

Cross sectional study on the association among hypertension with obesity indicators and dietary patterns of fishing community at coastal regions in India

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ABSTRACT

Background and aim: One of the main factors of sickness and disability around the world is hypertension and obesity is the main predictor of hypertensive condition. A few population-based studies on fishermen in West Bengal, India, evaluated the association between anthropometric parameters, nutritional intake, and obesity indicators with blood pressure (BP). The present investigation aims to explore the association between obesity indicators and nutrient consumption with blood pressure.

Methods: In the present study, a number of 1202 male fishermen (ages 25–60 years) from West Bengal's coastal areas, took their anthropometric measurements, BP values, and nutritional intake using standard techniques. The cut-off values of body mass index (BMI) and percentage of body fat (BF%) correlated with hypertension were determined by using receiver operating characteristic analysis. The statistical analyses were performed using SPSS (Version 20) and MedCalc statistical software (version 20.115).

Results: The study showed that most of the anthropometric parameters were higher in the control group than the fishermen, and most of the fishermen remain in normotensive conditions. Obesity indicators were significantly high in hypertensive individuals. Increasing of the obesity indicators were associated with hypertensive condition. In the case of nutrient intake, only fat and oil intake had a significant positive correlation with an increase in BP. This finding also suggests that the BMI and BF% cut off values were associated with hypertension.

Conclusion: This study suggests that the increasing value of BMI and the cut-off value of BMI and BF% of this study are all potential risk factors for hypertension.

1. Introduction

India is the foremost producer of fish on a global scale, contributing 7.96% to the total production. About 16.24 million metric tons of fish were produced in India during FY 2020–2021.¹ It was predicted that the GDP of India will stand fifth in the world in 2022. Millions of people worldwide rely on the fishing sector for their survival and livelihood. Over 10% of the world's population makes their living from fisheries and aquaculture.²

Different weather patterns, potentially hazardous equipment, and ship movements are factors contributing to the high mortality rate among fishermen.³ Studies also revealed that tropical cyclones, which are life-threatening events in the deep sea, unsafe working conditions, days with little rest, robust physical effort, equipment failure, and continual economic and psychological stress are also risk factors for fishing and have an impact on their health, particularly their blood pressure.⁴ Irregular meal intervals and low consumption of green vegetables, roots, and tubers were very low in their diet.⁵

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Due to the higher risk of cardiovascular disease and also leading of other various disease and ailment, hypertension has emerged as a significant health concern globally.⁶ Genetic, environmental and societal factors, ethnicity, nationality, urbanisation, industrialisation, population migration, crowded living conditions and changes in lifestyle, all interact to cause hypertension. Environmental factors such as being overweight or obese, having a poor diet, consuming excessive amounts of salt or potassium, not exercising enough and consuming alcohol.⁷ Hypertension elevated risk of heart failure, stroke, myocardial infarction, cognitive impairment and renal disease. Systolic BP > 115 mmHg is associated with a higher risk of death globally and responsible for almost 7.6 million cardiovascular deaths annually.⁷ A few numerous factors, including sex, age, smoking, exercise, family medical history, nutrient intake habits and body mass index (BMI) have been linked to hypertension as per previous studies.⁸ Due to the strong correlation between obesity-induce hypertension with other diseases, develop in the sequence of the obesity and the association between the obesity and the hypertension is complex. BMI is the principal risk factors for hypertension which rises with increasing BMI.⁸ It is crucial from the perspective of public health to research the relation between height and weight (BMI) and BP (hypertension) in various populations due to reports of the Ministry of Health and Family Welfare of the Government of India, which indicate that the total prevalence of hypertension in Indians.⁹ The morbidity and mortality associated with hypertension have dramatically decreased as a result of increased knowledge of and adequate management of high blood pressure. The majority of hypertensive people are ignorant of their condition and have not received treatment, despite the fact that hypertension is straightforward to detect.⁷

