Achieving safe fish consumption among pregnant women in Jamaica

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Aims & objectives

Fish consumption is critical for a balanced diet during pregnancy. Fish contains essential nutrients such as selenium and the omega fatty acids (DHA and EPA). However, fish may also be contaminated with mercury. Mercury exposure can have severe adverse effects on fetal brain development. Previous studies have shown the significant relationship between maternal fish consumption and prenatal mercury exposure in Jamaica. Therefore, women should be sufficiently advised on their fish intake during pregnancy.
The main aims of the study were to
(i) calculate estimated portion size of fish for optimal nutritional benefits
(ii) design a fish consumption advisory on mercury
(iii) implement and evaluate public awareness of prenatal mercury exposure.

Method

The estimated portion size was calculated using the US EPA dietary requirement and reference limits [1], average body weight of pregnant women and the nutrients and mercury concentrations in each fish.

Estimating consumption limit /dietary requirement

$$C_{RLim} = \frac{rfD * BW}{C_m}$$

where CRLim, allowable fish consumption rate (kg/day)
RfD, reference dose (mg/kg/day)
*BW, consumer body weight (kg)
**Cm, measured concentration of mercury in a given species of fish (mg/kg)

**Typical body weight for pregnant woman is 70kg*
***The concentrations of mercury, selenium and omega 3 fatty acids (DHA +EPA) were retrieved from a previous study.*

Estimating recommended meal size

$$C_r = \frac{C_{RLim} * t_{avg}}{meal\ size}$$

Where C_r , consumption rate
Meal size (8 oz = 1 serving) = 0.22 kg
Averaging period (t_{avg}) = 30 days/month

Reference dose / dietary requirement	
Mercury (Hg)	0.22 microgram/kg/day (WHO/FAO, 2008)
Omega 3 fatty acids (DHA+EPA)	300 milligrams/day (FAO, 2008)
Selenium (Se)	60 micrograms/day (EU, 2000)

Results

Mercury fish consumption advisory: Recommended fish intake to reduce prenatal mercury exposure

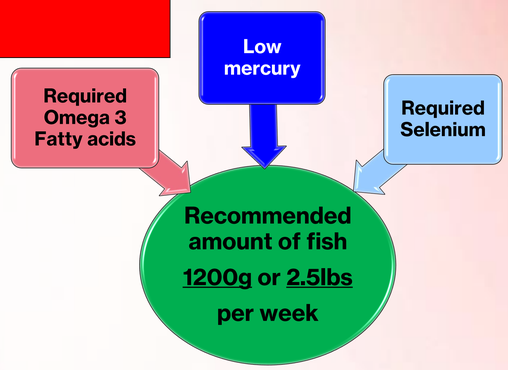
Type of fish	Consumption limit/ week	Recommendations
Doctorfish Parrotfish Tilapia Sprat Sea trout Snappers	 = 1500g or 3.5lbs	Best choices
Grunt Jackfish Goatfish	 = 1200 g or 2.5lbs	Better choices
'Saltfish' (Cod) Wenchman	 = 800g or 1.5lbs	Good choices
Kingfish Mullet	 =400g or 0.5lbs	Limited choices

Prenatal exposure to mercury can have adverse health effects at different levels of child development

Neonate	Infant (1 – 3 years)	Child (4 – 9 years)
		
• Lower birth weight • Smaller head circumference [2]	• Reduced cognitive performance • Decreased function in non-dominant hand in males (motor skills) [2]	• Attention deficit hyperactivity disorder (ADHD) related behaviours • Low intelligence quotient (IQ) [3]

Health benefits of omega 3 fatty acids intake during pregnancy [4,5]

- Building blocks of fetal brain and retina
- Play a role in determining the length of gestation and in preventing perinatal depression.
- Improve problem solving, and language development, outcomes in infants
- Improve cognition and psychomotor skills in infants



Health benefits of selenium intake during pregnancy [6]

- Extremely important for proper growth and development of fetus
- Involved in the regulation of mother's immune system and thyroid function.
- Low dietary selenium contributes to spontaneous abortion, preeclampsia, low birth weight.

Conclusion

- There is an unnecessary decline in fish consumption among pregnant women due to the fear of prenatal mercury exposure [7].
- The **health benefits** gained from eating popular fish found in Jamaica, outweighs the risk of mercury exposure.
- Due to the low levels of mercury concentrations found in Jamaican fish, the recommended fish meals from this study (i.e. 1200g) was greater than the US EPA's published limit (i.e. 680g)
- Pregnant women are encouraged to eat adequate amount of fish in order to receive the nutritional benefits that are only found in fish.
- A fish consumption advisory is a useful tool for proper diet planning during pregnancy.
- It is suggested that this advisory be available in every antenatal clinic, in order to prevent unnecessary prenatal exposure to mercury.

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