



ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

PREVALENCE OF HYPERTENSION AND ITS LEVEL OF
CONTROL IN PATIENTS ON CHRONIC HEMODIALYSIS FROM
MAY TO JULY 2019 AT SPHMMC HEMODIALYSIS UNIT: A
CROSS-SECTIONAL STUDY

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PI: HIWOT BEYENE (M.D, INTERNAL MEDICINE RESIDENT)

ADVISORS: Dr. LEJA HAMZA (MD, ASSOCIATE PROFESSOR OF
INTERNAL MEDICINE, NEPHROLOGIST)

MR. KINFE HAILE (MPH)

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Abstract

Background: Hypertension is very prevalent in patients undergoing dialysis therapy. As is for general population, it is one of the major causes of cardiovascular disease associated mortality for those who take dialysis. Yet, it is still challenging to diagnose and treat hypertension in patients on dialysis owing to the many unsolved problems and concerns mainly due to few good quality clinical trials. Thus far, there is no data showing prevalence of hypertension and the control in patients on chronic hemodialysis in Ethiopia.

Methods: A descriptive cross-sectional study design was used to assess the prevalence and control of hypertension in patients on maintenance hemodialysis for chronic kidney disease at St Paul's Hospital Millennium Medical College dialysis unit from May to July 2019. Data was collected by trained data collector using a standardized questionnaire. The data was analyzed using SPSS computer software version 25. Frequencies and proportions were used to describe the data and Pearson correlation to analyze the numerical variables.

Result: Sixty four patients on hemodialysis were studied. This included 42 (65.6%) men & 22 (34.4%) women. Mean age of the patients was 40.69 ± 14.44 yrs. Majority 53(82.8%), of patients were on dialysis for more than 1 year. Duration of each dialysis session for all patients was 4 hours and 50(78.1%) of the patients had three sessions per week. Hypertension (defined as intradialytic median systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg, or prior history of hypertension) was prevalent in 75% of the patients undergoing hemodialysis and significantly associated with presence of edema (P value 0.002). Although 60.9% of the patients were taking antihypertensive, hypertension was controlled adequately in only 37.4%.

Conclusion: Hypertension is a common disease among patients on chronic hemodialysis at St. Paul Hospital millennium medical college dialysis unit but it is found to be inadequately controlled in the majority of the patients. Large-scale study using a standard diagnostic method is needed to further explore the magnitude of the problem.

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Acronyms

ABPM - Ambulatory Blood Pressure Measurement

AV Fistula - Ateriovenous fistula

BP- Blood Pressure

CKD - Chronic Kidney Disease

ESRD - End Stage Renal Disease

HD – Hemodialysis

HTN – Hypertension

KIDIGO – Kidney Disease Improving Global Outcomes

MAP – Mean arterial pressure

RAAS - Renin Angiotensin Aldostrone system

SPHMMC - St Paul’s Hospital Millennium Medical College

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Chapter one: Introduction

1.1. Background

Hypertension is a very prevalent disease in patients undergoing dialysis therapy. As is for general population, it is one of the major causes of cardiovascular mortality for those who take dialysis. It is still challenging to treat hypertension in patients on dialysis, because there are many unsolved problems and concerns for its management mainly due to lack of good quality and relevant clinical research evidence (1,2).

The epidemiology of hypertension in dialysis patients differs based on how blood pressure is measured: either before and after dialysis or using ambulatory BP recordings. It preferentially defined on the basis of home ($>135/85$) or 24 hour- Ambulatory Blood Pressure Measurement ($>130/80$) measurements during a midweek dialysis interval. If home or 24 hour-ABPM cannot be applied, hypertension can be diagnosed as midweek median intra-dialysis systolic pressure ≥ 140 and/or diastolic pressure ≥ 90 mm Hg. Most patients on hemodialysis have systolic hypertension that may or may not coexist with diastolic hypertension. However, isolated diastolic hypertension is rare (1,3,4,5).

Pathophysiology of hypertension in chronic hemodialysis patients include extracellular volume expansion, increased vascular stiffness due to Sodium accumulation in arterial smooth muscle cells, Sympathetic over activity triggered by afferent signals which can lead to vasoconstriction and secondary activation of the renin–angiotensin system, which may play an important role in the high peripheral vascular resistance seen in end stage renal disease (3, 6).

Treatment of hypertension in hemodialysis patients include dietary sodium restriction (<2gm/day), free water restriction, lowering dialysate sodium based on pre-dialysis plasma sodium level, using long duration dialysis sessions with low ultrafiltration rate, practicing nocturnal hemodialysis, practicing short daily sessions and drug therapies (7).

Optimal blood pressure is defined when pre and post-dialysis BP is < 150/90 mmHg without therapy or the ambulatory day BP monitoring < 135/85 without therapy or the ambulatory night time BP monitoring < 120/80 without Therapy (7).

1.2. Statement of the problem

Hypertension is a common disease, difficult to diagnose and poorly controlled in patients with end stage renal disease (ESRD). Hypertension is also an independent risk factor for ESRD. It affects about 60-90% of patients on chronic hemodialysis (1,2,8).

