better nutritional balance that met recommendations.

T. Harvey

Obstetrician-gynecologist, Head of the maternity department,  
Diaconesses Hospital, Paris, FRANCE

### 2017 F&V WORLD DAY

In order to raise global awareness about the importance of fruit and vegetables in our diet, AIAM5 has been celebrating since 2012, the F&V world day. Aprifel is delighted to share a TV broadcast "E= M6 Nutrition", created by the French TV channel M6 on [why should we eat at least 5 F&V a day ?](#)



Editions available in:

English:

[www.aprifel.com](http://www.aprifel.com) / [www.freshfel.org](http://www.freshfel.org) / [www.kauppapuutarhaliitto.fi](http://www.kauppapuutarhaliitto.fi)  
[www.unitedfresh.co.nz](http://www.unitedfresh.co.nz) / [www.5amtag.ch](http://www.5amtag.ch) / [www.halfyourplate.ca](http://www.halfyourplate.ca)

French:

[www.aprifel.com](http://www.aprifel.com)

Spanish:

[www.5aldia.org](http://www.5aldia.org)

A worldwide  
shared newsletter

P. Alvarado • 5 a Day Nicaragua  
S. Barnat • Aprifel • France  
P. Binard • Freshfel Europe • Belgium  
S. Carballo • 5 a Day Uruguay • MAES  
L. DiSogra • United Fresh • USA  
P. Dudley • United Fresh • New Zealand  
J. Estradas • 5 a Day Bolivia  
D. Ferreira • 5 ao dia • Portugal  
N. Rios • 5 a Day Paraguay  
C. Gamboa • Network 5 a Day Costa Rica  
• Ministry of Health  
ME. Leão Diogenes Melo • F&V Promotion - INCA  
• Brazil  
A. Gysi • 5 am Tag • Switzerland  
P. Harycki • 5 a Day Poland • KUPS  
H. Huss • CO CONCEPT • Luxemburg  
Z. Huszti • 5 a Day Hungary  
Y. Iritani • 5 a Day Japan  
J. Jalkanen • 5 a Day Finland  
S. Lauxen • 5 am Tag Germany Corporation  
S. Lewis • Fruits & Veggies Half Your Plate! • Canada  
C. Macias • F&V Promotion Program of Cuba  
• Institute of Nutrition and Food Hygiene  
A. Moises • 5xday • Mexico  
M. Penny • 5 a Day Peru  
E. Pivonka • Fruits & Veggies - More Matters • USA  
G. Rebnes • 5 a Dagen • Norway  
J. Rey • 5 a Day Spain • Association for the Promotion  
of consumption of F&V  
A. Senior • 5 a Day Colombia • Corporación  
Colombia Internacional  
M. Tapia • 5 a Day Foundation Venezuela  
F. Vio • 5 a day Chile Corporation  
H. von Bergen • 5 am Tag Germany  
M. Winograd • 5 a Day Association Argentina



Acknowledgement to  
250 contributors since 2006

November 2016 : WPT. James, M. Allman-Farinelli, SR.  
Partridge, M. Nour & R. Roy, SL. Solberg, L. Terragni, SI.  
Granheim, T. Effertz (Obesogenic environment: origin and  
consequences)

December 2016 : A. Martin, M. Padilla, C. Julia, S. Hercberg &  
E. Kesse-Guyot, L. Jahns (Food labeling)

January 2017 : M. Caroli, A. Nyaradi, M. Padilla, RY. Kharofa  
(Diet quality in the early years)

February 2017 : R. Lemaire, LM. Minaker, V. Drapeau, MA.  
Fernandez & V. Provencher (Fruit & Vegetables in Canada)

March 2017 : JM. Lecerf, JP. Haibach & colleagues, V. Benetou  
& colleagues, E. García-Esquinas (Fruit and vegetables: still  
surprising !)

# Association between nutritional status with spontaneous abortion

Ziaei Saeideh and colleagues

Department of Midwifery and Reproductive Health, Faculty of Medical Sciences, Tarbiat Modares University, Téhéran, IRAN

Spontaneous abortion is the most common adverse pregnancy outcome occurring in approximately 15% of clinically recognized pregnancies. Although a number of spontaneous abortions are caused by chromosomal abnormalities, maternal factors including nutritional status, also may contribute to this occurrence<sup>1-3</sup>.