2. Methodology

2.1. Selection of subjects' and study sites

The community related descriptive cross-sectional field survey was carried out among fishermen in the coastal regions of Purba (East) Medinipur district of West Bengal, India. Purba (East) Medinipur is positioned between the latitudes of 22°05'10"N and 21°36'35"N, and the longitudes of 88°12'40"E and 86°33'50"E (Supplementary Fig. S1). In this survey 1202 male subjects having age group of 25–60 engaged in fisheries were selected randomly from Shankpur, Tajpur, Balisai, Digha, Jaldha, and Petuaghat. These areas are specific locations of coastal region of Bay of Bengal and many people are engaged in fishing profession in this area. In addition to fishermen, 393 males without occupational engagement in fisheries, matched by age, residence and social class were enrolled as a control group. Before to the experimental trial, the protocol was verbally explained to the participants in native language (Bengali) and their informed consent was obtained. The eligibility criteria for the recruitment of the participants in the study were being aged 25–60 years, having at least two years of work experience in the fisheries, and not having any physical deformity. Participants were measured on the same day or another as per their agreement by fixing prior appointments. Due to some logistical problems, participants were taken to a common place where they were interviewed and measured. A second visit was performed when participants fail to present at the time of data collection. Participants were excluded if they had any self-reported chronic medical illnesses (heart failure, malignant diseases, diabetes etc.) and history of any infection within 2 weeks prior to testing.

2.2. Anthropometric measurements

Anthropometric measurements such as height, weight, Hip Circumference (HC), Skin fold thickness, Thigh skinfold, Chest skinfold, mid upper arm circumference (MUAC), Waist Hip Ratio and Waist Circumference (WC) measurement were taken. To measure height, weight was anthropometric rod and weighing machine was used respectively and the BMI was calculated using standard procedures.¹⁰ Circumferences

were measured using standard inelastic, flexible tape to the nearest 0.1 cm and skinfold thickness nearest 0.1 mm was measured using a Holtain skinfold caliper. The body composition of the participants was assessed using the skin-fold thickness measurement. By estimating the body density from the skin fold data, the lean body weight and total body fat weight were determined¹¹ using following formula,

Body density (gm / cc) for men = $1.10938 - 0.0008276 (\text{sum of chest, abdomen and thigh skin folds}) + 0.0000016 (\text{sum of the same three skin folds})^2 - 0.0002574 (\text{age in years})$. 1

Percentage of fat = $\{(4.95 \div \text{Body density}) - 4.5\} \times 100$ 2

Total weight of fat = $(\text{Weight in kg} \times \text{Percentage of fat}) \div 100$ 3

Lean body weight = $\text{Total weight (kg)} - \text{Total weight of fat (kg)}$ 4

2.3. Blood pressure (BP)

The measurement of BP was done by standard technique using calibrated manual sphygmomanometer. Five minutes rest was allowed for each participant prior to the measurement BP. The reading was taken to nearest 2 mmHg. Average BP was taken after two recordings of BP taken in 5 min apart.¹²

2.4. Assessment of dietary pattern

Twenty-four-hour recall and food frequency questionnaires were applied among 410 fishermen and 51 non-fishermen to calculate the frequency of intake of nourishing foods and the actual quantity of nutrient consumption. In diet recall, the participant was asked to recall the appropriate food intake on an exact day, usually during the past 24 hours (24- hours recall)¹³ and food models, standard measuring cups and spoons were exposed to the participants during the interview as references so that they could get an idea of the portion size precisely. The values of the household measures were changed to raw equivalents, and nutrient consumption was computed using the food composition table.¹⁴

2.5. Statistical analysis

Data was summarized using mean and standard deviations for continuous data and frequencies and percentages for categorical data. Differences were assessed by employing participant's *t*-test and Chi-square test for continuous and categorical variables, respectively. Bivariate logistic regression analysis was done to determine the risk of hypertension among the fishermen and non-fishermen with increasing BMI. Pearson's correlation coefficient (*r*) was computed to test the association of all the continuous variables using the SPSS (Version 20). ROC analysis was performed to identify the cut-off values of BMI and BF % as associated factors of hypertension. The ROC analysis was computed using MEDCALE, version 20.115 (MedCalc Software, Mariakerke, Belgium).

3. Results

In this descriptive study, a total number of 1202 fishermen and 393 non-fishermen were examined. Here, the selected control group was non-fishermen (they are not engaged in the fishing profession). The two major groups of fishermen and non-fishermen were further split into two subgroups based on their age, such as under 50 years and ≥50 years. According to the study, the majority of participants are fishermen under the age of 50 years, with the majority of non-fishermen falling into the same age bracket. Most physical parameters, such as height, MUAC, waist, hip, BP values such as SBP, DBP, and MBP, and obesity indicators

such as BMI and BF%, are significantly higher in the 50 years age group in both groups, fishermen and non-fishermen (Fig. 1).

