

Research Article

Patterns of Drug Therapy Among Diabetic Hypertensive Patients - A Single Center Study in Bangladesh

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Abstract

Hypertension is extremely prevalent in patients with diabetes. Limited data exist on whether patterns of drug therapy among diabetic hypertensive patients are consistent with evidence-based practice guidelines. There are many variations in prescribing patterns of diabetic hypertensive patients needs much care while choosing drugs. We have very limited research-based information regarding the patterns of drug therapy among diabetic hypertensive patients. The aim of this study was to assess the patterns of drug therapy among diabetic hypertensive patients. This retrospective study was conducted in the Department of Pharmacology, Uttara Adhunik Medical College and Hospital, Dhaka, Bangladesh during the period from January 2000 to December 2020. In total 78 diabetic hypertensive patients treated in the mentioned hospital were enrolled in this study as study subjects. As per the inclusion criteria of this study, only those patients who got at least one anti-diabetic and one anti-hypertensive drug in treatment were included. Proper written consents were taken from all the participants before data collection. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 23.0 program as per necessity. In this study, the male-female ratio of the participants was 1.3:1. The mean $\pm$ SD age (Year) and BMI (Body Mass Index) (Kg/m^2) of our participants were 53.2 ± 6.82 and 32.41 ± 2.49 respectively. For our patients, 87% and 13% drugs were used through oral and parenteral routes respectively. In this study, among all of our participants, as antihypertensive drug therapy, in 49%, 36% and 15% cases mono, dual and triple antihypertensive drugs were used respectively. In this study, among all of our participants, as anti-diabetic drug therapy, in majority of the patients, mono-therapy was used whereas, in 24% cases double and in 10% cases triple drug therapy was used. Majority of the diabetic hypertensive patients are treated by mono antihypertensive and mono antidiabetic therapy. The treatment cost of insulin receiving patients are higher than that of other diabetic hypertensive patients.

Keywords

Patterns, Diabetic, Hypertension, Drug Therapy, Prescription

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1. Introduction

Hypertension is extremely prevalent in patients with diabetes. Information regarding whether medication therapy patterns among individuals with diabetes and hypertension align with evidence-based practice guidelines is scarce. Hypertension and diabetes mellitus are interrelated diseases which strongly predispose an individual to atherosclerotic cardiovascular disease [1]. The resulting changes in drug use in time and place may have social, medical and economic implications. These differences need to be explained, identified and corrected if needed. Drug utilization studies are very necessary to assess such effects with a particular focus on socio-demographic characteristics, co-morbid conditions and pattern of antihypertensive drugs usage [2]. Nearly 60% of patients with type 2 diabetes have hypertension, according to research [3]. Serious cardiovascular events are more than twice as likely in patients with diabetes and HTN than either disease alone [4]. Hypertension is the most important modifiable risk factor for all-cause morbidity and mortality worldwide and is associated with an increased risk of cardiovascular disease (CVD) [5]. The Seventh Joint National Committee and American Diabetes Association recommends that, blood pressure in diabetes be controlled to levels of 130/80 mmHg or lower [6]. Whatever the goal level, rigorous control of BP is paramount for reducing the progression of diabetic nephropathy to the end stage renal disease [7]. However, studies consistently demonstrate that, the most diabetic patients do not achieve recommended levels of blood pressure control and the majority have a blood pressure of >140/90mmHg [8]. Patients with heart failure with reduced ejection fraction should be treated initially with a beta blocker and an Angiotensin-converting enzyme inhibitor (ACEI) or Angiotensin II receptor blocker (ARB) (or an angiotensin receptor–neprilysin inhibitor), followed by add-on therapy with a mineralocorticoid receptor antagonist and a diuretic based on volume status. Treatment for patients with chronic kidney disease and proteinuria should include an ACEI or ARB plus a thiazide diuretic or a calcium channel blocker. Patients with diabetes mellitus should be treated similarly to those without diabetes unless proteinuria is present, in which case combination therapy should include an ACEI or ARB [9]. The major objective of this study was to assess the patterns of drug therapy among diabetic hypertensive patients.

