Medication Adherence among Hypertensive Patients Attending a Tertiary Care Hospital in Nepal

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ABSTRACT

Background: Drug therapy and adherence to the medication is critical to prevent complications of hypertension and more importantly in countries like Nepal where more than one quarter adults suffer from it. Primary aim was to measure adherence to anti-hypertensive medication and factors associated with low adherence.

Methods: Morisky Medication Adherence Scale was used for measuring medication adherence and a structured questionnaire for measuring background and illness related factors in a cross-sectional study among 216 hypertensive patients in a tertiary care hospital selected through sequential sampling. Data was analysed using descriptive and inferential statistics and results presented with proportion or odds ratio with 95% CI.

Results: It was found that 72% of the patients had low adherence to anti-hypertensive medication, with sub-group differences notably higher among females (77%); among those with co-morbidity (80%); and among those getting medicines free of cost (76%). Post multivariate logistic regression, it was found that patients with co-morbidity had higher odds of having low adherence (Adjusted Odds Ratio – AOR: 2.50; 95%CI:1.28-4.89) than those without; and those who get medicine free of cost had higher odds of having low adherence (AOR: 3.01; 95%CI:1.32-6.86) than those who pay for medicine.

Conclusions: A substantial proportion of hypertensive patients had low adherence to medication. Presence of co-morbidity, getting medicine free of cost, and not having regular follow up were the major factors associated with low adherence to anti-hypertensive medication. Targeted interventions in hospitals and health care centers in Nepal would improve medication adherence.

Keywords: Adherence; hypertension; hypertensive patients; medication; Nepal.

INTRODUCTION

The World Health Organization estimates 1.13 billion people worldwide having hypertension, with two thirds of them in low-and middle-income countries.[1] One fifth of deaths due to non-communicable diseases in 2017 in Nepal was attributed to hypertension.[2] The 2016 Nepal Demographic Health Survey showed the prevalence of hypertension in Nepal to be 17% among women and 23% among men,[3] and the recent STEPS survey an overall prevalence of 25%.[4] Drug therapy for hypertension is one of the most cost-effective measures to prevent heart attacks and strokes[1] and this requires medication adherence. Studies depict relationship of low medication adherence to higher risk of acute cardiovascular disease events upto 1.4 to 1.8 times.[5] To further add to the scientific base from different settings, this study was conducted to measure adherence to anti-hypertensive medication (AHM) and factors associated with low adherence among hypertensive patients in tertiary care hospital. The study might contribute to evidence base towards improving AHM adherence among hypertensive patients in Nepal.

METHODS

We carried out a hospital based cross-sectional descriptive study in Shree Birendra Hospital, Kathmandu among 216 patients of hypertension enrolled through sequential sampling. Ethical approval was obtained from the Institutional Ethical Review Committee of Nepalese Army Institute of Health Sciences. Before implementing the study written permission was obtained from the administration of Shree Birendra hospital, and informed written consent from each study participant. Patients with physician confirmed diagnosis of Hypertension for

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more than 6 months, which was confirmed through the observation of out-patient ticket, was the inclusion criteria for enrolling the patients. Consecutive patients meeting the criteria were enrolled and subsequently interviewed from the medical out-patient department (OPD) of the hospital through a face to face interview from July to August 2017. Morisky Medication Adherence Scale[6] was used to measure the medication habits and if they forget to take medicines which later was used to calculate the adherence level. Alongside this, a structured questionnaire was used to capture background information and illness related information. Data was entered using EpiData Version 3.1, cleaned it in SPSS 24.0, and analyzed it using STATA SE 14. The descriptive results are presented as proportions with 95% CI and inferential statistics through multivariate logistic regression as adjusted odds ratio (aOR). The variables used for adjustment in the regression analysis were sex, age, ethnicity, education and marital status. At first, binary logistic regression with a single covariate for the dependent variable (medication adherence) was carried out, followed by multivariate logistic regression to determine the associated factors for low adherence.

RESULTS

The results achieved by our analysis are presented in the following three tables.

Table 1 gives the overview of the background characteristics of hypertensive patients interviewed and distribution of the independent variables used in this study. With regards to sex, just above half (51%) of the participants were male. In terms of age group, majority (81%) of the participants were aged 51 to 70 years. With regards to ethnicity, almost half (48%) of the participants belonged to upper caste groups, while the remaining 52% were other than upper caste groups. In terms of education, just above two third (73%) of the participants were illiterate or had informal schooling. Just above three quarters (76%) of the participants were currently married.

