

Retraction

The article "Medication adherence and health belief model among hypertensive patients attending rural health centres of a tertiary care hospital in South India" is retracted by the Editor and Publisher, as per the request of corresponding author Dr. Shameena A.U. and co-authors, due to an unintended mistake.¹ The Morisky Medication Adherence Scale (MMAS-8) was used without proper permission.

REFERENCES

1. Shameena AU, Badiger S, Kumar SN. Medication adherence and health belief model among hypertensive patients attending rural health centres of a tertiary care hospital in South India. *Int J Community Med Public Health* 2017;4(4):1159-65. DOI: <http://dx.doi.org/10.18203/2394-6040.ijcmph20171342>.

Original Research Article

Medication adherence and health belief model among hypertensive patients attending rural health centres of a tertiary care hospital in South India

Shameena A. U.*, Sanjeev Badiger, Nanjesh Kumar S.

Department of Community Medicine, KSHEMA, NITTE University, Mangalore, Karnataka, India

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***Correspondence:**

Dr. Shameena A.U,

E-mail: shameenahafis@gmail.com

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ABSTRACT

Background: Medication adherence is a growing concern to healthcare systems as non-adherence to pharmacotherapy has been associated with adverse outcomes and higher costs of care. Objective: To assess the determinants of Patient's adherence to Hypertensive medication and to evaluate the levels of adherence based on Health belief Model.

Methods: A cross-sectional study conducted in the OPDs of Rural Health Centres of a tertiary care hospital over a period of 4 months (April'16 –July'16) using a semi-structured and validated questionnaire which contain information on demographic characteristics, medication and health related facility and Health Belief Model. All hypertensives taking medication for more than 6 months were included in this study. Medication Adherence was assessed using the Morisky Medication Adherence Scale-8(MMAS-8). Statistical Analysis: Data was analysed using SPSS and P value <0.05 was considered statistically significant.

Results: Out of 300 patients, 114 were males and 186 were females. The level of Adherence was 23% in our study subjects. Gender (0.05), Religion (0.02), Marital status (0.035), Socioeconomic status (p=0.000) and Frequency of medication (p=0.000) had association with adherence. Based on health belief model, perceived severity (p=0.000), perceived susceptibility (p=0.000), perceived benefit (p=0.000), perceived barrier (p=0.000), Cue to action (p=0.025) and self-efficacy (p=0.00) had association with adherence.

Conclusions: Patients Knowledge, understanding and perception can improve the adherence to medication. The results of our study can be used for better treatment of Hypertension.

Keywords: Hypertensive medication, Health Belief model, Adherence

INTRODUCTION

Hypertension is one of the main risk factor for the development of cardiovascular disease. Effective and well tolerated once a day drugs are now available for the treatment of Hypertension.. Yet poor adherence with prescribed medication continues to be one of the main causes of poor control of blood pressure and might lead to end organ damage and increased cardiovascular risk.¹

Non-communicable diseases (NCDs), no longer a disease of the rich, impose a major threat in the developing nations due to demographic and epidemiological transition. NCDs are contributing as a major disease burden in India and their risk factors are a cause of concern most dreaded situations being faced now by India and other nations. HT (Hypertension) is one of the

most important treatable causes of mortality and morbidity. The CURES cohort suggested that every fifth person in India is hypertensive.^{2,3}

Medication adherence is defined as “the extent to which the medication-taking behaviour of a patient corresponds with agreed recommendations from a health care provider. It is an important factor in achieving blood pressure control.”^{4,5}

High cost of medication and adverse drug reactions are mainly associated with nonadherence to pharmacotherapy which in turn causes a major concern to healthcare systems. As the number of medication increases in the elderly population and among people suffering from chronic morbidities, the nonadherence is also to rise. Several studies highlighted that the levels of adherence to treatment in patients with chronic diseases are inadequate showing rates that do not exceed 50%. The key factors necessary to gain a significant reduction in morbidity and mortality are mainly adherence and persistence to drug treatment, but these aspects are widely underestimated in clinical practice and by patients.⁶⁻¹⁰

The different approaches used to assess medication adherence include direct and indirect methods. Indirect methods include patient interviews, pill counts, refill records, and measurement of health outcomes. However, the most practical approach to apply in clinical practice self-reporting by patient. The advantages of assessing medication adherence by self-report includes simplicity, speed, and viability of use.¹¹ The Morisky Medication Adherence Scale (MMAS-8) is one of the most frequently used self-reporting methods.^{12,13}

Health Belief model has been identified as one of the earliest and most effective models in health promotion.¹⁴ Most health promotion interventions pursue in some way to change health behaviour. Currently many studies are done to assess the compliance of treatment using direct and indirect methods. But only few studies are done to evaluate the effect of behavioural attitudes and beliefs of patient to drug adherence and Hypertension. So the objective of our study is to assess the determinants of drug adherence and to determine the level of adherence based on Health Belief Model.