2. Methodology

This retrospective study was conducted in Uttara Adhunik Medical College Hospital, Dhaka, Bangladesh during the period from January 2020 to December 2020. In total 78 diabetic hypertensive patients treated in the mentioned hospital were enrolled in this study as study subjects. As per the inclusion criteria of this study, only those patients who got at least one anti-diabetic and one anti-hypertensive drug in treatment were included. According to the exclusion criteria

of this study, paediatric patients and pregnant women, patients who were not willing to disclose their information were excluded. Proper written consents were taken from all the participants before data collection. The whole intervention was conducted in accordance with the principles of human research specified in the Helsinki Declaration [10] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [11]. A predesigned questionnaire was used in data collection. All the demographic and clinical data of the participants were recorded. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 23.0 program as per necessity.

3. Results

In this study, among total 78 participants, 56% were male whereas the rest 44% were female. So male participants were dominating in number and the male-female ratio was 1.3:1. The mean $\pm$ SD age (Year) and BMI (Kg/m^2) of our participants were 53.2 ± 6.82 and 32.41 ± 2.49 respectively. For our patients, 87% and 13% drugs were used through oral and parenteral routes respectively. Co-morbidities including CKD, RTI, and eye disease were present in 10%, 9%, and 8% among the population. Mono, dual, and triple antihypertensive medications were administered in 49%, 36%, and 15% of cases, respectively. As mono antihypertensive therapy calcium channel blockers, ACE Inhibitors and ARBs were used among 17%, 15% and 10% cases respectively which was noticeable. On the other hand, as dual antihypertensive therapy, ARB & diuretics, CCB & ARB and ACEI & diuretics combinations were used more frequently than some other combinations. To handle some critical cases, some triple antihypertensive therapies using ACEI, b-Blockers, CCBs, diuretics and/or ARB were applied. Anti-diabetic monotherapy was prescribed in the majority of patients (66%), whereas double and triple medication therapy were administered in 24% and 10% of cases, respectively. As mono anti-diabetic drug therapy, in majority of the cases (56%) metformin was prescribed. As dual anti-diabetic drug therapy, in 14% cases Met & SU and in 8% cases Met & DPP-4i were used. Moreover, in only 8 cases, as anti-diabetic therapy triple drug combination was used.

Table 1. Demographic status of the study patients (N=78).

Characteristics	n (%) / Mean $\pm$ SD	
Gender		
Male	44	56%
Female	34	44%
Age		

Characteristics	n (%) / Mean $\pm$ SD	Characteristics	n (%) / Mean $\pm$ SD
Age in year	53.2 $\pm$ 6.82	BMI (Kg/m ²)	32.41 $\pm$ 2.49
BMI			

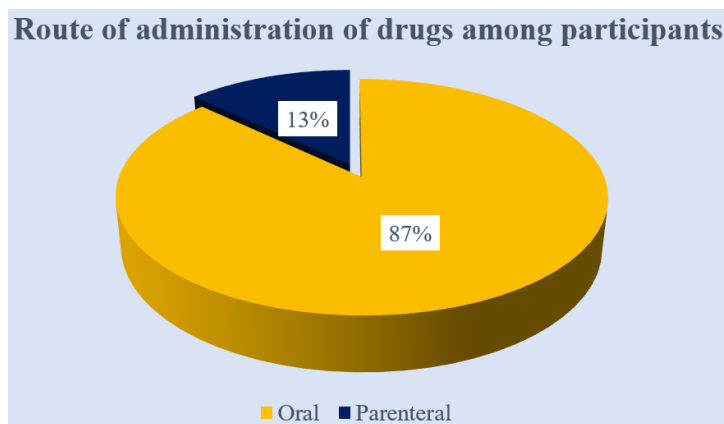


Figure 1. Pie chart showed route of administration of drugs among participants (N=78).