About the state of health of both participants, fishers and non-fishers, most subjects belonging to the age range of below 50 years were normotensive, and a least number of subjects tend to be hypotensive (Supplementary Table S1).

In the study, 851 were normotensive and 349 were hypertensive and the result indicates that in both fishermen and non-fishermen, the all-obesity indicators such as BMI, WHR, fat%, TWF, LBM were significantly high in hypertensive individuals compared to normotensive. The hypotensive subjects were not listed in this figure due to minimum number of participants and also due to not related with our study design (Fig. 2).

The subjects were once again divided into four categories based on their BMI values, such as underweight, normal weight, overweight, and obese. Significant differences in BP values (SBP, DBP, and MAP) were observed among underweight, overweight, and obese compared to normal weight in both participants. Overweight and obese subjects had highly significant BP values as compared to underweight and normal weight subjects. On the other hand, the individual who was underweight had significantly lower BP values than normal weight subjects (Supplementary Table S2).

There was a significant difference in hypertension in the different BMI categories of both fishermen and non-fishermen. The tendency for hypertension was lower in underweight fishermen (OR = 0.22, 95% CI: 0.08–0.6) and non-fishermen (OR = 0.48, 95% CI: 0.14–1.68) respectively, than normal individual. The odds of hypertension were 1.71 (OR = 1.71, 95% CI: 1.24–2.35) and 1.05 (OR = 1.05, 95% CI: 0.56–1.98) fold higher in both cases of fishermen and non-fishermen respectively than normal weight individual based on BMI. Obese subjects also tended to be hypertensive, which was around 2.64 fold (OR = 2.64, 95% CI: 1.95–3.57) and 2.22 fold (OR = 2.22, 95% CI: 1.29–3.8) higher in fishermen and non-fishermen, respectively, as compared to normal participants (Table 1). Correlation analysis demonstrated that the all-anthropometric parameters and obesity indicators except hip ratio of non-fishermen, were significantly correlated with SBP, DBP, MBP in both fishermen and non-fishermen (Table 2).

The BP parameters (SBP, DBP and MAP) had a significant positive correlation with fat and oil intake. Fat and oil consumption were significantly higher in case of hypertensive fishermen (Supplementary Table S3).

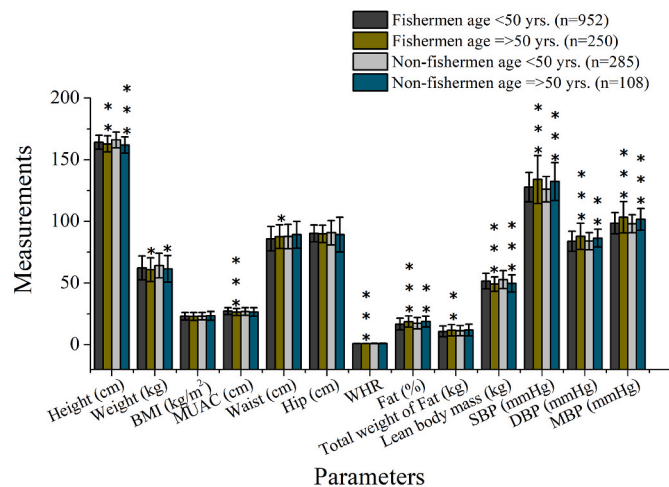


Fig. 1. Comparison of different physical measures, blood pressure values, and obesity indicators of fishermen and non-fishermen of different age groups (Age group <50 years and Age group ≥50 years). Here, the control group is non-fishermen. The values are expressed as mean ± SD. Significant difference presented by single Asterix [$*p < 0.05$], double Asterix [$**p < 0.01$], and triple Asterix [$***p < 0.001$].

