

Original Research Article

A cross sectional study of hypertension and their risk factors in fishermen of Chennai district

Gopal Muthukrishnan¹, Suresh Balan Kumaraswamy Pillai Uma^{2*}, Anantharaman V. V.³

Department of Community Medicine, ¹Kanyakumari Government Medical College, ²Government Tuticorin Medical College, ³SRM Medical College and Research Institute, Katankulathur, Tamil Nadu, India

Received: 21 March 2018

Revised: 02 May 2018

Accepted: 03 May 2018

*Correspondence:

Dr. Suresh Balan Kumaraswamy Pillai Uma,
E-mail: surbal65@yahoo.co.in

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ABSTRACT

Background: Hypertension is one of the major public health issues in worldwide. The objective of this study was to find out the prevalence of hypertension and its associated risk factors in fishermen of Chennai district, Tamil Nadu, India.

Methods: The cross sectional study was conducted among 519 fishermen at the coastal areas of north Chennai district selected by multistage cluster sampling method.

Results: In our present study, the significantly associated with the factors included age, level of education, economic status, marital status, BMI, diabetes mellitus, diet, smoking and alcohol user were significantly association ($p < 0.05$) with hypertension. The study included 519 fishermen. Among them, 63% (328) were in the age group of 36–55 years, 24% (124) were in the age group of 18–35 years, 13% (67) were >55 years. The fishermen population showed a prevalence of 46.6% for hypertension. The prevalence of smoking tobacco use and alcohol use were found 34.30% and 71.68%. The average SBP and DBP was 127 and 84 mmHg respectively. The mean BMI was 24 (4.38) kg/m². The prevalence of hypertension was found in 45% and 38.73% were having abdominal obesity.

Conclusions: The prevalence of hypertension was higher than the general population. The present study showed a significant association between the duration of alcohol use and prevalence of hypertension although smoking was not found to have significant association. The present study supports the association of obesity with hypertension.

Keywords: Fishermen, Hypertension, Prevalence, Risk factors

INTRODUCTION

Hypertension is a major health problem throughout the world because of its high prevalence and its association with increased risk of cardiovascular disease. In developed world about 330 million people worldwide have hypertension as do around 640 million in the developing world.¹ The WHO rates hypertension as one of the most preventable risk factor of premature deaths worldwide and the problem is growing. In 2025 it is estimated there will be 1.56 billion adults living with high blood pressure. According to the WHO hypertension

constitutes an important modifiable risk factor related to 4.5% the world wide disease burden and is associated with an approximately 40% reduction of stroke risk and 15% reduction of myocardial infarction when treated and controlled.²

Fishermen have prolonged hours of continuous work and fishing still remains a hazardous occupation and stressful occupation as it presents difficult physical conditions, dislocation, isolation and less than ideal personal habits.³ Fishermen have lower socio-economic status and their illiteracy influences their general health.⁴ India is having

one of the largest fresh and marine water resources, stands second and seventh in the world, in total fish production from fresh and marine waters respectively. Chennai which is the capital city of Tamilnadu is subjected to industrial development and population explosion. Fisheries are a vital food production sector in Tamil Nadu and have ensured the food security of large number of people. The fishermen are the most important part of the fishing activities. The total number of fisher folk dependant on marine industry in Tamil Nadu was nearly 8.11 lakh (2012-2013). Fishing is a hazardous occupation.³ The stressful and strenuous nature of the job makes the fishermen prone for many health related morbidity especially non communicable disease. Studies across the world have shown the prevalence of hypertension in fishermen from 4% to 45%. The several authors have shown the high blood pressure prevalence of 44.9% in fishermen of Lithuania.⁵ They have shown the hypertension prevalence of 4.4% in fishermen of coastal area of Mangalore, India.⁶

The first hypertension prevalence study in India was done by Chopra et al with continuation thereafter. Literature search and findings of many of the studies found a regular increase in the prevalence of hypertension. In India with a population estimation of 1.1 billion, the prevalence of HTN has been estimated to be 3% to 34.5% in males and 5.8% to 33.5% in females.⁷ This study was undertaken with the intention of finding the prevalence of hypertension in the fishermen population and looking for the associated risk factors contributing to that morbidity. The objective of this study was to estimate the prevalence of hypertension and its associated risk factors in fishermen of Chennai district.

