Adherence to Antihypertensive Medications: Population Based Follow up in Eastern Nepal

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ABSTRACT

Background: Poor adherence toward antihypertensive drugs is a worldwide problem that results in poor health outcomes and increased health care costs. Community based study related to adherence to antihypertensive medication is limited in context of Nepal.

Methods: This study was conducted to explore the extent of adherence towards prescribed antihypertensive treatment and to identify the factors of non adherence. Community based cross sectional study was conducted in Dharan Municipality of Eastern Region of Nepal from September 2009 to February 2010. Out of 975 hypertensive patients, 154 calculated samples were selected following simple random sampling method. Data was collected by interview method and adherence was measured by using four items Morisky Medicine adherence scale. Data was analyzed using SPSS by descriptive and inferential (Chi square and logistic regression analysis) Statistical method.

Results: Among the 154 hypertensive patients, only 56.5% patients were adherent to antihypertensive medication. The important predictors of non adherence by logistic regression analysis at 95% Confidence Interval were illiteracy (OR 5.34, CI= 1.23 -23 , P=0.025), expensive price of medicine (OR 5.14, CI=1.1-23.9, P=0.037), missed medicine due to cost (OR 0.143,CI=0.02-0.78, P= 0.025), no family history of hypertension (OR 4.46,CI= 1.21-16.4, P=0.024), irregular follow up (OR 6.39,CI=1.22-33.3, P=0.028), more than one pills per day (OR 5.33,CI=1.19-23.7, P= 0.028).

Conclusions: Around half of the population was non adherent towards antihypertensive medications so identified gap need to be addressed to increase adherence level.

Keywords: Adherence; hypertension; medication.

INTRODUCTION

Adherence is the extent to which a person's behavior- taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a health care provider.[1] Adherence is dependent on numerous factors and has been shown to vary from 0 to 100% in different populations studied.[2] The consequences of poor adherence to long term therapies are poor health outcomes and increased health care costs.[3] Hypertension is one of the most important modifiable risk factors for cardiovascular disease. In both developing and developed countries, high blood pressure has been identified as the leading risk factor for mortality and is major cause of disease burden.[4] The prevalence of Hypertension ranges from 23% to 34% in different subsets of population in Nepal[5-9] and it was 22.7% among males of Dharan municipality.[10] Poor adherence to antihypertensive treatment is a major therapeutic challenge. Studies have shown that those with poorer adherence have greater rates of stroke, heart failure and other cardiovascular complications.[11]Several studies have shown that 50% of hypertensive patients don't take their medications as prescribed.[12]

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The objective of this study was to explore the extent of adherence towards prescribed antihypertensive treatment and to elucidate the factors of non adherence.

METHODS

A community-based cross-sectional study was conducted in Dharan Municipality of Eastern region of Nepal among one hundred and fifty four hypertensive patients which was calculated by using $4pq/l^2$ in 95% CI where allowable error was taken as 12% and prevalence 64.2%.[13] The calculated samples were selected following simple random sampling method from list of 975 hypertensive patients above 35 years[10] of old from Dharan diagnosed at B.P. Koirala Institute of Health Sciences in one year. Study was conducted from September 2009 to February 2010 by doing interview by the researcher at their home using semi structured questionnaire. Adherence to antihypertensive medication was measured by four item Morisky medication adherence scale.[14] Each questions had five options and scores range from 0 to 4, with a higher score 3+ representing non adherent.[15] Data was analyzed in Statistical Package for social sciences (SPSS 16 Version). Socio demographic, medical and behavioral variables were compared using the non parametric Chi-squares test between adherence and non adherence group. Significant variables (p =< 0.05) were further analyzed using logistic regression analysis to isolate predictors of non adherence in 95% confidence interval with P < 0.05 as statistically significant level. Ethical approval was taken from Institutional Ethical Review Board BPKIHS and Verbal consent was taken from each respondent. Non adherent participants were advised to take their medication regularly by giving health education.

