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NUTRITION

Nutrition health issues in self-reported postpartum depression

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ABSTRACT

Aim: In this retrospective survey women with and without self-reported postpartum depression (PPD) were compared in regards to consumption-frequency of foods and supplements rich in nutrients beneficial to nervous system (NS) health, in regards to consumption-frequency of compounds which may counteract the effect of the above and in regards to nutritional support provided to them during a pregnancy between 2003 and 2008.

Background: Postpartum depression (PPD) is defined as a major depressive episode that begins within 1 month of delivery and is experienced by roughly 13% of mothers.

Patients and methods: Four Hundred participants were recruited through the internet. Data gathered via multiple choice questionnaires was statistically analyzed using SPSS and Statistical software; statistical procedures included discriminant analysis, Pearson's product moment correlation, independent t-test and cross-tabulations.

Results: Out of 400 participants 83 (20.8%) were affected by self-reported depression after a pregnancy between 2003 and 2008. Depressed subjects consumed oily fish and offal significantly more often than non depressed subjects. Depression was more prevalent among women with vegetarian diets. No significant difference concerning food group intake or the ratios between foods rich in nutrients beneficial to NS health and foods rich in compounds antagonising their effect were found between depressed and non depressed subjects. Iron supplementation correlated positively with zinc supplementation in both groups. Roughly 70% of women reported to have received no information about n-3 fatty acid fish oils during pregnancy; informed subjects consumed fish oils more often. The majority of subjects with self-reported depression described nutritional support during pregnancy as inadequate.

Conclusion: Within this Austrian sample, the prevalence rate of postpartum depression was high; while the consumption of oily fish and vegetarian diets negatively correlated with depression, Patient information positively correlated with the consumption of fish oil supplements. These results indicate that further studies will be required in order to establish the exact relationship between nutrition and mental health during and after pregnancy.

Keywords: Depression postpartum, Maternal nutrition physiology, Mental health, Diet, Consumer health information.

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Introduction

Postpartum depression (PPD) is defined as a major depressive episode that begins within 1 month of delivery and is experienced by roughly 13% of mothers (1, 2). Prevalence rates vary greatly often depending on factors such as methodological approach. In a large Australian study, MacLennan et al (1996) demonstrated that 49% of mothers with the condition had not sought help due to social stigma attached to it (3). In

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other cases, symptoms may be misinterpreted leaving the condition untreated (4). PPD as such can have far-reaching consequences for the mother, her family and the development of her child. Various psychosocial risk factors such as stressful life events, birth mode, and lack of support as well as hormonal risk factors and poor immune function have been identified as possible triggers for the condition (5-8).

Nutrition & PPD

During pregnancy a mother is the sole source of nutrients for the fetus and its development; requirements for most micro and macro nutrients increase during this period. Even though physiological adjustments during pregnancy and lactation are directed at improved utilisation of nutrients, they may not always meet the requirements for pregnancy and lactation in nutrient depleted mothers. Maternal under nutrition can therefore result in competition for nutrients between mother and child and may implicate serious health risks for both (9).

Key nutrients

A number of key nutrients have been identified as essential to normal brain function. N-3 fatty acids, specifically Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA) , vitamin B12 and folate, iron, zinc, calcium, selenium and tryptophan have been linked with major depressive symptoms in nutrient depleted mothers (10-12).

Nutrient loss & information

While nutrient requirements increase, maternal appetite changes during the course of pregnancy and is often accompanied by cravings and aversions as well as nausea and vomiting. In addition, the maternal blood volume increases by up to 40% of the value for non pregnant state resulting in decreased nutrient concentrations with advancing gestation (9). Nutrient deficiencies can also occur due to malabsorption, food choice, food preparation, other socio economic factors such as education and financial restrictions and the excessive consumption of certain compounds, such as caffeine, which can disrupt the absorption and action of nutrients essential to NS health (13, 14). Without replenishing these nutrient losses, mothers may become depleted of nutrients critical to nervous system (NS) health.

It is generally understood that supplementation has therefore an important role in the maintenance of a healthy pregnancy and postpartum. Supplementation of micronutrients has the purpose to improve pregnancy outcome, the quality of breast milk and the nutrient status of the mother´s own body (13). As discussed by King (2000), dosage is thought to often exceed recommended intakes set by the Institute of Medicine (15). Because some nutrients share the same absorptive pathways, high supplementation of one nutrient may interfere with the absorption of others like in the cases of iron, zinc and calcium (15, 16). In this context, a Viennese study undertaken by Stengl et al. (2000) reported a lack of knowledge on dosage and protective function of nutrients among physicians and pregnant women, using the example of folate supplementation (17).

