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**Analysis of antihypertensive drugs and blood pressure control among hemodialysis patient at kidney center, Hadhramout, Yemen .2020/2021**

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**ABSTRACT**

**Introduction**

Hypertension is very prevalent in patients undergoing dialysis therapy. Poorly controlled hypertension in hemodialysis patients is a risk factor for cardiovascular disease, most HD patients require anti-hypertensive drugs to control BP.

**Objective**

To assess blood pressure control and to evaluate and compare the utilization classes of antihypertensive drugs among dialysis patients with hypertension.

To evaluate the use of classes of antihypertensive drugs among dialysis patients with hypertension and to assess their blood pressure control.

**Methods :**

This is a prospective observational study conducted to establish the antihypertensive drugs in dialysis patients with hypertension who were undergoing of hemodialysis in kidney center at wadi hadramout over a period of 6 months from October. 2019 to March. 2020.

**Results :**

In this study it was found that controlled blood pressure was noted in 25 (38%) patients and uncontrolled SBP or isolated systolic hypertension ( $\geq 140$  mmHg) was noted in 40 (62%) patients, Calcium Channel Blockers (88.5%) were commonly prescribed class in both mono and poly therapy. but methyldopa was rarely used as monotherapy. Among the patients received polytherapy, 19 (68%) patients were on combination of two drugs most common, followed by 07 (25%) on combination of three- drugs, and only 02 (7%) were on blend of greater than three -drugs.

**CONCLUSION**

This study demonstrated that most of dialysis patients with hypertension were uncontrolled and majority of dialysis patients with hypertension received multiple therapy. The most often used antihypertensive drugs were CCBs, followed by BBs and ARBs .

**Key words :** antihypertensive drugs , dialysis patients ,hypertension, blood pressure control

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تحليل الأدوية الخافضة للضغط والتحكم في ضغط الدم لدى مرضى غسيل الكلى في مركز الكلى ، حضرموت ، اليمن . 2021/2020

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## الملخص

### المقدمة

ينتشر ارتفاع ضغط الدم بشكل كبير في المرضى الذين يخضعون لعلاج الغسيل الكلوي كما ان عدم السيطرة على ارتفاع ضغط الدم في مرضى الغسيل الكلوي يشكل عامل خطر للإصابة بأمراض القلب والأوعية الدموية وغيرها، لذا يحتاج معظم مرضى الغسيل الكلوي(الأستصفاء الدموي) إلى أدوية خافضة لضغط الدم .

### الهدف

تقييم التحكم في ضغط الدم وأيضاً تقييم ومقارنة استخدام الأدوية الخافضة للضغط بين مرضى الغسيل الكلوي المصابين بارتفاع ضغط الدم .

### الطرق:

هذه دراسة وصفية استطلاعية أجريت لتحديد الأدوية الخافضة للضغط في مرضى غسيل الكلى، مع قياس ضغط الدم للمرضى الذين يخضعون لغسيل الكلى في مركز الكلية الصناعية في وادي حضرموت، خلال مدة 6 أشهر من أكتوبر 2019 إلى مارس 2020 .

### النتائج:

في هذه الدراسة ، وجد أن ضغط الدم المتحكم فيه لوحظ بنسبة (38٪). وأن ضغط الدم غير المنضبط أو ارتفاع ضغط الدم الانقباضي المعزول لوحظ بنسبة (62٪) من المرضى . أدوية حاصرات قنوات الكالسيوم الأكثر استخداماً (88.5٪) في كل من العلاج الأحادي والمركب، بينما الميثيل دوبا يستعمل نادراً. المرضى الذين يتلقون العلاج المركب (68٪) يتعاطون مزيجاً من عقارين وهم الأكثر، يليه (25%) يتعاطون مزيجاً من ثلاثة أدوية، بعد ذلك (7٪) فقط يتعاطون مزيجاً لأكثر من ثلاثة أدوية.

### الاستنتاج:

أظهرت هذه الدراسة أن معظم مرضى غسيل الكلى المصابين بارتفاع ضغط الدم لم يتم التحكم بهم ، وأن غالبية مرضى غسيل الكلى المصابين بارتفاع ضغط الدم تلقوا علاجاً أحادياً ، وكانت خافضات ضغط الدم الأكثر استخداماً هي حاصرات قنوات الكالسيوم، ثم حاصرات بيتا، و حاصرات مستقبلات الأنجوستين على التوالي .

