Does eating oily fish improve gestational and neonatal outcomes?

Fish is a source of long-chain polyunsaturated n-3 fatty acids (LCPUFA), and its consumption is associated with prolonged length of gestation, decreased pre-term birth rates, increased birth weight. However, fish may contain a number of pollutants which may adversely affect gestational length, fetal growth and birth outcomes. Because fish contains both favorable and unfavorable substances, the net effect of its consumption during pregnancy is still uncertain.

Between April and July 2013, we selected 114 women who gave birth to living babies, and divided them according to type and frequency of the fish consumed.

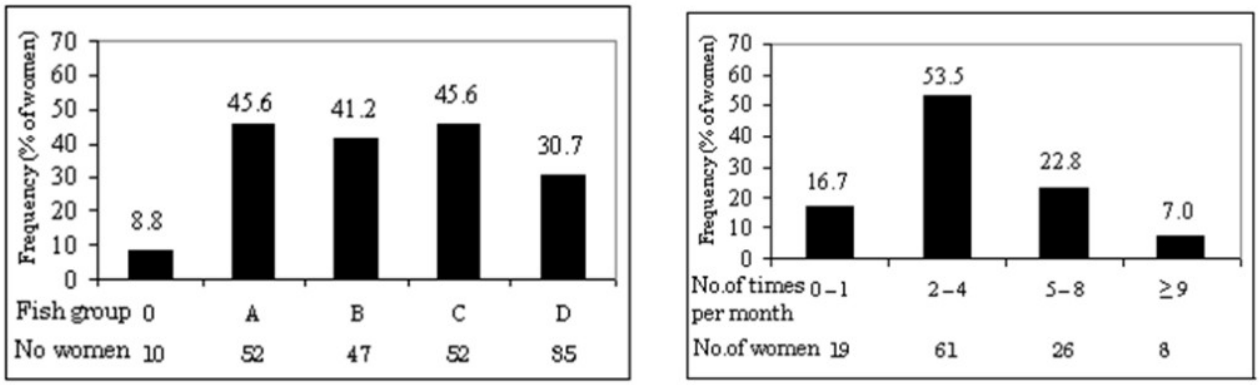

Fig. 1. Left panel. Monthly frequency of fish consumption in 114 pregnant women. Right panel. Distribution of women among the no fish eaters group and the 4 groups of fish eaters.

We considered four types of fish: A) large size oily fish with both high DHA and mercury content (tuna, swordfish); B) small size oily fish with high DHA, low mercury content (mackerel, salmon, anchovy, garfish, spatula, sardine) ; C) lean fish with low DHA and medium mercury content (sea gilt-head bream, sea bass, cod, sea bream, perch); D) shellfish with low DHA, and low mercury content.

We evaluated gestational and neonatal outcomes. Gestational outcomes were: gestational duration; complications during pregnancy: preterm birth, PIH, GDM; complications at delivery and mode of delivery. Neonatal outcomes were: neonatal weight, height and head circumference (NHC).

One hundred and four women (91.2%) consumed fish with an average frequency of 4.7 times per month. Each fish meal consumed averaged 150 g. Monthly frequency of fish consumption is

shown in Figure 1, left panel. Distribution of women based on type of fish consumed is shown in Figure 1, right panel.

Fiftynine women (51.8%) were taking supplements containing DHA (200 mg/day), almost all of whom (n= 55) consumed fish.

	FISH CONSUMPTION				
Gestational/Neonatal outcomes	A* N=52	B N=47	C N=52	D N=35	A+B+C+D N=104[b]
Gestational duration (days)	r= 0.062	r= 0.136	r= -0.041	r= 0.121	r= -0.031
	P=0.519	P=0.155	P=0.672	P=0.204	P=0.747
Neonatal weigth (g)	r= 0.136	**r= 0.195**	r= 0.029	***r= -0.165***	r= -0.008
	P=0.148	**P= 0.037**	P=0.762	***P=0.079***	P=0.937
Neonatal length (cm)	r= 0.058	***r= 0.155***	r= 0.023	r= -0.143	r= -0.023
	P=0.541	***P= 0.099***	P=0.809	P=0.128	P=0.810
Neonatal Head Circumference (cm)	r= -0.032	**r= 0.211**	**r= -0.206**	**r= -0.192**	r= -0.143
	P=0.736	**P= 0.024**	**P= 0.028**	**P= 0.041**	P=0.130

Fig. 2. Correlation between the type of fresh fish intake and gestational/ neonatal outcomes. a Type of fish: A (tuna and swordfish), B (mackerel, salmon, anchovy, garfish, spatula, sardine), C (sea gilt-head bream, sea bass, cod, sea bream, perch), D (shellfish). b Numbers do not add up to 104 (and % do not add up to 100) because some women consumed more than one type of fish. P values are typed bold-face if statistically significant.

The following complications occurred during pregnancy: preterm birth 7%, GDM 7%, PIH 6.1 %. At birth, neonatal weight, length and NHC averaged 3200 ± 449 g, 48.4 ± 2 cm, 34.1 ± 1.4 cm, respectively. Consumption of small size oily fish correlated positively with both neonatal weight (r= 0.195 , P= 0.037) and head circumference (r= 0.211 , P= 0.024). In contrast, consumption of lean fish or shellfish correlated negatively with neonatal head circumference (r= -0 206, P= 0.028, or r= -0 192, P= 0.041). (Fig. 2.).

Comparing the rates of gestational complications, PIH was significantly more frequent in non-fish eaters (group 0) than in fish eaters (20% *vs* 4.8%, P = 0.056). Among fish eaters, preterm birth occurred less frequently in group B compared with the other groups (2.1% *vs* 10.4%, P = 0.086) . Supplementation with DHA did not influence gestational or neonatal outcomes.

This is the first study in our geographical area on fish consumption in pregnant women and its influence on gestational and neonatal outcomes, taking into account the different categories of seafood and DHA supplementation. The mean frequency of fish consumption in our sample of pregnant women is almost half than the one recommended by FDA (1.2 times per week vs 2.0 per week).

We found , that some gestational and/or neonatal outcomes were related to fish consumed in terms of either frequency of fish intake or type of fish consumed. In agreement with previous observational studies, we show that fish consumption correlates inversely with prevalence of pregnancy induced hypertension (PIH). We also show that small fish oil consumption is associated with increased neonatal weight and neonatal head circumference (NHC), while lean/shellfish consumption is associated with decreased NHC.

Our conclusions can only be suggestive that maternal consumption of fish influences fetal growth depending on the amount and the type of fish consumed. In agreement with Oken we think that the increased intake of fish with high content in DHA and low content in mercury during gestation is healthy.

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