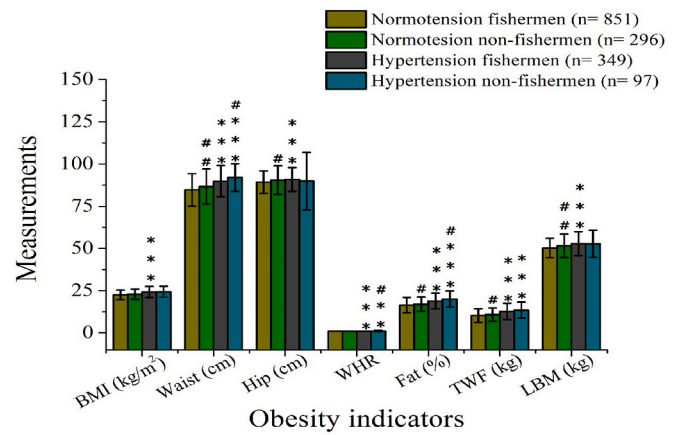


Fig. 2. Obesity indicators of blood pressure categories. Here, the control group is non-fishermen. Due to the smaller number of hypotensive subjects and not related with the present study theme they were excluded from this analysis. The values are expressed as mean ± SD. Concerning normotension, significant differences were presented by single Asterix [$*p < 0.05$], double Asterix [$**p < 0.01$], and triple Asterix [$***p < 0.001$]. With respect to fishermen (w.r.t. Fishermen # $p < 0.05$; ## $p < 0.01$).

Table 1

Prevalence (%) of hypertension according to the nutritional categories.

BMI categories	Hypertension			
	Prevalence		Odds Ratio (95% CI)	
	Fishermen	Non-fishermen	Fishermen	Non-fishermen
Underweight (BMI <18.5 kg/m ²)	4 (5.8)	3 (11.11)	0.22** (0.08–0.6)	0.48 (0.14–1.68)
Normal (BMI 18.5–22.9 kg/m ²)	123 (22.28)	35 (20.71)	1	1
Overweight (BMI 23–24.99 kg/m ²)	91 (32.85)	19 (21.59)	1.71*** (1.24–2.35)	1.05 (0.56–1.98)
Obese (BMI ≥25 kg/m ²)	131 (43.09)	40 (36.7)	2.64*** (1.95–3.57)	2.22** (1.29–3.8)
χ^2	61.411 (0.001)	13.026 (0.01)		

** $p < 0.01$; *** $p < 0.001$.

Table 2

Correlation between obesity indicators and blood pressure of the participants.

Parameters	SBP		DBP		MBP	
	F	NF	F	NF	F	NF
BMI	0.264 ^a	0.294 ^a	0.270 ^a	0.353 ^a	0.289 ^a	0.362 ^a
Waist	0.284 ^a	0.255 ^a	0.298 ^a	0.286 ^a	0.316 ^a	0.302 ^a
Hip	0.230 ^a	0.052	0.205 ^a	0.065	0.234 ^a	0.065
WHR	0.202 ^a	0.154 ^a	0.248 ^a	0.180 ^a	0.246 ^a	0.187 ^a
Thigh skin fold	0.189 ^a	0.223 ^a	0.166 ^a	0.198 ^a	0.191 ^a	0.233 ^a
Chest skin fold	0.198 ^a	0.271 ^a	0.158 ^a	0.212 ^a	0.190 ^a	0.266 ^a
Abdomen skin fold	0.214 ^a	0.185 ^a	0.200 ^a	0.301 ^a	0.223 ^a	0.274 ^a
Fat %	0.267 ^a	0.311 ^a	0.263 ^a	0.337 ^a	0.286 ^a	0.361 ^a
Total weight of Fat	0.292 ^a	0.330 ^a	0.264 ^a	0.341 ^a	0.299 ^a	0.374 ^a
Lean body mass	0.232 ^a	0.139 ^a	0.188 ^a	0.206 ^a	0.224 ^a	0.195 ^a

^a 0.001.

The analysis of the association between nutritional status and BP demonstrated that almost all nutrients, such as energy consumption, carbohydrate, protein, and fat from all food groups, are positively correlated with hypertension except vegetables (Table 3).

To determine the BMI and BF% cut-off points as potential risk factors for hypertension, a ROC curve was made. In this study, the BMI cut-off

Table 3

Correlation between nutrition intake and blood pressure of the participants.