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## Introduction

Hypertension is very prevalent in patients undergoing dialysis therapy (1), (2). As general, it is one of the major causes of cardiovascular mortality for those who take dialysis (3).

Poorly controlled hypertension in hemodialysis patients is a risk factor for cardiovascular disease, congestive heart failure, cerebrovascular disease and neurological complications leading to high morbidity and mortality in these patients.

It is still challenging to treat hypertension in patients on dialysis because there are many unsolved problems and concerns for the management of hypertension, mainly due to few good quality clinical trials available (4).

There is marked variation in the blood pressure reading in the patients during the different phases of hemodialysis making the treatment more complicated and difficult. The blood pressure in these patients can be measured in the dialysis unit just before dialysis, during dialysis and after dialysis. (5)

The optimal blood pressure in patients undergoing hemodialysis due to ESRD is not clearly defined by the national kidney foundation K/DOQI guidelines in which they suggest that pre dialysis and post dialysis blood pressure should be < 140/90 and 130/80mmHg respectively whereas other guidelines such as Japanese Society for Dialysis Therapy (JSDT) recommend BP less than 140/90 mmHg at the beginning of the week, with a caution not to apply uniformly to all patients. (6) (7) (8)

Most HD patients require anti-hypertensive drugs to control BP. Almost all patients have past history of hypertension before starting dialysis and have taken multiple anti-hypertensive medications (4).

Most classes of antihypertensive drugs are appropriate for use in the hemodialysis patients. There is no published controlled trials data on specific antihypertensive agents in the dialysis patients, retrospective studies provided conflicting evidence for the possible survival benefits of various classes of antihypertensive drugs. (9) (10) (11)

The choice of antihypertensive depends upon the coexisting comorbidities, patient demographic characteristics, risk profile and lifestyle (12).

Major guidelines for treatment the hypertension of dialysis patients were published in 2005 by National Kidney Foundation (KDOQI). (13) and Japanese Society for Dialysis Therapy (JSDT) in 2012 (6). The objective of our study is to evaluate the use of classes of antihypertensive drugs among dialysis patients with hypertension and to assess their blood pressure control

## Objective :

- To assess blood pressure control and to evaluate and compare the utilization classes of antihypertensive drugs among dialysis patients with hypertension.

## Material and Method :

### Study Design:

This is a prospective observational study conducted to establish the antihypertensive drugs in dialysis patients with hypertension who were undergoing of hemodialysis in kidney center at wadi hadramout over a period of six months from October. 2019 to mar. 2020.

The total of 82 dialysis patients were screened and among them 65 patients (53 male and 12 female) met with the inclusion criteria. All patients in the study group were informed about the purpose of the study. All of the patients were routinely dialyzed for (3–4 h) twice or thrice weekly.

#### Measurement of blood pressure:

Measurement of blood pressure (BP) was done in kidney center before dialysis process at the sitting position. Blood pressure measurement in this study was pre-dialysis blood pressure (Systolic blood pressure (SBP) and diastolic blood pressure (DBP)). first, measured BP for each session during 6 months, then took average BP for each week (2 or 3-reading in week) and took average BP for each month (4-reading in month), finally took average BP for six months (6-reading in this duration) and it was considered as BP in this study.

#### Ethical approval:

The researcher took permission from the Kidney center before starting the collection of data.

#### Inclusion and exclusion criteria:

The dialysis patients with hypertension, both male and female patients aged more than 18 year attending during the study period at kidney center at wadi hadhramout. (Hypertension defined as mean pre dialysis systolic BP greater than 140 mm Hg, or diastolic BP greater than 90 mm Hg, or use of one antihypertensive drug)

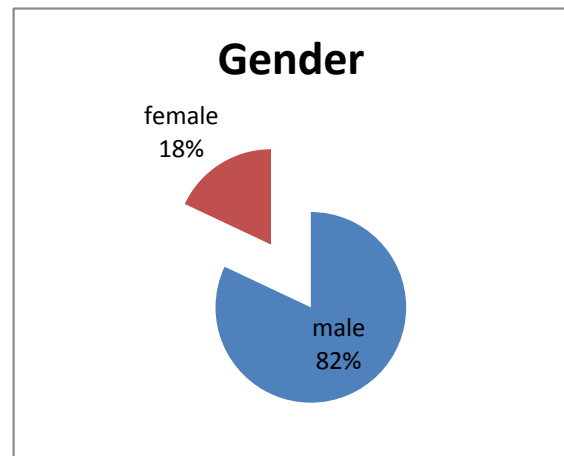
#### RESULTS :

During the study period of six months from Oct. 2019 to Mar. 2020, a total of 82 hemodialysis patients were included

in this study, 65 patients who met with inclusion criteria were selected. Among them 53 were male and 12 were female (Figure 1). There were 12 (18%) patients aged more than 65 yrs. and 16 (25%) patients aged between (18-40) yrs., and 37 (57%) patients aged between (40 – 60) yrs.