**Our aim:** study to explore the association between nutrient deficiencies and the risk of spontaneous abortion in humans

This case-control study was carried out in Tehran. The case group (n=331) experienced a spontaneous abortion before 14 weeks of pregnancy, while the control group (n=331) were healthy pregnant women over 14 weeks of pregnancy. Each case was assigned one control matched on maternal age, duration from last delivery in multiparous women, body mass index, occupation, and educational status.

The assessment of dietary intake was performed using the Food Frequency Questionnaire (FFQ) which was previously validated on the adult population of the city of Tehran<sup>4</sup> (168 food items consumed in the preceding three months). For assessment of micronutrients intake, Mosbys Nutria Trace Nutrition Analysis Software was used.

There were no significant differences between the two groups regarding demographic and obstetric characteristics.

**Significant differences on food intake between the two groups**

There were significant differences between the number of women in the two groups regarding consumption servings/day of food items (table 1).

Our findings indicated that there are significant differences between the two groups in the number of the women who consumed servings/day of food items. Maternal malnutrition is considered to be an important factor contributing to spontaneous abortions by way of altering the germ cell morphology; however, the relationship between maternal nutrition and spontaneous abortion is complex and influenced by several biologic, socioeconomic, and lifestyle factors, which vary extremely in different populations<sup>5</sup>.

**A diet poor in several nutrients may increase risk of spontaneous abortion**

There is a significant association between all micronutrients and spontaneous abortion (table 2).

It was recognized that poor pregnancy outcomes, result not only from a deficiency of protein and macronutrient but also from inadequate intake of micronutrients that are vital during pregnancy<sup>1-3</sup>. A number of studies have indicated that suboptimal vitamin B6 status and elevated plasma total homocysteine concentration are a marker of poor folate or vitamin B12 status, may increase the risk of spontaneous abortion. We also found lower consumption of vitamin C, iron and zinc in the women with spontaneous abortion. This is consistent with other studies, in which they have found an association between poor micronutrients status and adverse pregnancy outcomes<sup>1-3</sup>.

Our findings illustrated that a diet poor in several nutrients may increase risk of spontaneous abortion.

Table 1- Comparison of daily intake of food items between two groups\*.

Food items	Case group	Control group	P
<b>Vegetables</b>			<b>0.012</b>
(<3 parts)	282(85.2)	253(76.4)	
(3-5 parts)	49(14.8)	77(23.3)	
(>5 parts)	0(0)	1(0.3)	
<b>Fruits</b>			<b>0.055</b>
(<2 parts)	152(45.9)	122(36.9)	
(2-4 parts)	169(51.1)	195(58.9)	
(>4 parts)	10(3)	14(4.2)	
<b>Breads and cereals</b>			<b>&lt;0.001</b>
(<6 parts)	129(39)	88(26.6)	
(6-11 parts)	199(60.1)	208(62.8)	
(>11 parts)	3(0.9)	35(10.6)	
<b>Meat and beans</b>			<b>0.004</b>
(<2parts)	268(81.0)	232(70.1)	
(2-3 parts)	63(19.0)	98(29.6)	
(>3 parts)	0(0)	1(0.3)	
<b>Dairy products</b>			<b>&lt;0.001</b>
(<2 parts)	173(52.3)	120(36.3)	
(2-3 parts)	151(45.6)	190(57.4)	
(>3 parts)	7(2.1)	21(6.3)	
<b>Fats and oils</b>			<b>0.019</b>
(<55 g)	77(23.3)	50(15.1)	
(55-66 g)	113(34.1)	114(34.4)	
(>66 g)	141(42.6)	167(50.5)	

\*number (%) \2 test



Based on: Ahmadi R, Ziaei S, Parsay S. Association between nutritional status with spontaneous abortion. *Int J Fertil Steril.* 2017; 10(4): 337-342

## References

1. Keen CL, Clegg MS, Hanna LA, Lanouel, Rogers JM, Daston GP, Oteiza P, Uriu-Adams JY. The plausibility of micronutrient deficiencies being a significant contributing factor to the occurrence of pregnancy complications. *J Nutr* 2003;133:1597S-1605S
2. de la Calle M, Usandizaga R, Sancha M, Magdaleno F, Herranz A, Cabrillo E. Homocysteine, folic acid and B-group vitamins in obstetrics and gynecology. *Eur J Obstet Gynecol Reprod Biol* 2003;107:125-134.
3. Abu-Saad K, Fraser D. Maternal nutrition and birth outcome. *Epidemiol Rev* 2010;32(1):5-25.
4. Mirmiran P, Esfahani FH, Mehrabi Y, Hedayati M, Azizi F. Reliability and relative validity of an FFQ for nutrient in the Tehran lipid and glucose study. *Public Health Nutr* 2010;13(5):654-662.
5. Kramer MS, Seguin L, Lydon J, et al. Socio-economic disparities in pregnancy outcome: why do the poor fare so poorly? *paediatr perinat epidemiol* 2000;14(3):194-210.

