The Effects of Healthy Diet in Pregnancy

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Received: April 2013, Revised and accepted: July 2013

Abstract

Objective: To evaluate the importance of observing healthy habits by pregnant women that influences different aspects of mother and fetus health, we assessed the change in dietary behavior, and cigarette smoking after distributing the guidelines among 485 prenatal care patients.

Materials and methods: The subjects were pregnant women who enrolled in health care centers of Tehran University from September, 18, 2010 to July 21, 2012. At first the standard questionnaires including questions about socio demographic factors and also their dietary behavior, and cigarette smoking were filled out. Then we gave them the guideline. After 2 months the participants received the similar questionnaires .The change in their behavior was evaluated comparing the 2 series of questionnaires by SPSS- 16 analysis methods.

Results: Totally 1.9% of participants met fruit & vegetable guidelines before education & 5.6% after that (3.7% rise) ($p< 0.0001$). In studied group 99% met cigarette smoking guidelines before & 100% after education. There was a meaningful association between the amount of fruit & vegetables consumption before and after pregnancy ($p< 0.0001$).

Conclusion: According to the significant effect of education, we can apply it as an effective way of improving the healthy behaviors in our society. Furthermore, discovering related factors to healthy behavior can lead to addressing the most appropriate (needy, necessitous, deserving) group of population for education.

Keywords: Pregnancy, Healthy Habits, Education

Introduction

Lots of studies have indicated that health behaviors such as dietary behavior & smoking impacts both mother & fetus health (1).

For example about smoking during pregnancy a study (2) has shown to be associated with increased risk of infertility among female fetus and another study insisted that nutritional deficiencies can lead to preterm labor & intra uterine growth retardation (3).

Furthermore, in a cohort research which studied the relation between dietary patterns during pregnancy & post partum depression it been pointed that more consumption of fish, olive oil, diary & fruit

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& vegetables were associated with decrease in depression test scores? Also, there are some evidences showing the decrease in upper respiratory tract infection among pregnant women with more fruit & vegetable in their diet (4).

Another article reported that diets including more fruit & vegetable have the most adequacies for 15 nutritional trace elements.

One study (4) that examined pregnant women's dietary patterns showed that only 7 % of their subjects meet guidelines for vegetables & 13 % for fruit and the mean consumption for fruit & vegetable during the day were only 2 servings, however, the ideal recommended amount for that is > 7 servings per day based on ADA & ACOG (5).

About physical activity there are evidences that show: unfortunately pregnant women are physically less active than non pregnant ones (6). & most of them don't receive during pregnancy (7).

Lots of studies introduced different related factors in pregnant women's health behavior including: age (8), education (1, 8, 9), occupation, parity, economic status, physical activity before pregnancy (8, 9), safety believes, such as having husband, and being smoker. All these were included in our questionnaires.

In addition, lots of study illustrated that education & giving the guidelines to pregnant women has a great impact on their behavior. And it can lead to a big change (10).

Another research (11) that has examined that effect of education by distributing a small leaflet about alcohol abstinence during pregnancy indicated that even the distribution of a simple educational leaflet has great effect in development of their attitude and behavior. It should be pointed out that there is no study in Iran with expand investigation of pregnant women health behavior in all 3 fields: smoking, diet & physical activity & examining the numerous predicators related to their behavior therefore, in this study our goal were to: 1) examine the pregnant women behavior in different health factors in which we compared their behavior to the guidelines & illustrate whether they are compatible to the guidelines or not. 2) Investigating the predicators & predisposing factors related to their behaviors.

3) Examining the effect of education on the change in their behavior and evaluating in their behavior and evaluating that in which field it (education) has the most impact (diet, smoking or physical activity).