METHODS

This cross sectional study was conducted in the Outpatient departments of the rural health centres attached to a Medical college in Mangalore during a period of four months (April 2016). All hypertensive patients aged above 30 years and taking medication for more than 6 months were included as our eligible participant. Pregnant women reporting hypertension, patients with comorbidities and those with cognitive or hearing impairment were excluded from our study.

Sample Size was determined after considering prevalence of low adherence of 23% from a previous study³, Using the formula $N=4pq/d^2$ where p is the prevalence, q is 100-p and d is absolute precision of 5%, the sample size was calculated to be 300. Two stages simple Random Sampling method was used. In the first stage, out of the 18 rural health centres attached to the medical college 2 were randomly selected. Next stage out of the total registered hypertensive patients (1834) 300 were randomly selected. The Ethical Clearance was obtained from the Institutional Ethical Committee.

All the eligible participants were interviewed personally after explaining them about the procedure in detail. A written informed consent was taken before the start of the study. The Data was collected using a semi structured pre tested questionnaire which consisted of:

1. Sociodemographic characteristics including Name, Age, Sex, Education, Religion, Marital Status, Education, Occupation and Socio economic status (using modified BG Prasad Classification).
2. Medication and health related facilities like caregiver, person paying fees, cost of medication and frequency of medication.
3. Moriskys Medication Adherence Scale (MMAS-8). The MMAS-8, an update with greater sensitivity of the four-item scale published in 1986 and considered the most commonly used self-reporting method to determine adherence, contains eight questions with closed dichotomous (yes/no) answers. Thus, each item measured a specific adherence behavior, with seven questions that must be answered negatively and only one positively, with the last question being answered according to a scale of five options: never, almost never, sometimes, often, and always.

The degree of adherence was determined according to the score resulting from the sum of all the correct answers: high adherence (eight points), average adherence (6 to < 8 points) and poor adherence (< 6 points).¹⁵⁻¹⁷

4. Health belief model has been identified as one of the earliest and most influential models in health promotion. the model presents with six key concepts: perceived susceptibility (patients risk awareness of disease), perceived severity (concept by which a disease can cause morbidity, disability or mortality), perceived benefits (benefit of taking drug)), perceived barriers (hindrance in taking medication like cost, frequency, side effects), cues for action (factors that can initiate an individual to take action like death of a close person due to same disease) and self-efficacy.^{18,19}

Statistical analysis

The Data obtained were entered into excel sheet and analysed using SPSS version 16. Descriptive data were

analysed using frequency, percentage and proportion. Appropriate Statistical tests were done and p value < 0.05 was considered as significant.

RESULTS

Out of the 300 participants, 186 (62%) were females and

114 (38%) were males. Maximum individuals 120 (40%) were in the age group 51-60 years followed by 98 (32.7%) in the age group above 60 years, 60 (20%) in the age group 41-50 years and 22 (7.3%) in the age group 31-40 years.

Table 1: Association of socio demographic factors and adherence (n=150).

