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Research Paper

A study on fish consumption pattern among pregnant women in kashmir valley

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ABSTRACT

Fish is one of the most important sources of animal protein, vitamins, minerals and fatty acids, essential for the maintenance of health and metabolism. Besides, fish is reckoned as an ideal diet for expectant and lactating women owing to its high nutritional value and health benefits. In this paper, in order to assess the fish consumption pattern among the pregnant women of Kashmir, the current study was carried out in Kashmir valley of J&K region during June 2023. We explained the purpose of study to the respondents and after taking their consent, we chose 200 respondents at random on the basis of consecutive sampling procedure during the study period using a well- designed validated questionnaire and via direct personal interviews. The data collected from our survey was analysed statistically and interpreted using appropriate statistical tools. The study revealed that majority of the respondents consumed fish occasionally during pregnancy. The major reason for inappreciable consumption was found to be the lack of awareness about the health benefits of fish during this phase. Moreover, consumption pattern of fish was related to the educational background of the respondents as comparatively higher percentage of respondents who consumed fish was found to be educated. However the consumption pattern was not significantly associated with the family status. Hence, the study elicits the need to effectively communicate the benefits of fish consumption in order to encourage proper nutrient intake among pregnant and lactating mothers and their children.

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1. INTRODUCTION

Fish as a food group are a unique source of enormous nutrients. Fish is regarded as a complete diet in itself. It's a lowfat food rich in proteins, vitamins, minerals and essential fatty acids. Apart from the metabolic, hormonal and cardiovascular benefits it offers, fish is an ideal diet for pregnant women [1]. However" Whether to eat fish or not" has been a question concerning the expectant women. Fish such as salmon, trout and mackerel contain omega 3 fatty acids in the form of Eicosa Pentaenoic Acid (EPA) and Docosa Hexanoic Acid (DHA) which have uncountable health benefits. DHA is particularly important for the foetal development. It's crucial for expectant and lactating mothers to assist baby's brain growth, neurocognitive development and eyesight. It also aids in preventing malnutrition in infants and mothers. Fish is also rich in other elements optimal for foetal development. Some of these include Manganese, Vitamin A, Vitamin D and Vitamin B12 [2], [3]. The experts suggest fish consumption once to thrice per week for expectant mothers. The advice issued in 2017 from the US Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) 1 recommends consuming 224 to 336 g (2–3 servings) per week of most types of commercially available fish during pregnancy, stating that "Fish and other protein-rich foods have nutrients that can help your child's growth and development." The 2017 advice recommends consumption of 2 to 3 servings of fish because of unspecified benefits for "growth and development [4]." However, regrettably, fish consumption among pregnant women is not significant in Kashmir. Maternal prenatal nutrition is an important factor which determines child's neurodevelopment [5].

Thus, failure to provide adequate key elements during such crucial phase may result in impairments that may not be corrected after birth. A survey was conducted among women in Kashmir to find out the frequency of fish intake during pregnancy and its impact on the babies delivered. The other objective of the survey was to figure out the reasons for limited fish consumption among such women. The results demonstrated that expectant and lactating women in Kashmir do not consume enough fish to derive health benefits for themselves and their children. Through the survey conducted, the reasons for inappreciable fish consumption were found to be:

1. Lack of awareness about the benefits of fish consumption.
2. Superstitious norms regarding fish intake during pregnancy.
3. Fear of exposure to mercury.
4. Complications during expecting phase.

Since lack of awareness among masses was the most followed reason, we sought to understand how fish consumption advice could be effectively communicated to encourage expectant women to have recommended amount of fish and other sea foods [6].

In literature, we came across a number of studies related fish consumption pattern among people particularly among pregnant women worldwide [1], [7], [6], [2]. In view of the literature cited above and the material available on various websites, it was found that very little work was done on fish consumption pattern among pregnant women in Kashmir region, hence we chose this study.

