

## Do We Consume Fish And Poultry Enough? : A Cross Sectional Study At West Of Iran

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### Abstract

Seafood is an important part of a healthy diet. Fish consumption decreases risk of sudden death. Poultry consumption with a reducing in red meat intake significantly decreases the risk of colorectal cancer. The aim of this study was to determine fish and poultry consumption and the style of cooking among adult people in Khorramabad city, Iran in relation to socio-demographic characteristics. This cross-sectional study was carried out on 300 adults (178 women and 122 men; aged 19-70 years) of Khorramabad city, Iran. Fish and poultry intake (from a FFQ), demographic and cuisine style (from a self-reported questionnaire) were evaluated. Statistical methods included independent t-test and one-way ANOVA. Consumption of fish was  $27.8 \pm 33.5$  g/d and poultry was  $22.7 \pm 25.35$  g/d. The most acceptable cuisine style for fish was frying (83.3%) and for poultry was boiling (43.5%). The result shows that the fish consumption is in moderate range and the poultry consumption is weak in this area and needs some governmental challenges.

**Key Words:** Fish, poultry, consumption, Iran

### INTRODUCTION

Seafood is an important part of a healthy diet.<sup>[1]</sup> Fish consumption decreases risk of sudden death.<sup>[2]</sup> It has been suggested that high fish consumption and high intake of polyunsaturated fatty acids (PUFAs) especially n-3 such as eicosapentaenoic acid (EPA, 20:5n-3) and docosahexaenoic acid (DHA, 22:6n-3) promote mental well-being,<sup>[3-6]</sup> prevention of chronic disease, cardiovascular disease (CVD),<sup>[7-8]</sup> improve depressive disorders,<sup>[9]</sup> reduce ischemic strokes<sup>[10]</sup> and may affect bone health.<sup>[8,11]</sup>

Poultry consumption with a reducing in red meat intake significantly decreases the risk of colorectal cancer,<sup>[12]</sup> and poultry with skin may increase the risk of recurrence or progression of prostate cancer in men.<sup>[13]</sup> The absence of cultural or religious obstacles and dietary and nutritional qualities which are belonging to poultry's protein are the main factors explaining poultry meat's attractiveness and since 1995 poultry has become the meat with the second highest consumption worldwide.<sup>[14]</sup>

Factors that influence food consumption choices among individuals and populations include cultural, socio-economic factors, and the impact of gender, age, the presence of children, family size, income, education and region as socio-demographics. Also, other factors such as religious, BMI, total energy expenditure have been studied.<sup>[3,15-19]</sup>

The diseases which mentioned occur in Iran too; just as chronic disease and CVD which are high prevalence in Iran and in Lorestan province, too.<sup>[19]</sup> On the other hand, poultry and fish consumption in Khorramabad is different from that of other areas and may be influenced by the local culture and its habits.<sup>[20,21]</sup> The aim of this study was to determine fish and poultry consumption and the style of cooking among adult people in Khorramabad city in relation to socio-demographic characteristics.

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### MATERIALS AND METHODS

In this cross sectional study, the data were collected through personal interviews with adult people in Khorramabad city, Iran, from January- February 2011. Respondents were selected by using multi stage random cluster sampling. The clusters were health care centers of Khorramabad city. Of the total number of clusters (including 16 units), 10 health centers (3 in the north, 4 in the center, and 3 in the south of the city) were selected. The samples were selected to represent each region's population. Two questionnaires were administered. At first, a preliminary Demography and Cuisine Questionnaire (DCQ) and a Food Frequency Questionnaire (FFQ) were constructed through consideration of existing literature and discussion with an expert panel (face and content validation). Then, the questionnaires were completed by 30 healthy individuals by using test-retest reliability over a 2-week interval. The final validated and reliable (DCQ) included 2 types of questions about "demography items", "the cuisine". Also, the validated and reliable FFQ including fish meat and poultry meat items was used to determine the frequency of fish and poultry consumption. Data were collected by trained nutritionists during a personal interview with each participant. Data for the sample size were obtained from a pilot study. In the pilot study one hundred (50 males and 50 females) healthy people were engaged. This study was part of a larger study concerning red meat and white meat consumption in Khorramabad city. The sample size was estimated based on the mean estimation of red, poultry, and fish, and  $\alpha=0.05$  and  $SD=4.46$  (for red meat) in the pilot study. The largest sample size was related to red meat. In conclusion, the sample size was determined to be 305. Data from the pilot study was used in the final analyses.