# Falling short of dietary guidelines

## What do Australian pregnant women really know?

### A cross sectional study

Khlood Bookari<sup>a</sup>, Heather Yeatman<sup>a</sup>, Moira Williamson<sup>b,c</sup>

a. School of Health and Society, UOW, AUSTRALIA

b. School of Nursing, UOW, AUSTRALIA

c. School of Nursing and Midwifery, CQ University, AUSTRALIA

*What we did:* We surveyed 388 pregnant women across Australia about what they ate, their food knowledge, and their confidence in their food knowledge. Their motivation, attitudes towards healthy eating, and attempts to adopt and maintain a healthy diet were measured. We looked at how their beliefs and practices matched Australia's healthy eating guidelines for major food groups, including fruit and vegetables.

*How did we do it:* We adapted a well-known questionnaire and made it available online and at antenatal clinics and public locations.

#### women highly motivated to eat healthily when pregnant

The majority of women (72%) were ready and willing to make changes to what they ate and very confident that they could do this (65%). Only 2% thought dietary change did not apply to them. Three quarters were trying to adopt or maintain a healthy diet during their pregnancy. They thought that knowing about eating healthily (based on the major food group guidelines) was very important during pregnancy. The majority also indicated that they were not confused about these topics. However, their other responses contradicted this.

While the women thought they knew a lot about what was important in healthy eating in pregnancy and were quite confident in their practice, the survey results indicated that in some areas there was little reason to be confident. In terms of what they ate, 93% ate less than the recommended level for vegetables, and 90% ate less than the recommended level for fruit. Their knowledge about the recommended intake of the five major food groups, including fruit and vegetables, was poor (55% were unaware of the correct fruit and vegetable intake).

Broadly speaking, none of the pregnant women – despite their strong motivation, assumption of knowledge and confidence about their actions – actually met the recommendations for the five major food groups. There was under-consumption of fruit, vegetables, cereals and bread, and an over-consumption of meat:

- 93% failed to meet recommendations for vegetables

- 90% failed to meet recommendations for fruit
- 52% ate too much meat
- 30% ate too much dairy (although 30% ate the recommended amount – the highest level of any food group)

Women who had the more accurate knowledge of recommended fruit and vegetable consumption were more likely to report that their diet conformed with the relevant recommendations. The more accurate knowledge of the dietary guidelines was associated with better eating habits, with the likelihood of the consumption of selected food groups significantly increased: eight times more likely for fruit and vegetables and 6.8 times for breads and cereals. Women in early pregnancy were also most likely to eat the correct level of fruit and vegetables.

#### Defining their knowledge levels is highly required

Although the pregnant women were highly motivated and confident about being able to eat healthily and they reported they knew and understood dietary guidelines, the results showed less knowledge than they claimed and low conformity with such guidelines. Such results must be of great concern for health care providers.

A majority of pregnant women consume diets that are less than optimal. This is likely to impact on both their health and that of their babies, now and in the future.

Pregnant women who are confident in their nutrition knowledge and ability to maintain a healthy diet may fail to seek information, particularly from authoritative sources such as health professionals. Their confidence is a barrier to accessing health services and resources.

Health care providers could use a brief food frequency questionnaire (e.g. 5-6 items about the five food groups) as a short knowledge screening tool to determine existing knowledge levels. This may assist to initiate a conversation with pregnant women about their nutrition knowledge and healthy eating practices. The use of such a tool could reduce the possibility of a health professional assuming a level of knowledge for an



# Effect of a low-intensity diet intervention during pregnancy on dietary behavior in the randomized controlled Norwegian Fit for Delivery study

Elisabet R. Hillesund, Elling Bere & Nina C. Øverby

Department of Public Health, Sports and Nutrition, University of Agder, Kristiansand, NORWAY.