Patients with ESRD treated by dialysis have an increased risk of mortality, with nearly 50% of deaths due to cardiovascular causes. The burden of ESRD is rising internationally. Because the prevalence of HTN among maintenance dialysis patients is increasing its treatment is considered an important means to improve outcomes. The 2005 National Kidney Foundation Kidney Disease Outcomes Quality Initiative (KDOQI) clinical practice guideline recommends pre- and post-dialysis BP goals of 140/90 and 130/80mmHg, based in part on data in patients not on dialysis. A direct relation between treatment of elevated BP levels and improved outcomes among dialysis patients has not been demonstrated, and definitive clinical trials investigating optimal target BP have yet to be carried out (8).

The aim of this study was to assess the prevalence of hypertension and its control in chronic kidney disease (CKD) patients undergoing chronic hemodialysis. Furthermore, this study can be used as stepping stone for further studies in the field by serving as a source data.

Chapter Two

2.1. Literature review

The majority of the patients of ESRD leading to hemodialysis suffer from hypertension. Increase in blood pressure is both a cause and a consequence of chronic kidney disease and inadequate control of blood pressure in these patients increases the risk of development of left ventricular hypertrophy, congestive heart failure, stroke and other cardiovascular and neurological complications leading to high morbidity and mortality in these patients (9).

In studies made within the framework of the Dialysis Outcomes and Practice Patterns Study (DOPPS), the prevalence of hypertension was very high and rose over time in all countries. In the last of these surveys (2011), hypertension prevalence ranged from 72.7%-95.9% (78% in Japan, 95.9% in Germany, 82.3% in Belgium, 90.7% in Canada, 90.6% in Spain, 91.4% in France, 80.7% in Italy, 89.1% in Sweden and 72.7% in UK) (10).

In studies done in United States, the prevalence of hypertension was 86% among 2535 clinically stable adult hemodialysis patients participating in a multicenter trial. Among the hypertensive patients, 12% did not receive antihypertensive drugs, 58% were treated but not controlled, and only 30% were controlled (1). In a population of 369 predominantly African American patients who received hemodialysis treatment the prevalence of hypertension was found to be 82%. Eighty-nine percent of the hypertensive patients were treated with antihypertensive drugs, but the rate of 44-hour BP control (i.e. patients with average BP below the above thresholds) was as low as 38% (4). In study done in missisipi on 649 patients prevalence of hypertension defined by predialysis MAP $\geq$ 114 mmhg was 71.9%, among them 81.5% were taking antihypertensive medication and BP control was achieved in 48.6% (11). In another study done at Indiana university on 369 patients the prevalence of hypertension defined by 44-hour interdialytic ambulatory BP measurements was 82% from whom 89% were taking antihypertensive with BP control of 38% (12).

Diagnosing hypertension in dialysis patients is challenging for several reasons. For example; BP in these patients is often measured without attention to technique and BP declines during hemodialysis with ultrafiltration. Pre-dialysis BP may therefore be hypertensive and post-dialysis BP may be hypotensive. It therefore remains unclear which BP measurement to use in order to diagnose hypertension. Compared with pre-dialysis and post-dialysis BP measurements, diagnosis of hypertension is better made by using home BP recordings or interdialytic ambulatory BP recordings (2).

In another study done in United States to compare pre-dialysis and post-dialysis BP with ambulatory BP measurements the prevalence of hypertension found to be variable. Eighty two percent using ambulatory BP, 91% by predialytic BP, and 86% by postdialytic BP recordings ($p = 0.004$ for differences in prevalence) (5).

The nonpharmacologic management of hypertension is based on four principles: dietary sodium restriction, individualizing dialysate sodium, the management of dry weight, and providing an adequate duration of dialysis. Fewer hours of delivered dialysis are associated with a higher systolic BP. Upon probing dry weight, compared with shorter dialysis treatment times, 4 h of delivered dialysis per session provokes reductions in systolic BP over fewer dialysis treatment sessions. Reduction of BP may lag dry-weight reduction when shorter dialysis is delivered (1, 13).

Pharmacological management of hypertension may include several categories. First-line antihypertensive agents include angiotensin converting enzyme inhibitors and angiotensin receptor blockers given their safety profile and demonstrated benefit on cardiovascular outcomes in clinical trials. Beta-blockers and combined α - and β -blockers should also be used in patients with cardiovascular disease or congestive heart failure and may improve outcomes in these populations. Calcium channel blockers and direct vasodilators are also effective for controlling blood pressure. Many blood pressure agents can be dosed once daily and should preferentially be administered at night to control nocturnal blood pressure and minimize intra-dialytic hypotension. In patients who are noncompliant with therapy, renally eliminated agents (such as lisinopril and atenolol) can be given thrice weekly following hemodialysis (14).

