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EXPLORING THE ANTHROPOMETRIC CHARACTERISTICS AND EATING HABITS OF FISHERMEN IN KERALA

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Abstract

In this study of anthropometric profile and the dietary pattern of fishermen in Kerala was examined with the help of a total 100 subjects aged between 20-45 years marine fishermen from different coastal areas of four districts in Kerala state were selected. Subjects willingness to participate in study by taking informed consent. To collect the required information a set of questionnaires was developed and administered on the entire subjects who were recruited in the study. Anthropometric measurements like body weight, height, BMI and Hand grip strength were measured using standard techniques. Dietary information was collected using 24hrs. Recall and food frequency questionnaire. Subjects selected by proportionate sampling from different districts were enrolled for the study. A set of tools were administered on the subjects to collect the background information, work related profile, physical activity and dietary information. The study concluded that among the subjects around 76% were married while only 24% were single. All are living in nuclear families; the average income of subjects was 5945/- Rs. 91%. The anthropometric values are good, but the lifestyle habits, work related activity and nutritional values were not good at all. I recommend organizing a specialized awareness campaign featuring interactive activities aimed at emphasizing the significance of nutritional intake, recovery, and positive lifestyle habits for enhancing the overall health and wellness of fishermen.

Keywords: Fisherman, Nutrition, Anthropometric, Dietary Pattern, Physical Activity, Lifestyle Habits

Introduction

The fishing and fish industry play crucial roles in both developing and developed nations, serving as significant sources of income and employment, including in India. Fishermen constitute a vital segment of the population in Kerala, where the sector ranks eighth in terms of population size among the fourteen coastal states. Kerala is home to an estimated 11.114 lakh fishermen, with 8.55 lakh engaged in the marine sector. Of these, 2.28 lakh are active fishermen, distributed between the marine and inland sectors. The

state encompasses 222 fishing villages in the marine sector and 113 fishery villages inland, providing livelihoods for a substantial portion of the populace. Marine fishermen are predominantly concentrated in Trivandrum, Alappuzha, Kollam, and Kozhikode districts, while inland fishermen are primarily found in Ernakulum. Alappuzha, and Kollam districts. Despite Kerala's reputation for high-quality living standards, its fishing community has often been excluded from overall developmental gains. Both the Indian and Kerala fishing sectors, although performing adequately, encounter significant challenges such as socioeconomic disparities, low incomes for fishermen, declining catch rates, overexploitation of marine resources, and limited access to essential services like water and sanitation, and poor health conditions exacerbated by

climate change hazards. These challenges directly affect the nutritional well-being of fishermen, impacting their physical capacity to work efficiently and overall productivity. Understanding the nutritional profiles of fishermen is crucial to addressing these issues and optimizing their sector's potential. This review aims to explore the nutritional profiles of fishermen and evaluate whether they meet their dietary requirements adequately.

The objectives of the study are as follows:

- To construct an anthropometric profile of fishermen in Kerala.
- To determine the dietary patterns of fishermen in Kerala through 24-hour dietary recall data.

Methodology

To investigate the dietary patterns and anthropometric profiles of fishermen in Kerala, a sample of 100 marine fishermen aged between 20 and 45 years was selected from various coastal areas across four districts in Kerala. Individuals within this age range were approached for participation, with their informed consent obtained prior to the study. A comprehensive set of questionnaires was developed and administered to collect the necessary information from all recruited subjects. Anthropometric measurements, including body weight, height, BMI, and hand grip strength, were obtained using standardized techniques. Dietary information was gathered through a combination of 24-hour dietary recall and food frequency questionnaires. Subjects were chosen through proportionate sampling from different districts to ensure representation from diverse geographical areas. Various tools were employed to collect background information, work-related profiles, physical activity levels, and dietary habits of the participants. Statistical analysis, including descriptive statistics and Z scores, was conducted using SPSS version 21 to analyse the collected data.

Results and Discussion

Anthropometric Assessment: The anthropometric measurements, including height, weight, BMI, and hand grip strength, were obtained from all individuals within the selected population using standardized procedures

Table 1: Mean value of Height, Weight and BMI, hand grip strength of the subjects

variables	Mean ± SD Total = 100
Height	162.93±13.48 centimetre
weight	63.33±11.52 kilogram
BMI	23.81±3.10
Hand grip strength	40.87±7.83 kilogram

Table 1 presents the anthropometric measurements of the study participants. The mean height of the subjects was 162.93±13.48 centimetres, and the mean weight of the total subjects was 63.33 ± 11.52 kilograms. These values indicate the average physical characteristics of the participants. Notably, most of the subjects exhibited a normal weight for their present height. Height is influenced by various factors, including genetics and nutritional intake, particularly during adolescence. The mean BMI of the subjects was 23.81 ± 3.10, indicating that the study participants fell within the normal range of weight, which is crucial for preventing overweight and obesity-related issues.