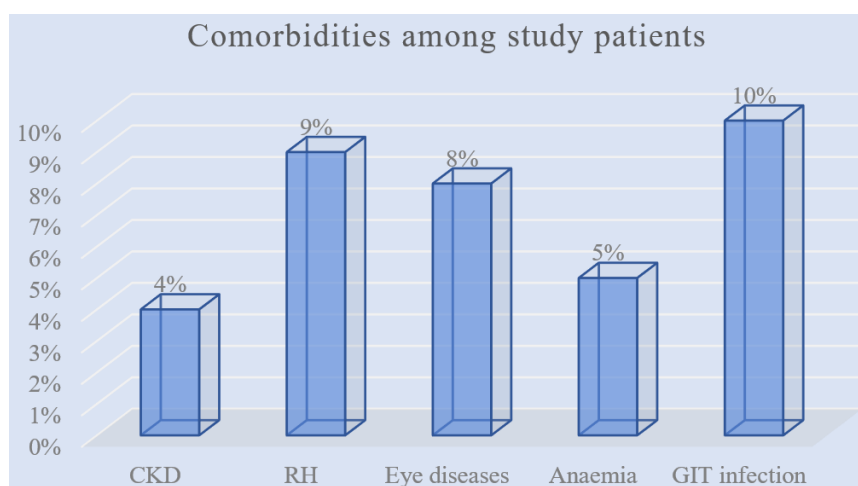


Figure 2. Bar chart showed distribution of comorbidities among study patients (N=78).

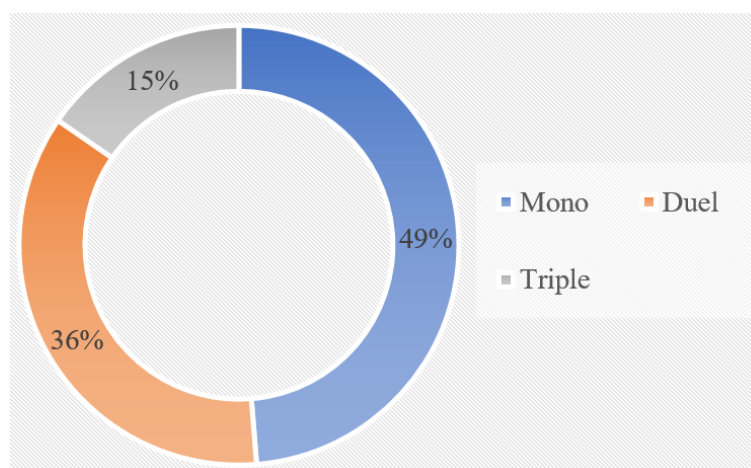


Figure 3. Ring chart showed types of antihypertensive drug therapies used among participants (N=78).

Table 2. Mono antihypertensive drugs used among participants (N=78).

Mono antihypertensive drug	n	%
Diuretics	3	4%
b-Blockers	2	3%
Calcium Channel Blockers	13	17%
ACE Inhibitors	12	15%
ARBs	8	10%

B-Blocker: β -blocker

Table 3. Duel antihypertensive drug combinations used among participants (N=78).

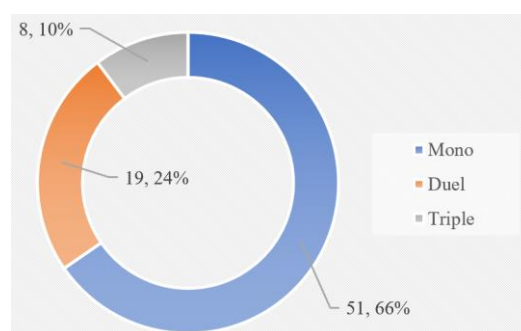
2 Drugs combination	n	%
ARB +Diuretics	5	6%
CCB+ARB	6	8%
b-Blockers +ARB	1	1%
CCB +Diuretics	1	1%
b-Blockers +diuretics	1	1%
CCBs + b-Blockers	3	4%
ACEI+ Diuretics	5	6%
ACEI + CCBs	3	4%
ACEI + CCBs	1	1%

ARB: Angiotensin receptor blocker, CCB: Calcium channel blockers, B-Blocker: β -blocker, ACEI: Angiotensin-converting-enzyme inhibitor

Table 4. Triple antihypertensive drug combinations used among participants (N=78).

3 Drugs combination	n	%
ACEI + b-Blockers + CCBs	3	4%
ACEI + b-Blockers + Diuretics	1	1%
ACEI + CCBs+ Diuretics	3	4%
b-Blockers +ARB +diuretics	2	3%
CCB +ARB +Diuretics	2	3%
CCB+ b-Blockers +Diuretics	1	1%

ARB: Angiotensin receptor blocker, CCB: Calcium channel blockers, B-Blocker: β -blocker, ACEI: Angiotensin-converting-enzyme inhibitor

**Figure 4.** Ring chart showed Types of anti-diabetic drug therapies used among participants (n=78).**Table 5.** Mono anti-diabetic drugs used among participants (N=78).