Patients undergoing dialysis have a substantially increased risk of cardiovascular causes of mortality and morbidity as in general population but there is uncertainty about the efficacy and tolerability of reducing blood pressure in patients on dialysis. Treatment with agents that lower blood pressure should routinely be considered for individuals undergoing dialysis to reduce the very high cardiovascular morbidity and mortality rate in this population. However, unlike the direct and linear association of BP with cardiovascular outcomes and mortality in dialysis patients other studies showed an inverse relationship of BP recorded before or after dialysis with mortality. That is lower BP being associated with poor long-term outcomes and higher BP being associated with a better outcome has been labeled as “reverse” epidemiology of hypertension, raising substantial uncertainty on whether hypertension is harmful and should be corrected in this particular population. Contrary to the reverse prognostic association of conventional peridialytic BP recordings, elevated BP recorded outside of the dialysis unit either with self-measured home BP recordings or with 44-hour interdialytic ABPM was shown to be directly associated with excess risk of mortality (15, 16).

According to KIDIGO hemodialysis update the clinical benefits of treatment of hypertension in patients undergoing hemodialysis have not been established. Observational cohort studies have also been unable to demonstrate evidence for a higher risk of death or cardiovascular events in patients undergoing maintenance hemodialysis with higher pre-dialysis blood pressures. In contrast, observational data suggest higher risk of death in patients with low systolic blood pressure, both pre- and post-hemodialysis (8).

In a meta-analysis of randomized controlled trials of antihypertensive therapy in hemodialysis patients, blood pressure lowering treatment was associated with a 29% lower relative risk of cardiovascular causes of mortality and a 20% lower relative risk of all-cause mortality. While blood pressure control may improve cardiovascular causes of mortality and morbidity, the management of hypertension is a big challenge in these patients especially in developing countries like India where the maintenance of optimal dry weight in between the dialysis therapy is inadequate due to high cost of hemodialysis and limited number of centers providing dialysis therapy (9).

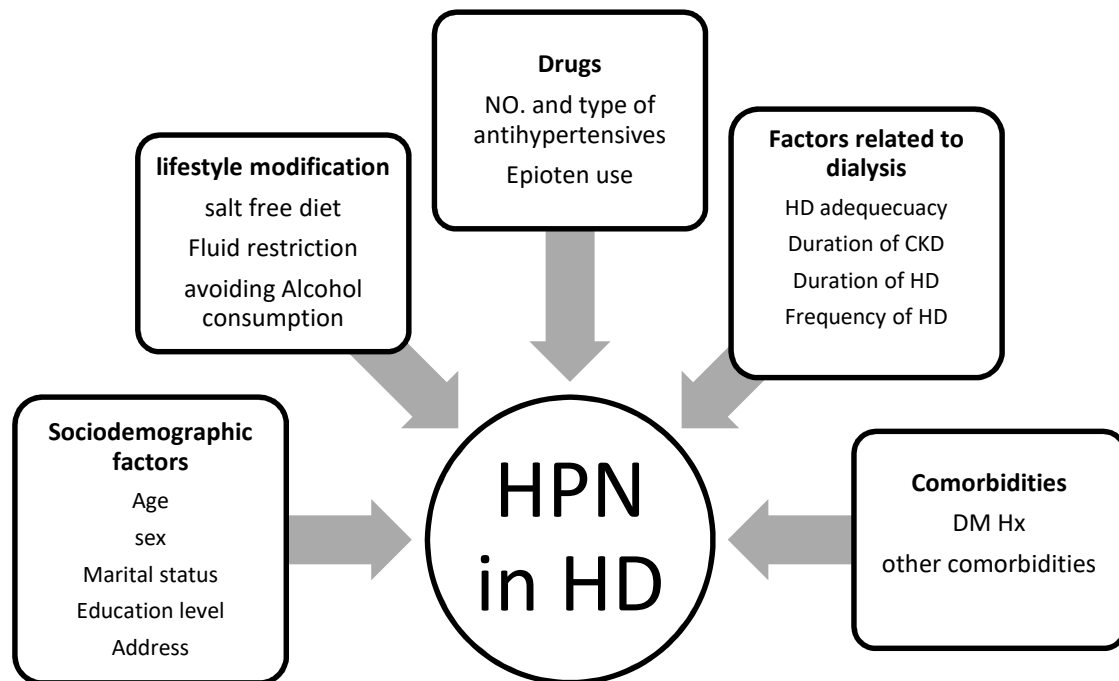
Most of the patients have isolated systolic or combined systolic and diastolic HTN. Pre-dialysis BP varies substantially within individuals and higher BP variability has been associated with cardiovascular events and mortality. The mean number of antihypertensive drug classes prescribed six months after starting HD is 2.5. Beta-adrenergic blocking agents are most commonly prescribed antihypertensive class, followed by RAAS blocking agents and dihydropyridine calcium channel blockers. Hypertension is frequently treated with antihypertensive drugs, but remains adequately controlled in only a minority of the patients (17, 18).

2.2. Significance of the study

CKD is an emerging problem in developing countries like Ethiopia. In our practice there are many patients on chronic hemodialysis with raised blood pressure. However, little is known about the prevalence of hypertension and its level of control in CKD patients on chronic hemodialysis.

There are no studies done on this topic in Africa in general and in Ethiopia in particular. Therefore, it seemed appropriate to examine the prevalence of hypertension in CKD patients on chronic hemodialysis and its level of control in SPHMMC hemodialysis unit. This study aimed at assessing the occurrence of hypertension and the control thereof in CKD patients on chronic hemodialysis. The data generated in this study may serve as a basis for developing a standard protocol on diagnosis and management of hypertension in chronic hemodialysis patients.