All data from the FFQ were changed to g/week. Participants' verbal consensus was obtained. SPSS software version 19 was used for data analysis. Independent t-test was used to compare amount of consumption among male and female, one-way ANOVA was used to compare the means of other indices and linear correlation was tested by Spearman. The significance level was set at 0.05.

### RESULTS

Response rates to the DCQ and the FFQ were 98% and

88.5%, respectively. We had also some missing data for some items, so the number of cases in analyses for various items may be different. Most participants were females (59.3%). The mean and standard deviation of age was  $34.1 \pm 11.6$  years, ranging from 19-70 y. The highest frequency was for < 30 years age categories. Guidance and high school education had the highest frequency in the literacy categories. Many participants (47.2%) had incomes between \$300 and 600. Thirty percent of participants were housewives and the frequencies of government employers and businessmen were 25% and 24.7%, respectively. Table 1 shows the details of basic socio-demographic characteristics of the samples. Table 2 shows the mean weekly intakes of poultry and fish in consumers. White meat consumption was  $349.20 \pm 305.81$  g/w. Poultry consumption was  $157.16 \pm 176.02$  g/w and for fish was about  $192.03 \pm 233.38$  g/w.

Men consumed significantly more poultry and total white meat than women ( $p<0.05$ ) but simply we can see women also consumed more fish than men. There was a significant correlation between occupation and fish consumption and Post-hoc Duncan test showed that the poultry's intake was higher in the student. There wasn't any significant relation between income and fish consumption but Post-hoc Duncan test showed that fish

**Table 1: Demographic characteristics of participants' poultry and fish consumption in the West of Iran.**

	n	%
<b>Gender</b>		
Male	122	40.7
Female	178	59.3
<b>Age (years)</b>		
<30	125	42.5
30-39	86	29.3
40-49	42	14.3
50-59	32	10.9
$\geq 60$	9	3.1
<b>Literacy</b>		
Illiterate and primary school	41	13.8
Guidance and high school	138	46.4
Collegiate	118	39.7
<b>Income (\$ per month)</b>		
<300	56	18.7
300-600	141	47.2
600-1000	68	22.7
$\geq 1000$	34	11.4
<b>Occupation</b>		
Unemployed	15	5
Housewife	90	30
Government employer	75	25
Retired	15	5
Student	26	8.7
Others	79	26.3