METHODS

The community based cross sectional study was conducted among 519 fishermen at the coastal areas of north Chennai district selected by multistage cluster sampling method. The study population consisted of fishermen 18yrs and above who venture into the sea to catch fish. The study was carried out from November 2013 to September 2014. The total fishermen population above 18 years in whole of Chennai district was 24326. The total fishermen population above 18 years in north Chennai district was 15959. Fishermen who stay onshore and don't venture inside the sea to catch fish were excluded. The sampling method used was multistage cluster sampling method. Chennai coastal district was divided into north and south Taluk comprising of 42 fishing villages in all. Each fishing village was considered as a cluster. All the fishermen who venture into the sea were members of the respective cooperative society. The study instrument consisted of a semi structured questionnaire, a standard weighing scale, non-stretchable inch tape and sphygmomanometer. Data collection was done in the study area after obtaining necessary permission from the Institute Ethics Committee.

Statistical analysis

Statistical analysis was performed using SPSS software program, version 16. Chi-square test and Mean \pm SD was used to determine statistical significance of the observed differences. The results were expressed as mean and standard deviation. A probability level (p-value) of less than 0.001 was considered statistically significant at 99% confidence interval. The prevalence of hypertension and the estimate of associated risk factors and its 95% confidence interval were derived. The p<0.05 was considered statistically significant. Hypertension was kept as dependent variable and independent variables were age, BMI, salt intake, diabetes mellitus, smoking, alcohol, occupation, history of hypertensive parents and familial history.

RESULTS

Socio demographic profile of the participants

The study included 519 fishermen. The fishermen population showed a prevalence of 46.6% for hypertension. Among them, 63% (328) were in the age group of 36–55 years, 24% (124) were in the age group of 18-35 years, 13% (67) were >55 years.

Table 1: Socio-demographic details of the fishermen.

Parameters	Frequency (n=519)	Percentage (%)
Age in years		
18-35	124	23.89
36-55	328	63.21
>55	67	12.90
Education		
Illiterate	160	30.83
Literate	359	69.17
Marital status		
Married	480	92.48
Unmarried	39	7.52
Socioeconomic status		
Upper middle	16	3.08
Lower middle	93	17.92
Upper lower	410	79.00
Social security		
Yes	111	21.40
No	408	78.60
Owning house		
Yes	317	61.10
No	202	38.90
Boat ownership		
Own	49	9.44
Others	470	90.56

Table 1 reveals that the mean age of the fishermen population as 44 \pm 10 years with 2/3rd belonging to middle age group and nearly one third had no formal education.

According to modified Kuppaswamy's socioeconomic status scale, 79% of the population belonged to upper lower socioeconomic class. Out of 519 individuals, 49 (9%) of the population having boat ownership and the majority of fisherman (91%) not having boat ownership.

Table 2: Mean values of physical parameters measured in the study population.

Physical parameters (N=519)	Mean	95% CI
Weight (kg)	65.87	64.75-66.99
Height (cm)	165.56	165-166.12
Waist circumference (cm)	87.54	86.48-88.60
Systolic blood pressure (mmHg)	127.40	125.52-129.28
Diastolic blood pressure (mmHg)	84.26	83.04-85.48
BMI	24.00	23.62-24.38

Table 2 reveals that the mean weight of the sample population as 65.87 kg and mean height as 165.56 cm. Mean WC was 87.54 (12.29) cm. The average SBP and DBP was 127 and 84 mmHg respectively. The mean BMI was 24 (4.38) kg/m². The operational definition of hypertension was any person who had a self-reported physician diagnosis, the use of antihypertensive medication, or with a current systolic blood pressure of ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg. Based on the criteria modified for Asian Indians, a person was considered to be obese if body mass index (BMI) ≥ 25 kg/m² and overweight when BMI ≥ 23 kg/m.

Among them, 78% (403) were using the mechanised boat, 20% (108) were in the hand driven boat and 2% (8) were using both participants. The present study showed that three-fourth of the fishermen took to mechanised boat than hand driven boat were presented in Table 3. On a monthly average, the percentage of population working in sea for more than 2 weeks and 3 weeks was 41.23 and 28.90 respectively. About 40 per cent of the participants made daily fishing trips to sea and the rest of the population stayed in sea ranging between 2 to 15 days per fishing trip. The data showed that 11% of the fishermen were involved in alternate jobs for living other than fishing. The eating practise of the fishermen revealed that only one third of the population consumed fruits on a daily basis, one-third consumed on a weekly basis and 14.06% never consumed fruits. With regard to vegetable intake, only 23.7% individual's consumed vegetables on a daily basis, one-fifth consumed on a weekly basis and 5% of the population never consumed vegetables. As far as fish intake was concerned, nearly one fifth of the sample population consumed fried fish daily and 2.70% consumed salted dried fish on a daily basis.