Although pregnant women preferentially use anonymous and up to date sources like books and the internet in order to seek nutritional information, the role of health professionals who are generally perceived as credible sources for nutritional information appears to be of great importance (18).

Patients and Methods

Study subjects

Four hundred participants were recruited through e-mail announcement to parent–toddler related discussion groups in Austria and via snowball sampling. Participation was limited to mothers who had previously not suffered from

postpartum psychosis, were currently not affected by PPD and had given birth between 2003 and 2008. Only questionnaires that were completed could be integrated into the analysis.

Survey instrument

The questionnaire to this study was uploaded and presented on the online service *SurveyMonkey.com* on 23/03/2010 (19). *SurveyMonkey* was closed to new responses on 10/04/2010.

For developing a questionnaire, a literature search was conducted using *Google Scholar* and *FET Food Composition Database* (20). The 55 item non quantitative food frequency questionnaire covered food and supplement intake during a pregnancy between 2003 and 2008. The questionnaire included foods with high content of nutrients and antinutrients, previously linked to PPD: n-3 fatty acids, B vitamins, Fe, Zn, vitamin C, Ca, Se as well as foods rich in compounds antagonistic to the above: n-6, saturated and trans fatty acids, phytic acid, caffeine & tannin, sucrose, casein and foods with high glycaemic index values. Supplements included: multivitamin & mineral, folate, vitamin B12, n-3 fish oils, Zn, Fe. Some foods were presented in aggregated form. The questionnaire also intended to gather information about nutritional support provided to women during pregnancy and about their opinion regarding the adequacy of nutritional support received.

Statistical analysis

Data was downloaded from the SurveyMonkey website and was processed and analysed using SPSS 12.0.1 statistical software. Statistica 6.0 was used in order to calculate the correlation between two metrical variables (21, 22). For all significance tests a p-value of <0.05 was the cut off point for significance. Statistical methods included descriptive statistics and significance statistics. Depending on the type of variable involved, descriptive statistics produces mean values and standard deviations for metric variables and frequencies and percentages for categorical variables. The following types of significance statistics were used: discriminant analysis, independent t-test, Pearson's product moment correlation and crosstabs with chi-square tests. Foods with high content of a specific compound associated with nervous system health, were aggregated and grouped into categories, ie. zinc-foods. Food frequency points were coded; higher numbers reflect more frequent, lower numbers reflect less frequent consumption of a food. See table 1.

Table 1. Food frequency points

Consumption of a food	% of the daily consumption
7 days/ week	100
4-6 days/ week	71
2-3 times/ week	35.7
2-3 times/ month	8.3
once a month	3.3
< than once a month or never	1.7

Results

Out of 435 questionnaires, 400 responses could be integrated into the analysis. 20.8% (83/400) of participants reported PPD. Within the age groups, the largest instance of depression falls within the group of 21- 25 year olds; 30% (12/40) of all women within this age group reported having suffered from depression during the months after a particular birth within this time frame.

Mothers with one child share the largest proportion of depression; 43 subjects (26.7%) out of 161 reported to have been affected by depression. In contrast, least affected was the group of subjects with four or more children (11%).

54.2% (45/83) mothers who reported having suffered from depression during this period did not have A-level education.

Out of 55 single food items/ supplements and 28 food groups, Oily Fish ($p= 0.03$) and Offal ($p= 0.01$) were selected as significant to the classification of subjects as non depressed and

depressed via stepwise discriminate analysis. Depressed subjects consumed both foods significantly more frequently than non depressed subjects (Table 2).

Table 2. Differences in daily consumption of single foods, supplements and food groups between depressed and non depressed subjects

	Non depressed		Depressed	
Food	n	Mean±SD*	n	Mean±SD
Oily fish	315	6.7±11	80	9.9±13.6
Offal	317	0.3±1.4	83	0.8±4

* Mean in %; SD: Standard deviation.

Table 3. Depression in relation to vegetarian diet/ omnivorous diet*

	Non depressed	Depressed	Total
Omnivorous	307(80.6)†	174(19.4)	381(100)
Vegetarian	10(52.6)	9 (47.4)	19(100)

* Chi-square (Pearson)= 8.6; df= 1, p =0.003; † Number (%)