It was found that about 60% of the participants were having hypertension for more than five years. Just above half (53%) of the participants had family history of hypertension. Similarly, it was found that almost half (48%) of the participants had other co-morbid conditions alongside hypertension. Just more than two third (69%) of the participants were taking 1 to 2 types of medicines while the remaining 31% were taking more than two types of medicine in a day. Majority (85%) of the participants were getting medicines free of cost and just above half (56%) of the participants had regular

follow up for their illness (Table 1).

Table 1. Background and illness related characteristics of antihypertensive patients.

Variables	Categories	n (216)	%
Sex	Female	106	49.1
	Male	110	50.9
Age group	31 to 50 Years	31	14.4
	51 to 70 Years	143	80.6
	More than 70 Years	42	19.4
Ethnicity*	Upper caste groups	103	48.4
	Other than upper caste groups	110	51.6
Education	Formal schooling	59	27.3
	Illiterate and informal schooling	157	72.7
Marital status*	Currently married	162	75.7
	Separated/ Widowed/Divorced	52	24.3
Years since first diagnosis of Hypertension	6 months to 5 Years	87	40.3
	More than 5 Years	129	59.7
Family member with Hypertension	Yes	115	53.2
	No	101	46.8
Presence of co-morbidity	Yes	104	48.2
	No	112	51.8
Number of types of medicine	1 to 2 types	149	69.0
	More than 2 Types	67	31.0
Payment for medicine	Free of cost	184	85.2
	Pay or get reimbursed	32	14.8
Regular follow up	Yes	120	55.6
	No	96	44.4

*3 Cases in ethnicity and 2 cases in marital status are missing

Table 2 below presents the proportion of patients with low adherence to AHM. Overall 72% of the participants had low adherence to AHM. Of the hypertensive patients interviewed, more females (77%) than males (67%) had low adherence. Four-fifth (81%) of the participants of age group 31 to 50 years; two third (69%) of 51 to 70 years and 79% of those more than 70 years old had low adherence. Similarly, a higher proportion of upper caste group participants (75%) compared to other caste groups (70%); and those with illiterate and informal schooling (75%) compared to those with formal schooling (64%) had low adherence. A similar proportion of participants who were currently married (72%) and those separated/widowed/divorced (71%) had low adherence to AHM.

Table 2. Proportion of patients with low adherence of medication.

Variable Categories	Variables	Categories	n (216)	%	95% CI
Background Variables	Sex	Female	106	77.4	68.3-84.4
		Male	110	67.3	57.9-75.6
	Age in Category	31 to 50 Years	31	80.6	62.6-91.2
		51 to 70 Years	143	68.5	60.4-75.7
		More than 70 Years	42	78.6	63.4-88.6
	Ethnicity*	Upper caste groups	103	74.8	65.4-82.3
		Other than upper caste groups	110	70.0	60.7-77.9
	Education	Formal Schooling	59	64.4	51.3-75.7
		Illiterate and informal schooling	157	75.2	67.7-81.3
	Marital Status*	Separated/Widowed/Divorced	52	71.2	57.3-81.9
		Currently married	162	72.2	64.8-78.6
Illness related Variables	Years since first diagnosis of Hypertension	6 months to 5 Years	87	70.0	58.4-77.9
		More than 5 Years	129	74.4	66.1-81.3
	Family member with Hypertension	No	101	70.3	60.6-78.5
		Yes	115	73.9	65.0-81.2
	Presence of Co-Morbidity	No	112	65.2	55.8-73.5
		Yes	104	79.8	70.9-86.5
	Number of Types of Medicine	1 to 2 Types	149	71.8	63.9-78.5
		More than 2 Types	67	73.1	61.2-82.5
	Payment for Medicine	Pay	32	53.1	35.8-69.7
		Free of cost	184	75.5	68.8-81.3
	Regular Follow up	Yes	120	69.2	66.4-83.6
		No	96	76.0	60.3-76.8
Total			216	72.2	65.8-77.8

*3 Cases in ethnicity and 2 cases in marital status are missing

Table 3. Logistic regression of different factors with low adherence.