	Parameters	SBP	DBP	MBP
All	Energy (kcal)	0.144**	0.140**	0.152**
	Carbohydrate (g)	0.122*	0.135**	0.138**
	Protein (g)	0.134**	0.108*	0.127*
	Fat (g)	0.163***	0.115*	0.145**
	Iron (mg)	0.085	0.082	0.089
Animal foods	Vitamin-C (mg)	0.107*	0.088	0.103*
	Energy (kcal)	0.122*	0.086	0.109*
	Carbohydrate (g)	0.127*	0.089	0.113*
	Protein (g)	0.120*	0.085	0.107*
	Fat (g)	0.125*	0.088	0.111*
Cereals	Iron (mg)	0.127*	0.089	0.113*
	Vitamin-C (mg)	0.127*	0.089	0.113*
	Energy (kcal)	0.097	0.133**	0.125*
	Carbohydrate (g)	0.097	0.133**	0.125*
	Protein (g)	0.094	0.131**	0.123*
Vegetables	Fat (g)	0.103*	0.140**	0.133**
	Iron (mg)	0.041	0.072	0.062
	Energy (kcal)	0.095	0.059	0.080
	Carbohydrate (g)	0.098*	0.059	0.076
	Protein (g)	0.088	0.058	0.068
Oil	Fat (g)	0.071	0.058	0.081
	Iron (mg)	0.069	0.065	0.072
	Vitamin-C (mg)	0.079	0.069	0.078
	Energy (kcal)	0.160**	0.110*	0.141**
	Fat (g)	0.160**	0.110*	0.141**

*p < 0.05, **p < 0.01, ***p < 0.001.

value was above 23.01 kg/m² in fishermen and above 25.71 kg/m² in non-fishermen associated with hypertension, and the cut-off value of BF % was above 13.22 and 16.23 in fishermen and non-fishermen, respectively, also associated with hypertension (Table 4). The study showed that the AUC values of BMI for fishermen and non-fishermen were 0.646 and 0.631 respectively, and the AUC values of BF% for fishermen and non-fishermen were 0.642 and 0.691 respectively, for hypertension. The relation in between BMI and BF% and hypertension was shown by ROC analysis, but this was a weak relation based on AUC. The YI of BMI and BF% were 0.220 and 0.229 respectively, for fishermen and 0.229 and 0.322 respectively, for non-fishermen. The value of YI was very low, which demonstrated a poor association between BMI and BF% and hypertension (Fig. 3).

4. Discussion

Globally, hypertension is a leading cause of disease and disability. The dramatic increase in cardiovascular deaths, type 2 diabetes, coronary heart disease, and renal disease is mainly attributed to hypertension, or high blood pressure, which is influenced by many factors.¹⁵ The main aim of this investigation is to explore the health status of fishermen living in coastal locations as well as the variables at risk of developing

Table 4

BMI and BF% cutoff values, sensitivity, specificity, AUC and YI for hypertension.

		Fishermen	Non-fishermen
BMI	Cutoff	>23.01	>25.71
	Sensitivity	63.61	36.08
	Specificity	58.40	86.82
	YI	0.2201	0.2291
	AUC	0.646*	0.631*
	95%CI	0.618–0.673	0.581–0.679
BF%	Cutoff	>13.22	>16.23
	Sensitivity	94.56	86.60
	Specificity	28.44	45.61
	YI	0.2299	0.3221
	AUC	0.642*	0.691*
	95% CI	0.615–0.670	0.642–0.736

YI- Youden's index, AUC- Area Under Curve, 95th CI - 95% Confidence Interval.

*P < 0.001.

hypertension, such as an increasing obesity index, eating habits, etc.

As is well knowledge, one's age group is also a significant determinant in the development of hypertension. In this study, the most active participants involved with fisheries were in the age group of under 50 years, and similar kinds of observations have also reported that the most productive age group of the fishing community was 40–50 years.¹⁶ Most fishermen (44.4%) who were suffering from hypertension remained in the age group of ≥50 years. Along with growing older, the risk of developing hypertension also rises.¹⁷