2.3. Conceptual Framework



Chapter Three: Objective

3.1. General objective

To assess the prevalence of hypertension, its level of control and associated factors among patients on chronic hemodialysis at SPHMMC dialysis unit

3.2. Specific objective

To determine the prevalence of hypertension among patients on chronic hemodialysis

To assess the level of control of hypertension among patients on chronic hemodialysis

To identify factors associated with hypertension among patients on chronic hemodialysis

Chapter Four: Methods and Materials

4.1. Study Area and Study Period

This study is conducted in St. Paul's Hospital Millennium Medical College, one of the referral hospitals in Addis Ababa, Ethiopia. It provides care to approximately 200,000 people each year with a catchment population of more than 5 million. The dialysis unit is the largest dialysis center among the governmental dialysis units and was established 6 years ago. The study was conducted in the hemodialysis unit which was providing service to 64 CKD patients during the data collection period.

The study was conducted from May to July 2019.

4.2. Study design

Institutional based Descriptive Cross sectional study was conducted.

4.3. Population

4.3.1. Source and Study population

The source and study populations are all CKD patients who are having maintenance hemodialysis at SPHMMC dialysis centers.

4.4. Sampling Procedure and Sample Size

Sixty four patients on chronic hemodialysis at SPHMMC dialysis unit during the study period were included in the study.

4.5. Study Variables

4.5.1. Independent Variables

Socio-demographic factors - Age, Sex, Marital status, Education, Address

Use of antihypertensive drugs

Duration since CKD diagnosis

Duration since initiation of hemodialysis

Frequency of dialysis per week

Duration of each dialysis session

Salt free diet use

Alcohol consumption after initiation of HD

Epioten use

Free fluid restriction

Dialysis adequacy (Kt/V)

4.5.2. Dependent Variables

Hypertension

Level of hypertension control

4.6. Data Collection and quality control

Data was collected by a trained data collector while the patients' were undergoing their mid-week dialysis session using interviewer administered structured questionnaire and also by reviewing their medical charts. Intra-dialysis BP measurements' median $\geq 140/90$ was used to diagnose hypertension. The collected data was checked for completeness and accuracy to determine their validity and formats with insufficient information were refilled.

4.7. Questionnaire design

The questionnaire is divided in to three parts. The first section is about the socio demographic characteristics of the patients, the second part contains questions related with dialysis, and the third part focuses on comorbidities and treatment related questions.

4.8. Method of data processing and analysis

Quantitative data was obtained from the questioners and analyzed using SPSS (statistical package for social sciences) version 25. Descriptive statistics such as frequencies, percentage, appropriate graphic presentation, cross tabulation, and Pearson correlation were used for the analysis.

4.9. Ethical Consideration

Ethical clearance was obtained from the institutional review board of SPHMMC. Permission was also obtained from SPHMMC management, Internal medicine department and Renal and Dialysis Unit. Verbal consent was obtained from patients. Their privacy and confidentiality were highly maintained.

4.10. Dissemination of Results

The result of the research will be reported to internal medicine and public health department of SPHMMC. The finding will also be presented to staffs and students of SPHMMC and others as much as possible.

4.11 Operational Definitions

- **Hypertension** - if home or 24h-ABPM cannot be applied, hypertension can be diagnosed as midweek median intradialysis systolic pressure ≥ 140 and/or diastolic pressure ≥ 90 mm Hg (3,8).
- **Treatment target:** intradialysis BP median $< 140/90$ mm Hg (3, 8).
- **Dry weight** is the lowest weight a patient can tolerate without development of symptoms or hypotension.
- **Dialysis adequacy (Kt/V)**- to say adequate dialysis average Kt/V should be at least 1.2
- **Level of control** - was be assessed using the treatment target BP for the specific measurement as controlled or not controlled.
- **Salt free diet:** avoiding salt completely except which is used for the preparation of 'berbere'
- **Alcohol consumption:** consumption of any type and amount of alcohol after initiation of HD
- **Fluid restriction** - < 500 ml/day

5. Result

Socio-demographic characteristics

Sixty four patients on hemodialysis were studied. This includes 42 (65.6%) men & 22 (34.4%) women. Mean age of the patients was 40.69 ± 14.44 yrs with 44 (68.8%) patients being between 25 & 54 yrs. Forty (62.5%) of patients came from Addis Ababa. Forty-three (67.2%) are married. Thirty-four (53.1%) patients had higher education but the majority of patients, 45(70.3%), were unemployed due to their illness.