The Table 4 showed that 67.77 per cent of the hypertensive individuals are in the middle age group. The difference in prevalence of hypertension with age was

found to be statistically significant. The literacy level of the surveyed people did not show any significant association with hypertension. Majority of the hypertensive (81.4 per cent) belonged to the upper lower socioeconomic status. The current smokers were 179 (34.30%), out of which nearly 60% had the habit for more than 10 years. Three fourth of the participants were currently alcoholic, out of which nearly 60% had the history of use for more than 10 years. One- fifth of the sample population had a family history of diabetes and one-tenth of the population had family history of hypertension. Nearly 86% of the interviewed people did not exercise outside of work. 15.99 per cent and 38.73 per cent of the individuals were overweight and obese respectively. 42.77 per cent of the study group had central obesity. It was also seen that the years of fishing and the type of boat used showed a significant association with hypertension in fishermen ($p < 0.05$). The consumption of fish, fruits, smoker and alcoholic status had no significant association with presence of hypertension.

Table 3: Distribution of fishermen among different occupational characteristics.

Parameters	Frequency (N=519)	Percentage (%)
Type of boat		
Un mechanised	108	20.81
Mechanised	403	77.65
Both	8	1.54
Years of fishing		
1-10	80	15.41
11-20	160	30.83
>20	279	53.76
Workings days in sea per month		
<1 week	78	15.03
1-2 week	77	14.84
2-3 week	214	41.23
3-4 week	150	28.90
Fishing trips		
Daily	211	40.70
2-5 days	106	20.40
6-10 days	172	33.10
11-15 days	30	5.80
Alternate job		
Yes	57	10.98
No	462	89.02

Table 5 showed that 81.40% hypertensive participants had no exercise outside of their work time, which was found to have statistical significance. Similarly higher body mass index (≥ 25 kg/m²) had significant association with higher prevalence of hypertension. Close to 50% prevalence of hypertension was seen in obese fishermen. The positive family history of hypertension did not have significant association. However the association between hypertension with presence of diabetes in the individuals

showed a very significant difference. Nearly 2/3rd (65.15%) of diabetic study population had prevalence of hypertension. A probability level (p-value) of less than

0.05 is considered statistically significant. The p value is greater than 0.05 is considering as not significant. This analysis is carried out with 99% confidence level.

Table 4: Association of the prevalence of hypertension with socioeconomic and demographic parameters.

Parameters	Prevalence of hypertension			χ^2	P value	Inference
	Yes (%) N=242	No (%) N=277	Total (%) N=519			
Age (yrs)				23.87	0.00	significant
18-35	36 (29.03)	88 (70.97)	124			
36-55	164 (50)	164 (50)	328			
>55	42 (62.69)	25 (37.31)	67			
Education				0.01	0.94	Not significant
Illiterate	75 (46.87)	85 (53.12)	160			
Literate	167 (46.52)	192 (53.48)	359			
Marital status				5.75	0.02	significant
Married	231 (48.12)	249 (51.87)	480			
Unmarried	11 (28.2)	28 (71.79)	39			
Alternate job				0.20	0.66	Not significant
Yes	25 (43.86)	32 (56.14)	57			
No	217 (46.97)	245 (53.03)	462			
Socioeconomic status				1.13	0.44	Not significant
Upper middle	7 (43.75)	9 (56.25)	16			
Lower middle	38 (40.86)	55 (59.14)	93			
Upper lower	197 (48.05)	213 (51.95)	410			

P<0.05 level of significant. p>0.05 level of not significant.

Table 5: Association of the prevalence of hypertension with obesity and family history.

Parameters	Prevalence of hypertension			χ^2	P value	Inference
	Yes (%) N=242	No (%) N=277	Total (%) N=519			
Exercise						
Yes	45 (60)	30 (40)	75	6.30	0.01	Significant
No	197 (44.37)	247 (55.63)	444			
BMI						
Normal	86 (36.59)	149 (63.40)	235	17.83	0.00	Significant
Overweight	43 (51.81)	40 (48.19)	83			
Obesity	113 (56.22)	88 (43.78)	201			
Waist circumference						
Normal (<90 cm)	108 (36.36)	189 (63.63)	297	29.40	0.00	Significant
Abnormal (≥90 cm)	134 (60.36)	88 (39.64)	222			
F/H hypertension						
Present	19 (45.24)	23 (54.76)	42	0.04	0.85	Not significant
Absent	223 (46.75)	254 (53.25)	477			
Diabetes mellitus						
Present	43 (65.15)	23 (34.85)	66	10.43	0.00	Significant
Absent	199 (43.93)	254 (56.07)	453			

P<0.05 level of significant. p>0.05 level of not significant.