Materials and methods

This is an interventional prospective (before- after) study about the change in behavior in some healthy habits, after education. The subjects are pregnant women who enrolled in to the health care centers of Tehran University. (The participants at prenatal care visits up to 24 wk of gestation (mean: 15wk of gestation) were requited from September 2010, to July 2012. Eligibility criteria included < 24 wk gestational age at first interview, singleton pregnancy, no prior history of hypertension, chronic renal disease, diabetes, premature labor, ruptured membrane & during this pregnancy they shouldn't have placenta previa, need for complete bed rest, ruptured membrane or bleeding. Also we excluded cases end in abortion, or premature labor or failure to follow up we collected information on their physical activity diet (fruit & vegetable consumption) smoking & substance use and socio demographic factors as independent variables at the time of recruitment. We collected some information on their obstetric history for example: nuliparity multiparity adverse history in previous pregnancy of the participants (n= 488) were interviewed a second time, later in pregnancy, to update information on their behavior in 3 different fields: diet, physical activity, smoking & substance use (mean: 28wk of gestation). Participant who had miscarriage, pregnancy termination, or preterm labor < 28wk (n= 60) or failed to attend following prenatal visits or couldn't be located by our personnel (n= 52).

Covariates

We collected information on socio demographic variables including age, education level, job, parity, history of gestational diabetes, adverse history of previous pregnancy (like, prior preterm birth, still birth, membrane rupture,....), having another child in home, their economic status, cigarette smoking in their husbands. We also had questions about dependent variables in 3 fields: physical activity, fruit & vegetable consumption cigarette smoking and substance use in pregnancy both before & after giving the guidelines to the participants. (we will illustrate the guideline paper in next page after requiting (collecting) the first questionnaires we gave them the guidelines that were arranged based on the reference article (8) that is produced by ACOG (American college of Gynecology), IOM (Institude of medicine) & ADA (American diet Association).

Later in pregnancy (after the first stage) (mean: 28 wk) we gave them another questionnaire involving

the same questions of the first ones except the independent socio demographic variants. (We only asked about their behavior in 2 fields of diet, and cigarette smoking)

Cigarette smoking was assessed with the use of questions designed by the pregnancy risk assessment monitoring system (PRAMS), a surveillance project of the centers for disease control and prevention. Participants were asked to self – report the number of cigarettes/ packs of cigarettes smoked on an average day. Participants were also asked to report the average amount of substance was consumed per day, week or month.

Diet during pregnancy was assessed with use of a food frequency questionnaire (FFQ) total servings of fruit & vegetables were calculated summing the reported usual (average) daily number of fruit & vegetable servings. According to ADA & ACOG those who consume > 7 servings / d were considered to be meeting dietary guidelines during pregnancy. & we considered the same definition as our guideline.

Statistical analysis

After collecting the second time questionnaire we analyzed the data with SPSS 16 statistical methods and compared the participants' behavior in 2 different fields before & after taking the guidelines to recognize the effect of education on their healthy habits & behavior. We also assessed the relation of different variables such as socio demographic and other factors as a predicator of meeting health behavior guidelines. We considered the p-value < 0.05 as the significant & p< 0.2 as a borderline association. We also evaluated adverse history of previous pregnancy or healing timed or painful as predictors of health behavior & introduced the strongest & most relevant positive & negative predisposing factors in meeting guidelines.

Results

We requited 600 pregnant women and eliminate 54 of participants because of abortion & 59 of them because of failure to follow up finally we evaluated 485 participants. From 16 to 40 years old in brief, 45/48% out of them were 25-29 years old and 33/4% were 30-40 years old.76/3% of participants were housewives (not employed) and the remaining 23/17% were employed 42/3% had diploma,24/4% bachelor 67/2% of participants were nulliparous whereas nearly 32% were multiparous. Approximately half of our population(52/6%) has an income of 2000000-4000000 Rials per month overall, in the first style of study (before education),1/9% met fruit-vegetable guidelines & 99% & 99/6% met cigarette smoking and drug abuse guidelines whereas, after education.

Considering their changes in dietary behavior we conclude that 69/7% of participants had no change after education ,25/4% had improvement , and 4/9% decreased their fruit & vegetable consumption (p<0/000) in addition the most considerable positive change was observed in women with 4-7 servings of fruit & vegetable and after education 59/3% of them continue to eat 4-7 servings and 10/2% increase it to 7s/day (p=0/000) (Tables 1, 2).

