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Compliance to Hypertension Treatment in Residents of a Fishermen Colony in District Kollam, Kerala

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Abstract:

Background: Hypertension is an important underline cause for cardiovascular deaths worldwide. Treatment compliance for hypertension depends on a lot of factors. There is paucity of studies about awareness and compliance to antihypertensive treatment particularly in coastal areas. Our aim was to know the awareness, treatment, compliance and control of blood pressure among hypertensive patients in a fishermen colony of Jonakapuram, Kollam.

Material and Methods: A community based cross sectional study was done in a coastal area of Kollam. A house-to-house survey was conducted with a pretested semi-structure questionnaire. Three blood pressure readings were taken and mean value was calculated. The study period was one year. Data was analyzed by using Statistical Package of Social Sciences 12. Appropriate statistical tests were applied.

Results: A total of 276 persons were found to be hypertensive. The percentage of awareness, treatment among aware subjects, treatment compliance and control of BP among patients taking anti-hypertensives was 71.74%, 85.86%, 73.53% and 50.58%. The awareness and treatment was significantly more among females as compared to males. The advices received by the patients were medicines, diet restrictions and lifestyle changes. Financial problems were the main reason for non-compliance to medicines.

Conclusion: Nearly 3/4th of the study subjects were aware that they have hypertension. Monetary problems were an important cause for non-compliance. Half of the patients taking antihypertensive medication had their blood pressure uncontrolled. Patient's economic status should be considered before advising them medications. This will increase compliance and help in improving the quality of patient care.

Keywords: Hypertension, compliance, awareness, control, Kollam

Background

There is a rapid rise in Non-Communicable Diseases (NCD) in Low and middle income countries. World Health Organization (WHO) states that high blood pressure (BP) or hypertension is an important NCD which if controlled can prevent coronary heart disease and stroke. [1]

Hypertension is an "iceberg disease" following "Rule of halves".[2] It is usually asymptomatic initially which delays its diagnosis. Continued care and frequent check-ups are required for effective treatment and control. It is adequately controlled only in less than one third of affected individuals even in developed countries.[3]

Diet and behavioural modification is vital in the control of hypertension. Giving advices, regular monitoring and follow-up encourage compliance among hypertensive patients taking medications.[4] A multicentric study done in Bangladesh and India showed that about 45% of hypertensives were aware of their status, 40% were actually taking medications but only 10% achieved the required level of BP.[5]

Several studies have been done previously on hypertension but very few are done to see factors responsible for compliance targeting specifically fishermen colonies in coastal areas. Keeping this in mind, we did a study to find out the awareness, treatment, compliance for advices and control of BP and their related factors among hypertensive patients in a fishermen colony of Jonakapuram, Kollam.

Material and Methods

Study design and the participants: A cross sectional study was done in the field practice area of urban health training centre of Travancore medical college, Kollam, Kerala, South India. It is a coastal area with the main bulk of population comprising of fishermen.

Data collection: A house-to-house survey was conducted from 265 houses with a total population of 1124 (520 males and 604 females) and a sex ratio of 1161 females per 1000 males. After informed consent of individuals, a pretested semi-structure questionnaire was used to collect data regarding awareness, treatment and control of hypertension. The investigator along with fourth year medical students measured blood pressure. We measured BP in the sitting position after giving a resting period of 5 minutes by using a standard mercury sphygmomanometer. We took three BP measurements on each participant in a period of 30 minutes and mean was calculated. The survey was completed in 2013.

Inclusion criteria: Persons of 19 years and above and those who gave consent were interviewed.

Exclusion criteria: Persons less than 19 years were excluded from the study. Those who did not agreed to get interviewed were also excluded.

Sample size calculation

In a pilot study done prior to the study with 100 subjects showed expected percentage of the awareness of raised blood pressure or hypertension was 71. The required sample size was 220, for precision= 6 % and desired confidence level 95%.

Explanatory variable: Age and gender were taken as explanatory variable in individual level.

Outcome variable: "Awareness" was defined as when study subjects answered "yes" to the following question: "Have you ever been told by any medical person that you have high BP after taking BP measurement?" Treatment was defined as currently using antihypertensive medications by a physician. It was cross checked by seeing prescriptions and matching drugs by the investigator himself. "Compliance" to advice given by the health care provider was defined as the extent to which the patient is following the prescription. Compliance was classified as- followed completely, partially or not followed at all. We defined "controlled hypertension" as a blood pressure less than threshold (140/90 mm of Hg) among persons taking antihypertensive medication at the time of survey.

Ethical committee approval: We got approval from our college ethical committee.