Table 5.1, Sociodemographic characteristics of patients on chronic HD at SPHMMC dialysis unit from May to July 2019

		Address					
		Addis Ababa		Out of Addis Ababa		Total	
		n	%	n	%	n	%
Gender	Male	29	45.3%	13	20.3%	42	65.6%
	Female	11	17.2%	11	17.2%	22	34.4%
Educational Status	Can't read or write	3	4.7%	2	3.1%	5	7.8%
	Elementary School	6	9.4%	3	4.7%	9	14.1%
	High School	10	15.6%	6	9.4%	16	25.0%
	Higher Education	21	32.8%	13	20.3%	34	53.1%
Marital Status	Single	11	17.2%	9	14.1%	20	31.3%
	Married	28	43.8%	15	23.4%	43	67.2%
	Widowed	0	0.0%	0	0.0%	0	0.0%
	Divorced	1	1.6%	0	0.0%	1	1.6%
Occupation	Student	0	0.0%	1	1.6%	1	1.6%
	Government Employee	6	9.4%	3	4.7%	9	14.1%
	Private Employee	6	9.4%	1	1.6%	7	10.9%
	Unemployed	26	40.6%	19	29.7%	45	70.3%
	Retired	2	3.1%	0	0.0%	2	3.1%

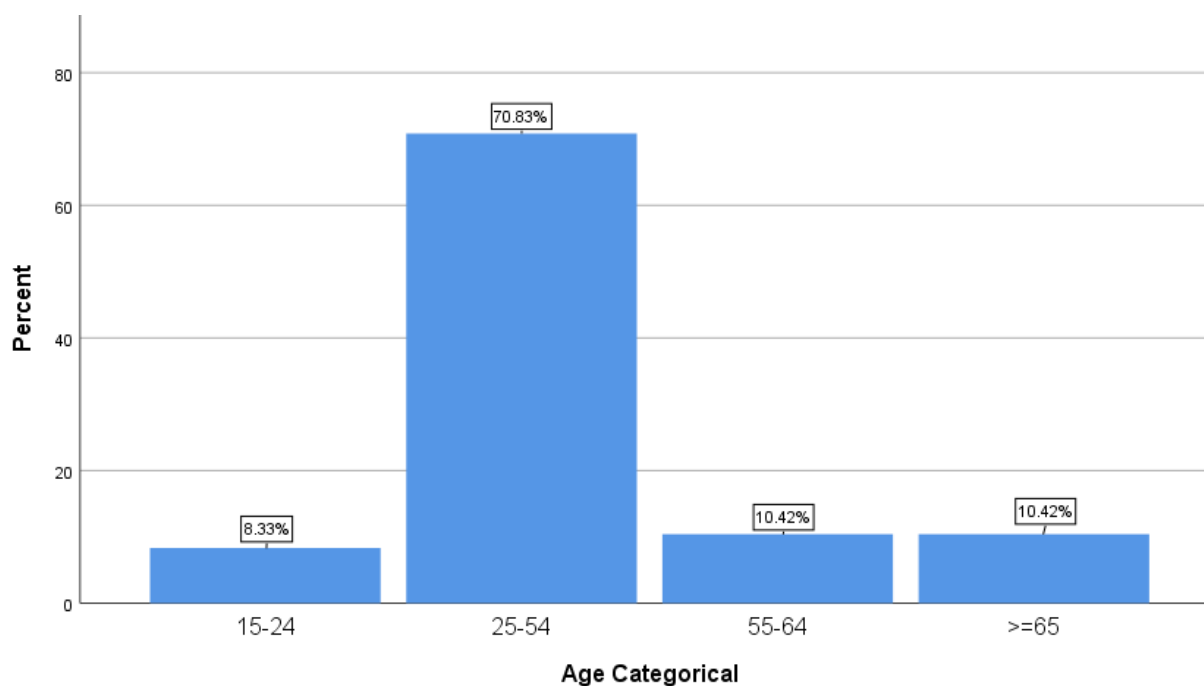


Figure 5.1, Percentage of the study population by Age group of patients on chronic HD at SPHMMC dialysis unit from May to July 2019

Factors related to dialysis

The average time on dialysis was 33.25 ± 22.51 months. Majority of patients, 53(82.8%), were on dialysis for more than 1 year. Duration of each dialysis session for all patients was 4hrs & 50 (78.1%) of the patients had 3 sessions per week. The average Kt/V is 1.52. Pre-dialysis mean weight was 60.24 ± 14.01 kg, which was 3 ± 0.32 kg above dry weight. Patients gained 2.51 ± 0.24 kg between dialysis sessions. Seven (10.94%) of patients had lower extremity edema.

