

Medicines Availability among Hypertensive Patients in Primary Health Care Facilities in a Rural Province in South Africa: Findings and Implications

Enos M. Rampamba^{1,2}, Johanna C. Meyer¹, Elvera Helberg¹, Brian Godman^{1,3,4,5}

¹Division of Public Health Pharmacy and Management, Sefako Makgatho Health Sciences University, Ga-Rankuwa, Pretoria, South Africa

²Department of Pharmacy, Tshilidzini Regional Hospital, Limpopo Province, South Africa

³Department of Pharmacoepidemiology, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, United Kingdom

⁴Department of Laboratory Medicine, Division of Clinical Pharmacology, Karolinska Institutet, Karolinska University Hospital Huddinge, Stockholm, Sweden

⁵School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

Received: 16-04-2020.
Accepted: 24-07-2020.
Published: 11-01-2021.

INTRODUCTION

Controlling blood pressure (BP) in hypertensive patients is a challenge especially in lower-and middle-income countries (LMICs).^[1,2] However, these countries have the greatest prevalence of hypertension,^[3,4] and in South Africa, hypertension is the greatest reason why patients with noncommunicable diseases (NCDs) visit primary health care (PHC) facilities.^[2] Factors impacting on

ABSTRACT

Objective: Controlling blood pressure (BP) in hypertensive patients is a challenge, with the lack of antihypertensive medicines negatively impacting on BP control. Consequently, we assessed the availability of prescribed antihypertensives among patients with chronic hypertension attending primary health care (PHC) facilities in a rural province of South Africa and explored any association between medicines availability, the number of prescribed antihypertensive medicines and BP control. **Methods:** Secondary data that included patients' demographics, BP, and data on medicines availability of the intervention group from a 3 months' operational study conducted in rural PHC facilities in South Africa were analyzed. The association between medicines availability, the number of antihypertensive medicines, and BP control was explored. **Findings:** Fifty-five African patients (89.1% females) with a mean age of 61.3 years were included. Two-thirds (67.2%) received all their medicines during their monthly visits, 25.5% received some, and for 7.3%, there was no record of whether medicines were dispensed or not. Patients with controlled BP (60.0%) were more likely to have been prescribed only one antihypertensive medicine compared to patients with uncontrolled BP (20.7%) ($P = 0.017$; odds ratio: 5.75; 95% confidence interval: 1.46, 22.61). **Conclusion:** It is concerning that one-third of patients went home without all of their antihypertensive medicines from PHC facilities in this Province of South Africa where there is evidence of use of herbal medicines and uncontrolled BP contributing to high morbidity and mortality from cardiovascular diseases. Additional studies are needed to fully explore the association between medicines availability, their use, and BP control among patients.

KEYWORDS: High blood pressure, medicine, hypertension, South Africa

poor BP control in LMICs include patients' beliefs and concerns about their medication, poor access to services, their socio-economic status, and limited professional

Address for correspondence:

Prof. Brian Godman,
E-mail: brian.godman@strath.ac.uk

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Rampamba EM, Meyer JC, Helberg E, Godman B. Medicines availability among hypertensive patients in primary health care facilities in a rural province in South Africa: Findings and implications. J Res Pharm Pract 2020;9:181-5.

Access this article online	
Quick Response Code: 	Website: www.jrpp.net
	DOI: 10.4103/jrpp.JRPP_20_49

help.^[2,3,5,6] Previous surveys among 40 LMICs found the mean availability of chronic medicines was 14.3% less than for acute medicines,^[7] with the availability of antihypertensive and cardiovascular medicines 8.5% and 21.4% respectively lower than those to treat acute conditions.^[7] More recent studies have also documented concerns with access to medicines to treat cardiovascular diseases among LMICs.^[8]