Variable	Low adherence (n=142) (%)	Moderate adherence (n=88)(%)	High adherence (n=70)(%)	Total	P value
Age(years)					
31-40	8(36.4)	6(27.3)	8(36.4)	22(100)	0.262**
41-50	32(53.3)	20(33.3)	8(13.3)	60(100)	
51-60	52(43.3)	38(31.7)	30(25)	120(100)	
>61	50(51)	24(24.5)	24(24.5)	98(100)	
Sex					
Male	58(50.9)	38(33.3)	18(15.8)	114(100)	0.05*
Female	84(45.2)	50(26.9)	52(28)	186(100)	
Religion					
Hindu	104(50)	64(30.8)	40(19.2)	208(100)	0.02*
Christian	0	0	2	2(100)	
Muslim	38(42.2)	24(26.7)	28(31.1)	90(100)	
Marital staus					
Married	92(44.2)	60(28.8)	56(26.9)	208(100)	0.035*
Widow/er	38(52.8)	20(27.8)	14(19.4)	72(100)	
Separated	4(100)	0	0	4(100)	
Single	8(50)	8(50)	0	16(100)	
Education					
Illiterate	46(54.8)	12(14.3)	26(31)	84(100)	0.010*
Lower primary	50(39.7)	44(34.9)	32(25.4)	126(100)	
Upper primary	26(52)	14(28)	10(20)	50(100)	
High school	10(45.5)	10(45.5)	2(9.1)	22(100)	
Puc	6(60)	4(40)	0	10(100)	
Graduation	4(50)	4(50)	0	8(100)	
Occupation					
Unemployed	76(50)	46(30.3)	30(19.7)	152(100)	0.001*
Unskilled	28(51.9)	10(18.5)	16(29.6)	54(100)	
Semiskilled	34(48.6)	22(31.4)	14(20)	70(100)	
Skilled	4(22.2)	4(22.2)	10(55.6)	18(100)	
Semiprofessional	0	2(100)	0	2(100)	
Professional	0	4(100)	0	4(100)	
Socio economic status					
Class1	6(25)	14(58.3)	4(16.7)	24(100)	0.00*
Class2	14(36.8)	20(52.6)	4(10.5)	38(100)	
Class3	6(75)	2(25)	0	8(100)	
Class4	24(41.4)	10(17.2)	24(41.4)	58(100)	
Class5	92(53.5)	42(24.4)	38(22.1)	172(100)	

**Chi square test, *Likelihood ratio and P <0.05 considered statistically significant.

As per religion, 208 (69.3%) belonged to Hindu, 90 (30%) were Muslims and only 2 (0.7%) were of Christian religion.

Regarding marital status, 208 (69.3%) were married, 72 (24%) were widow/er and 16 (5.3%) were single.

Table2: Association of adherence and medication and health related facility (n=150).

Variable	Low adherence	Moderate adherence	High adherence	Total	P value
Care giver					
Self	124(46.6)	76(28.6)	66(24.8)	266(100)	0.241**
Others	18(52.9)	12(35.3)	14(11.8)	34(100)	
Person paying fees					
Self	100(52.1)	48(25)	44(22.9)	192(100)	0.051**
Others	42(38.9)	40(37)	26(24.1)	108(100)	
Type of medical facility					
Private	88(49.4)	52(29.2)	38(21.3)	178(100)	0.565**
Public	54(44.3)	36(29.5)	32(26.2)	122(100)	
Distance of medical facility					
Less than 5km	102(47.2)	64(29.6)	50(23.1)	260(100)	0.986**
More than 5km	40(47.6)	24(28.6)	20(23.8)	84(100)	
Medicines cost					
Free	86(48.3)	56(31.5)	36(20.2)	178(100)	0.276**
Purchased	56(45.9)	32(26.2)	34(27.9)	122(100)	
Frequency of medication					
Once a day	88(40.7)	64(29.6)	64(29.6)	216(100)	0.000**
Twice a day	54(64.3)	24(28.6)	6(7.1)	84(100)	

**Chi square test, *Likelihood ratio and P <0.05 considered statistically significant.

Table 3: Association of adherence and health belief model (n=150).

Variable	Low adherence	Moderate adherence	High adherence	Total	P value
Perceived susceptibility					
High	0	0	8(100)	8(100)	0.000*
Moderate	38(50)	30(39.5)	8(10.5)	76(100)	
Low	104(48.1)	58(26.9)	54(25)	216(100)	
Perceived severity					
High	10(38.5)	12(46.2)	4(15.4)	26(100)	0.000**
Moderate	84(43.3)	72(37.1)	38(19.6)	194(100)	
Low	48(60)	4(5)	28(35)	80(100)	
Perceived benefit					
High	54(44.3)	30(24.6)	38(31.1)	122(100)	0.000*
Moderate	88(52.4)	54(32.1)	26(15.5)	168(100)	
Low	0	4(40)	6(60.4)	10(100)	
Perceived barrier					
High	52(65)	12(15)	16(20)	80(100)	0.000**
Moderate	46(46.9)	36(36.7)	16(16.3)	98(100)	
Low	44(36.1)	40(32.8)	38(31.1)	121(100)	
Cue to action					
High	30(60)	14(28)	6(12)	50(100)	0.025**
Moderate	52(45.6)	40(35.1)	22(19.3)	114(100)	
Low	60(44.1)	34(25)	42(30.9)	136(100)	
Self-efficacy					
High	34(23.3)	58(39.7)	54(37)	146(100)	0.000**
Moderate	80(66.7)	30(25)	10(8.3)	120(100)	
Low	28(82.4)	0	6(17.6)	34(100)	

**Chi square test, *Likelihood ratio and P <0.05 considered statistically significant.

Out of 300 respondents, 123 (42%) had education of lower primary status and most of them 152 (80.7%) were unemployed. Also 172 (57.3%) of the respondents belonged to class 5 socio-economic status.