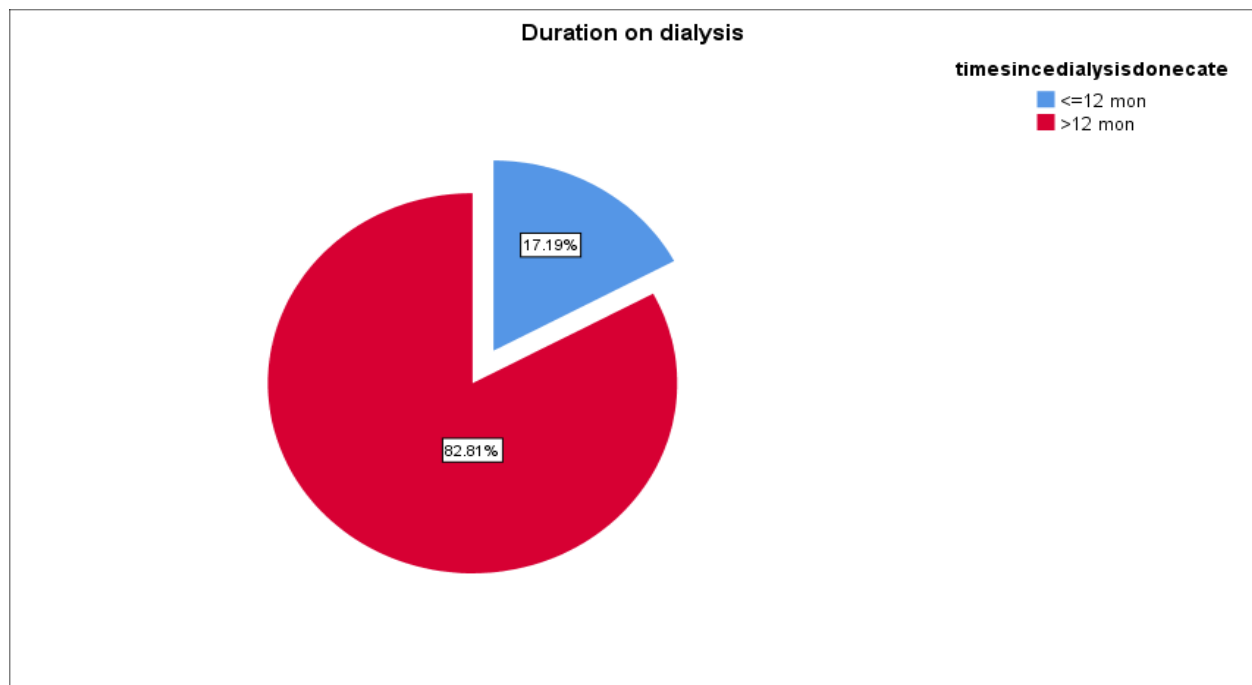


Figure 5.2, Percentage of patients' duration on HD at SPHMMC dialysis unit from May to July 2019

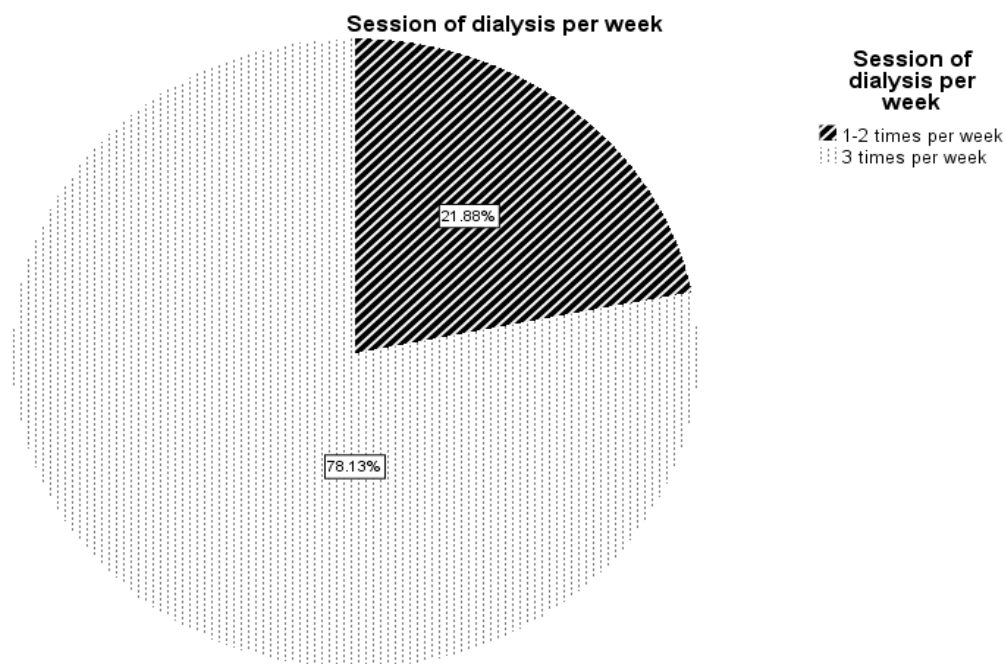


Figure 5.3 Frequency of patients' session of HD per HD at SPHMMC dialysis unit from May to July 2019

Table 5.2, Parameters used to assess dialysis adequacy of patients on chronic HD at SPHMMC dialysis unit from May to July 2019

		Minimum	Maximum	Mean
Kt/V		1.01	2.64	1.52
Predialysis weight (kg)		31.3	93.5	60.24
Postdialysis weight (kg)		29.8	90	57.73
Dry weight (kg)		29	90	57.24

Comorbidities

Ten (15.6%) patients are diabetic, 8 (12.5%) patients had concomitant cardiovascular disease, 2 (3.1%) patients had post TB fibrosis and 1 patient is paraplegic secondary to trauma.

Prevalence of hypertension

Raised blood pressure based on midweek intra-dialysis BP median among the 64 patients was 29(45.3%), 35(54.7%) by pre-dialysis BP measurement & 25(39.1%) by post-dialysis BP. The number of patients who had history of hypertension prior to CKD diagnosis was 34(53%). Out of the 34 patients 15(44.1%) had raised BP & 19(55.9%) patients were normotensive. Out of the 29 patients 14 (48%) were diagnosed to be hypertensive on intra-dialysis BP median had no prior history of hypertension.