Additionally, the mean grip strength in the left hand and right hand of the subjects were 60.48 ± 15.04 and 57.92 ± 15.17, respectively. These values provide insights into the physical strength and functional capacity of the participants, which are essential for various activities related to their occupation as fishermen.

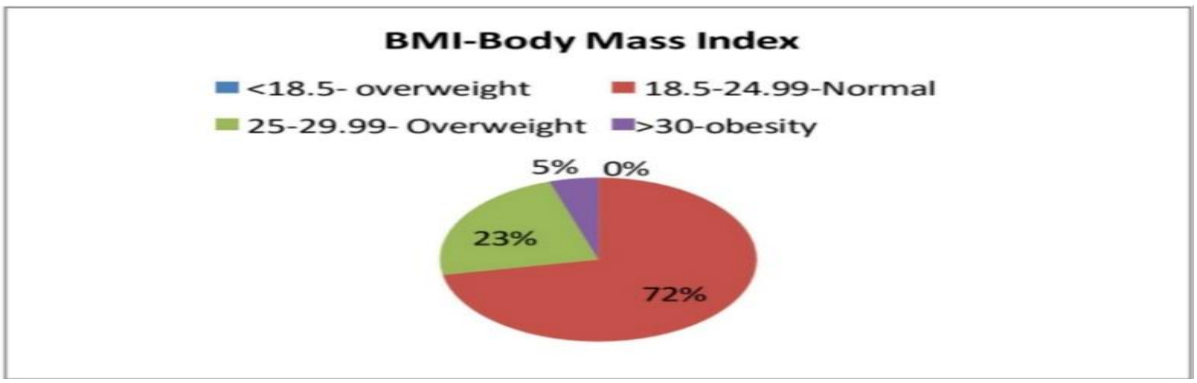

Figure 1: classification of subjects according to BMI classification WHO (2004)

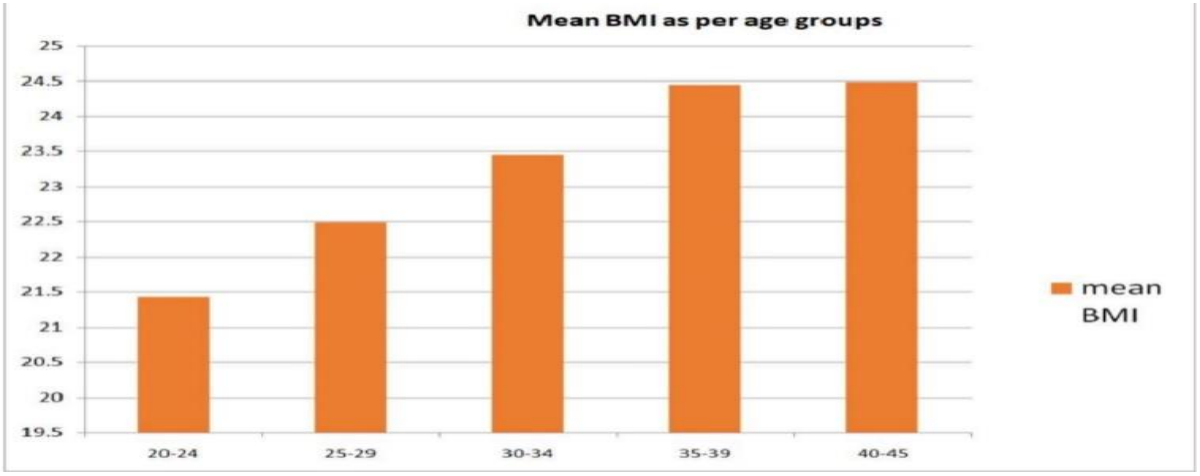

Figure 2: Average BMI according to age

Figure-1 illustrates the distribution of BMI categories among the study participants. It indicates that none of the subjects were underweight, with 72% classified as normal weight, 23% as overweight, and 5% as obese. This data highlights that the majority of fishermen fell within the normal BMI category.