Data management and Statistical analysis: Data was entered in MS excel 2007 and analyzed by using Statistical Package of Social Sciences (SPSS) 12. Appropriate statistical tests were applied. The Chi square test was applied. A p value of <0.05 was taken as statistically significant.

Results:

A total of 276 persons were found to be hypertensive in the survey. Table 1 shows that among these hypertensives, the awareness of raised blood pressure or hypertension was in 198 (71.74%) subjects. The awareness was significantly more among females (80.6%) as compared to males (58.5%). Persons aged less than 60 years were less aware (69.6%) about their hypertensive status as compared to persons aged more than or around 60 years (76.1%) but the difference is not significant (p>0.05).

Table 1: Gender and age group wise awareness of hypertensives (N=276)

Gender	Awareness		Total	OR	95% C.I. of OR	Statistics
	Aware	Not aware				
Males	65 (58.5)	46 (41.5)	111	0.34	0.19-0.58	χ^2 =15.9 , DF = 1,
Females	133 (80.6)	32 (19.4)	165	1		$p < 0.0001$; highly significant
Age group						
<60 yrs	128 (69.6)	56 (30.4)	184	0.72	0.40-1.27	χ^2 =1.29 , DF = 1,
≥60 yrs	70 (76.1)	22 (23.9)	92	1		$p = 0.257$; not significant
Figures in parenthesis are in percentages						

Table 2 shows gender and age group wise treatment status of aware hypertensives. Out of 198 study subjects who were aware about their hypertensive status, 170 (85.9%) were on treatment and 28 (14.1%) were untreated. Among untreated subjects, males were more (23.1%) as compared to females (9.8%). Overall more females than males (90.2% vs 76.9%) were on anti-hypertension treatment at the time of survey. This difference is significant.

Out of 198 aware subjects, 15.6% of less than 60 years of age were untreated as compared to 11.4% of subjects more than or equal to 60 years of age. Overall treatment status among subjects who were more than equal to 60 years of age (88.6%) was slight better than those less than 60 years of age (84.4%) but the difference is not significant.

Table 2: Gender and age group wise treatment status of aware hypertensives (N=198)

Gender	Treatment status		Total	OR	95% C.I. of OR	Statistics
	Treated	Untreated				
Males	50 (76.9)	15 (23.1)	65	0.36	0.16-0.81	χ^2 =6.36 , DF = 1,
Females	120 (90.2)	13 (9.8)	133	1	-	$p = 0.012$; significant
Age Group						
<60 yrs	108 (84.4)	20 (15.6)	128	0.69	0.28-1.67	χ^2 =0.66 , DF = 1, p=0.418;
≥ 60 years	62 (88.6)	8 (11.4)	70	1	-	not significant
Figures in parenthesis are in percentages						

Table 3 shows the treatment advices received and their compliance status by treated hypertensives. The important advices received by the patients were medicines (100%), salt restriction in diet (94.12%), fatty food avoidance (61.76%), red meat avoidance (31.18%), abundance of fruit and vegetables in diet (83.53%), less coconut oil (60%), weight reduction (29.41%), stop smoking (20.59%), avoid alcohol (23.53%) and physical exercise (28.24%) [Figure 1]. We found that 19 (11.18%) subjects were advised irregular treatment and told to take medicines only when they have high BP and withdraw when BP is controlled or when symptoms are waned although we could not find any such advice written in prescription. So, we cannot rely just on what patients are telling. Among the major advices for investigations, blood sugar was the commonest (77.65%), followed by hemogram (65.88%), Urine (53.53%), ECG (48.24%), Lipid profile (38.23%) and X ray (20.59%) in that order.

Overall compliance to medicine was maximum i.e. 73.53% (70.20% for regular medicines and 100% for irregular ones!). The compliance proportions in decreasing order for dietary and lifestyle advices were 47.89% (for fruits and vegetables), 28.12% (salt restriction), 22.91% (physical exercise), 21.90% (fatty food avoidance), 10% (weight reduction), 9.80% (less coconut oil consumption), 8.57% (smoking cessation), 3.77% (red meat avoidance) and 2.5% for avoiding alcohol.

