

The use of Omega 3 on pregnancy outcomes: A single-center study

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Abstract

Objective: To investigate the rate of Omega 3 use in pregnant women and its effect on pregnancy outcome.

Methods: The study was conducted from January to April 2010 at Tamin Ejtemaee Hospital, Hamedan, Iran, and comprised women who were carrying 16 weeks of pregnancy and were referred to the study site. They were divided into 3 groups: those who did not consume fish in a month, those who consumed fish 1-3 times in the preceding month, and those who had it more than 3 times in the same period. Data was analysed using SPSS version 16.

Results: Of the 550 subjects initially approached, 20(3.6%) either declined to participate or were lost to follow-up. The final study sample, as such, comprised 530(96.4%) who were followed up until delivery. The overall mean age of the subjects was 27.98±/5.30 years. Of the total, 21(4%) were below 18 years, 467(88%) were between 18-35 years, and 42(8%) were over 35 years of age. Omega 3 consumption was significantly associated with neonate weight ($p<0.03$), pre-eclampsia ($p<0.04$) and pre-term labour ($p<0.01$).

Conclusion: Increased consumption of omega 3 can prevent low birth weight, pre-term labour and pre-eclampsia.

Keywords: Omega 3, Pregnancy outcomes, Weight of neonate. (JPMA 64: 1363; 2014)

Introduction

Fish consumption during pregnancy has been shown to be associated with positive and negative effects on reproductive outcomes and yet remains a matter of debate.¹

Fish is the main source of ω-3 (n-3) fatty acids, which are essential for foetal visual and neurological development. Consumption of 1-2 servings fish/week is recommended to provide 200mg long-chain marine ω-3 fatty acids/day, mainly docosahexaenoic acid (DHA), as part of a healthy diet for pregnant women.²

The ω-3 fatty acids are involved in placental flow and the process of parturition, and their intake during pregnancy is related to foetal growth and longer gestation.³ However, fish is also the main route of exposure to pollutants, such as mercury and polychlorinated biphenyls (PCBs), which mainly accumulate in large predators. Therefore, in some countries pregnant women are advised to limit the amount and to carefully select the type of fish that they eat.^{4,5} These recommendations are intended to provide enough DHA to the foetus while protecting the developing nervous system from mercury neurotoxicity.⁶

It has long been known from human studies that pregnancy outcomes are related to maternal nutrition,⁷⁻⁹

and maternal fish intake during pregnancy attracted much attention because fish is a rich source of proteins, vitamins, iron and long-chain unsaturated fatty acids, which are necessary for healthy foetal development.¹⁰

The hypothesis that fish oil might be protective against hypertensive disorders of pregnancy dates back to observations in the 1980s that elongated n3 fatty acids result in increased vasodilatation and decreased platelet aggregation.¹¹

Pre-eclampsia is found in 3-10% of pregnancies worldwide and remains a major cause of maternal and foetal morbidity and mortality.¹¹ Women who develop pre-eclampsia have been found to have lower level biochemical markers of n-3 fatty acid intake. Observational studies of fish intake and randomised trials of fish oil supplementation generally have not supported a protective effect.¹²

Since the negative impact of fine particulate matter on birth weight was only significant in infants born to mothers who reported low fish consumption in pregnancy, this may suggest that a higher maternal fish intake confers protection against the harmful effect of prenatal exposure to ambient toxicants. Both positive¹³ and inverse associations¹⁴ between fish consumption and birth size have been found in observational studies in communities with moderate fish consumption.

It was estimated that in infants whose mothers reported low fish consumption (<91 g/week), the average birth weight deficit attributable to higher prenatal exposure to

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fine particulate matter ($>46.3\mu\text{g}/\text{m}^3$) amounts to 133g, but the interaction term between low fish consumption and prenatal exposure to fine particulate matter was insignificant.¹⁰

With respect to recent studies and different results, the purpose of the current study was to investigate the rate of fish consumption in pregnant women and its effect on pregnancy outcomes in Iran.