RESULTS

Out of 154 hypertensive patients, 87 (56.5%) were adherent towards antihypertensive medication whereas 67 (43.5%) were non adherent according to Morisky Medication adherence scale.[14] Table 1 shows most of the variables were comparable except sex, educational status, current occupation. Non adherence group had significantly higher females (54.2% vs. 30.9%, P=0.004), illiterate ((71.2% vs. 22.7%, P= <0.001) and unemployed (55.3%% vs. 38.3%, P= <0.05) compared to adherent group.

Table 1. Association of demographic characteristics and non adherence.

Characteristics	Categories	Non-adherence Yes (67) %	No (87) %	P value[a]
Age in years	35 - 45	40.6	59.4	0.937
	45- 55	44.4	55.5	
	55- 65	40.6	59.4	
	65 +	46.6	53.4	
Sex	Male	30.9	69.1	0.004*
	Female	54.2	45.8	
Caste	Disadvantaged Janajatis	50	50	0.407
	Relatively upper caste	40.6	59.4	
	Others **	37.1	62.9	
Religion	Hindu	45.9	54.1	0.822
	Christian	47.1	52.9	
	Kirat	36.6	63.4	
	Buddhist	40.9	59.1	
Educational Status	Literate	22.7	77.3	<0.001*
	Illiterate	71.2	28.8	
Marital status	Married	42.9	57.1	0.799
	Widower	45.5	54.5	
Current occupation	Unemployed	55.3	44.7	<0.050*
	Employed	38.3	61.7	

*= significant , a= chi square test ** others = dalit, non dalit, minorities group

This study shows reason of non adherence are forgetfulness (55.1%), switched on to alternative medicine such as ayurvedic medicine, chiraito (a kind of leaf of plant which has bitter taste), yoga (25.97%), not having symptoms of disease (19.4%), fear of addiction (18.8%), side effects (16.8%), not having faith on allopathic medication (16.8%) and 9.7% due to high cost of medication assessed by multiple response questions.

Table 2 shows that in non adherent group percentage of people having uncontrolled blood pressure is significantly higher compared to control blood pressure (54.2% vs. 34.5%, p= 0.014). Among medical characteristics, non adherence group had significantly higher percentage of patients without family history of hypertension (57.9% vs. 35.1%, P= 0.006), taking more than one pills per day (58.2% vs. 28%, P= <0.001) compared to adherent group.

Table 2. Association of physical and medical characteristics and non adherence.

Characteristics	Categories	Non-adherence Yes (n=67) %	No (n=87) %	P value[a]
Blood pressure	Controlled BP <140/90	34.5	65.5	0.014*
	Uncontrolled ≥140/90	54.2	45.7	
Obesity	Non-obese BMI < 25	42.2	57.8	0.836
	Obese BMI ≥ 25	44	56	

Duration of hypertension	Less than 5 yrs	41.4	58.6	0.482
	More than 5 yrs	47.3	52.7	
Family history of HTN	Yes	35.1	64.9	0.006*
	No	57.9	42.1	
History of other disease**	Yes	41.9	58.1	0.557
	No	46.9	53.1	
Number of drugs prescribed	Only one	28	72	<0.001*
	More than one	58.2	41.8	
Frequency of medication	One time	40	60	0.199
	More than one time	51.1	48.9	

*= significant   a= chi square test   ** Diabetes, Kidney disease etc

Smoking	Yes	43.9	56	0.925
	No	43.1	56.8	
Stress	Yes	52	48	0.038*
	No	35.5	64.5	

*= significant   a= chi square test

In non adherent group, significantly higher percentage of patients had bought medication by themselves (47.1% vs. 20%, P= 0.029), thought price of the medication expensive (57.3% vs. 15.7%, P= <0.001), missed medication due to high cost (70% vs. 30.8%, P=<0.001) and did not used reminder (49.1% vs 27.5%, P=0.018), not taking low fat diet (53.3% vs. 29.6%, P=0.004), not doing regular exercise (51.2% vs. 32.8%,P=0.024), not doing regular follow up (59.5% vs. 21.2%, P=<0.001), not carrying medication while going out from home for some day (72.3% vs. 30.8%, p= <0.001),using alternative medicine (59.1% vs. 31.8%, p= <0.001), not aware about complication of non adherent(55.2% vs. 24.1%, p= <0.001) and having stress (52% vs. 35.5%, p= 0.038) compared to adherent group as shown in **Table 3**

Table 3. Association of behavior characteristics of respondents and non adherence.