Table 3: Compliance and advices received among those treated for Hypertension

Advice received	Response (N=170)	Completely	Followed Incompletely	Not
		Medicines		
Regular	151 (88.82)	106 (70.20)	42 (27.81)	3 (1.99)
Irregular	19 (11.18)	19 (100)	-	-
Total	170 (100)	125 (73.53)	42 (24.70)	3 (1.77)
Diet				
Salt restriction	160 (94.12)	45 (28.12)	74 (46.25)	41 (25.62)
Fatty food avoidance	105 (61.76)	23 (21.90)	61 (58.09)	21 (20)
Red meat avoidance	53 (31.18)	2 (3.77)	11 (20.75)	40 (75.47)
Fruits & vegetables	142 (83.53)	68 (47.89)	62 (43.66)	12 (8.45)
Less coconut oil	102 (60)	10 (9.80)	14 (13.72)	78 (76.47)
Weight reduction	50 (29.41)	5 (10)	10 (20)	35 (70)
No Smoking	35 (20.59)	3 (8.57)	-	32 (91.43)
No alcohol	40 (23.53)	1 (2.5)	28 (70)	11 (27.5)
Physical exercise	48 (28.24)	11 (22.91)	8 (16.67)	29 (60.42)
Investigations				
Blood sugar	132 (77.65)	65 (49.24)	52 (39.39)	15 (11.37)
ECG	82 (48.24)	24 (29.27)	53 (64.63)	5 (6.10)
Hemogram	112 (65.88)	68 (60.71)	26 (23.21)	18 (16.08)
X ray	35 (20.59)	3 (8.57)	10 (28.57)	22 (62.86)
Urine (routine)	91 (53.53)	65 (71.43)	24 (26.37)	2 (2.20)
Lipid profile	65 (38.23)	4 (6.15)	42 (64.61)	19 (29.23)

Figures in parenthesis are in percentages

Figure 1: Reason for non-compliance to medicines (n=45)
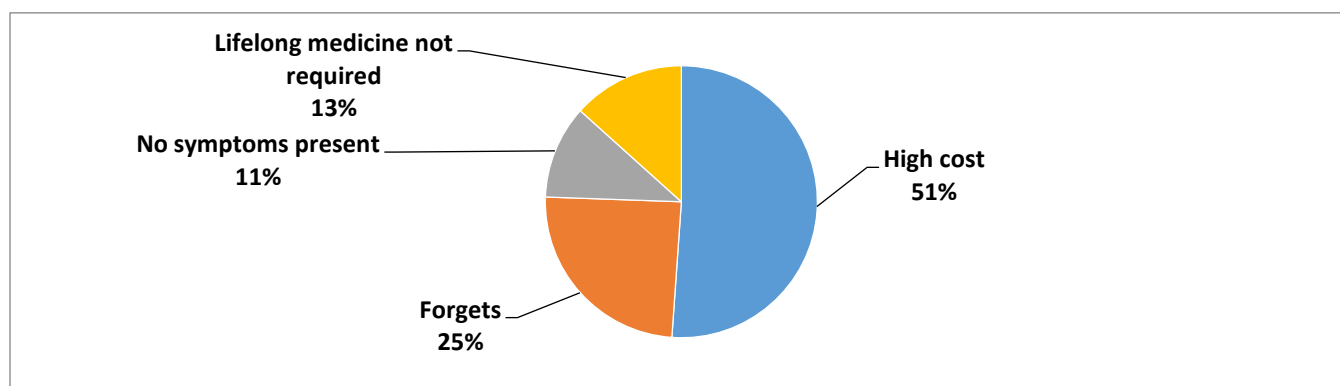

Table 4 shows the reasons for non-compliance (absolute and incomplete) for treatment advices. Financial constrains were the main reason for non-compliance for medicines (51.11%) as well as for investigations (77.5%). Figure 2 shows the different reasons for non-compliance to medicines. The second most common reason for non-compliance to medicines was that patients forget to take medicine (25%). 13% do not accept this fact that medicine have to be taken life long and 11% do not take medicines as there are no symptoms. Less salty diet, coconut oil avoidance and physical exercise was unacceptable to all those who were advised for better hypertension control.

Table 4: Reason for non-compliance (absolute and incomplete) to treatment advices

Advices	Reasons	No (%)
Medicines (n=45)	High cost	23 (51.11)
	Forgets	11 (24.44)
	No symptoms present	5 (11.11)
	Lifelong medicines unacceptable	6 (13.33)
Salt restriction (n=115)	Cannot accept less salty diet	115 (100)
Red meat avoidance (n=51)	Habit since childhood	32 (62.74)
	Cannot cause harm	19 (37.26)
Fruits and vegetables (n=74)	High cost	21 (28.38)
	No habit since childhood	53 (71.62)
Coconut oil avoidance (n=92)	Custom	92 (100)
Weight reduction (n=45)	Not practical	27 (60)
	cannot change food habits	13 (28.89)
	Exercise is difficult	5 (11.11)
Physical exercise (n=37)	Not feasible	37 (100)
Smoking (n=32)	Cannot live without it	32 (100)
Alcohol (n=39)	Hard to avoid	31 (79.48)
	Only source of entertainment	8 (20.52)
Investigations (n=40)	Money problem	31 (77.5)
	Unnecessary	9 (22.5)