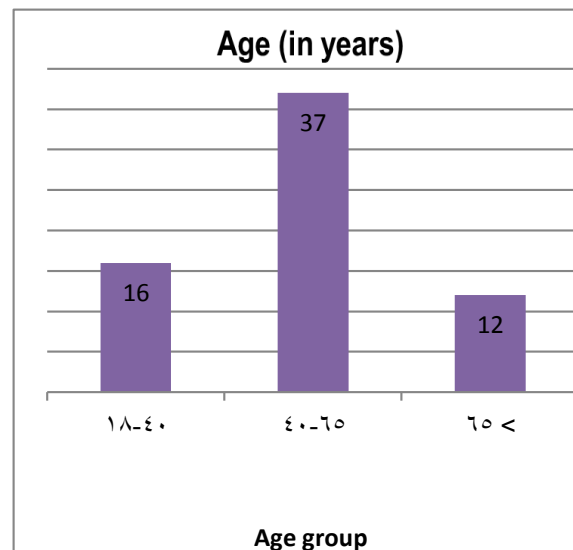
( Figure 2).

Figure 1: Distribution of dialysis patients



(n =65) on gender

Figure 2: Distribution of dialysis



patients (n =65) on age

In this study it was found that controlled blood pressure was noted in 25 (38%) patients (Figure 3), including 6 (24%), without treatment, 12 (48%) patients on monotherapy and 07 (28%) patients on multiple therapy (Figure 4).

Uncontrolled SBP or isolated systolic hypertension ( $\geq 140$  mmHg) was noted in 40 (62%) patients and uncontrolled DBP or isolated diastolic hypertension ( $\geq 90$  mmHg) was noted in only 04 (06%) patients.