Table 6: Parameters significant for the logistic regression model for hypertension.

S.no	Variables	Estimated coefficient	Standard error	Wald statistic	Sig	Exp (B)
1	Old age	1.321	0.367	12.954**	0.000	3.747
2	Middle age	0.787	0.252	9.727**	0.002	2.197
3	Type of boat	-0.496	0.233	4.544*	0.033	0.609
4	Dried fish daily	1.566	0.655	5.716*	0.017	4.790
5	Waist circumference	0.732	0.306	5.709*	0.017	2.079
6	Alcohol user	0.653	0.234	7.818**	0.005	1.922

*significant at 5 per cent level of probability; **significant at 1 per cent level of probability.

The Table 6 showed that the parameters significant for the logistic regression model for hypertension. The log odds for the fishermen going to be affected by hypertension above 55 years have 3.747 times higher odds of developing hypertension compared to the younger age group. Similarly, there was 2.197 times higher odds for individuals in 35-55 year group compared to younger age group. The fishermen population with abdominal obesity have 2.079 times higher odds of developing hypertension compared to population with normal waist circumference. Central obesity was considered when the waist circumference measured ≥ 90 cm. Current smoker was defined as a person who continued to smoke at the time of survey daily or occasionally. Current alcoholic was defined as a person who had consumed alcohol in the past 12 months.

DISCUSSION

Demographic characteristics of study population

The present study has revealed that the prevalence of the adult literacy rate of fishermen in the current study was 69.2% which was more than the national average for literacy of 58% among fisher folk, according to CMFRI census 2010. The average national literacy rate for males in general population was 82.14% (2010- 2011).^{8,9} The current study showed that the majority (79%) of the participant belonged to upper lower socioeconomic class which was similar to the study were reported by Palivela et al in the coastal region of Visakhapatnam, Andhra Pradesh.¹⁰ The present study showed that nearly 40% of the fishermen preferred to return to shore daily after a fishing trip, and the rest of them were at work in sea spanning between 2 days to 15 days. The irregular job timing may lead to the absence of adequate rest and proper sleep, which in turn may make them susceptible to the physical morbidity. The highlighted in the study on New Zealand fishermen population that 23% of days at sea, fishermen obtained less than 4 hours of sleep.

Overweight is a well-known risk factor for hypertension, diabetes and stroke.¹¹ The prevalence of overweight and obesity in the fishermen population in the current study was 15.99% and 38.73% respectively. The study findings were less than the findings in the study by Pougnet et al. who reported overweight prevalence of 60.9%.¹² The present study also showed that three-fourth of the fishermen took to mechanised boat than hand driven boat. The total prevalence of currently smoking tobacco in the population was found to be 34.30% which was nearly fifty percent lesser than the study done by Bhondve et al in Mumbai fishermen group.¹³ The reason for the difference could be because the present study only counted fishermen who currently had the habit of smoking tobacco and other form of intake of tobacco was ignored. The prevalence of alcohol consumption in the present study was 71.68%, which was nearly the same as the study done by Bhondve et al which had found the prevalence to be 63.4%.¹³ Lawrie et al reported that 61%

and 80.6% of the fishermen were alcohol consumers respectively.¹⁴ Kirkutis et al reported 80.2% of seamen were alcohol consumers.¹⁵ This could probably prove that the behaviour towards alcoholism was universally same in the fishermen population. Kalulanda et al revealed that the prevalence of overall, urban and rural smoking among general population in Sri Lanka as 18.3%, 17.2% and 18.5% respectively, which were far lower than the fishermen.¹⁶ The prevalence of current smoking in Scotland fishermen as 38.4%. The low prevalence of current smoking in the later study may be due to the low response rate (57%). Further the author also reported low prevalence of smokers among fishermen (21.8%) than non-fishing community (27.2%).¹⁷ In contrast a Indian study reported much higher (74.3%) smokers among fishermen. The percentage of fishermen found to have never performed any kind of exercise outside work was 85.55%, which was nearly similar to the study done by Frantzeskou et al in fishermen of Greece where it showed 66% of the fishermen had no exercise other than their work.¹⁸