In Figure-2, the relationship between BMI and age is depicted. It demonstrates an increase in BMI with age among the participants. Specifically, the mean BMI was 21.42 for individuals aged 20-24 years, 22.48 for those aged 25-29 years, 23.25 for individuals aged 30- 34 years, 24.45 for those aged 35-39 years, and 24.481 for individuals aged 40-45 years. This trend suggests a potential correlation between age and BMI among the fishermen population

Table 2: Left- and Right-hand grip based on age

Age	Average Left hand grip strength	Grip strength(L)	Average right hand grip strength	Grip strength (R)
20-40	53.33	Normal	60.06	Strength
25-29	56.61	Normal	59.69	Strength
30-34	55.32	Normal	57.1	Strength
35-39	60.13	Strength	60.16	Strength
40-44	58.48	Strength	62.17	Strength

Table 2 presents the hand grip strength data categorized by age groups among the fishermen. It indicates that in the 20-24, 25-29, and 30-34 age groups, individuals exhibited greater grip strength in their right hand compared to their left hand. However, in the 35-39 and 40-44 age groups, participants showed higher grip strength in both their left and right hands. This observation suggests variations in hand grip strength across different age groups among the fishermen population, with notable differences between younger and older age cohorts.

Dietary Assessment: Alton Brown once stated, "There are no bad foods, only bad food habits." With this perspective in mind, this section delves into the food habits of the study subjects and their average nutrient intake. The dietary assessment was conducted using the "24 hours' dietary recall" method. To evaluate both dietary quantity and profile, data was collected and analyzed according to the guidelines provided by the Indian Council of Medical Research (ICMR) in 2020. Food items were categorized into various groups, including cereals, pulses, fruits, green leafy vegetables, other vegetables, roots and tubers, milk and milk products, sugar, fats and oils, meat/fish/poultry, and nuts and oilseeds. Nutrient intake assessment involved calculating calories, carbohydrates, proteins, and total fat.

Food Habits: Human beings worldwide are often categorized into two groups based on their dietary preferences: vegetarian and non-vegetarian. Through research on fishermen in Kerala, it was observed that all fishermen in the region were non-vegetarian, primarily due to the abundant availability of fish.

Dietary Intake of the Subjects: Table 3 presents the average consumption of various food groups by the study subjects. The dietary data depicted in the table were derived from the 24- hour dietary recall method. Furthermore, the data were compared with the recommended dietary intake (RDI) outlined by the Indian Council of Medical Research (ICMR) in 2020.

Table 03: Food items and its mean value

Food items	Number ofMean value fishermen		RDA
Cereals	100	351.52±100.27 gm	360
Pulses	24	69.68±23.08 gm	120
Fruits	30	77.96±40.7 gm	150
Green leafy vegetables	15	63.14 ±19.6gm	100
Roots and tubers	33	65.38±33.39gm	100
Other vegetables	28	122.5±43.3gm	200
Milk and milk products	88	62.5±23.08 ml	300
Fat and Oil	100	38.05±14.91 gm	30
Nuts	13	10.92±5.57gm	30

Table -03 provides insights into the dietary habits and nutrient intake of the study subjects. here's a Summery of the table -03 findings;

1. Cereal Intake: The overall cereal intake of the subjects was 351.52 grams per day, slightlybelow the recommended intake of 360 grams per day. Cereals are rich in carbohydrates, whichcontribute to bone strength.
2. Pulse Intake: Only 24 subjects consumed pulses, with an overall intake of 61.68 grams per day,significantly lower than the recommended intake of 120 grams per day.
3. Fruit Intake: Among the subjects, only 30 consumed fruits, with an average intake of 77.96 grams per day, below the recommended intake of 150 grams per day.
4. Green Leafy Vegetable (GLV) Intake: Only 15 subjects consumed GLVs, with an average intake of 63.14 grams per day, below the recommended intake of 100 grams per day. GLVslike kale and spinach are rich in vitamins and are beneficial for heart health and weightmanagement.
5. Root Intake: The overall intake of roots among the fishermen was 65.38 grams per day, lowerthan the recommended intake of 100 grams per day.
6. Other Vegetable Intake: The overall intake of other vegetables was 122.5 grams per day, belowthe recommended intake of 200 grams per day.
7. Milk and Milk Product Intake: The overall intake of other milk and milk products was 62.5 grams per day, significantly lower than the recommended intake of 300 grams per day
8. Fat and Oil Intake: The overall intake of fat and oil among the fishermen was 38.05 grams perday, slightly higher than the recommended intake of 30 grams per day
9. Nuts and Oil Intake: Only 13 subjects consumed nuts and oil, with an average intake of 10.92 grams per day, significantly lower than the recommended intake of 30 grams per day.