Variable Categories	Variables	Categories	n (216)	Crude OR (95% CI)	Adjusted OR (95% CI)
Background Variables	Sex	Female	106	1	1
		Male	110	0.60 (0.33-1.10)	0.76 (0.40-1.44)
	Age in Category	51 to 70 Years	143	1	1
		31 to 50 Years	31	1.91 (0.73-4.99)	2.12 (0.78-5.74)
		More than 70 Years	42	1.68 (0.74-3.81)	1.79 (0.76-4.25)
	Ethnicity*	Upper caste groups	103	1	NA
		Other than upper caste groups	110	0.79 (0.43-1.44)	NA
	Education	Formal Schooling	59	1	NA
		Illiterate and Informal Schooling	157	1.67 (0.88-3.18)	NA
	Marital Status*	Separated/Widowed/Divorced	52	1	NA
		Currently Married	162	1.05 (0.53-2.10)	NA

Illness related Variables	Years since first diagnosis of Hypertension	6 months to 5 Years	87	1	NA
		More than 5 Years	129	1.31 (0.72-2.39)	NA
	Family member with Hypertension	No	101	1	NA
		Yes	115	1.12 (0.66-2.17)	NA
	Presence of Co-Morbidity	No	112	1	1
		Yes	104	0.47 (0.26-0.88)	2.50 (1.28-4.89)
	Number of Types of Medicine	1 to 2 Types	149	1	NA
		More than 2 Types	67	1.1 (0.56-2.04)	NA
	Payment for Medicine	Pay	32	1	1
		Free of Cost	184	2.73 (1.26-5.89)	3.01 (1.32-6.86)
	Regular Follow up	Yes	120	1	1
		No	96	1.41 (0.77-2.60)	1.93 (0.99-3.77)

*3 Cases in ethnicity and 2 cases in marital status are missing

Slightly higher proportion of participants having history of hypertension for more than 5 years (74%) compared to those with less than 5 years of such history (70%); and higher proportion of participants having family history of hypertension (74%) compared to those without (70%) had low adherence to AHM. Similarly, nearly four-fifth (80%) of the participants who had other co-morbid conditions and 65% of those without; 73% of participants taking more than two types of drugs in a day and 72% of those with 1 to 2 types of drugs had low adherence to AHM. Just more than three quarters (76%) of participants had low adherence even though they got medicines free of cost, while around half (53%) of the participants who pay for the medicine also had low adherence. Likewise, 69% of the participants who had regular follow-up and just above three quarters (76%) of with no regular follow up had low adherence to AHM.

Table 3 below presents the results from multivariate analysis showing that patients with co-morbidity had higher odds of having low adherence (aOR: 2.50; 95%CI: 1.28-4.89) than those without any co-morbidity. Similarly, patients who get medicine free of cost had higher odds of having low adherence (aOR: 3.01; 95% CI: 1.32 to 6.86) than those who pay for medicine.

DISCUSSION

Medication adherence is an important characteristic for hypertensive patients to control the blood pressure. Due to the asymptomatic nature of the disease, patients' adherence to their prescribed medications is often a problem. The rate of medication adherence in hypertension treatment could differ from study to study based on the study methods employed, the population under study, and the definition of adherence itself.

In this hospital-based study assessing adherence to AHM, it was found that a very high percentage (72.2%) of low adherence to AHM among hypertensive patients, indicating a need to intervene to improve medication adherence to those hypertensive patients with low adherence visiting the hospital. Consistent result with a pooled percentage of non-adherence being 63% was found in a systematic review and meta-analysis of studies in low-and-middle-income countries.[7] In consistent with this study, several studies from across the world also reported similar prevalence of low or non-adherence to AHM: 79% non-adherence in a study from northern China;[8] 64% low adherence in another Chinese study;[9] 65% non-adherence in yet another study from China;[10] 57% low adherence in a study from Lima, Peru;[11] and 54% non-adherence in a study from Congo.[12] However, the finding is not similar with the study done in eastern region of Nepal which showed that only about two fifth (43.5%) of the participants were non adherent to AHM.[13] A systematic review and meta-analysis that included studies from 15 countries showed non-adherence to AHM among 45% of the participants in the study;[14] with another systematic review of studies within Iran showing 33% of medication adherence. Likewise, the findings on low adherence to AHM from the current study also do differ from similar studies in other countries – 47% in a nationwide study in Taiwan;[15] 45.6% northern United Arab Emirates;[16] 38.2% southwest Ethiopia;[17] to as low as 35% new territories region of Hongkong;[18] and a similar proportion in a University Hospital in northwest Ethiopia.[19] This variation in the result may be due to different socio-demographic factors, subset of population and settings of the study. There could be several reasons to low adherence in Nepalese population as studied in this study: that could be starting from simple forgetfulness,

low level of seriousness of consequences of missing the medications, poor and irregular follow up patterns and at times difficulty in access to medications.