A mother's diet during pregnancy has the potential to influence both her own and her child's short- and long-term health. Because expectant mothers may be especially motivated for behavior change, pregnancy is considered a window of opportunity for public health initiatives<sup>1</sup>. In the Norwegian Fit for Delivery (NFFD) study, we developed a lifestyle intervention combining dietary advice and twice-weekly structured physical activity lessons during pregnancy, with the aim of avoiding excessive weight gain, lowering the proportion of large newborns, and improving pregnancy health in general. We evaluated the effect of the overall intervention on gestational weight gain, pregnancy complications and child neonatal health in a randomized controlled trial and found that mean weight gain was lower in the intervention group than in the control group with no difference in other outcomes<sup>2</sup>. This short paper summarizes a previous paper describing the dietary component of the intervention and how it influenced post-intervention dietary behavior<sup>3</sup>.

## The diet intervention

Between 2009 and 2013 a total of 606 first-time pregnant women were recruited from 8 healthcare clinics in southern Norway in early pregnancy and randomized into receiving dietary advice and twice-weekly exercise classes for the rest of pregnancy or continued routine pregnancy care. All participants completed a questionnaire that included diet-related items at baseline before randomization.

The diet intervention was based on 10 dietary recommendations with the potential to improve energy balance-related dietary behavior and to improve diet quality in general (see below)<sup>4</sup>. Shortly after inclusion, women in the intervention group received a pamphlet describing the 10 dietary recommendations and their simplified rationale. They were also scheduled for two telephone sessions with a trained diet advisor aiming to reinforce the dietary recommendations, and given access to a website with healthy recipes and inspirational messages. A one-evening cooking class in the University of Agder kitchen facilities was also included.

### The 10 dietary recommendations in the Norwegian Fit for Delivery study:

1. Eat regular meals
2. Drink water when thirsty
3. Eat vegetables with dinner every day
4. In-between meals - choose fruit and vegetables
5. Eat sweets and snacks occasionally - only when you really appreciate it
6. Choose small portion sizes of unhealthy foods
7. Limit your intake of added sugar
8. Limit your intake of salt
9. Do not eat beyond satiety
10. Read nutritional labels

In late pregnancy, a follow-up questionnaire on diet was completed. We developed a diet score built from 10 subscales to evaluate participant adherence to the dietary recommendations at both time points, and assessed post-intervention differences between the intervention and control group with analysis of covariance adjusted for baseline diet<sup>3</sup>.

## Findings

A total of 508 women completed both questionnaires both pre- and post-intervention and were eligible for the analysis. There was no significant difference between the two groups in baseline dietary behavior or other maternal or sociodemographic characteristics. In late pregnancy, women in the intervention group (n=254) had higher overall diet score (p=0.013) and more favorable dietary behavior in 7 out of 10 dietary domains compared with the control group (n=254). Intervention women reported higher consumption of water relative to total beverage consumption (p=0.002), having vegetables with dinner more often (p=0.027), choosing fruit and vegetables for between-meal snacks more often (p=0.023), and buying small portion sizes of unhealthy foods more often than control women (p=0.010). They also limited sugar intake to a larger degree (p=0.005), avoided eating beyond satiety more often (p=0.009), and reported reading food labels more often than control women (p=0.011).

The NFFD diet intervention improved several aspects of dietary behavior. In combination with increased physical activity this contributed to lower pregnancy weight gain. The diet intervention was of relatively low intensity and could realistically be incorporated into routine pregnancy care. Considering that these women were expecting their first child, sustained dietary improvements could affect not only this first child but also their spouse and subsequent children. Potential long-term influence of the intervention on maternal and child diet and health will be investigated in further studies.



## References

1. Phelan S. Pregnancy: a "teachable moment" for weight control and obesity prevention. *Am J Obstet Gynecol.* 2010;202(2):135 e1-8.
2. Sagedal LR, Overby NC, Bere E, Torstveit MK, Lohne-Seiler H, Smastuen M, et al. Lifestyle intervention to limit gestational weight gain: the Norwegian Fit for Delivery randomised controlled trial. *BJOG : an international journal of obstetrics and gynaecology.* 2017;124(1):97-109.
3. Hillesund ER, Bere E, Sagedal LR, Vistad I, Øverby NC. Effect of a diet

intervention during pregnancy on dietary behavior in the randomized controlled Norwegian Fit for Delivery study. *Journal Of Developmental Origins Of Health And Disease.* 2016:1-10.

4. Overby NC, Hillesund ER, Sagedal LR, Vistad I, Bere E. The Fit for Delivery study: rationale for the recommendations and test-retest reliability of a dietary score measuring adherence to 10 specific recommendations for prevention of excessive weight gain during pregnancy. *Matern Child Nutr.* 2015;11(1):20-32.