The overall prevalence of hypertension including those who had hypertensive history & based on intra-dialysis BP median is 48(75%).

Drug use

Out of the 64 patients 38(59.4%) of the patients were taking epotone. Thirty nine (60.9%) of the patients were taking antihypertensive drugs, Out of them 30(77%) were taking single drug, commonest being amlodipine 61.5% & 9(23%) were taking two drugs.

Life style modification

All patients denied alcohol intake after initiation of HD, 40(62.5%) of patients restrict their fluid intake to less than 500ml & only 23(35.9%) patients restrict their salt intake.

The hypertensive population

Fourty eight (75%) patients were hypertensive with 34 (70.8%) patients having had history of hypertension prior to CKD diagnosis and 14 (29.2%) patients after initiation of hemodialysis. Out of the 14 patients, 10 (71.4%) were taking epotene. From the 34 patients who had history of hypertension 15(44.1%) still has raised BP and 19 (55.9%) patients are normotensive on the first BP measurement.

Second BP measurement was taken after 6 weeks to assess control for the hypertensive patients. Out of the 48 patients 3 (6.2%) of them had transplant done during the 6 week period so excluded from the study, 22 (46%) of the patients still has $BP \geq 140/90$, 5(10.4%) patients who had raised BP becomes normotensive, 5(10.4%) of the patients who were normotensive on the first measurement developed new raised blood pressure & 13(27%) patients were normotensive on both measurement. According to the above data, hypertension was not controlled in 27 (56.4%) and controlled in 18 (37.4%).

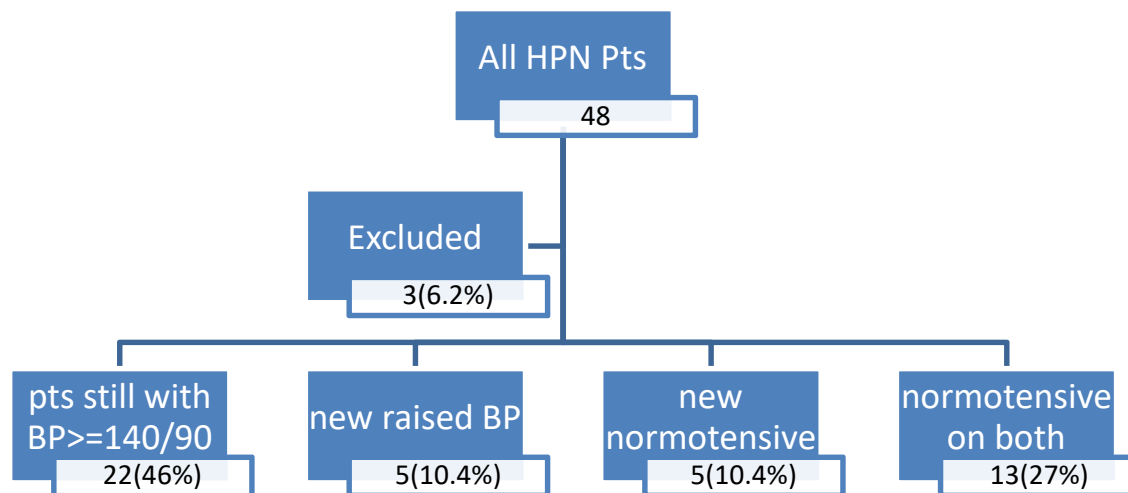


Figure 5.4, Control of blood pressure among the hypertensive population of patients on chronic HD at SPHMMC dialysis unit from May to July 2019

Factors correlating with hypertension

Presence of edema was positively correlated with hypertension ($r=0.385$ & $P= 0.002$). All 7 of the patients with edema were hypertensive. Epotine use was correlated with antihypertensive drug use ($r=0.381$, $P=0.002$). 29 (76.3%) of 38 patients who were taking epotine were also taking antihypertensive.

Prevalence of hypertension was not associated with time of start of dialysis, age, gender, session of dialysis per week, fluid restriction or salt free diet, dialysis adequacy, and excess weight.

Table 5.3, Factors correlating with hypertension of patients on chronic HD at SPHMMC dialysis unit from May to July 2019

Factors	Correlation coefficient r	Probability value
Presence of edema	0.385	0.002
Age	-0.009	0.946
Epotine use	0.05	0.695
Kt/V	-0.05	0.695
Excess weight	0.144	0.260
Time since dialysis started	0.213	0.091
Session of dialysis per week	-0.126	0.322

6. Discussion

To the best of the author's knowledge, this study is the first study of its kind in Ethiopia. Sixty four patients on hemodialysis were included in this study, of whom 42 (65.6%) were men and mean age of patients was 40 ± 14.44 yrs which was comparable with a study done in US, Indiana university, where 65% of the patients were men & their mean age was 54.2 ± 12.5 (12).

In this study the average time on dialysis was 33.25 ± 22.51 months & majority of patients 53(82.8%) were on dialysis for more than 1 year. Likewise, duration on dialysis was greater than 1 year in around 70% of patients in similar studies conducted elsewhere (11, 12).