Characteristics	Categories	Non adherence Yes(n=67)	Non adherence No (n=87)	p. value[a]
Medicine Bought	By themselves	47.1	52.9	0.029*
	Get reimbursed	20	80	
Price of medicine	Affordable	15.7	84.3	<0.001*
	Expensive	57.3	42.7	
Missed medicine due to cost	Yes	70	30	<0.001*
	No	30.8	69.2	
Use of reminder(alarm)	Yes	27.5	72.5	0.018*
	No	49.1	50.9	
Taking low salt diet	Yes	41.5	58.5	0.585
	No	45.8	54.2	
Taking low fat diet	Yes	29.6	70.4	0.004*
	No	53.3	46.7	
Regular exercise	Yes	32.8	67.2	0.024*
	No	51.2	48.8	
Regular follow up	Yes	21.2	78.8	<0.001*
	No	59.5	40.5	
Carry medicine while going outside	Yes	30.8	69.2	<0.001*
	No	72.3	27.7	
Use of alternative medicine	Yes	59.1	40.9	0.001*
	No	31.8	68.1	
Aware about complication of non adherence	Yes	24.1	75.9	<0.001*
	No	55.2	44.7	
Drink alcohol	Yes	43	57	0.863
	No	44.4	55.5	

After the logistic regression analysis, illiteracy, uncontrolled blood pressure, expensive price of medicine, missed medicine due to cost; no family history of hypertension, irregular follow up and more than one pill per day were found significantly associated with non adherence compared to adherence.

Table 4. Independent predictors of non adherence by logistic regression analysis.

Variables	Sig	Exp B	95 CI of Exp B Lower	95 CI of Exp B Upper
Sex	0.399	1.71	0.49	5.98
Educational status (illiterate vs. literate)	0.025*	5.34	1.23	23.0
Occupation (Unemployed vs. employed)	0.294	0.45	0.106	1.97
Controlled BP (Uncontrolled vs. controlled)	0.004*	9.26	2.07	41.44
Cost of medicine (expensive vs. affordable)	0.037*	5.149	1.107	23.95
Missed medicine due to cost (missed vs. not missed)	0.025*	0.143	0.02	0.78
Family h/o Hypertension (no Family history vs. have family history)	0.024*	4.46	1.21	16.43
Follow up (irregular vs. regular)	0.028*	6.39	1.22	33.36
Number of drugs (one pills/d vs. more than one pills/d)	0.028*	5.33	1.19	23.75

DISCUSSION

The present study examined the magnitude of non adherence of hypertensive patients towards prescribed antihypertensive drugs and factors associated with non adherence in a town of Eastern region of Nepal. Adherence to medication regimen is generally defined as the extent to which patients take as prescribed by their health care providers.[16] Despite the availability of effective treatment, over half of the patients being treated for hypertension drop out of care entirely within a year of diagnosis[17] and those who remain under medical supervision only about 50% take at least 80% of their prescribed medications.[18]

The present study found that 56.5% of hypertensive patients were adherent to antihypertensive

therapy measured by Morisky Medication Adherence Scale.[14] It is lower than hospital based study done at western region of Nepal (64.28%)[13] and in central region 92%.[19] This could be due to measurement of adherence based on different criteria, along with variation in the subset of population which served as the study sample and that previous studies were hospital based whereas ours is community based study. Among the studies conducted on various populations of the world, the adherence we observe is higher than what has been reported in studies in Malaysia (44.2%)[20] china, the Gambia and the Seychelles, only 43%, 27% and 26%[21] respectively and lower than what a study in western population (Scotland) reports (91%) and as study in Egypt (74.1%).[22] On the contrary, more people of a developing country, like Pakistan 77%[23] were adherent to their medication than this study.

