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Original Research Article

Non Compliance to Anti-Hypertensive Medications and Associated Factors- Community Based Cross Sectional Study from Kerala

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Abstract: Prevalence of hypertension is rising in India. Less than one-fifth of the patients in India have their blood pressure under control. Compliance to medications is known to be associated with blood pressure control. In this cross sectional study we measured prevalence of non compliance to anti hypertensive medications and associated factors. We enrolled 166 hypertensive subjects selected by systematic random sampling in community setting of rural Kerala. Voluntary written informed consent was taken from the study participants. They were interviewed with a pilot tested structured questionnaire. Compliance was assessed by brown bag technique. Among the study participants, 61.4% were senior citizen, 58.4% were females, three-fourth were married and 63.2% belonged to middle socio economic class. Majority (87.3%) preferred private facility for treatment. Prevalence of non compliance to anti hypertensive medication was 24.9% (95% CI: 18.2% to 31.6%). Age, gender, socio economic status, awareness of complications and history of adverse reactions attributed to anti hypertensive medication were not associated with non compliance. Opinion that insufficient time was spent for consultation by their doctor turned out to be a significant risk factor for non compliance (adjusted odds ratio: 4.567, 95% CI: 2.079 to 10.031). In conclusion, prevalence of non compliance is considerably lower in rural Kerala compared to other states in South India. We can conclude that offering more explanation, spending more time to clarify patient's doubts and hence building a good doctor patient relationship would result in better compliance to the medications prescribed.

Keywords:adherence, compliance, hypertension, antihypertensive, lifestyle disease, doctor-patient relationship

INTRODUCTION

Hypertension is largely a preventable disease [1]. However, hypertension is a major threat to public health. Cardiovascular diseases account for nearly one-third of deaths globally of which, around half can be attributed to complications of hypertension [2,3]. Low and middle income countries contribute nearly 80% of deaths due to cardiovascular diseases [2]. Prevalence of hypertension is increasing in India. Around two decades back, the prevalence of hypertension in urban and rural area was probably 15% and 8% respectively **[4].** Currently, prevalence of hypertension in urban area is 25% and in rural area it is 10% to 15% [4]. About 118 million were hypertensive in India in the year 2000 and the figure is expected to rise to 213 million by 2025 [5]. Multiple measures may be needed to control blood pressure. Lifestyle modifications include salt restriction in diet, avoiding alcohol and tobacco, weight reduction, physical exercise, stress management [6]. Along with lifestyle modification, pharmaceutical agents may also be necessary [6]. Only one-tenth of rural and one-fifth of urban Indians have their blood pressure under control [7]. Compliance to antihypertensive medications is known to be associated positively with control of blood pressure [8]. Hence, we conducted this study to measure the prevalence of non compliance to antihypertensive medications and its associated factors among hypertensive patients in the community.

MATERIALS AND METHODS

This was a community based cross sectional study. The study was conducted in the service area of Community Medicine department of medical college situated in rural parts of Central Kerala in India. Community members diagnosed with hypertension who were prescribed antihypertensive at least for past one

month were enrolled with voluntary written informed consent. For an expected prevalence of 75.9% non compliance [9], relative precision 10%, alpha error of 5% and design effect of 1.4, the sample size calculated was 171. We aimed to enroll 28 participants from six clusters of our service area by systematic random sampling within cluster. We reached sample size of 166. A pilot tested structured questionnaire was administered by the investigator. Compliance to anti hypertensive medications was determined by brown bag technique. Non compliance was defined as any missed dose of medication in past one week. Prevalence of non-compliance was calculated with 95% confidence intervals. Socioeconomic status was assessed by Kuppuswamy socioeconomic scale 2014 [10]. Association of socio demographic factors and treatment related factors with non compliance was ascertained by chi square test and the associations were quantified as odds ratios. Binary logistic regression was done to determine independent risk factors for non compliance. The study was approved by Institutional Ethics Committee.

RESULTS AND DISCUSSION

Among the 166 study participants, 61.4% were senior citizens. Majority were females (58.4%). Three fourth of the participants were married. Majority (63.2%) belong to middle socio economic class by modified Kuppuswamy scale 2014. The socio demographic characteristics are detailed in Table 1. As shown in Table 2, majority (87.3%) preferred private facilities for their treatment of hypertension. 44.6% participants used to travel 5 or more kilometers for their consultation and 38.6% depended on their family members for travel to their preferred health care facility.

The prevalence of noncompliance to anti-hypertensive medication was 24.9% (95% CI: 18.2% to 31.6%). Table 3 shows certain treatment characteristics of the study participants. Duration of hypertension was more than 3 years in the majority (68.0%). Majority (80.1%) was on single antihypertensive medication and only 3% were on three or more medications. 15.7% had perceived adverse drug reactions. Majority (74.7%) opined that their doctor spent adequate time for consultation. 63.9% were aware about complications of hypertension.