Prevalence of hypertension is variable in different studies conducted so far probably owing to the way hypertension was defined. In this study the prevalence of hypertension defined by intradialytic BP median and history of hypertension diagnosis was found to be 75%. In Dialysis Outcomes and Practice Patterns Study (DOPPS) the prevalence of hypertension ranged from 72.7%-95.9% (78% in Japan, 95.9% in Germany, 82.3% in Belgium, 90.7% in Canada, 90.6% in Spain, 91.4% in France, 80.7% in Italy, 89.1% in Sweden and 72.7% in UK) (10). In study done in Mississippi on 649 patients prevalence of hypertension defined by pre-dialysis MAP ≥ 114 mmHg was 71.9% (11). In another study done at Indiana University on 369 patients the prevalence of hypertension defined by 44-hour interdialytic ambulatory BP measurements was 82% (11). In 2,535 clinically stable, adult HD patients participating in a multicenter trial, the prevalence of hypertension defined by pre-dialytic BP measurements was found to be 86% (1).

In our study out of the 64 patients 39(60.9%) were taking antihypertensive of whom majority 77% were taking single drug commonest being amlodipine and 23% were taking two drugs commonest combination of drugs being atenolol with amlodipine. This finding is different from other studies done which showed the percentage of using antihypertensive agents ranges from 81.5%-89% (11,12). In a study done in United states on hemodialysis and peritoneal dialysis patients the mean number of antihypertensive drug classes prescribed six months after starting hemodialysis is 2.5. Beta-adrenergic blocking agents were most commonly prescribed antihypertensive class, followed by RAAS blocking agents and dihydropyridine calcium channel blockers (1,18).

Even though hypertension is frequently treated with antihypertensive drugs it remains adequately controlled in only minority of the patients. In our study a second BP measurement was done after 6 weeks for the hypertensive patients (48 patients) to assess the control of BP and hypertension was controlled in only 18(37.4%) of the patients. This finding is comparable with the findings of other studies which showed control of hypertension ranges from 30-48 %(1, 11, 12).

In this study the only variable which was found to be correlated with hypertension is presence of edema. All the 7 patients with edema were found to be hypertensive. Prevalence of hypertension was not associated with of time since dialysis was started, age, gender, session of dialysis per week, fluid restriction or salt free diet, dialysis adequacy, and excess weight. In a study done in age was the only factors which was correlated with prevalence of hypertension (11).

Strength

- As to the authors knowledge there no other study that probed this topic in Ethiopia.
- This study is a pioneer study that addressed one of the major public health concerns in our set-up.

Limitation

- Even though Intradialysis BP median is the third option to define hypertension it was used in this study due to lack of ambulatory BP measurement apparatus & infeasibility of home BP monitoring
- This is a single center study with limited number of patients and cannot be generalized to the whole population

7. Conclusion and Recommendation

Hypertension is a common disease among patients on chronic hemodialysis at SPHMMC dialysis unit but it is found to be inadequately controlled in the majority of the patients. Presence of edema was the only factor that was found to be associated with the prevalence of hypertension.

Ambulatory BP measurement apparatus is not available in the hospital therefore for a standard diagnosis and to optimize control of hypertension it should be made available in the dialysis unit. Further large scale study using standard diagnostic method should be done to confirm the magnitude of the problem.

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Annex I

Questionnaire

Instruction: Circle the letter of selected answers and for the questions that need direct answer, write the answer in the space provided.

Part I: socio demographic characteristics of respondents

1. Card number _____
2. Age _____
3. Gender: A. Male B. Female
4. Marital Status: A. Single B. Married C. Widow D. Divorced
5. Educational Status: A. Uneducated B. Elementary school C. High school D. Higher education
6. Occupation: A. Student B. Government employee C. Private employee D. Unemployed E. Retired F. Others (mention) _____
7. Address: A. Addis Ababa B. Out of Addis Ababa _____

Part II—Dialysis associated characteristics of respondents

1. Time since dialysis started (in months) _____
2. Session of dialysis per week _____
3. Duration per dialysis _____
4. Dry weight _____
5. Presence of Edema: A. Yes _____ B. No
6. Dialysis adequacy (Kt/V) _____
7. Predialysis BP _____
8. Predialysis weight _____
9. Intradialytic BP _____
10. Postdialysis BP _____
11. Postdialysis weight _____

Part III- Comorbidities and treatment related characteristics of respondents

1. Does the patient have history of hypertension prior to CKD diagnosis: A. yes
B. No
2. Is patient taking any antihypertensive drug: A. if yes specify type and dose _____
B. No
3. Does the patient have history of Diabetes mellitus: A. Yes B. No
4. Does the patient have history of other comorbidities: A. Yes B. No
If yes, A. CVD B. Pulmonary disease C. GI disease D. Neurologic disease
E. Others _____
5. Is the patient taking eptotene: A. yes B. No
6. Is the patient on salt free diet: A. yes B. No
7. Does the patient have any kind of alcohol intake after initiation of HD: A. Yes
B. No
8. Is the patient on free fluid restriction A, yes B, No