2. RELATED WORK

Fish serves as a significant component in the diet of expectant and lactating women owing to high nutritional quality. The research aimed to explore the perspectives and behaviors of pregnant women regarding fish consumption. Through qualitative methods, such as interviews and focus groups, the study investigated various factors influencing fish intake during pregnancy, including knowledge, beliefs, cultural influences, and concerns about mercury exposure. The findings provided valuable insights into the complexities surrounding fish consumption among pregnant women, informing public health efforts to promote safe and nutritious dietary choices during pregnancy. (A qualitative study of fish consumption during pregnancy - Arienne Bloomingdale, Lauren B Guthrie, Sarah Price, Robert O Wright, Deborah Platek, Jess Haines, and Emily Oken.)

The study investigates the relationship between fish intake during pregnancy and its effects on maternal-foetal health. It explores aspects such as the nutritional benefits of fish consumption, potential risks associated with certain types of fish due to mercury contamination, and the overall impact on maternal and foetal well-being. The paper reveals the importance of fish as a source of omega-3 fatty acids, protein, vitamins, and minerals essential for foetal development and maternal health along with the risks posed by mercury contamination in certain fish species, highlighting the importance of choosing low-mercury options to avoid adverse effects on foetal neurodevelopment. (Fish Intake in Pregnant Women and Its Impact on Maternal-Foetal Health Status by [2].

Cultural factors play a significant role in determining fish consumption patterns among pregnant women. Studies have examined cultural beliefs, dietary traditions, and socioeconomic factors that shape fish intake during pregnancy [6].

Effective communication strategies have been explored to educate expectant mothers about the benefits of consuming fish while minimizing exposure to contaminants. These strategies often involve tailored messaging, clear guidelines, and collaboration between healthcare providers and public health agencies.

3. METHODOLOGY

The study was carried out during June 2023 among women residing in district Srinagar of Kashmir valley. A total of 200 participants selected at random were involved in the survey. The data was exclusively primary, collected via direct personal oral interviews and validated questionnaires. The participants were diverse with respect to educational qualification, economic status and age. The data has been analysed and interpreted statistically [8].

3.1. Research Hypothesis

Hypothesis 1: There is no significant difference in frequency of fish consumption between literate and illiterate sections of women in the study area.

In order to test the hypothesis 1, we use chi-square test (with usual notations) given as

$$\chi 2 = \sum (Oi - Ei)2/Ei$$

where Oi and Ei are observed and expected frequencies respectively. We reject H0 if p value is less than specified level of significance.

4. RESULTS AND DISCUSSION

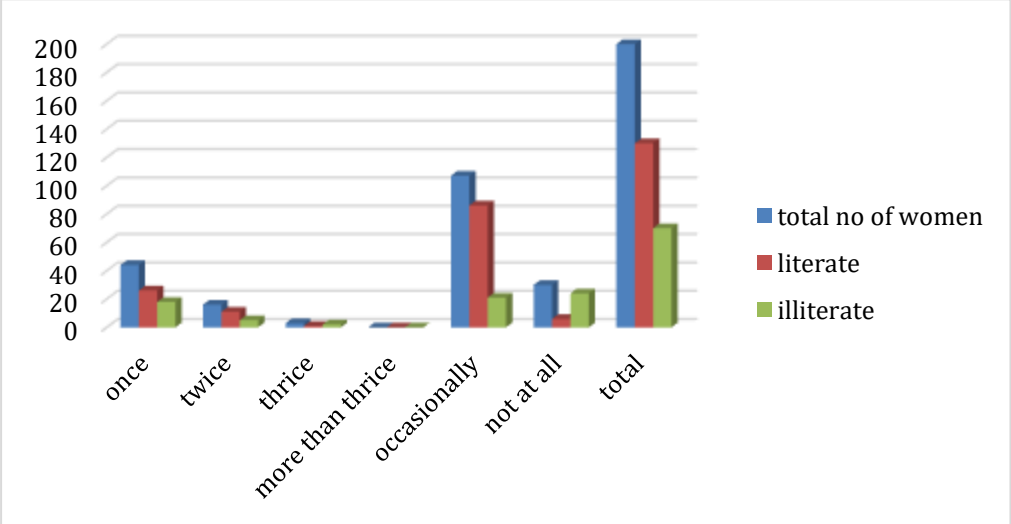


Figure 1. Bar Graph Depicting Relation Between Fish Consumption Pattern and Educational Status of Respondents