**Table 2: Intake amount of poultry and fish based on participants' demographic characteristics<sup>a,b</sup>**

	White meat		
	Poultry	Fish	Total
<b>Gender</b>			
Male (107)	$215.35 \pm 197.36$	$210.71 \pm 284.15$	$426.07 \pm 346.09$
Female (163)	$118.97 \pm 149.19$	$179.76 \pm 192.95$	$298.73 \pm 265.42$
P value	<0.05 <sup>a</sup>	NS	<0.05 <sup>a</sup>
<b>Age (years)</b>			
<30 (113)	$165.48 \pm 173.90$	$198.89 \pm 205.51$	$364.37 \pm 301.90$
30-39 (76)	$156.96 \pm 185.03$	$205.13 \pm 258.94$	$362.09 \pm 312.53$
40-49 (37)	$139.29 \pm 170.95$	$179.74 \pm 292.27$	$319.04 \pm 340.34$
50-59 (29)	$147.93 \pm 155.49$	$170.93 \pm 216.41$	$318.86 \pm 267.58$
$\geq 60$ (9)	$218.33 \pm 260.36$	$195.58 \pm 207.97$	$413.91 \pm 356.28$
P value	>0.05	>0.05	>0.05
<b>Literacy</b>			
Illiterate and primary school (40)	$142.05 \pm 191.48$	$150.98 \pm 168.05$	$293.03 \pm 260.26$
Guidance and high school (126)	$151.39 \pm 159.9$	$219.79 \pm 289.32$	$371.19 \pm 338.17$
Collegiate (101)	$171.90 \pm 191.44$	$174.02 \pm 165.34$	$345.93 \pm 280.44$
P value	>0.05	>0.05	>0.05
<b>Income (\$ per month)</b>			
<300 (55)	$151.90 \pm 207.01$	$127.77 \pm 150.93$	$279.68 \pm 291.56$
300-600 (125)	$167.04 \pm 182.91$	$209.66 \pm 273.44$	$376.7 \pm 331.10$
600-1000 (57)	$158.81 \pm 152.06$	$196.21 \pm 175.26$	$355.02 \pm 250.69$
$\geq 1000$ (32)	$125.68 \pm 130.83$	$230.18 \pm 260.25$	$355.86 \pm 314.33$
P value	>0.05	>0.05	>0.05
<b>Occupation</b>			
Retired (14)	$234.10 \pm 251.31$	$215.13 \pm 288.65$	$449.23 \pm 390.63$
Unemployed (14)	$175.17 \pm 171.67$	$194.80 \pm 163.25$	$369.98 \pm 253.08$
Government employer (64)	$118.64 \pm 144.85$	$206.05 \pm 276.61$	$324.69 \pm 300.87$
Student (22)	$254.31 \pm 265.85$	$205.09 \pm 217.45$	$459.40 \pm 426.60$
Housewife (86)	$105.22 \pm 96.21$	$184.18 \pm 181.85$	$289.40 \pm 217.86$
Others (70)	$206.67 \pm 199.42$	$179.58 \pm 257$	$386.25 \pm 338.91$
P value	<0.05 <sup>b</sup>	P>0.05	P>0.05
<b>Cooking methods</b>			
grilling (123)	$187.68 \pm 181.22$	$206.14 \pm 262.05$	$393.82 \pm 329.15$
Boiling (100)	$132.07 \pm 148.21$	$178.14 \pm 201.51$	$310.22 \pm 243.58$

consumption was notably lower in <300\$ group. Also there wasn't any significant relation between literacy and fish consumption but Post-hoc Duncan test showed that fish consumption was notably lower in Guidance school and high school group. There was positively linear between poultry consumption and literacy ( $p<0.05$ ) also between fish consumption and income ( $p<0.05$ ).Cuisine styles of poultry meat were boiling (43.5%), grilling (33.1%), friezing (18.7%), and steamer (4.7%) and cuisine styles of fish were friezing (83.3%), steamer (7.7%), grilling (7%) and boiling (2.1%).

## DISCUSSION

In this study the fish consumption among west of Iran inhabitants was about  $27.8 \pm 33.5$  g/d.compared with many European countries such as Portugal and Spain, consumption of

fish in the UK is low at 22 g/d<sup>22,23</sup>. The highest increases in seafood have occurred in Oceania and Asia, especially China, with increases from approximately 11 g per capita per day in 1963 to approximately 69 g per capita per day in 2003<sup>23</sup>.

Fishes are one of the important sources of good quality protein and are low in fat (except for the oily fish which provide a very good source of long-chain polyunsaturated fatty acids). Fishes may also be a major source of iodine accumulated from their environment<sup>[23]</sup>.

Da sila et al reported that the calory intake of fish consumption in central, nothern and mediterranean Europe is about 19.1, 21.3 and 44.8 kcal/day respectively<sup>[24,25]</sup>.

Chrysohou et al reported that dietary intervention enriched with fish consumption(>3 times/week equals to 42.85 g/d versus never/rare) may be proveduseful in lowering the burden of morbidity related to depression in elderly population and this benefit may be belongs to DHA & EPA<sup>25,26</sup>.