Furthermore, we detected a significant association between the mount of fruit & vegetable consumption before & after pregnancy (p<0/0001).

Table 1: Factors that affects guideline usage in pregnant women

	Adjustment with guideline before education (%)	Adjustment with guideline after education (%)	P value
Age			
16-19	6.7%	7.4%	0.4
30-40	0.6%	0%	0.003
Educational level			
Diploma or below	7.1%	11%	0.05
Master or above	0%	21%	0.03

Table 2: Fruit and vegetables use before and after guideline

	0-4 serving/day	4-7serving /day	>7serving /day	Number	P value
Before guideline	71.9%	23.7%	4.3%	320	
After guideline	93.8%	71.7%	66.%	138	0.003

Discussion

It is clear that maternal nutrition during pregnancy can exert long-lasting effects on the health of the offspring. In light of the current epidemic of Type 2 diabetes and obesity, it is vital that the importance of diet during pregnancy is widely known and that the mechanisms by which it influences the long-term health of the offspring are understood (12).

We considered a variety of socio demographic factors such as age, employment, education, parity and conclude that there was no significant correlation between none of these factors and meeting either physical activity or diet guidelines neither before nor after education (p value= 0/6, 0/1, 0/3, 0/9 and 0/4 respectively) however it is important to indicate that regarding some of These predisposing factors (independent variants) there was a significant association between meeting the guidelines in both stages at study .(before & after) education. For example among women 25-29 years old a significant percent of them who met diet guidelines before education, continue to observe the guidelines after education (68/6% and 75% respectively) (p=0/003). There were similar results for parity , employment & economic status & consistent with the results. We detected a significant trend for persisting on behave in accordance with guidelines after education (p value < 0.000, 0.002 and 0.03 respectively).

Although fetal growth and development are driven by the program encoded in its genome, the genetic regulation of fetal growth is influenced by the intra-uterine environment in which the fetus grows. (13, 14). One factor that is critical for fetal survival and health is the supply of nutrients and oxygen from the mother. The ability of a mother to provide nutrients for her baby depends on her nutritional status, body size, body composition and metabolism, all of which are being established throughout the mother's own fetal life, childhood and adolescence. Assuming that adequate nutrition is available, the fetus can reach its growth potential, resulting in the birth of a healthy newborn of appropriate size (15).

In pregnant Japanese women, the dietary pattern high in rice, fish, vegetables, fruit and some others showed a better profile of nutritional adequacy except for sodium (16).

They identified three dietary patterns, labeled as the ‘meat and eggs’, ‘wheat products’ and ‘rice, fish and vegetables’ patterns, from a validated dietary assessment questionnaire among 997 pregnant Japanese women aged 18–43 years and evaluated the nutritional adequacy of each derived dietary pattern by comparison with the DRI. Their main finding was that participants with the ‘rice, fish and vegetables’ pattern had a better nutritional profile with lower prevalence of inadequacy for many essential micronutrients than participants with the other two dietary patterns (17).

These results suggest that the dietary pattern high in vegetables, fruit, pulses, fish and dairy products is associated with high intake of protein and several key vitamins and minerals regardless of the analytic methods for identifying dietary patterns (18).

Several previous studies have reported that the ‘healthy’ or ‘health-conscious’ pattern in pregnant women is positively associated with higher educational levels, owner-occupied housing, fewer financial difficulties, older age and less smoking (19, 20). In contrast, the ‘fast food’ dietary pattern shows a positive association with smoking (21).

We recognize that education, even with a simple paper guideline, has a significant effect on dietary habits which can indicate the important role of education in promoting healthy behaviors of society. However, according to the fact that there was a more significant improvement in their healthy behaviors, further investigations about probable reasons seem to be necessary (22).

Acknowledgements

There is no conflict of interest among the authors.