Since fishing entails hard labour, physical fitness is essential for effective work. Our findings revealed that most anthropometric measurements were higher in non-fishermen, it is more or less similar to a previous study, which also found that in comparison to the reference control group, the young fishermen were found to have a significantly lower BF%, which may be related to their youth and tendency toward being leaner rather than obese.¹⁸ BMI is the ratio of height and weight, whose high value is considered the condition of being overweight or obese but not always the best marker. People who carry the greatest visceral fat or fat around the abdomen may be at higher risk, and waist circumference is a stronger predictor of obesity than BMI.¹⁹ In obese individuals, some factors such as greater sympathetic nervous system activity, insulin resistance, hyperinsulinemia, sodium retention, activation of the renin-angiotensin-aldosterone (RAAS) system, changes in adipose-derived cytokines, changes in the structure and function of the kidneys, and increased vascular reactivity may contribute to hypertension.²⁰ This survey also indicates that 29.03% of the fishermen community suffers from hypertension, with significantly higher obesity indicators, anthropometric measurements, and high consumption of fat and oil than normotensive. Overweight people with an unhealthy WC and WHR were more likely to develop hypertension, because visceral fat depots are thought to produce free fatty acids and proinflammatory cytokines. Another similar kind of study in the adult population of Raipur city, Chhattisgarh, India, reported that all anthropometric parameters were higher for high BP, and another previous study also demonstrated the higher significant BMI value and anthropometric parameters in hypertensive individual.²¹ Obesity is defined as having a BMI more than ≥25 kg/m² and it is a primary risk factor for high blood pressure. Since fats contain a significant amount of energy, whatever that body doesn't use is stored as body fat. It's crucial to avoid eating excessive amounts of fat because being overweight will increase BP. Prior study also demonstrated the similar kind of result that fat intake compared to individuals with low dietary fat intake were more likely to have elevated SBP and hypertension.²² As per the study by Pal et al. (2014), which found the same kind of result in comparison to people with normal BP, hypertension subjects had considerably higher obesity indicators and anthropometric parameters. The possible risk of rising rates of hypertension from the growing populations of overweight and obese has been shown.²³

Based on the outcomes of this research, the prevalence of hypertension is much lower in the normal weight and underweight categories than it is in the overweight and obese groups. A significant poor association between obesity indicators, all nutrients, from all food groups, as well as BMI and BF% with hypertension, has been shown in our study of both fishermen and the control group residing in coastal areas. But according to the results of most previous surveys, there was a strong correlation between obesity indicators and dietary consumption and hypertension; such as, Landi et al. (2018)⁸ demonstrated the significant positive association between BMI value and hypertension in coastal fishermen in Karnataka in South India, BMI significantly correlate with hypertension.²⁴ Similarly, another prior study resulted that the relationship between the carbohydrates to energy proportion (CEP) and the rate of weak regulatory BP in hypertensive individuals.²⁵ In general, blood pressure is affected not only by numerous dietary patterns but also by a wide variety of dietary components.²⁶ Based on another survey, it was also reported that BMI and BF% have a significant positive correlation with the prevalence of hypertension.²³ The results of this