Prevalence of hypertension

Hypertension is a major public health problem in India and globally. The prevalence of hypertension in developing countries like India has an increasing trend. In this present study had shown that 46.63% of the fishermen population above age of 18 year were suffering with hypertension which was similar to the study done by Kirkutis et al reported that prevalence of hypertension in Lithuanian seamen was 44.9%.¹⁵ The increase in prevalence of hypertension in later study may be due to differences in risk factors. The reason for the high prevalence of hypertension in the present study population probably could be attributed to exclusive male group and selection of fishermen who mainly do offshore fishing. The mean SBP and DBP of the fishermen population in the current study was 127.40 ($\sigma=21.84$) mmHg and 84.26 ($\sigma=14.16$) mmHg respectively. The study findings were consistent with the study done by Sambasiva Rao et al. 2007 where it found the mean SPB and DBP to be 124.25 ($\sigma=7.83$) mmHg and 82.59 ($\sigma=6.15$) mmHg respectively.¹⁹

Prevalence of risk factor associated with hypertension

The high prevalence of the overweight in the Danish study may be due to the different time period of the study and differences of the socio-economic factors of the two countries. Both body mass index (BMI) and abdominal adiposity showed a significant associated risk factor for hypertension which was consistent with the study done by Chand et al in the coastal fishermen's urban slum of Visakhapatnam.¹⁹ Age was a significant risk factor for hypertension in the current study. The current study showed an increase in the proportion of hypertensive individuals (29.03%, 50%, 62.69%) with increasing age groups (18-35, 36-55, >55 years). This was consistent with the study done by Rao et al on the adult population

of coastal region of Karnataka.²⁰ The present study showed a significant association ($p < 0.05$) between the types of boat used for fishing and prevalence of hypertension among the group. This probably could be due to the decrease in the physical activity for mechanised boats and psychosocial stress associated with prolonged stay in sea during each trip. Overweight has become a major emerging health problem. It is a known risk factor for many of NCDs. The prevalence of the overweight and obesity was 15.99% and 38.73% respectively. Prevalence of obesity was reported as 20.3% in four provinces in Sri Lanka and this was higher than our study.²¹ A study done in Denmark has revealed that the prevalence of the overweight among the fishermen was 73.6%.²² The present study showed a significant association between the duration of alcohol use and prevalence of hypertension although smoking was not found to have significant association.

CONCLUSION

The study showed that the illiteracy rate in fishermen was high and most of them belonged to lower socioeconomic status. With regard to diet, fruits and vegetable consumption was very poor. The consumption of fried fish and salted dried fish was high, which could cause a negative impact on their cardiovascular system. The fishermen population showed a prevalence of 46.6% for hypertension. The prevalence of hypertension was higher than the general population. The prevalence of hypertension, smoking and alcohol consumption were higher and obesity was lower among fishermen than general population. There was striking lack of awareness of elevated blood pressure among affected study population. There was a significant association of age and hypertension. The high prevalence of overweight and obesity in the study population due to their food habits, lack of exercise outside of work and the mechanised fishing activity need to be addressed. The present study supports the association of obesity with hypertension. The prevalence of hypertension, overweight, obesity, BMI, diabetes mellitus, current smoking and alcohol consumption were higher among fishermen.

Recommendations

Health education intervention must be instituted among the fishermen especially the younger generation to avoid hypertension. The excessive prevalence of alcohol consumption in the fishermen population must be controlled through the use of effective behavioural change communication method. The occupational health services must be strengthened in order to help the fishermen identify their diseases early and improve the health seeking behaviour of the population. There is a need for more longitudinal studies to be done in the fishermen population to assess the effect of these risk factors on the physical morbidity. Information, education and communication activities should be started to increase the awareness of common people to adopt

healthy life styles like regular physical exercise in the form of brisk walking, restricted salt intake, avoidance of alcohol and smoking.

ACKNOWLEDGEMENTS

I would like to sincerely express my thanks to Dr. G. Kathiravan, Ph.D., Professor of Biostatistics, Department of Community Medicine, Government Tuticorin Medical College, for his valuable suggestions for this work and Mr. A. Ganesan, President, fishermen cooperatives, for his timely help for this work.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Gopal M, Suresh Balan KPU, Anantharaman VV. A cross sectional study of hypertension and their risk factors in fishermen of Chennai district. *Int J Community Med Public Health* 2018;5:2464-70.