These findings suggest that the dietary habits of the fishermen in Kerala may not fully alignwith the recommended intake levels for various food groups and nutrients outlined by ICMR. population.Further efforts may be needed to promote balanced and nutritious dietary habits among this population

Table 04: Nutrients and its average

Nutrient	Mean Value
Energy	3389.4 ± 962.5 Kcal
Fat	67.97 ± 39.42gm
Protein	128.12±49.35gm
Carbohydrate	568 ±148 gm

The table 04 shows the following findings, the average caloric intake of the subjects was3389.4 ± 962.5 kilocalories (Kcal). Specifically, the average energy intake was 3655.3 Kcalfor individuals aged 20-24 years and slightly decreased to 3325.3 Kcal for those aged 35-45 years. According to the Food Safety and Standards Authority of India, the recommendeddietary allowance of energy for heavy workers in India is 3490 Kcal per day

The total fat intake of the participants was 67.97 ± 39.42 grams per day. On average,individuals aged 20-24 years consumed 80.14 grams of fat, which slightly decreased to 65.96 grams for those aged 35-45 years. The Indian council of medical research ICMR 2020 guidelines state that the recommended dietary allowance of fat is 40 grams per day in india.

The mean protein intake among male subjects was 128.12 ± 49.35 grams. Specifically, individuals aged 20-24 years consumed an average of 154.88 grams of protein, which slightly decreased to 123.73 grams for those aged 35-45 years. The ICMR 2020 guidelines recommenda daily protein intake of 60 grams in India.

The average carbohydrate intake among the subjects was 568 ± 148 grams per day. Carbohydrates, which constitute 45% to 65% of total daily calories, were mainly sourced from cereals, pulses, roots, and tubers. Rice water also contributed to the carbohydrate intake.

These findings provide insights into the macronutrient intake of the study participantsand highlight potential variations across different age groups. Efforts may be needed to ensurethat dietary intake aligns with recommended allowances to promote optimal health and well-being among fishermen in Kerala.

CONCLUSION

Here's a summarized overview of the key findings from the study:

- The average age of the subjects was 34.53 ±7.12 years, with a total of 100 participants.
- Approximately 76% of the subjects were married, while 24% were single, and all livednuclear families.
- The average income of the subjects was Rs. 5945/-
- Only 9% of subjects had 17 years of work experience, while 9% had less than 10 years of work experience. They typically worked 6-7 days a week, with more than 10 hours per day,and had no fixed work timings. About 99% of subjects worked overtime, averaging 58.36± 15.07 hours per week
- Most subjects consumed tea (97%), with 50% also consuming coffee. Additionally, 75% were smokers, 74% consumed alcohol, and 75% used tobacco
- In the anthropometric assessment, 4% of subjects were underweight, 72% were normal weight, 23% were overweight, and 5% were obese.
- The hand grip strength of aged fishermen was higher compared to that of the younger category.
- Around half of the subjects were non-vegetarian.

- Among the food groups, the average intake was: cereal 351.52g, pulses 69.68g, fruits 77.96g. green leafy vegetables (GLV) 63.14g, roots 65.38g, other vegetables 122.5g, milk and milk products 62.5ml, fat and oil 38.05g, and nuts 10.92g.
- In terms of nutritional intake, the average caloric intake was 3389.4g, protein intake was 128.12g, carbohydrate intake was 568.6g, and fat intake was 67.97g.

These findings provide insights into the demographic characteristics, lifestyle habits, dietary patterns, and nutritional intake of the fishermen population in Kerala.

RECOMMENDATIONS

1. Conduct Follow-up Studies: It is crucial to conduct follow-up studies and maintain constant monitoring of the nutritional status of the assessed fishermen population. Regular assessments will help track changes over time, identify emerging nutritional issues, and evaluate the effectiveness of interventions.

2. Expand Assessment Scope: Extend the assessment of nutritional and anthropometric profiles beyond the current sample to include fishermen from various districts, states, and the nation as a whole. This broader scope will provide a comprehensive understanding of the nutritional challenges faced by fishermen across different regions and facilitate the development of targeted interventions.

3. Implement Nutrition Education Programs: Implement supplementation and nutrition education. programs tailored specifically for fishermen to enhance their nutritional knowledge and improve their overall health status. These programs can focus on promoting balanced dietary habits, increasing awareness about the importance of micronutrients, and providing practical guidance on accessing nutritious foods within their local environment

By implementing these recommendations, stakeholders can work towards addressing the nutritional needs of fishermen communities and promoting their well-being and resilience

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