Various socio demographic and treatment related factors were analyzed for association with non compliance (Table 4). Opinion that the consultation time spent by doctor was insufficient was associated with non compliance (p-value <0.001). No other factor had significant association with non compliance. A binomial logistic regression model was built with age, gender, socio economic status, awareness of complication, opinion about duration of consultation time spent and history of adverse drug reaction. Opinion that doctor spent insufficient time for consultation was independently associated with non compliance (adjusted odds ratio of 4.567, 95% CI: 2.079 to 10.031)

Table 1: Socio-demographic characteristics of the study participants

Variable	Category	Frequency	Percentage
Age (years)	**60 and above**	102	61.4%
	Below 60	64	38.6%
Sex	**Male**	69	40.6%
	Female	97	58.4%
Marital status	**Married**	126	75.9%
	Widowed	34	20.5%
	Unmarried	6	3.6%
Socioeconomic status*	**Upper**	10	6.0%
	Upper middle	52	30.7%
	Lower middle	53	32.5%
	Upper lower	47	28.3%
	Lower lower	4	2.4%

*Socio economic status by modified Kuppuswamy scale 2014

Table 2: Access to preferred health care facility

Variable	Category	Frequency	Percentage
Healthcare facility	**Government**	21	12.7%
	Private	145	87.3%
Distance to healthcare facility	**<5km**	92	55.4%
	≥5km	74	44.6%
Travel to healthcare facility	**Independent**	102	61.4%
	Depend on family member	64	38.6%

Table 3: Treatment characteristics

Variable	Category	Frequency	Percentage
Compliance to treatment	**Non-compliant**	43	24.9%
	Compliant	123	74.1%
Duration of hypertension (in years)	**< 1**	22	13.2%
	1 - 3	31	18.8%
	>3	113	68.0%
Number of anti hypertensive medications	**1**	133	80.1%
	2	28	16.9%
	≥3	5	3.0%
History of Perceived Adverse Drug Reaction	**Present**	26	15.7%
	Absent	140	84.3%
Duration of consultation	**Sufficient**	124	74.7%
	Insufficient	26	15.7%
	Grossly insufficient	16	9.6%
Awareness regarding complications	**Present**	106	63.9%
	Absent	60	36.1%

Table 4: Factors associated with non-compliance to antihypertensive treatment

Risk factors		Non-compliant n (%)	Compliant n (%)	p-value of Chi square	OR (95% CI)	a-OR (95% CI)
Age (years)	**<60**	16 (25.0%)	48 (75.0%)	0.858	0.926 (0.452- 1.896)	1.136 (0.516-2.499)
	≥60	27 (26.5%)	75 (73.5%)			
Gender	**Male**	18 (26.1%)	51 (73.9%)	1.000	1.016 (0.503-2.055)	0.909 (0.425-1.943)
	Female	25 (25.8%)	72 (74.2%)			
SES*	**Better**	14 (22.6%)	48 (77.4%)	0.471	0.754 (0.362-1.571)	0.946 (0.419-2.134)
	Poor	29 (27.9%)	75 (72.1%)			
Awareness of complication	**Absent**	19 (31.7%)	41 (68.3%)	0.268	1.583 (0.779-3.218)	1.344 (0.626-2.882)
	Present	24 (22.6%)	82 (77.4%)			
Duration of consultation	**Insufficient**	21 (50.0%)	21 (50.0%)	**<0.001**	**4.636 (2.168-9.917)**	**4.567 (2.079-10.031)**
	Sufficient	22 (17.7%)	102 (82.3%)			
History of ADR**	**Absent**	34 (24.3%)	106 (75.7%)	0.329	0.606 (0.247-1.484)	0.593 (0.228-1.543)
	Present	9 (34.6%)	17 (65.4%)			

*Socio economic status by modified Kuppuswamy scale 2014.
**Adverse Drug Reaction

Based on a study from south India, we expected a non compliance of around 75% [9]. Similarly a study from Guntur, in south India reported adherence of only 15.3% [11]. However, the prevalence of non compliance was low in our study setting (24.9%). However, definitions used for non compliance were different in these studies. In our study, only duration of one week was introspected for non compliance to minimize recall errors.

In our study, we had studied the socio demographic characteristics, accessibility to health care facility and treatment related factors. The study from Guntur shows that females and age above 50 years had better adherence to medication [11]. In another south Indian study, males were seen to be significantly associated with non-compliance [12]. In yet another south Indian setting, we had seen that socio economic status, level of education and marital status were associated with adherence [13]. In our study none of the socio demographic factors were associated with non compliance. We had seen that participants who opined that their doctor spent insufficient time for consultation had significantly higher risk for non compliance. A study from Nigeria reported that consultation failure on the part of clinicians was a reason for non compliance [14]. Few explanations given by physician and low physician-patient interaction were recognized as reasons for non compliance in a qualitative study [15]. Evidence based recommendations by World Health Organization show that for adherence to long term therapies, patients needs advice, support and information from health professionals to understand the importance and rationale of treatment, to learn how to deal with missed doses and to identify and cope with adverse events [16]. Health beliefs of patients are important factors which determine compliance. Patients who perceive high susceptibility, severity and benefit tend to be more compliant [9,17]. Personal habits such as sedentary lifestyle, smoking and alcohol use may be associated with non compliance [9]. Similar to our findings, another study reported that knowledge of

hypertension was not associated with compliance [18]. Depression could be associated with non compliance [18]. Family support may improve adherence [19]. In our study we looked into one aspect of family support, in the form of accompanying the patient and that was not associated with compliance.

CONCLUSION

The strength of the study was that brown bag technique was used to assess compliance. However only one week period was inquired, which was a limitation. The study concludes that the prevalence of non compliance is much lower in our setting compared to other parts of south India. The study suggests that poor doctor patient interaction could be a reason for non compliance. We can conclude that offering more explanation, spending more time to clarify patient's doubts and hence building a good doctor patient relationship would result in better compliance to the medications prescribed.

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