

Can current supply figures support the nutritional recommendation of fish consumption in Iran?

A case-study of the challenges in front of a nutrition policy

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ABSTRACT

"Fish consumption twice per week" recommendation has been adopted in many countries, including Iran, by Nutrition experts. Data derived from food balance sheets (FBSs) and national household food consumption surveys (NHFCs) show that fish consumption has been increased in the last 20 years in Iran. The gap between supply and recommendation figures in order to analyze the feasibility of this policy however needs to be determined. In this study, we took current figures of fish supply and consumption in Iran and calculated the amount of fish needed to support the recommendation of fish consumption. Data obtained from FAOSTAT-FBSs in 1980-82, 1990-92 and 2000-02, and NHFCS reports in 1992-95 and 2001-03. Fish supplies needed to fulfill the nutritional policy were calculated based on 120 and 180 gr/caput/wk scenarios. Sharp increase happened in the average fish supply from 1980s to 1990s, but slowed down afterwards. In early 2000, fish availability and intake were 4.73 and 4.43 kg (as raw-whole fish)/capita/year, respectively. The amount of fish required to fulfill the recommendation were however calculated as 10.97 and 16.43 kg/caput/yr based on the two scenarios, respectively. This study reveals that the gap between present fish consumption and the amounts for nutritional goal is still big. Whether bridging this gap in terms of feasibility, ecological, environmental and logistical burdens is attainable, needs more evaluation. Nutrition educators should be aware of the effects of their campaigns on the nationwide food policy as well as on issues such as consumer demand, prices, and environment.

Key words: Fish consumption; fish supply; nutritional recommendations; nutrition policy analysis; Iran

INTRODUCTION

Nutritional policies are usually publicized in forms of dietary guidelines and recommendations/advice. "Food Guide Pyramid" (USDA) and "5-a-day" (NHS UK; DHHS-CDC US) are known examples of such policies to promote healthy eating and consumption of fruits and vegetables, respectively. "Fish consumption twice per week" is another well-established nutritional advice [1] which has been adopted in many countries, including Iran, by the health authorities and

nutrition educators. Provision of high quality protein, very long chain fatty acids from the omega-3 class (i.e. EPA and DHA), iodine, vitamin D and available iron, zinc and calcium (with small fishes) might be considered as the rationale behind this recommendation to promote physical and mental health [2-7]. However, the controversies still exist in some health effects such as cancer prevention [8]. But overall due to the emerging importance of the polyunsaturated omega-3 fatty acids, the recommendations regarding fish intake are

being suggested to be set even at higher levels [9], and more educational campaigns are being encouraged [10]. As a result, many nutrition education programs, especially media-based programs, have been designed and implemented to target the aim of increasing fish intake among different segments of population. It seems that these campaigns have been contributed to some extent in increasing fish consumption in Iran as shown in both national FBSs and NHFCs data. Role of other important factors such as competitive prices with other protein foods, notably red meats and chicken, should however be considered when judging on the success of this policy. Needless to mention that from the other hand, any demand created by these educational campaigns and programs would in turn affect the availability and price of fish in the country unless higher production capacities, foreign resources and or other governmental supportive policies come to the scene. In brief, these complexities and sometimes inconsistencies with the on-going food policies, ecological and environmental concerns, together with international, economic and/or political pressures can dramatically change the outcome of a science-driven nutrition recommendation from what was intended at first. In this study, we analyzed recent trends of fish supply and consumption in Iran and calculated the total amount of fish needed to support the nutritional recommendation of fish consumption twice weekly in the country.

MATERIALS AND METHODS

Average per capita fish supplies in Iran for the 3 time periods i.e. 1980-82, 1990-92 and 2000-02 were extracted from the National Food Balance

Sheets (FBSs) data archives, obtained from on-line FAOSTAT databank. Average fish consumption figures, were drawn from published reports of the last two National Household Food Consumption Surveys (NHFCs), conducted by the National Nutrition and Food Technology Research Institute (NNFTRI) using the combined method of "2-day weighed recall" [11] in 1992-95 and 2001-03 in Iran. Consumption values had initially been reported for raw-lean fish products which were increased by 35% to estimate raw-whole fish, to be comparable with values appeared in the food balance sheets. Finally, total amounts of fish/fish products needed to fulfill the present nutritional recommendation of fish consumption twice per week were calculated based on the two scenarios of 120 and 180 grams of intake of cooked-lean fish per person per week (60 and 90 grams in each time, respectively).

RESULTS

Tables 1 to 3 show the trends of fish supply and consumption at individual level in Iran and the capacity that the fisheries sector needs to possess if the nutritional goal of fish consumption twice per week (120 and/or 180 gr of cooked lean fish per week) is to be achieved.

In table 1, the sharp increase from 1980s to 1990s and a slow increase afterwards in the average fish supply is shown. Comparisons are also made between shares of different sources in total fish supply in different time periods. In a 20-year period, from early 1980s to early 2000s, local production was dramatically increased. Moreover, the importation did not seem as a significant source for human consumption considering the amount of food quantity in early 1980s.

Table 1. Twenty year trend of fish (raw-whole) supply in Iran *

	Time period		
	1980-82	1990-92	2000-02
Total fish production (1000 tones)	71.7	291.0	407.7
Import (1000 tones)	353.3	315.3	256.33
Food quantity (1000 tones)	55.3	259.3	318.3
Fish for human consumption (Kg/capita/yr)	1.34	4.46	4.73

* Food Balance Sheets, FAOSTAT databank, FAO, <http://faostat.fao.org/site/502/DesktopDefault.aspx?PageID=502>

Table 2. Fish/fish products consumption in Iran*

	1992-95		2001-03	
	Raw-lean Fish	Raw-whole Fish	Raw-lean Fish	Raw-whole Fish
Average fish consumption (kg/caput/yr)	2.19	2.96	3.29	4.43

* National Household Food Consumption Surveys, National Nutrition and Food Technology Research Institute, Tehran

Table 3. Total raw whole fish needed to support recommendations at two levels of 120 and 180 gr of cooked lean fish per person per week

Level	Recommended intake of fish (gr/caput/wk)			D Total fish needed [‡] (Kg/caput/yr)
	A Cooked-lean	B Raw-lean* (A+30%)	C Raw-whole* (B+35%)	
A	120	156	211	10.97
B	180	234	316	16.43

* Corrections were made based on factors derived from NHFCSs (2001-03), National Nutrition and Food Technology Research Institute, Tehran, Iran.