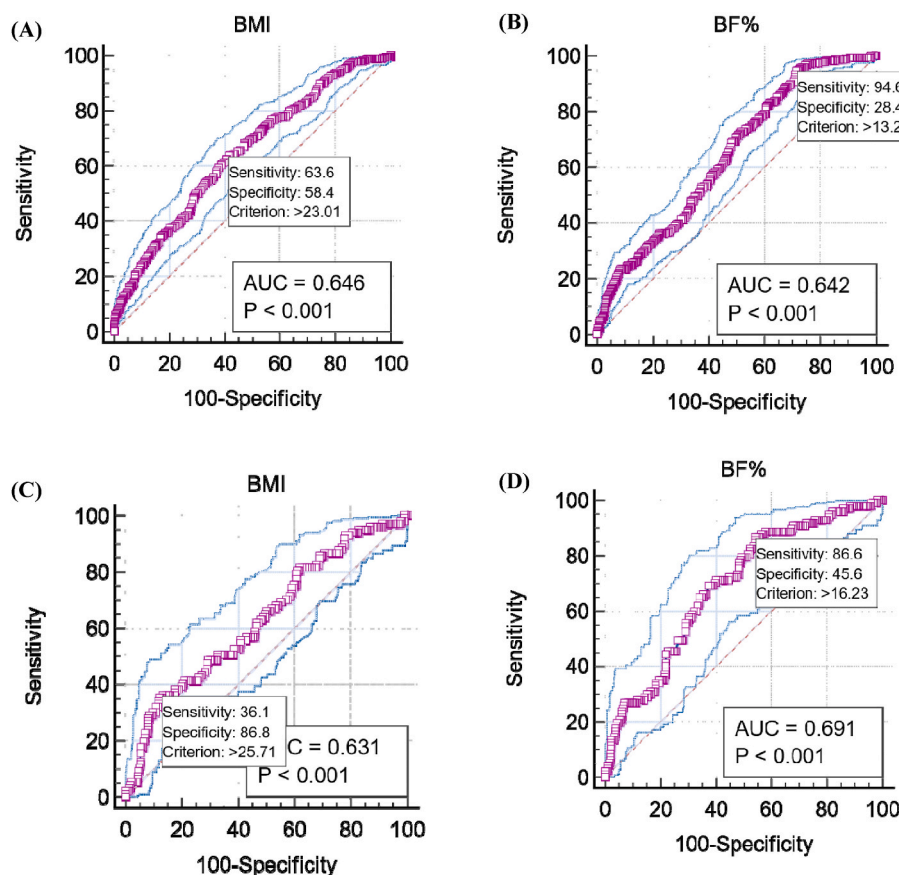


Fig. 3. ROC curves of BMI (A) and BF% (B) with hypertension of fishermen. ROC curves of BMI (C) and BF% (D) with hypertension of non-fishermen.

investigation revealed a substantial connection between various obesity indicators and blood pressure. In addition, this link is weak for both the fishermen and the control people (coastal residents; those are non-fishermen) who live in the area being investigated. On the other hand, the majority of the studies that were done in the past indicated that there is a strong link between the markers of obesity and the consumption of a diet and blood pressure. So, based on the results of our study, it may be concluded that obesity indicators and dietary intake are not major predictors of hypertension among fishermen and coastal residents. There must be additional factors that contribute to this type of occurrence. One of the known risk factors for hypertension is a geographical location, such as a coastal area. This factor is related to having a high exposure to salt via daily food or water consumption.²⁷ Several studies have shown a correlation between high blood pressure and sodium consumption. Reducing sodium intake is connected with lesser cardiovascular disease-related illnesses and deaths, in addition to lowering blood pressure and the prevalence of hypertension. Oppositely, consuming an excessive amount of salt has been demonstrated to cause a considerable rise in blood pressure and has been related to the development of hypertension as well as the cardiovascular issues associated with it.²⁸ According to the recent study, residents of the urban coastal population who lived in Kenjeran beach, Surabaya, and were younger than 45 years old had a considerable high daily salt intake, and hypertension was still prevalent.²⁹ A further study from the past revealed that coastal regions in Southeast Asia are experiencing high salt contents in drinking water sources that are regularly consumed by residents, and these populations had elevated blood pressure level.³⁰

5. Conclusion

A large number of earlier studies suggested that the anthropometric

parameter and dietary food intake had a strong correlation with hypertension; however, our survey in the community of fishermen didn't show a strong correlation between the factors that had been mentioned previously. But the present study suggests that obesity indicators are significantly associated with hypertension, and it also showed that hypertension has increased with age. To draw the conclusion that markers of obesity and nutritional intake are not substantial predictors of hypertension among the participating coastal inhabitants and fishermen. The underlying cause of these results may be salt exposure through the water or food chain; it was also observed in the previous literature that residents of coastal areas have elevated blood pressure levels, and a number of other reports evidently suggest sodium intake has a significant correlation with hypertension. However, it's possible that determining the values of these indicators will be helpful in terms of achieving the goal of reducing the incidence of hypertension among these fishermen.

Author's contribution

SKD, KMA and AP developed the study concept and the study design; SKNR, SD, and SS involved in data acquisition and communication; SKNR and AP performed data analysis and first drafting; SD, SS and SKNR participated in data interpretation and manuscript writing; RA, JB and SKSA performed review and editing, revising the manuscript critically for important intellectual content; SKD, KMA and AP supervised the entire research work. All authors approved the final version of the manuscript.

Ethical approval

The Institutional Ethics Committee (Human) of the University of

Gour Banga in Malda, West Bengal, India, gave approval to the study's overall design before it was carried out. Under the reference number UGB/IEC (Human)/0011–21, the authorisation was granted.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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List of Abbreviations

BF%	Body Fat Percentage
BMI	Body Mass Index
BP	Blood Pressure
CEP	Carbohydrates to Energy Proportion
HC	Hip Circumference
LBM	Lean Body Mass
MUAC	Mid Upper Arm Circumference
OR	Odd Ratio
RAAS	Renin-Angiotensin-Aldosterone System
ROC	Receiver Operating Characteristics
TWF	Total Weight of Fat
WC	Waist Circumference
WHR	Waist Hip Ratio

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cegh.2024.101573>.

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