Subjects and Methods

The cohort study was conducted from January to April 2010 at Tamin Ejtemaee Hospital, Hamedan, western Iran, and comprised women who were carrying 16 weeks of pregnancy and had been referred to the study site. The subjects were enlisted after signing an informed consent form. Those with urinary tract illness, pre-eclampsia, eclampsia, multiple pregnancies, foetal anomalies, polyhydramnios, cardiovascular diseases, smoking, decolman, placenta previa, fish allergies and other conditions that could affect pregnancy outcome were excluded from the study.

The subjects included in the study were divided into 3 groups: those who did not consume fish in the preceding month (Group 1); those who consumed fish 1-3 times in the preceding month (Group 2); and those who had it more than 3 times in the same period (Group 3). All types of fish were included. The women were followed up until delivery.

Data including age, parity, occupation, and education were recorded. Exclusion criteria were: urinary tract illness, preeclampsia, eclampsia, multiple pregnancies, foetal anomalies, polyhydramnios, cardiovascular diseases, smoking, placenta abruption, placenta previa, allergy with fish and other disease that may affect pregnancy outcome.

A questionnaire related to fish consumption, gestational age, pre-eclampsia, eclampsia was completed by the subjects in privacy.

SPSS version 16 was used for data analysis. All hypothesis tests were two-sided and $p < 0.05$ was considered statistically significant. Chi square test was used to evaluate pre-term labour, low birth weight (LBW) and pre-eclampsia.

Results

Of the 550 subjects initially approached, 20(3.6%) either declined to participate or were lost to follow-up. The final study sample, as such, comprised 530(96.4%) who were followed up until delivery. The overall mean age of the subjects was 27.98 ± 5.30 years. Of the total, 21(4%) were

Table-1: Maternal of characterization.

Characteristics	(n=530)
(Years) age	Mean \pm SD 27.9 \pm 5.3
Delivery before	N (%)
Nulliparous	240(45.3)
Multiparous	290(54.7)
Education	N (%)
Less than high school	241(45.5)
High school and more	289(54.5)
Job	N (%)
Housewife	469(88.5)
With job	61(21.5)

Table-2: Correlation fish use and pregnancy outcomes.

Fish use in month	<1 N= 172	1-3 N= 282	>3 N= 76	*P
Preterm labor	32(52.4)	20(32.7)	9(14.7)	0.01
(gr) Low birth weigh	17(46.0)	15(40.5)	5(13.5)	0.03
Preeclampsia	21(61.7)	10(29.5)	3(8.8)	0.04

*Mean \pm standard deviation of the difference.

\times chi square test.

below 18 years, 467(88%) were between 18-35 years, and 42(8%) were over 35 years of age. (Table-1)

Besides, 172(32.45%) subjects were in Group 1, 282(53.2%) in Group 2, and 76(14.33%) in Group 3.

Omega 3 consumption was significantly associated with neonate weight ($p < 0.03$), pre-eclampsia ($p < 0.04$) and pre-term labour ($p < 0.01$) (Table-2).

Discussion

The results of the study suggest that increased fish consumption can prevent LBW, pre-term labour and pre-eclampsia. This is in line with earlier studies.

Studies done in Faroc Islands and Denmark as well as Iran (3.15-19) showed that the longest gestational age belonged to mothers consuming fish oil, and the shortest to those consuming olive oil, and that with the use of fish oil, chances of pre-term labour decreased.^{12,19} The outcome related to fish oil was the same in our study.

Observational studies on fish intake and randomised trials of fish oil supplementation generally have not supported a protective effect.¹² A more recent study, however, found a U-shaped association, with greater risk of hypertensive disorders among women with the lowest and highest intake of n3 fatty acids, primarily from cod-liver oil.²⁰ Our results suggest that further investigation into potential benefits of moderate n3 fatty acid intake might be

warranted.

In our study it was shown that with use of fish oil led to decreased pre-eclampsia. The result is similar to earlier studies.²¹⁻²³

Our findings suggest that maternal fish consumption plays a different role in foetal weight depending on the amount and type of fish consumed. The potential effects of fish consumption on foetal weight should be taken into account when recommending fish consumption to pregnant women or those of childbearing age.

With regard to the limitations of the study heed must be paid to the differences in the types of fish used. We propose further studies in other countries with a higher sample size.

Conclusion

Higher consumption of fish by expecting women may reduce the risk of adverse health effects of prenatal exposure.

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