Table 1. Fish Consumption Pattern and Educational Status of Respondents

Fish Intake Frequency	Literate	Illiterate	Total No. of Women	Chisquare	P-Value
Once a week	26	18	44	39.916	<0.05
Twice a week	11	5	16		
Thrice a week	1	2	3		
More than thrice	0	0	0		
Occasionally	86	21	107		
Not at all	6	24	30		
Total	130	70	200		

The results obtained from the study showed that among 200 participants surveyed, 107 women (53.5%) consumed fish occasionally during pregnancy, 44 (22.00 %) consumed fish once a week, 16 (8%) consumed twice a week, 3 (1.5%) consumed thrice a week, 30 (15%) consumed no fish at all and none (0%) consumed fish more than thrice. Statistically, there was a significant association between fish intake and education of women ($P<0.05$). Further, it was found that among 170 participants who consumed fish during pregnancy, 124 (72.94%) belonged to literate background and 46 (27.06%) were illiterate. On the contrary, among 30 participants who consumed no fish at all during pregnancy, 6 (20%) were literate and 24 (80%) were illiterate. Hence, from the data so obtained, it is evident that fish intake during pregnancy is more frequent in educated masses in comparison to the illiterate section of the study area. Statistically, in the frequency of fish intake, there was a significant difference between educated and uneducated women. Hence, the hypothesis set in the paper is rejected.

Table 2. Main Reasons for Nil Fish Intake Among Respondents Under Study

Reason for No Fish Intake	Lack of Awareness	Fear of Bio Magnification	Superstitious Norm	Complications	Total
No. of women	19	8	2	1	30

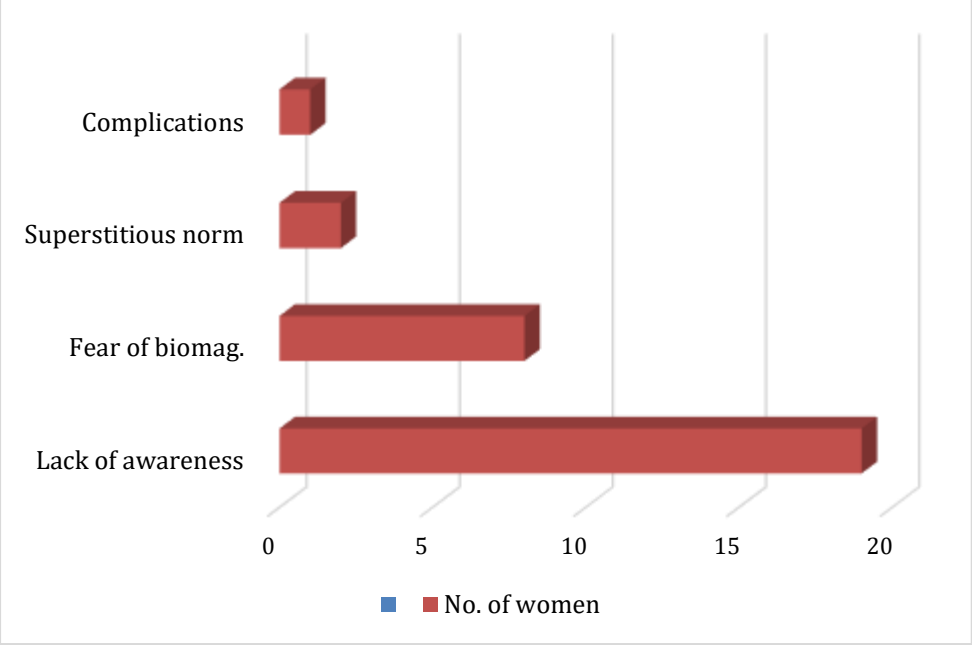


Figure 2. Graph Depicting Reasons for Nil Fish Intake Among Women

Among 30 participants who did not consume any fish during pregnancy, 19 (63.33%) stated they were unaware of its health benefits, 8 (26%) feared exposure to mercury and other harmful chemicals, 2 (6.66%) believed in superstition and 1 (3.33%) had complications and were not recommended seafood.