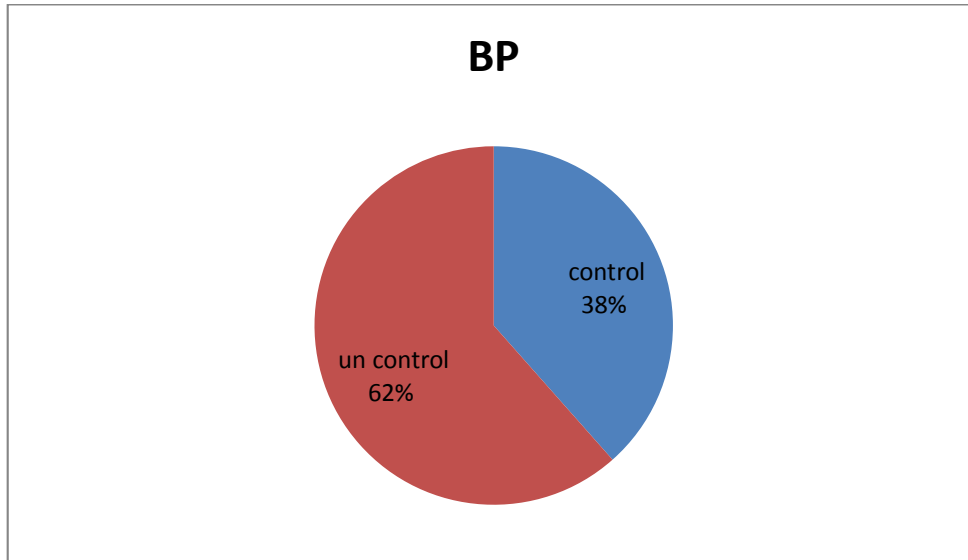


Figure 3: Distribution of dialysis patients (n =65) on controlled blood pressure

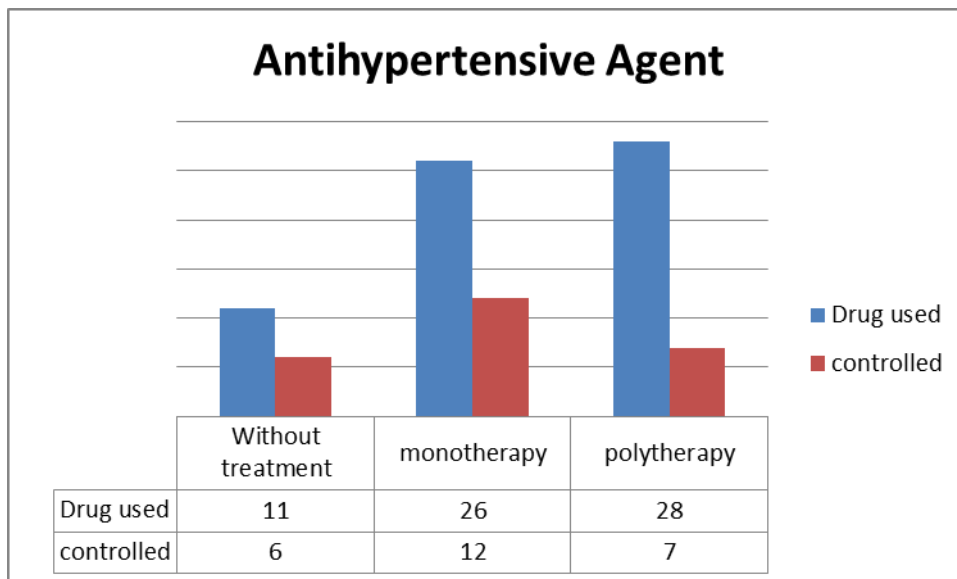


Figure 4 : Antihypertensive classes prescribed for dialysis patients (n=65)

Overall, 26 (40%) patients were on monotherapy (one drug) and controlled blood pressure were (26%) with CCB

noted in 10 (43%) patients and followed by ARBs and BB as the same ( 8%). In patients receiving monotherapy, Calcium Channel Blockers (88.5%) were

commonly prescribed class followed by Beta blockers and Angiotensin Receptor Blockers (4%) (Figure 5).

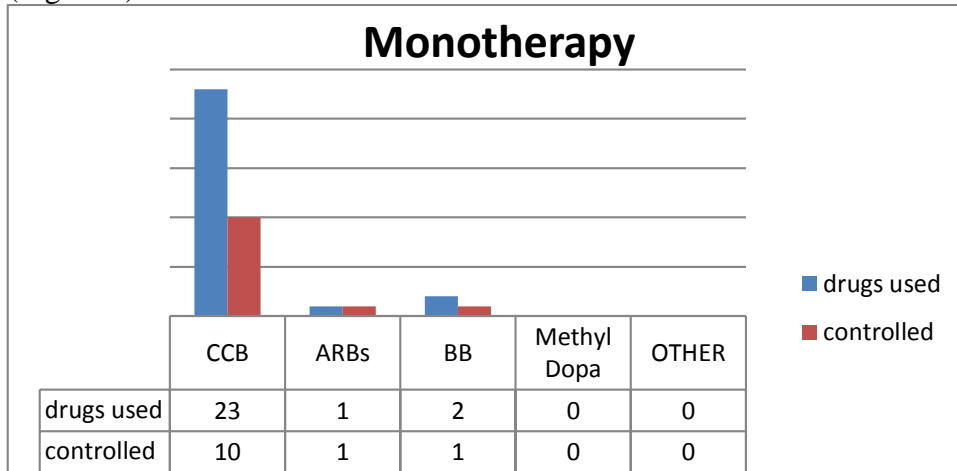


Figure 5 :Antihypertensive class used as monotherapy (n=26 )

polytherapy (more than one drug) was noted in 28(43%), the most common 19 (68%) patients on combination of two drugs, followed by 07 (25%) on combination of 3 drugs and only 02 (7%) were on blend of greater than three drugs.