Age was not significantly associated with adherence in our study. This finding is contrast with a number of other studies including the regional study in Malaysia[24] although there are studies which shows either no association[22] with decreasing adherence with increasing age. Present study found significant association between gender and non adherence. Gender may not be a good predictor of non-compliance because of the inconsistent conclusions.[24] Education was significantly associated with non adherence as some study support this findings[25] and some contradict. [24]

Furthermore this study showed the reason of non adherence were forgetfulness 55.1%, use of alternative medicine 25.9%, treatment of asymptomatic disease 19.4%, fear of addiction18.8%, not having faith on medicine 16.8%, side effects 16.8% and cost of medicine 9.7%, whereas Eagan et.al found forgetfulness, adverse effects and not liking to take medication are the reasons for poor adherence in a nationally representative sample in the United States.[26] The most commonly reported reason for unintentional non adherence was forgetfulness (72%)[27] which is corresponding to our findings.

Good adherence has been associated with improved blood pressure control and reduced complications of hypertension.[28] This study has similar finding. The number of pills per day is associated with

adherence. Misconceptions or erroneous beliefs held by patients would contribute to poor compliance. Several studies about compliance among hypertensive patients found that patients who smoked or consumed alcohol were more likely to be non adherent.[29] In contrast, this study found no any significant association between smoking, alcoholism and non adherence. Similarly, our study found significant association between having stress at home or working area and non adherence. One review showed an association between patients' negative attitude towards therapy (e.g. depression, anxiety, fears or anger about the illness) and their compliance.[29]

CONCLUSIONS

This study reveals nearly half of the respondents were non adherent to antihypertensive medication. The findings of the study show that non adherence was significantly associated with illiteracy, high cost of medicine, no family history of hypertension and more than one pill per day and irregular follow up pattern. An underdeveloped country like Nepal need to invest in community based awareness and intervention program and identified gap needs to be addressed. Some more in depth follow up study is needed to find out why people do not perceive the threat caused by chronic condition like hypertension, as cultural, anthropological and psychosocial dimension of individual were beyond the scope of this study.

REFERENCES

1. World health organization. Chapter XIII Hypertension in Adherence to Long Term Therapies – Evidence for Action 2003; 1- 4. Available:http://www.emro.who.int/ncf/publications/adherence_report.pdf. Assesses February 2007.

2. Bloom BS. Daily regimen and compliance with treatment. British Medical Journal 2001;323:647

3. Herborg H, Haugbolle LS, Sorensen L, Rossing C, Dam P. Developing a generic individualized adherence programme for chronic medication users. Pharmacy practice 2008 Jul-Sep;6(3):148-57.

4. Yi W,Shyong Tai E, Heng D, Eng Tan C, Lip P L. Risk factors associated with hypertension awareness, treatment and control in a multi-ethnic Asian Population. Journal of Hypertension 2009;27:190- 97.

5. Sharma SK, Ghimire A, Radhakrishnan J, Thapa L, Shrestha NR, Paudel N, et al. Prevalence of hypertension, obesity, diabetes, and metabolic syndrome in Nepal. International journal of hypertension. 2011;2011:821971. PubMed PMID: 21629873. Pubmed Central PMCID: 3095978.

6. Vaidya A, Pathak RP, Pandey MR. Prevalence of hypertension in Nepalese community triples in 25 years: a repeat cross-sectional study in rural Kathmandu. Indian heart journal. 2012 Mar- Apr;64(2):128-31. PubMed PMID: 22572484. Pubmed Central PMCID: 3861166.

7. Shrestha UK, Singh DL, Bhattarai MD. The prevalence of hypertension and diabetes defined by fasting and 2-h plasma glucose criteria in urban Nepal. Diabetic medicine : a journal of the British Diabetic Association. 2006 Oct;23(10):1130-5.

8. Mehta KD, Karki P, Lamsal M, Paudel IS, Majhi S, Das BK, et al. Hyperglycemia, glucose intolerance, hypertension and socioeconomic position in eastern Nepal. The Southeast Asian journal of tropical medicine and public health. 2011 Jan;42(1):197-207.

