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Assessing the Consumer Knowledge and Perception on Health Benefits of Fish Consumption – Evidence from the Tribal Populace of Wayanad

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Abstract

This study evaluated the knowledge, perception, and receptiveness of tribal population in Wayanad, Kerala, towards the health benefits on the consumption of fish and fish-based products. Data on 200 households were collected through a questionnaire, where 78% of respondents were females and 22% were males. The results of the survey indicated that only 34.5% of the respondents exhibited satisfactory knowledge on health benefits of fish consumption with an average score of 2.97. About 68.5% of the respondents had an unsatisfactory perception towards the benefits of fish consumption with an average score of 20. Misconceptions regarding the nutritional value of fish were prevalent among the respondents, including beliefs that fish lacks essential vitamins (76%) and is not a good source of omega-3 fatty acids (93.5%). However, positive perceptions were observed, with 89.5% recognizing potential of fish in preventing heart attacks and strokes. Moreover, 81% acknowledged that the consumption of fish can reduce the shrinkage of brain during old age. A significant share showed willingness to try fish-based products like fish balls and fish pappad, but most of them were less receptive to take fish-based products due to unfamiliarity, pricing and availability issues. These findings highlight the importance of targeted public health initiatives to address misconceptions about the consumption of fish to promote the consumption of fish and fish-based products for their numerous health benefits through awareness programme and education. Implementing strategies to increase the availability and accessibility of innovative fish-based products could further enhance their adoption among consumers, which could improve overall health and nutritional security in the tribal community.

Keywords: Fish consumption, health benefits, Knowledge, perception, receptiveness

Introduction

Kerala stands out with its remarkable fish consumption compared to other Indian states, surpassing the national average per capita fish consumption (PCFC) by four times (Salim, 2020). Over the past decades, the state has witnessed a substantial increase in annual per capita fish consumption, rising from 15 kg in the 1970s to nearly 30 kg in 2019 (Salim, 2020; Shasani et al., 2020; Lenka & Satpathy, 2020). Additionally, both rural and urban areas in Kerala exhibit significantly higher monthly per capita fish consumption compared to the national averages (Govt. of India, 2014). While Kerala is known for its significant fish consumption, there has been inconsistency in this trend across different ethnic groups in the state. Specifically, Wayanad, the north-eastern district of Kerala, stands out as the district with the highest tribal population in the state which represent 1.4% of the total state population (Mohandas et al., 2019). Furthermore, highlighting the irregularities in fish consumption within the state, Sajeev et al. (2021) estimated that the per capita fish

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consumption among tribal communities in Wayanad was 1.03 kg per month. This low fish consumption was accompanied by concerning health statistics, with reported cases of anaemia reaching alarming rates of 54.6% among adolescents and 15.5% among pregnant women within the tribal population. According to the National Family Health Survey (NFHS-5) conducted in 2019-20, Wayanad has the highest percentage of children with stunted growth in the state of Kerala, accounting for 31% of the state average. Moreover, the district records 16% of children suffering from wasting and 22.5% of children under the age of five are underweight (Chakraborty et al., 2021). Given these distressing health indicators, Wayanad was selected for this study. Its higher prevalence of anaemia in both women and children compared to the rest of Kerala makes it particularly advantageous for exploring potential interventions for improving food and nutritional security. The consumption of fish has scientifically been proven that it alleviates iron deficiency caused anaemia, investigating its role in this context can offer valuable insights to combat malnutrition and improve the well-being of the tribal population in Wayanad. Fish is rich in essential micro and macronutrients, making it an important dietary component that can potentially help to address malnutrition issues and improve overall health outcomes for children in the region. It is an important animal-based protein-source, that contains important amino acids, unsaturated fats, calcium, phosphorus and vitamins A and D (Craig et al., 2017). Fish, rich in omega-3 fatty acids and PUFA, is a highly nutritious choice, particularly beneficial for vulnerable groups like children, pregnant women and lactating women, ensuring better nutritional security. A 150 g portion can provide 50-60% of daily protein requirements for adults, which reduces malnutrition and promoting overall health through a well-rounded intake of vital nutrients and minerals (Barik, 2017).