Figures in parenthesis are in percentages

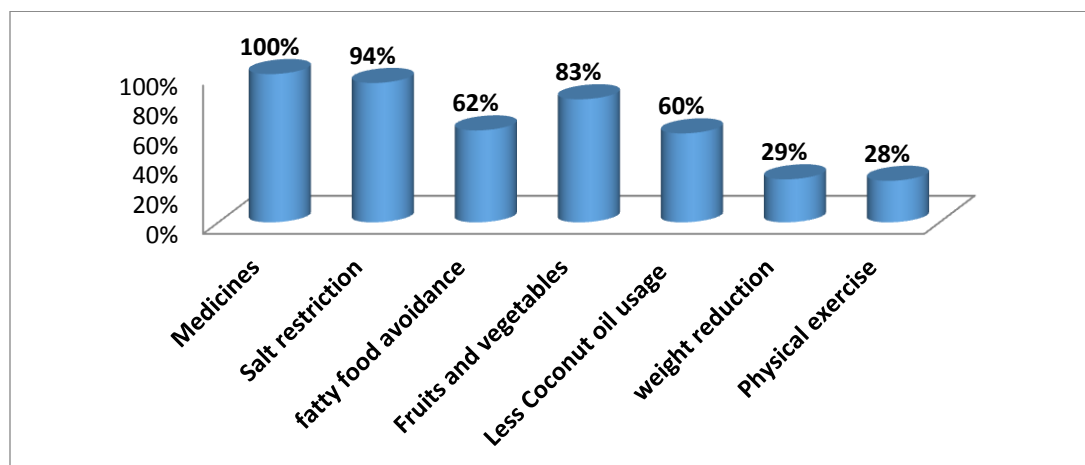**Figure 2: Advices received among those treated for hypertension (n=170)**

Table 5 depicts the status of blood pressure control among treated hypertensives. Overall about 50.58% (86) of the treated patients had their BP controlled at the time of survey. The control was significantly more in males as compared to females (64% vs 45%, OR=2.17, p=0.023). Also control was more among patients who were on regular treatment (60%) as advised by the health care provider in comparison to those who were either not following the advice or were following it incompletely (25%). This difference was highly significant.

Table 5: Control of blood pressure (<140/90 mm of Hg) in treated hypertensives (n=170)

Sex	Controlled	Uncontrolled	Total	OR	95% C.I. of OR	Statistics
Male	32 (64)	18 (36)	50 (29.41)	2.17	1.10-4.29	χ^2 =5.1 ,
Female	54 (45)	66 (55)	120 (70.59)	1	-	DF = 1,
Total	86 (50.58)	84 (49.42)	170 (100)			p=0.023;
Advice of Regular treatment followed completely						
Yes	70 (60.04)	36 (39.96)	106 (62.35)	5.38	2.91-11.68	χ^2 =26.89 ,
No	16 (25)	48 (75)	64 (37.65)	1		DF = 1,
						P<0.001;

Figures in parenthesis are in percentages

Discussion

Awareness about Hypertension among study population

The present study found out that nearly 72% of study subjects were aware that they have high BP. The awareness among females was better as compared to males. Wolf-Maier *et al* analysed different studies in developed countries and found that awareness was maximum in United States (88%) with awareness more in females (92%) than females (83%). He found awareness ranging from 82% (Canada) to 52.7% (Germany) and in all studies awareness was better in females. [3]

A systematic review done for Indian studies (from 1950 to 2013) found that awareness ranged from 25% in rural India to 42% in Urban India.[6] Another systematic review revealed awareness in India from 20-54%.[7] In Kerala, one study revealed awareness to be 34% and other 39%.[8, 9] So, our study subjects were having better awareness as compared to other places in India. The possible reasons for this may be high literacy in Kerala, a well functioning primary health centre in the area and frequent health checkups done by the medical students of our college.