[‡] Corresponding figure in Column C X 52 / 1000

Table 2 shows the 10-year trend of fish consumption in Iran. An almost 50 percent increase in intake is seen among Iranian population. The total amount of fish needed to support the current nutritional recommendation of fish consumption at two different levels of 120 and 180 grams of cooked lean fish per person per week is presented in Table 3. Correction factors for wastage during storage and preparation as well as loss of weight during cooking are also shown in the same table.

DISCUSSION

Fish supply has dramatically increased in Iran in the last 20 years. Data from consumption surveys confirm this trend. In this process, the Iranian Fisheries Organization, despite many obstacles, has become a major role player. As a result, the amount of fish imported has been gradually decreased since early 1980s. This shift was happened due to huge investments in the fisheries sector and its allied food industries as part of the self-sufficiency policy adopted in many sectors from early years after revolution in 1978. High population growth rate in Iran during 1980s and early 1990s is however responsible to mask the achievements made by the Fisheries sector when estimating per capita fish availability by FBS approach.

The present analysis does not attempt to convey the message that Iranian consumers' behavior has easily been altered through growth just in a single sector, i.e. Fisheries in this case. Besides

some critical concerns regarding fish consumption in Iran, e.g. the concentration of n-3 fatty acids in local fish species, residues of some unwanted chemicals (e.g. methylmercury, pesticides, fertilizers, etc), improper methods of fish catchment and storage, lack of habitual fish consumption in some parts of the country especially among children (Issues of culture and palatability), and improper fish preparation and cooking at household level (which is dominated by the prolonged frying method), fish supply (physical access), mainly as a result of production, importation and processing capacities, and its eventual impact on the prices (economic access) will act as key determinants of fish consumption among population.

At the same time, the calculations made in this study showed that in 2002, total fish consumption among Iranians was just about 40% of the most conservative recommendation, i.e. 120 gr cooked lean fish per week (level A). This will drop to 27% if 180 gr fish per week (level B) is taken as the recommendation. In the other words, despite huge achievements in the fisheries sector, the way to go to fulfill the nutrition policy is still quite long.

As can be seen in tables 1 and 2, a discrepancy exists between fish consumption figures provided by the FBSs and those obtained from NHFCSs. The difference however is quite small and expectable given the nature of two estimation methods. Part of this is related to the wastage which happens at the household level

(which is not estimated when compiling FBSs). Meanwhile, the under-estimation made by the recall method employed in the NHFCS is a key determinant to this difference. The real consumption figure is expected to be somewhere between the two estimations made by two different methods. At the same time, it should be noted that the discrepancies between data provided from two sources of FBS and NHFCS seems greater in early 1990s.

Gibney analyzed the cost of the well-known nutritional advice "five-a-day" which has been adopted to promote consumption of fruits and vegetables. While he considered this recommendation as an "ambitious" one, considering the changes which had been really happened in a 20-year period, he stated that "from an environmental point of view, this has implications for land use, ground water supplies and agro-chemical use. Fruits and vegetables require twice as much fertilizer as seed crops and up to twenty times as much pesticides". He then added that it didn't mean that the program was inappropriate, but rather needed further analyses before publicizing [12]. Similarly, by counting problems facing the discipline of Nutrition, Lang states "the third problem is that nutrition is generally blind to the environment despite the geo-spatial crisis over food supply, which will determine who eats what, when and how. How can we ask people to eat fish when fish stocks are collapsing, or to eat wisely if water shortage dominates or climate change weakens food security?" [13].

Overall, this analysis shows that the present supply of fish and fish products is by far less than adequate if the Iranian population is to follow the nutritional recommendation of having fish twice a week. Without adopting compensatory and back-up strategies, educational campaigns aiming at increasing fish consumption would be shadowed by increases in fish prices, which in turn, suppress the potential success achievable

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by the nutrition educational programs. On the other hand, any sharp increase in fish supply must be firstly weighed against its ecological and environmental costs, as well as market changes which will happen regarding other commodities. This kind of "holistic" analyses shall be done for all other nutritional recommendations, e.g. consumption of dairy products, to find out if they are not for example in accordance with food policies and or environmental concerns. Moreover benefits derived from food commodities such as fish should be judged within the overall dietary pattern, such as the Mediterranean diet [14], to simultaneously take other dietary components into account. No doubt that the Food Technology sector can make a big difference in the amount of fish availability, acceptance and consumption among different age groups through proper packaging and formulating new products. It may also provide good alternatives, e.g. fortifying spreads, juices, dairy and confectionary products and n-3 PUFAs, if the nutritional target is not realistic at least in the short-run [15-16].

CONCLUSION

Results and discussion briefly presented in this paper reveal that fish consumption has been increased in last 20 years in Iran with the fisheries sector acting as a growing food supplier in the country. At the same time, the gap between present consumption figures and the amounts needed to achieve the goal of fish consumption twice per week is quite big, even with the more conservative scenario.

The challenge of the nutritional policy is to further increase healthy fish consumption, while providing huge amounts of affordable hygienic fish through ecologically-accepted ways.

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