Among the patients on polytherapy , controlled blood pressure noted only with two drugs regimen ( 25% ) but three drugs regimen and four drugs regimen were not controlled

(figure 6)

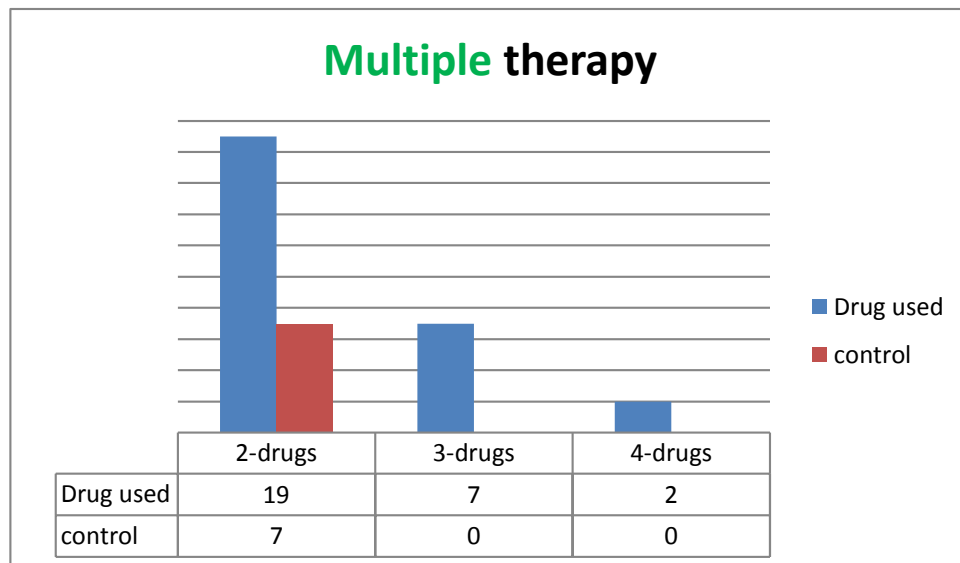


Figure 6 :Antihypertensive classes used as poly therapy(n=28)

Out of 19 patients on two drug regimen, the CCB +BB combination (63%) was prescribed often, followed by CCBs+ARBs (16%), ARBs +BB (11%), BB+diuretics(5%) and CCBs+methyldopa ( 5%) .

In patients receiving two drugs combination, controlled blood pressure was noted in (39 %) ,with CCB +ARBs ( 66%)followed by ARBs +BB (50 %) and CCB+BB ( 33%) . (Figure 7).

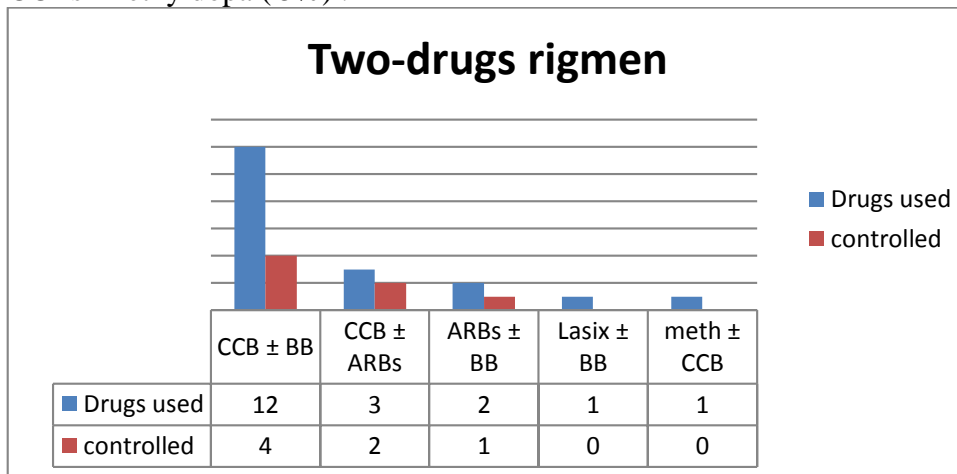


Figure 7: Two- drug combination regimen(n=19)

For the 07 patients on combination of three drugs regimen, most often prescribed three drug combinations were CCBs+BB+ARBs (71%), CCBs+BBs +methyldopa (14.5%), ARBs+BBs+methyl dopa(14.5%).

The four drug regimen of Calcium Channel Blockers with Angiotensin Receptor Blockers with Beta blockers and methyldopa were prescribed in (07%) of the treatment population.(Figure 8)