Mono anti diabetic drugs	n	%
Met	44	56%
SU	5	6%
DPP-4i	1	1%
Other	1	1%

DPP-4i: Dipeptidyl peptidase 4 inhibitors, SU: Sulfonylurea, Met: Metformin, TZD: thiazolidinediones

Table 6. Dual anti-diabetic drug combinations used among participants (N=78).

Dual anti diabetic drugs	n	%
Met +SU	11	14%
Met+DPP-4i	6	8%
Met +other	1	1%
Other dual therapy	1	1%

DPP-4i: Dipeptidyl peptidase 4 inhibitors, SU: Sulfonylurea, Met: Metformin, TZD: thiazolidinediones

Table 7. Triple anti diabetic drug combinations used among participants (N=78).

Triple anti-diabetics	n	%
Met+SU+DPP-4i	4	5%
Met +SU+TZD	2	2%
Other triple therapy	2	3%

DPP-4i: Dipeptidyl peptidase 4 inhibitors, SU: Sulfonylurea, Met: Metformin, TZD: thiazolidinediones

4. Discussion

The aim of this study was to assess the patterns of drug therapy among diabetic hypertensive patients. In this study, among total 78 participants, 56% were male whereas the rest 44% were female. So male participants were dominating in number and the male-female ratio was 1.3:1. But in another study [12] female were dominating in number where, 149 prescriptions belonging to 81 (54.4%) females and 68 (45.6%) males were studied. The mean $\pm$ SD age (Year) and BMI (Kg/m^2) of our participants were 53.2 ± 6.82 and 32.41 ± 2.49 respectively. In a study it was reported that, 50–60-year age group patient has 40% risk to get diabetes [13]. In this study, among all of our participants, as antihypertensive drug therapy, in 49%, 36% and 15% cases mono, dual and triple antihypertensive drugs were used respectively. As mono antihypertensive therapy calcium channel blockers, ACE Inhibitors and ARBs were used among 17%, 15% and 10% cases respectively which was noticeable. On the other hand, as dual antihypertensive therapy, ARB & diuretics, CCB & ARB and ACEI & diuretics combinations were used more frequently than some other combinations. To handle some critical cases, some triple antihypertensive therapies using ACEI, b-Blockers, CCBs, diuretics and/or ARB were applied. In another study, more than 60% of total cases were receiving angiotensin-converting enzyme inhibitors or ARB, followed by diuretics (38.1%), CCBs (35.3%) and b-blockers (28.5%) with 19.1% of patients untreated. [14] But some other studies have shown an excess of selected cardiac events among patients treated with dihydropyridine calcium channel blockers (DCCBs) compared with ACEI [15]. In this study, among all of our participants, as anti-diabetic drug therapy, in majority of the patients (66%), mono-therapy was used whereas, in 24% cases double and in 10% cases triple drug therapy was used. As mono anti-diabetic drug therapy, in majority of the cases (56%) metformin was prescribed. As dual anti-diabetic drug therapy, in 14% cases Met & SU and in 8% cases Met & DPP-4i were used. Moreover, in only 8 cases, as anti-diabetic therapy triple drug combination was used. Metformin (Met), in conjunction with lifestyle changes, is recommended as a first-line therapy for patients with T2DM by most clinical guidelines [16, 17]. There is preferential recommendation for the use of novel antidiabetic agents over the traditional classes in multiple clinical settings [18, 19].

5. Conclusion

Majority of the diabetic hypertensive patients are treated by mono antihypertensive and mono antidiabetic therapy. Lifestyle changes and early diagnosis may reduce the complication as well as maintaining treatment cost of such chronic patients.

Abbreviations

ARB	Angiotensin II Receptor Blocker
ACEI	Angiotensin-converting Enzyme Inhibitor
CVD	Cardiovascular Disease
CCB	Calcium Channel Blocker
HTN	Hypertension

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Conflicts of Interest

The authors declare no conflicts of interest.

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