The consumers' attitude towards the nutritional benefits of fish significantly influence their consumption behaviour (Verbeke & Vackier, 2005). Knowledge, both objective and subjective, plays a crucial role in consumers' decision-making process when purchasing products (Park et al., 1994). Moreover, there is a positive correlation between individuals' knowledge and their health-related behaviour, particularly concerning food consumption (Swanson et al., 2006). In recent years, numerous studies have focused on understanding consumer purchase behaviour and consumption patterns, especially concerning fish products (Carlucci et al., 2015). Examining consumers' knowledge levels and their perceptions of the health benefits associated with fish consumption becomes essential in predicting the demand for fish products and ensuring protein security (Michel et al., 2011; Gaviglio et al., 2014). Hence, this study aimed to assess the level of knowledge and perception on health benefits of fish consumption among the respondents and their willingness to include fish-based products in their diets to increase the intake of fish and to improve the nutritional quality. The findings of this study will provide valuable insights to formulate effective strategies and interventions to promote fish consumption among the tribal population.

Materials and Methods

Tribals in Kerala are the indigenous population inhabited mostly in the forests and mountains of Western Ghats, along the borders of Kerala and Tamil Nadu. The census of India, 2011 recorded that Kerala is home for about 484,839 scheduled tribes among which Wayanad had the highest number, 1,48,215 (Bindhu, 2021). Hence, the study was conducted among the six selected communities of tribal population of Wayanad district namely, Paniya, Kurichyan, Kuruman, Kattunaykkan, Adiyan and Vettakuruman. The Stratified Probability Proportional sampling technique was applied to select the number of households from different tribal groups for the study. The collected sample size was 200, whose responses were recorded using a survey schedule. During the survey, information on the personal and socio-economic characteristics of respondents such as age, education, income, and occupation were collected, which aimed to gain insights into the demographic profile of the tribal community under study. The study also evaluated the participants preferences towards fish-based products. The respondents were presented with five products like Fish Soup, Fish Pappad, Fish Noodles, Fish Balls and Fish Cutlet through proper explanation. They were asked to indicate whether they would be willing to consume these products. The data obtained from the survey were analysed to determine the percentage of respondents who chose the fish-based product. A numeric scoring system was used to determine the respondent's knowledge on health benefits of consuming fish. A set of ten

statements were designed to gauge the knowledge of respondents about the health benefits of fish consumption. To compute the outcomes, the responses scored as "True" or "False" were transformed as "1" or "0", respectively. Based on the scores obtained by the respondents in each category; cut-off points for adequate scores were set and defined as scores greater than mean scores obtained by the respondents (Table 1). Respondents scoring above the cut-off score assessed were regarded as having adequate knowledge level, while others considered to have an inadequate knowledge level. Responses of the participants on perception of health benefits of fish consumption with respect to its nutritional attributes were graded on a 5-point Likert scale, an agreement scale ranging from '1' for "Strongly Disagree" to '5' for "Strongly Agree" and expressed in percentage (Hager et al., 2020).

Results and Discussions

Most of the respondents participated in the survey were females (78%) and majority of them (78%) were in the age group of 26-50 years. On an average, 84% of the respondents had family size with 3-6 members, and a significant proportion of respondents (83.5%) lived in villages. It was observed that 51% of the respondents had primary education and 23% were illiterate. About 82.5% of the respondents were agricultural labourers and 4% were engaged in other works.

The scores obtained for the participants, in terms of their knowledge and perception is given in Table 1. On an average, the knowledge score was 2.97 ± 1.53, against the maximum score 10. Most of the respondents (65.5%) lacked a positive understanding on the health effects associated with fish consumption. Regarding perception, the respondents attained an average score of 20 ± 2 against the maximum score of 30. A total of 31.5% of the participants exhibited a tolerable level of perception regarding the health advantages associated with the consumption of fish.

The information presented in Table 2 provides an overview of respondents' familiarity with health-related factors associated with fish consumption. The mean knowledge level obtained by the respondents were 2.95. The knowledge level was classified as low, medium and high based on the scores obtained by the respondents. The scores obtained <3 was defined as low, 3-4 as medium and >4 as high level of knowledge. The maximum score and the minimum score obtained by the respondents were 9 and 0, respectively. The data indicated that a significant proportion of the participants (46%) demonstrated a limited understanding of various aspects concerning the consumption of fish in relation to health benefits. In contrast, a smaller percentage of respondents (18.5% and 35.5%) exhibited higher and moderate levels of knowledge

Table 1. Description of scores obtained by the respondents (n=200)

Outcome Variable	Maximum obtainable scores	Scores received by respondents		Mean ± SD	Adequate f (%)	inadequate f (%)
		Minimum score	Maximum score			
Knowledge	10	1	9	2.97 ± 1.53	69 (34.5 %)	131 (65.5 %)
Perception	30	8	28	20 ± 2	63 (31.5 %)	137 (68.5 %)