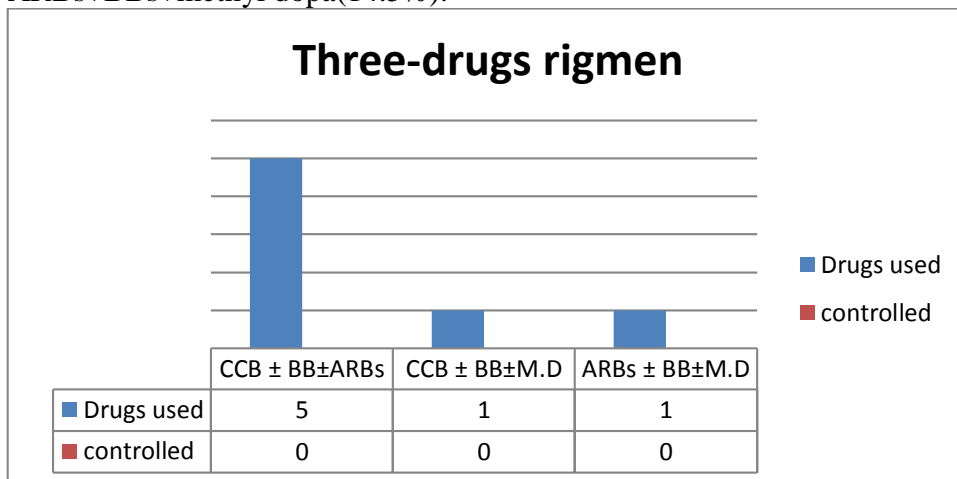


Figure 8 : three- drug combination regimen(n=07)

### Discussion :

The majority of the patients of end-stage renal disease (ESRD) leading to hemodialysis suffer from hypertension (1), (14).

Several reports and some randomized trials show or indicate that most hypertensive dialysis patient cannot be controlled with one drug and they will need two or more antihypertensive drugs class to achieve optimal blood pressure



control. In our study approximately 40% were prescribed as single antihypertensive (mono therapy) while approximately 43% were prescribed as multiple therapy, ( 29%) were prescribed 2-drug combination , 11% were prescribed 3-drug combination and 3% 4-drug combination).

In this study, most dialysis patient were male with aged between (40-65 years). Some dialysis patients with hypertension were not used any drugs to controlled BP & mostly with them ( 55% ) were controlled BP with life style modification and dialysis process .

Most patients on hemodialysis suffer from systolic hypertension which may or may not coexist with diastolic hypertension (15). In this study, it was found that uncontrolled blood pressure of dialysis patients more than controlled blood pressure patients , uncontrolled blood pressure was isolated systolic hypertension that more common from isolated diastolic hypertension and controlled BP was diastolic blood pressure that more common from systolic blood pressure, our study result is similar to study done in India ,2016 which most hypertensive dialysis patient were not adequately controlled their blood pressure (16).

Calcium channel blockers are the most commonly prescribed antihypertensive agents in the patients on hemodialysis (17). In this study, the most frequently prescribed class as monotherapy were CCB, whereas B-blockers and ARBs were less prescribed. These finding were similar to study conducted in Ohio,2004 (18).

The most controlled BP were found with patients used ARBs followed by B-blockers but these results are not reliable

because less patient used these classes and methyldopa was not use as monotherapy.

this popularity of CCB ( amlodipine) may be attributed by the availability of this drug at the clinics of the kidney center. B-blockers were the second antihypertensive drug used with controlled blood pressure patients.

In patient receiving multiple therapy, two- drug regimen was the most common prescribed and the most controlled blood pressure. Combination of CCB and BB in this study was the most commonly prescribed among two or more than two antihypertensive multiple therapy, this study result is different from study done by Razi Ahemed in the hemodialysis unit of Hakeem Abdul Hamid Centenary hospital from July 2015 to June 2016 (one year),were combination of amlodipine and clonidine was most frequently prescribed antihypertensive medication in these patients. (16) ,in this study All combination therapy of three or four drug regimen or four drug regimen was never controlled blood pressure

#### CONCLUSION :

This study demonstrated that Most of dialysis patients with hypertension was uncontrolled and majority of dialysis patients with hypertension received multiple therapy. The most often used antihypertensive drugs were CCBs, followed by BBs, ARBs, and methyldopa Therapy respectively.

Amlodipine was the most commonly prescribed drug class in both mono and multiple therapy but methyldopa was rarely used as monotherapy.

Combination of CCB and BB (Amlodipine + Bisoprolol **OR** Nebivolol) in this study was the most commonly prescribed as multiple therapy and combination of CCB and ARBs the most drugs controlled blood pressure in those patient.

In this study, antihypertensive drugs used was in agreement with the current treatment guidelines. But, The blood pressure control in dialysis patients was not adequate. Therefore, more strict control of blood pressure is needed to reduce severe complications of hypertension.

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