The major factor responsible for limited fish intake was found to be lack of awareness. A vast majority of participants were oblivious to the health benefits offered by fish during expecting and lactating phase. In fact, among 200 women involved in the survey, only 31 (15.5%) were suggested to eat fish by their gynaecologists. The second most popular reason for inappreciable fish consumption was the fear of bioaccumulation in fish. Increased urbanisation and subsequent untreated discharge into lakes and other water bodies has created fear of exposure to chemicals such as zinc, lead and especially methyl mercury among women, hence limiting fish consumption. A minor section followed superstition, believing fish intake during pregnancy was not good for the baby to be born. Only a rare case of complicacy was found wherein sea food was not recommended to the participant [9].

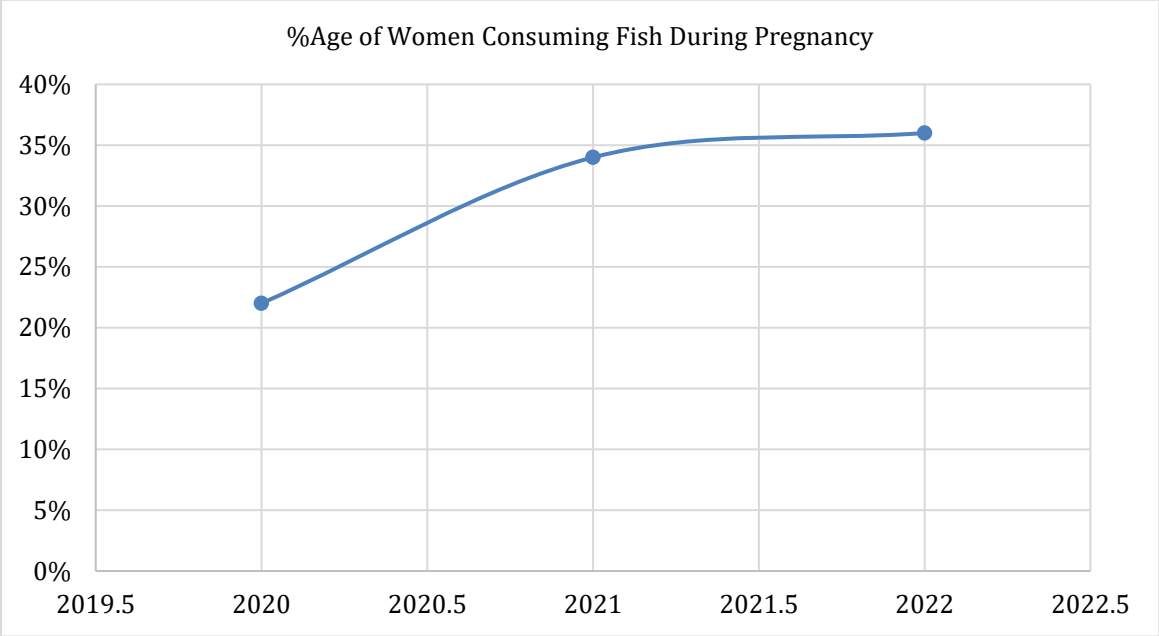


Figure 3. %Age of Women Consuming Fish During Pregnancy

From the data obtained, a marked increase in fish consumption can be noticed in consecutive 3 year span from 2020 to 2022 among pregnant women. For women of pregnancy year 2020, only 22% had consumed fish during pregnancy, 34% had consumed fish during 2021 and it had increased to 36% in 2022. Factors such as education and internet amplification can be reckoned. However, the frequency of fish intake still remains a cause of concern as participants have preferred "occasional" consumption over regular one.