Cut-off marks – mean score i.e. Knowledge - 2.97 and Perception – 20; Satisfactory scores – scores > mean scores obtained by the respondents; SD – Standard Deviation

Table 2. Level of knowledge obtained by the respondents (n=200)

Knowledge level	Categories	Mean	½ SD	Frequency (f)	Percentage (%)
Low	<3	2.95	0.75	92	46
Medium	3-4			71	35.5
High	>4			37	18.5

pertaining to fish consumption and health benefits, respectively. These findings emphasize that a considerable number of individuals lack comprehensive awareness on the potential health implications associated with fish. This suggests that the need for targeted educational initiatives to enhance public knowledge and awareness on the benefits and advantages associated with fish consumption.

The perception level of the respondents is given in Table 3. The mean level of perception obtained by the respondents was 20. Perception level was classified as poor, average and high based on the scores obtained by the respondents. The respondents obtained a score <19 was classified as poor and the scores >21 as high. The perception level of the respondents with scores between 19 and 21 was classified as average. The maximum and minimum scores obtained by the respondents were 16 and 30, respectively. The data indicated that a significant portion, accounting for 58 % of the participants, held an average perception level in relation to fish consumption. Conversely, a small proportion, constituting only 22% of the total respondents, exhibited a high level of perception towards consuming fish. In essence, the table underscores that majority of the participants (58%) fell into the category of having an average perception towards fish consumption; fewer individuals demonstrating a more positive high perception (22%) and a minority expressing a poor perception (20%). These findings shed light on the diverse range of attitudes and viewpoints of respondents regarding the consumption of fish. Further exploration of the factors influencing these varying perceptions could provide valuable insights into the dynamics of fish consumption.

Majority of respondents also acknowledged that consumption of fish prevents heart attacks and strokes (89.5%). However, a mere 26% of participants expressed doubts about the suitability of fish consumption during pregnancy. Furthermore, 81% of respondents recognized the positive impact of fish consumption on reducing brain decline during old age. Merely 16 % of the respondents agreed that fish consumption prevents depression and 23.5% agreed that the best frequency to consume fish is 1-2 times per week. A study by Mallappa et al. (2023) found that majority of consumers had a very low to low level of awareness about the nutritional value of fish. The study discovered that most fish eaters had low awareness on the nutritional and health benefits of fish consumption. According to Golden et al. (2016), it is generally recommended to include fish in one's diet twice a week at the best, with each serving comprising around 240 g, including one portion of oily fish. By adhering to this guideline and replacing unhealthy food choices, individuals can attain an average intake of 250 mg of Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA), which has been strongly supported by scientific evidence for its manifold health benefits. These advantages encompass cognitive development support, enhancement of mental well-being, reinforcement of the immune system, as well as the prevention of anaemia, cardiovascular disease, and dementia. The perception of the respondents towards the health benefits associated with the consumption of fish is depicted in Table 4.

While a substantial number of respondents (41 %) disagreed that fish is the most nutritious food, a notable proportion (34%) remained undecided. On a positive note, it was widely accepted (90%) that eating fish is recommended for all age groups due to its positive impact on health. Additionally, majority of respondents (62%) expressed uncertainty about the potential of fish consumption in reducing cardiovascular diseases, indicating a need for further awareness on this topic. A scant 3 % held the belief that consuming fatty fish could enhance bone development, while a substantial majority (55%) remained uncertain on this matter. Similarly, respondents were divided in their opinions on whether fish is healthier than red meat, with 48 % not expressing a clear stance. Furthermore, a notable percentage (52%) favoured fish over red meat for its

Table 3. Level of perception obtained by the respondents (n=200)

Perception level	Categories	Mean	½ SD	Frequency	Percentage (%)
Poor	<19	20	1	40	20
Average	19-21			116	58
High	>21			44	22

Table 4. Consumer's perception on health benefits (n=200)

Statements	Strongly Agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree (%)
Fish is the most nutritious food	3	21	34	41	1
Eating fish is recommended for all age groups	57	33	3	2	5
Fish consumption reduces cardiovascular diseases	10	19	62	4	5
Fatty fish consumption can improve development of bones	2	1	55	40	2
Fish is healthier than red meat	11	41	48	0	0
Regular fish consumption stimulates brain development	5	14	81	0	0

health-related advantages. However, majority (81%) remained unsure about whether regular fish consumption stimulates brain development, underscoring the widely recognized benefits in this area. Overall, the study highlights the importance of targeted health education campaigns to clarify misconceptions and promote the numerous health advantages of incorporating fish into their diet. By addressing knowledge gaps, individuals can make more informed dietary choices, leading to improved overall health and well-being.