Treatment status among aware subjects

86% of the subjects who were aware of their hypertensive status were actually taking anti-hypertensive medication. The percentage again was significantly more among females as compared to males. Two previous studies showed very less percentage of subjects getting treated among aware people, one 10% and other 32%.[10, 11] However, a study done in Kerala found that 89% of people who were aware of their hypertensive status were taking medications.[12]

Advices received by hypertensives for BP control

The treatment advices received by hypertensives were medicines, salt restriction in diet, fatty food avoidance, red meat avoidance, abundance of fruit and vegetables in diet, less coconut oil, weight reduction, stop smoking, avoid alcohol and physical exercise. These are the common advices with little

modifications which are given to hypertensives all over the world.[13] In a study done in Saudi Arabia, it was found that among hypertensives, 74% were under treatment, 62% were on dietary modification, 37% attempted weight reduction while 27% performed exercise for hypertension control.[14]

A lot of studies have proved that "Lifestyle changes" like loss in weight combined with salt restriction, added fruits and vegetables, exercise and avoidance of smoking lowers blood pressure in hypertensives as well as in normotensives.[15-18]

We found that some subjects were advised irregular treatment and told to take medicines only when they have high BP and withdraw when BP is controlled or when symptoms are waned. But we cannot verify for the authenticity of this fact.

Among the major advices for investigations, blood sugar was the commonest (77.65%), followed by hemogram (65.88%), Urine (53.53%), ECG (48.24%), Lipid profile (38.23%) and X-ray (20.59%) in that order. WHO also proposes similar investigations for the management of hypertension. Apart from these, WHO also advise to go for Serum uric acid, creatinine, potassium as routine tests while echocardiography, carotid ultrasound, C-reactive protein and fundoscopy as recommended tests.[19]

Compliance to antihypertensive treatment

WHO finds Compliance or adherence to antihypertensive treatment varying from 50-70% across the globe.[20] We found it nearly 73.5% in our study.

There were several reasons for non-compliance for treatment advices. The most common reason was financial constrains for medicines as well as for investigations advised. The other reasons were forgetfulness, non acceptance of the fact that medicines have to be taken lifelong and leaving medicines when there are no symptoms. High cost of drug or low financial status of the population is a major deterrent in drug compliance among hypertensives.[21, 22] Few studies have shown

that forgetfulness was an important cause for non-compliance.[23, 24]

Control of BP among hypertensives

Nearly half of the treated patients had their BP controlled at the time of survey and the control was more in males as compared to females. BP control was more among patients who were on regular treatment. So, poor compliance to treatment was an important cause for uncontrolled hypertension among study subjects.

Mohan *et al* did a study among 26000 individuals in Chennai and they found that 46% of the patients who were on antihypertensive treatment had their BP in control.[25] Elzubier *et al* in his study in eastern Sudan found that among compliant patients, 92% patients had BP in control.[21] Although Devi *et al* found that in India the percentage ranges from 7.5%-25%.[7] One factor can be attributed to this better control is the availability of a health centre in the area and better services provided to the people by the doctors and health staff of the centre.

Conclusion

It is evident from the present study that hypertension is a cause of concern for people living in fishermen colonies of coastal areas of Kollam. Overall, nearly 3/4th of the study subjects were aware that they have high BP. Out of these 86% of the subjects who were aware of their hypertensive status was actually taking anti-hypertensive medication. The treatment advices received by hypertensives by health care providers were medicines, diet restriction and other lifestyle changes. There were several investigations advised to the patients. Monetary problems were a big hindrance for not following advice apart from forgetfulness. Nearly half of the patients taking antihypertensive had their BP uncontrolled is something not acceptable and needs to be investigated further.

Recommendations
We must launch a comprehensive approach involving health care professionals including health workers and the general public with the aim of awaring patients to take treatment if diagnosed as hypertensive. Once diagnosed, they must take medications regularly as prescribed and also go for regular checkups to be sure that their BP is in control. Doctors must also consider the financial status of their patients in prescribing drugs. In our country we must keep the cost of medicines as well as investigations low enough for patients to have maximum advantage.

Limitation of the study: The findings are limited to only one coastal area in Kollam district. So, the results cannot be fully extrapolated for general population. Also, there is always a chance for recall bias.

Future scope of the study: India is going to become a capital of NCD's in near future. There is a need to study about awareness of hypertensives among all areas, rural and urban to find out the treatment compliance to anti-hypertensives and to know the roadblocks for poor compliance.

What is already known on this topic: Treatment compliance for hypertension depends on a lot of socio-economic factors.

What this study adds: Patient's economic status should be considered before advising them medications and proper follow up is necessary.

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Author's Contribution: ANA designed the study, drafted the manuscript and revised it. Concepts, definition of intellectual content, literature search, data analysis, statistical analysis, manuscript preparation, manuscript editing, manuscript review was also done by the author. Guarantee is also taken by the author.

Conflict of interest: None declared.

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