Significantly more depression was found amongst vegetarians (47.4%) compared to non vegetarians (19.4%) (table 3). Ratios of the consumption-frequency of foods/ supplements rich in n-3 fatty acids, iron, zinc and calcium: consumption-frequency of foods high in compounds antagonistic to the aforementioned nutrients does not significantly differ between depressed and non depressed group (Table 4). Iron and zinc supplementation highly correlated in both depressed (n= 70, r=0.45, p<0.001) and non depressed group (n=308, r=0.55, p<0.001). Increased/low daily iron intake was accompanied by increased/low daily zinc intake and vice versa. 70.1% (n=384) of women obtained no information on the role of n-3 fatty acids during pregnancy. Informed respondents (n=115) showed significantly (p<0.001) higher n-3 fatty acid supplementation (50.6% of daily consumption) than uninformed subjects (n=269, 11.9% of daily consumption); women with A-level education (n= 218), consumed fish oils significantly (p<0.001) more frequently (30.4% of daily consumption), than subjects without it (n=166, 14.4% of daily consumption). Information was mostly obtained from books/ media (19.5%) and/ or physicians (14.3%). The majority of women who obtained information via books and media (69.2%) and physicians (63.2%) were with A-level education. 53.9% of women with the self-rating depression would have preferred to receive more nutritional support during their pregnancy compared to 42% of non depressed subjects (p = 0.07).

Discussion

The results of this study should be interpreted with some caution. Roughly 21% of participants were affected by self-reported depression after a pregnancy between 2003 and 2008. In Austria, the prevalence rate of PPD is set at 8%-10% of mothers (23); prevalence rates may be affected by various factors (24, 25). The sample may be considered non random as only roughly 42% of Austrian women use the internet (23, 26). Formal diagnostic tools for retrospective diagnosis of PPD were not available or applied (1, 27, 28). Subjects

Table 4. Ratios nutrients: antinutrients*

	Non depressed		Depressed		T-value	df	p-value
Total n-3 foods, supplements: saturated fatty acids, trans fatty acids, Linoleic acid	308†	1.2±2.3‡	76†	1±2.4‡	0.7	3.8	0.5
Total Fe foods, supplements: phytic acid, caffeine/tannin, Ca	316	1.6±1.3	80	1.5±1.2	1	394	0.4
Total Zn foods, supplements: Fe, casein, phytic acid, caffeine/tannin	315	0.7±0.5	80	0.7±0.8	-0.7	394	0.5
Total Ca foods, supplements: phytic acid, caffeine/tannin, Zn supplement, protein	317	1.3±0.8	83	1.3±0.9	0.03	389	0.9

*, Fe: Iron, Zn: Zinc, Ca: Calcium; † Number; ‡Mean ± standard deviation

reported from memory and may therefore have over- or underrated their emotional status (29).

Significant differences in food consumption were found with oily fish and offal. Contrary to study results by Hibbeln (2001) (30), depressed participants in this study ate oily fish three times per month, but significantly more often than individuals without the condition. Browne et al (2006) (31) found no association between fish consumption (without fish oil supplementation) and the occurrence of PPD. In the presented study, non depressed subjects ate oily fish on average less frequently, but supplemented with omega-3 fish oils more often per week. Self-reported postpartum depression was more prevalent among vegetarians than subjects with omnivorous diets; these findings are supported by Baines et al (2007) (32).

Data collected via a quantitative food frequency questionnaire allowed no conclusion as to how much of a specific nutrient was consumed per day. No information was collected to daily dosage and brands of supplements and the commencement of supplementation during pregnancy. Dietary supplements vary in strength and nutrient content (33). Some food items in the diet history questionnaire were presented in aggregated fashion. Participants had to select food items from a pre-formulated list of foods and could only answer about these. It is therefore suggested that more detailed questioning regarding the variety of foods, information to portion sizes and food item servings per day as well as dosage and brands of dietary supplements may have produced different results (34, 35). The study was based on dietary recall; a previously demonstrated 60% -79% accuracy rate concerning pregnancy-diet recall abilities of mothers 3-7 years postpartum, could not be verified in this study (36).

Over 70% of participants received no information about n-3 fatty acids during pregnancy. This result is indirectly supported by a Viennese study which demonstrated poor general knowledge about the function of nutrients among mothers and doctors (17). Women who did receive this information obtained it from books, media and to a lesser degree from doctors. These findings are supported by Medeiros et al. (1991) who found that media were the most frequented source of information, followed by physicians (37). Subjects in the presented study who did obtain information about omega-3 fatty acids fish oils also consumed these products significantly more often than subjects without the information. This correlates with Eraker et al. (1984) who stressed that patient information positively correlates with compliance (38). The level of education may also be considered as an important factor in regards to supplement intake. Women with A-level education took significantly more fish oils than women without this education. This finding is confirmed by Radimer et al. (2004) who demonstrated that the level of education positively correlates with supplement intake (39).

In this Austrian pilot study the prevalence rate of postpartum depression was higher compared to that given by the Österreichisches Institut für Wirtschaftsforschung, 2008. While the consumption of oily fish and vegetarian diets negatively correlated with depression, patient information positively correlated with the consumption of fish oil supplements. The results of this work indicate that further studies will be required in order to establish the exact relationship between nutrition and mental health during and after pregnancy.

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