The United Nations 2030 Agenda for Sustainable Development highlighted inclusion of fish in daily diet to enhance the nutritional status of the population. It emphasized incorporating fish into regular meals as a crucial step towards addressing global hunger and achieving nutritional security. The deficiency of iron, an essential component of blood protein, can lead to conditions such as anaemia. Therefore, consuming fish, a good source of iron, plays a vital role in combating iron deficiency and related health issues. Consequently,

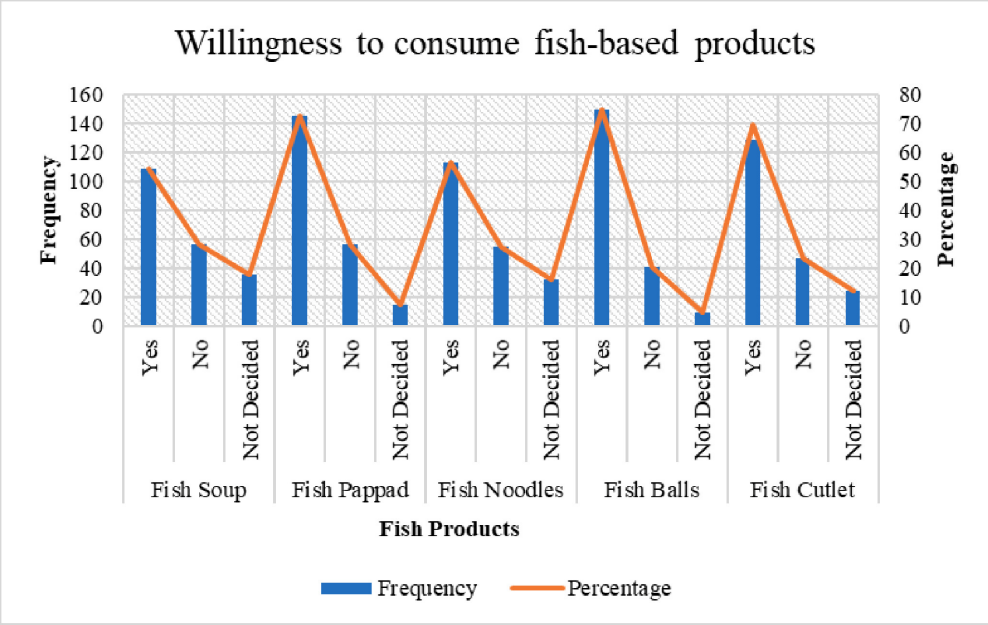

Fig 1. Willingness to consume fish-based products

a study was undertaken to assess the receptiveness of respondents towards consuming fish-based products under the provision of ICAR-CIFT intervention programs. Respondents were asked about their readiness to consume fish-based products such as fish soup, fish pappad, fish noodles, fish balls, and fish cutlets. Understanding consumer preferences is crucial for designing effective strategies for improving dietary habits and overall nutrition. The results are shown in Fig. 1.

The survey outcomes revealed varying degrees of receptiveness among participants towards consuming fish-based products. Among the options, fish balls and fish pappads emerged as the top preferences, with 75% and 72.5% of acceptability among respondents. Similarly, fish soup and fish noodles generated noteworthy interest, with 54.5% and 56.5% of participants displaying willingness to try them. Furthermore, a substantial proportion (27.5%) were reluctant to try the fish noodles. In terms of fish cutlets, 64.5% of the respondents were open to consume them, whereas 23.5% expressed reluctant to take it.

Conclusion

The study extracted the knowledge and perception levels of respondents regarding the health benefits of consuming fish in the tribal population significantly. The findings revealed that the respondents from the tribal community lacked knowledge on health benefits of fish consumption among the respondents. Majority (46%) had a poor level of knowledge about the health benefits of fish consumption, as many believed that fish lacks vitamins and is not a good source of omega-3 fatty acids. Moreover, there were misconceptions regarding fish consumption during pregnancy and its role in brain development. The study highlights the growing demand for convenient seafood products and the potential to increase fish consumption through the development of ready-to-consume fish-based products. Overall, the research provides valuable insights for guiding future interventions and policies aimed at enhancing fish consumption and improving public health, particularly among the tribal population.

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