Dallongeville et al reported that Fish consumption is associated with decreased heart rate in men. Because heart rate is positively associated with risk of sudden death, this association may explain, at least in part, the lower risk of sudden death among fishconsumers (more than twice per week).<sup>[2]</sup>

Oundin et al showed that fat fish intake decreases ischemic stroke risk and lean fish intake increases women's stroke risk( more than once a week equals to 14.2 g/d).<sup>[10]</sup>

In accordance to Hu et al results, in the USA, high consumption of fish was associated with lower risk of CHD in women,<sup>[27]</sup> and with lower CHD incidence and total mortality in diabetic women.<sup>[28]</sup> Regarding the mechanisms involved, it has been reported that fish oils improve the lipid profile, especially triglyceride levels in type 2 diabetics without leading to an adverse effect on glycemic control. However, in a meta-analysis, fish oils were associated with a small increase in LDL and glucose concentrations<sup>[29]</sup>.Panagiotakos et al reported that moderate fish consumption (150-300 g/w) was independently associated with a significant reduction in the odds of developing acute coronary syndrome<sup>[29]</sup>.

Drouillet et al reported that high seafood consumption (more than 170 g/w) before pregnancy is positively associated with fetal growth in overweight women (mean birthweight was 167g higher)<sup>[30]</sup>.

The European countries fish consumption is a little lower than the amount which Iranian consumed. The Iranian fish consumption was in an acceptable range (mean of moderate intake >150 g/w) but the cuisine style of fish is friezing in unhealthy oils such as hydrogenated or SFAs in 83.3% of participants and this matter will disturb nearly most of good beneficial effects of moderate fish consumption among west of Iran inhabitants. Lorestan is very far from the Caspian sea in the north and Persian Gulf in the south of Iran, so most of the sources of fresh fishes are belong farmed fish such as salmon so the canned or tuna fish has an important role in the amount of fish intake per day (7.6 g/d).

Our study shows that the poultry consumption in was about 22.7±25.35 g/d among the inhabitants of west of Iran. But USDA published data showed that Iranian poultry intake in 2011 was about30.1 g/d and this mean was decreased to 27.3 g/d in the first six month of 2012<sup>31</sup>.Valceschini reported that the poultry consumption among Middle East inhabitants was about 35.6 g/d

and it has been reported that US people consumed about 146.3 g/d [32,33].

Many different things are affecting on poultry intakes we can mention some the important ideas which increasing poultry intake such as being healthier, nutritious, innovative, versatile or good quality and some other ideas which decreasing poultry intake such as having unhealthy chemicals, being artificial or its benefits lost while the processing or cooking<sup>[18]</sup>.

Ronco et al reported the positive associations of breast cancer's risk with chicken with skin and fried fish, as well as negative breast cancer's risk associations with skinless chicken, not fried fish and both combined<sup>[34]</sup>.

The white meat consumption in our study was about 49.88±43.68 g/d and our published data reported 76±77.6 g/d for red meats 19 and it shows Iranian people's tend to consume more red than white meat.

Norat et al survey showed that colorectal cancer risk was positively associated with intake of red and processed meat (>160 g/day versus lowest <20 g/day), and inversely associated with intake of fish (>80 g/day versus <10 g/day), but was not related to poultry intake.<sup>[35]</sup>

Richman et al reported that Intakes of processed and unprocessed red meat, fish, total poultry, and skinless poultry were not associated with prostate cancer recurrence or progression but greater consumption of eggs and poultry with skin was associated with 2- fold increases in mentioned risk.<sup>[36]</sup>

The poultry consumption's means shows that west of Iran had a near amount of poultry intake versus the rest of the country. But the amounts which was measured by Valceschini shows the lack of poultry consumption in our country and it's a big deal that needs a governmental challenges.

## CONCLUSION

In conclusion we could say that the amount of fish consumption among inhabitants of west of Iran is acceptable and in moderate range but the survey shows the lack of poultry consumption in this area.

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