9. Neupane D, McLachlan CS, Sharma R, Gyawali B, Khanal V, Mishra SR, et al. Prevalence of hypertension in member countries of South Asian Association for Regional Cooperation (SAARC): systematic review and meta-analysis. Medicine. 2014 Sep;93(13):e74.

10. Vaidya A, Pokharel PK, Karki P, Nagesh S. Exploring the iceberg of hypertension: A community based study in an eastern Nepal town Kathmandu University Medical Journal (2007), Vol. 5, No. 3, Issue 19, 349-359

11. Vrijens B. Vincze G. Kristanto P. Burnier I. Adherence to prescribed antihypertensive drug treatments: longitudinal study of electronically compiled dosing histories. British Medical journal. 2008; 14 April: 1-6..

12. Wang PS, Bohn RL, Knight et. al. Noncompliance with antihypertensive medications. The impact of depressice symptoms and psychosocial factors. J Gen Intern Med 2002;17:504-11

13. Bhandari DR, Upadhyay N, Tamrakar BK. A study on drug therapy and treatment adherence of hypertensive patients in an urban setting of Nepal. The Journal of Medicine Use in developing Countries 2009;1(2):20-34.

14. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self reported measure of medication adherence. Medical Care 1986; 24:67-74.

15. Shelly A. V, Colleen J. M, David B. H et.al. Assessing medication adherence among older persons in community settings. Can J Clin Pharmacol Vol 12 Apr.

16. Lars O, Terrence B. Adherence to Medication. New England Journal of Medication 2005;353:487-97.

17. Caro JJ. Persistence with treatment for hypertension in actual practice. Canadian Medical association Journal 1999;160:31-37.

18. Bovet P. Monitoring one year compliance to antihypertension medication in the Seychelles. Bulletin of the World Health Organization. 2002;80:33-9.

19. Bhandari B, Bhattarai M, Bhandari M, Jha N. Awareness of disease and self-care among hypertensive patients attending Tribhuvan university teaching hospital, Kathmandu, Nepal. Journal of Nobel Medical College (2012), Vol.1;No2:29-35

20. Hassan NB, Hasanah CI, Foong K et al. Identification of psychological factors of noncompliance in hypertensive patients. J Hum Hypertens 2006;20:23-9.

21. World Health organization. Chapter XIII Hypertension in Adhernce to Long Term Therapies – Evidence for Action. Prevalence of adherence to Pharmacotherapy in patients with hypertension 2003:107.

22. MEInkster, Donnan PT, MacDonald TM, Sullivan FM, Fahey T Adherence to antihypertensive medication and association with patient and practice factors. J Hum Hypertens 2006;20: 295-97.

23. Hashmi SK, Afridi MB, Abbas K, Sajwani RA, Saleheen D. Factors associated with Adherence to anti-hypertensive treatment in Pakistan. PloS ONE 2007;2(3):e280.doi:1371/journal.pone.0000280.

24. Flack J.M. Novikov S.V. Ferrario C.M. Benefits of adherence to antihypertensive drug therapy. European Heart Journal 1996;17(Supplement A);16-20.

25. BT Baune, Y Aljeesh. The association of psychological stress and health related quality of life among patients with stroke and hypertension in Gaza Strip. Annals Of General Psychiatry 2006;5:6.

26. Brent M. Egan, Daniel T. lackland ; Neal E. Cutler. Awareness, knowledge and attitudes of older Americans about High Blood Pressure. Arch intern med 2003;163:681-87.

27. S.Palanisamy, A. Sumathy. Intervention to improve patient adherence with antihypertensive medications at a tertiary care teaching hospital International Journal of Pharmacology Tech Res 2009;1(2)

28. Lucher TF. Compliance in hypertension: facts and concepts. Hypertension 1985;3: S3-S9.

29. Jin j, Sklar G.E. Vernon M. Li S. Factors affecting therapeutic compliance: A review from the patient's perspective. Therapeutics and Clilnical Risk Management 2008;4(1):269-86.