References

1. Ye X, Skjaerven R, Basso O, Baird DD, Eggesbo M, Cupul Uicab LA. In utero exposure to tobacco smoke and subsequent reduced fertility in females. Hum Reprod 2010;25:2901-6
2. Da Motta Gde C, Echer IC, Lucena Ade F. Factors associated with smoking in pregnancy. Rev Lat Am Enfermagem 2010;18:809-15.
3. Wen LM, Flood VM, Simpson JM, Rissel C, Baur LA. Dietary behaviours duringpregnancy: findings from first-time mothers in southwest Sydney, Australia. Int J Behav Nutr Phys Act 2010;7:13.
4. Okubo H, Miyake Y, Sasaki S, Tanaka K, Murakami K, Hirota Y. Nutritional adequacy of three dietary patterns defined by cluster analysis in 997 pregnant Japanese women. Public Health Nutr 2011;14:611-21.
5. Chang MW, Nitzke S, Guilford E, Adair CH, Hazard DL. Motivators and barriers to healthful eating and

physical activity among low-income overweight and obese mothers. J Am Diet Assoc 2008;108:1023-8
6. Li L, Werler MM. Fruit and vegetable intake and risk of upper respiratory tract infection in pregnant women. Public Health Nutr 2010 ;13:276-82.
7. Gollenberg A, Pekow P, Markenson G, Tucker KL, Chasan-Taber L. Dietary behaviors, physical activity, and cigarette smoking among pregnant Puerto Rican women. Am J Clin Nutr 2008;87:1844-51.
8. Okoli CT, Greaves L, Bottorff JL, Marcellus LM. Health care providers' engagement in smoking cessation with pregnant smokers British Columbia. J Obstet Gynecol Neonatal Nurs 2010;39:64-77.
9. Bowden JA, Oag DA, Smith KL, Miller CL. An integrated brief intervention to address smoking in pregnancy. Acta Obstet Gynecol Scand 2010;89:496-504.
10. Crozier SR, Robinson SM, Borland SE, Godfrey KM, Cooper C, Inskip HM. Do women change their health behaviours in pregnancy? Findings from the Southampton Women's Survey. Paediatr Perinat Epidemiol 2009;23:446-53.
11. Vardavas CI, Patelarou E, Chatzi L, Roumeliotaki T, Sarri K, Murphy S.Factors associated with active smoking, quitting, and second hand smoke exposure among pregnant women in Greece. J Epidemiol 2010;20:355-62.
12. Harris AA. Practical advice for caring for women with eating disorders during the perinatal period. J Midwifery Womens Health 2010; 55:579-86.
13. Mimura A, Sudo N, Kato N. Educational effects of a single distribution of a leaflet on alcohol and pregnancy among female university students. Nihon Koshu Eisei Zasshi J 2010 ;57:431-8.
14. Cully G. Are pregnant women receiving support for smoking dependence when attending routine antenatal appointments? Ir Med J 2010 ;103:239-41.
15. Z Biro G. Food consumption pattern in pregnant women attending prenatal care centers in Maku Nutritional survey of pregnant women in Hungary. Int J Vit Nutr Res 1997;67: 115-225.
16. Gonzalez - Cossio T, Delgado H. Functional consequences of maternal malnutrition. WorldRev Nutr Diet 1991;64:139-73.
17. Panwar B, Punia D. Food intake of rural pregnant women of Haryana state, northern India: relationship with education and income. Int J Food Sci Nutr 1998; 49: 243-73.
18. Dava RP, Vijaylakshmi I, Chandy A. Nutritional status of expectant mothers and their offspring's. Ind J Nutr Diet 1980; 17:275-80.
19. Martin-Gronert MS, Ozanne SE. Maternal nutrition during pregnancy and health of the offspring. Biochem Soc Trans 2006; 34 : 779-82.
20. Kind KL, Moore VM, Davies MJ. Diet around conception and during pregnancy- effects on fetal and neonatal outcomes. Reprod Biomed Online 2006; 12: 532-41.
21. Haimov- Kochman R. Fetal programming- the intrauterine origin of adult morbidity. Harefuah 2005; 144 : 97-101
22. Aittasalo M, Pasanen M, Fogelholm M, Kinnunen TI, Ojala K, Luoto R. Physical activity counseling in maternity and child health care - a controlled trial. BMC Womens Health 2008;14;8-14.