The present study found lower adherence to AHM among patients with co-morbidity, and higher odds of having low adherence among those with co-morbidity. This finding is consistent with a study in Algeria which concluded co-morbidities to be associated with poor adherence,[20] and with another study from northwest Ethiopia which showed having one or no comorbidities to be associated with good adherence.[21] But at the same time, this contradicts with the findings of another study among Korean patients with hypertension which showed being on concomitant medication for diabetes was associated with good adherence to AHM,[22] and the contradiction is further supported by a scoping review of studies from within Russia suggesting higher adherence being associated with comorbidity including ischemic heart disease, diabetes mellitus, psychiatric disorders and history of myocardial infarction.[23]

The present study identified that the patients who get medicine free of cost had higher odds of having low adherence than those who paid for medicine. This result was consistent with the study result of a specialized hospital in southwest Ethiopia which found that getting medications was associated with non-adherence to AHM.[17] However, at the same time there are evidences that report financial constraints to be one of the predictors of non-adherence to AHM such as the one from a community-based study in Cameroon.[24]

The present study identified that patients with no regular follow up had low adherence to AHM when compared to regular follow up. The adjusted odds ratio though showed a marginally higher odds of having low adherence among those without regular follow-up, it appears to be an important factor. This finding corresponds to the findings of other studies around the globe - missing medical appointments independently predicted non-adherence to AHM among several other factors in a study from Brazil;[25] attendance of follow up visits significantly predicted adherence to AHM in another study from Brazil[26] and Namibia.[27] It is expected that regular follow up visits would help remind patients of the importance of adhering to the medications.

A study carried out in three hospitals in northern China reported association of patients' age, number of antihypertensive drugs taken in each dose, and duration of diagnosis with adherence to AHM[8] and these factors though measured in this study were not found to be associated with adherence. Besides this, a range of factors not assessed in this study were reported to be related to adherence to AHM in a number of studies: medication literacy in a Chinese study;[9] household income, daily frequency of medication, and social support in a study from northern China;[8] and severity of disease, community management, taking traditional medications in a study from Xinjiang, China;[28] and a qualitative study from Iran reporting financial situation and economic problems, family environment, forgetting medicine use and inappropriate advice from different sources were found to be the as common reasons for not adhering to medication.Beliefs about disease and medications are another group of factors shown to be related to adherence to AHM. Al-Noumani et al in 2019 through a systematic review of quantitative studies showedmedication adherence to be related to a range of beliefs among patients such as hypertension severity and susceptibility to its consequences, medication effectiveness of necessity, and barriers to medication adherence.[29] Fernandez-Arias et al in 2014 from a study in a national hospital in Lima, Peru also depicting beliefs of harm about medications and concerns about antihypertensive drugs being related to low adherence.[11] These findings from several other studies have two implications: first any upcoming studies from Nepal could include the factors not measured already but shown to be related to low or non-adherence to medication including the assessment of different beliefs that patients can have, second it is important for clinicians to explore individual patients' beliefs about hypertension medications and discuss their implication for medication adherence as discussed by Al-Noumani et al in their review article in 2019.[29]

In addition, there is a potential of further research. Moving beyond subjective assessment of medication adherence to objective assessment through measurement of urinary metabolites[30] could be important to guide specific interventions among high risk patients group requiring better hypertension control. Improving medication adherence is also important from the perspective better of quality of life of the patients, as shown by a study in Saudi Arabia.[31]

CONCLUSIONS

It was found that a high proportion of patients had low adherence to antihypertensive medication in this hospital-based study with a range of sub-group differences. Presence of co-morbidity, getting medicine free of cost, and not having regular follow up were some of the major predictors of low adherence to AHM in this study. Considering a high proportion of low adherence and

several other factors discussed above, there should be approaches in place in hospitals and health care centers in Nepal that would improve medication adherence. Hypertension treatment in Nepal could also benefit from further research on different patient beliefs related to the disease and medication as well as assessment of more patient care related factors including those about physicians and health care providers.

ACKNOWLEDGEMENTS

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