This study which had 300 respondents, only 70 (23.3%) had high adherence to hypertension medication. Most of them 142 (47.3%) had low adherence and 88 (29%) had moderate adherence.

Among the different factors under socio-demographic characteristics, majority of them had significant association with level of adherence like gender ($p=0.05$), religion ($p=0.02$), marital status ($p=0.035$), education ($p=0.010$), occupation ($p=0.001$) and socioeconomic status ($p=0.000$) as shown in Table 1.

Among medication and health related factors, our study found only significant association ($p<0.000$) with frequency of medication compared to other factors like caregiver, person paying fees, type and distance of medical facility and cost of medication as shown in Table 2.

In our study most of the components of Health Belief Model like perceived susceptibility ($p=0.000$), perceived severity ($p=0.000$), perceived benefit ($p=0.000$), perceived barrier ($p=0.000$), cue to action ($p=0.025$) self-efficacy ($p=0.000$) had significant association with level of adherence as shown in Table 3.

DISCUSSION

In our study high adherence to hypertensive medication was only 23.3%. The factors associated with adherence in our study were gender, Religion, marital status, education, occupation, socioeconomic status, frequency of medication and six components of Health Belief Model.

The level of adherence varied in different studies done in similar settings. Almost identical adherence was reported in a study conducted by Venkatachalam et al (24%) in India but was higher in other studies reported from Malaysia (44%) and Egypt (72%) which could be due to different socio demographic profile.^{3,20,21} While a community based study also showed a prevalence of 59%.¹⁷

In our study, adherence was higher among people in the age group above 60 years (24.5%), females (28%) compared to males and among married (26.9%) than widow/er. Similarly in an Iranian study by Hadi (2004) older patients were more and in a study from Iraq, the compliance was highest among patients aged 70 years and more (78%) followed by those <30-year-old (64%), and females were significantly more compliant than males.^{22,24} Another study carried out in Pakistan among 460 hypertensive, showed that adherence increases with

age and highest mean adherence rate was in the age group of 70-80 years.²³ Our study showed significant association with gender and marital status to the level of adherence. This might be due to proper care and respect given to the elderly in rural areas and greater emotional attitude of females towards their health.

Regarding Medication and health related factors, our study showed only significant association with frequency of medication. In the present study, adherence was high among those who took medication themselves (22.9%), where the distance of medical facility was less than 5 km (23%) and with people taking only once a day medication (29%) compared to those where caregiver is other people, distance more than 5 km and frequency of medication more than one time a day. Similar findings was reported in various studies where distance of medical facility played a vital role.^{3,18,25,26} Various researches have concluded that distance from medical facility greatly influence health seeking behaviour and in turn drug adherence.²⁷ Cost of Medication and Type of Medical facility didn't show any significance in our study which can be because of free and adequate medications provided by our centre.

As per Morisky Scale, 54.7% forget to take medication, 72% had missed taking medication for other reasons, 88% has stopped taking medication when they felt worse and 81.3% stopped taking medication when their hypertension was under control.

Analysing Health Belief Model, our study found significant association with all the six components of the model. Our results showed that adherence was high among those who had higher perception regarding the susceptibility of complications of hypertension, better perception regarding the benefit of drug intake, among those who perceived fewer barriers in taking medication and in those who were highly self-efficient in taking medication. Almost similar result was shown in a Houston American Study which revealed that perceived barrier was important predictor in noncompliance to antihypertensive drugs.²⁸ Other studies done in India mainly interpreted that adherence increases which higher perception of disease severity, susceptibility, medication benefit, cue to action and self-efficacy.^{3,18} This could also be the reason of overall low adherence among our study population where there is a need to improve the knowledge and attitude of people towards the disease and drug intake.

CONCLUSION

The prevalence of adherence is low in our study which could be due to inadequate perception regarding the benefit of proper drug intake and ignorance about the severity and susceptibility of the disease. These factors can be overcome by continued health education and behaviour change communication. There is also a need to

emphasize the importance of health promotion among practitioners to improve drug adherence.

Limitation of the study

As this study was done in a rural health centre of a tertiary care hospital in South India, it cannot be generalised to the entire population. It would have been better if comorbidities were also assessed which could have an impact on adherence. There is a chance of potential recall bias while assessing the self-report scale. Further researches can be done by conducting community based studies in larger population. There is also a scope for conducting qualitative method.

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