4.1. Relationship between Fish Consumption and Health of New Born

The study reported a positive relationship between fish intake and child development or health status. It was found that fish intake during prenatal period had a positive impact on baby's health as well as neurocognition which includes parameters such as IQ, attention, memory and behaviour. Among 170 participants who consumed fish, 166 gave birth to a healthy weighed child. Only 3 (1.76%) delivered underweight children and 1 (0.58%) delivered an overweight child. On the other hand, among 30 women who did not consume fish at all during pregnancy, 4(13.3%) gave birth to underweight kids and rest 26 (86%) delivered normal weight babies. It reflects higher percentage of abnormal weight babies in case of nil fish consumption. Furthermore, based on direct personal interviews, women who had fish during pregnancy reported average to good neurocognitive skills and IQ in their kids. One rare case of autism was reported. No case of protein deficiency was found. However, among women with nil fish consumption,1 case of autism was reported along with 2 cases of developmental language disorder. 3 women were TORCH positive and 1 was anaemic among these [10].

5. CONCLUSION

The study reveals that despite innumerable health benefits fish offers, the level of its consumption is still below par among expectant women in Srinagar Kashmir. The most popular reason is the lack of awareness about the health benefits of fish in pre-natal nutrition. Also, among women who consume fish, educated section show a greater percentage, indicating that education bears a positive impact on fish consumption level. Hence, our study reveals that by amplifying education among women, our objective of increasing fish consumption can be achieved. However, even among educated masses, the frequency of intake is a matter of concern as most women have preferred occasional consumption over regular one. The respondents even revealed that only in a few cases, fish was recommended in diet by their gynaecologists, while the rest were oblivious. This illustrates the need to effectively communicate the importance of fish servings in diet of expectant women to encourage consumption. This can be done by raising awareness campaigns and shooting ads too. However, the clinicians and gynaecologists have a greater role to play.

They need to regularly recommend fish to their enrolled patients verbally as well as via posters in the clinics. Fish should be prominently included in the diet charts of the expectant ladies. Increased awareness will certainly bring a positive impact on consumption level and enhance it manifold. The other most popular reason was that women were sceptical towards fish consumption owing to the fear of exposure to mercury or other lethal chemicals in fish. Considering the increased industrialisation and the industrial operations on river and lake banks, this reason can be reckoned genuine. However, the bioaccumulation level is not significant in local fish of Kashmir, eliminating the risk of exposure. Moreover, to be on the safer side, women can follow the third group in the advice from the FDA and EPA which lists 7 fish to avoid eating during pregnancy because of high mercury levels in these fish .They include shark, swordfish, king mackerel, tilefish from the Gulf of Mexico, orange Roughy, marlin, and bigeye tuna).

There is justification for highlighting these 7 fish to avoid, given their known levels of mercury and weak neurocognitive benefit. The rest of fish species are safe to consume. During the study, the respondents also revealed that they don't have specific preferences while buying fish and were oblivious to the fish species recommended by the experts during pregnancy. Hence, it is important to impart the knowledge about the "right type" of the fish that must be consumed during expecting and lactating phase.

The recommended sea foods which are low in mercury and high in omega 3 fatty acids such as Salmon, Herring, Hilsa, Rohu and Trout are predominantly recommended. Among such fish, trout is widely cultured and hence available in Kashmir. "Trout, when fully cooked, is safe to eat during pregnancy. Not only that, but it also has many nutrients that are beneficial during pregnancy, especially Omega 3 fatty acids''[by Gina Waggott, Medically Reviewed by Janet Gordon RD, MBDA in Fresh Food, Meat & Sea food.] Encouraging fish consumption among women can hit two targets with one arrow. It will ensure optimal nutrient intake and simultaneously help bridge the gap between fish supply and consumption in Kashmir.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Fiba Arif	✓	✓	✓	✓		✓		✓	✓	✓	✓		✓	✓
Bilal Ahmad Bhat	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration

Va : **Va**lidation
Fo : **Fo**rmal analysis
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study and their voluntary consent was obtained prior to data collection.

Ethical Approval

Not Applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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