Considering the high rate of defaulters with attending clinic appointment dates for either review or the collection of medicines in South Africa, along with concerns with access to, and subsequent care, at PHC facilities,^[9] it is important to ensure continued availability of medicines at PHC facilities to reduce future morbidity among chronic hypertensive patients.^[10] Previous studies have shown concerns between antihypertensive medicine availability, their use, and BP control on subsequent outcomes.^[11] To address this, the World Health Organization established a benchmark of 80% availability of key medicines,^[7] and in South Africa, the authorities implemented the Central Chronic Medicines Dispensing and Distribution (CCMDD) program to improve access to medicines.^[12] Access to medicines is a right to health and plays an important role in enhancing the quality of life of patients living with NCDs to meet Sustainable Development Goal 3.^[13] To the best of our knowledge, there appears to be no studies undertaken to date evaluating the availability of antihypertensive medicines among public PHC facilities in South Africa, and the implications, given concerns with the current quality of care.^[14] This is important given the commitment of the government to ensure and sustain universal health care.^[12]

Consequently, we sought to explore antihypertensive medicines availability and likely control of BP, as well as the number of antihypertensive medicines prescribed and BP control, among hypertensive patients expected to be enrolled into the CCMDD program in South Africa.

METHODS

This study was part of an operational study evaluating pharmacists' interventions in the management of chronic hypertension among PHC facilities in South Africa. It included secondary data from one district in a rural province. This province was chosen since supply chain infrastructures are typically more challenging in rural settings, with patients in rural areas typically more reliant on PHC facilities. Only 50 of the 120 PHC facilities in the district were conveniently sampled due to operational challenges.^[15] In this substudy, a retrospective observational and descriptive design was used to describe patients in the intervention group, with controlled BP as an outcome variable.

The 50 selected PHC facilities were listed alphabetically, with odd numbered facilities comprising the intervention group. The number of patients per facility was based on the availability of hypertensive patients on the data collection day. The intervention group comprised 55 hypertensive patients who completed the study with a 3-month interval between baseline and postintervention assessments.^[15] For this substudy, data included patients' demographics, a record of antihypertensive medicines prescribed and collected, and recorded BP.^[15] Only the intervention group was sampled for this sub-study because patients' data such as BP, and whether antihypertensive medicines were dispensed or not, were only captured for this group.

Data on BP recordings over the 3-month interval were subsequently available for only 44 of the 55 patients. Resting BP was measured by nurses using a digital automatic BP monitor or a sphygmomanometer.^[2]

Data were captured into Microsoft Excel® spread sheets and exported to SAS® for analysis. BP was designated as controlled if systolic BP <140 mmHg and diastolic BP <90 mmHg.^[16] Possible associations were explored using the odds ratio (OR) with 95% confidence interval (CI), and the Fisher's Exact test to determine statistical significance ($P \leq 0.05$; 2-sided). While the sample size was not statistically powered to determine associations, given the burden of hypertension, and poor adherence and BP control in this region, we believe the results would highlight trends for further investigation.

The Medunsa Research Ethics Committee of the University of Limpopo granted ethical clearance (MREC/H/27/2014:PG) and the Limpopo Department of Health gave permission to conduct the study. All patients provided written informed consent for participation.

RESULTS

Demographic data, antihypertensive medication, and BP control for 55 African patients are summarized in Table 1.

Two-thirds (67.2%) of patients received all their antihypertensive medicines during their monthly visits, 25.5% received some of their medicines, and in 7.2%, there was no record whether their medicines were dispensed or not. All patients were prescribed either one or more antihypertensive medicines from the South African PHC Standard Treatment Guidelines and Essential Medicines List, which included hydrochlorothiazide 25 mg, enalapril 20 mg, amlodipine 5 mg and/or atenolol 50 mg.^[12]

BP was recorded in all 3 months of the study period for only 44 (80%) study patients [Table 1]. BP was referred

to as being controlled or within target if this was within the agreed target range (systolic BP <140 mmHg and diastolic BP <90 mmHg) in all 3 consecutive months.^[16] Ten (66.7%) of the 15 patients who had controlled BP received all their prescribed antihypertensive medicines while 75.9% with uncontrolled BP ($n = 29$) also received all their prescribed medicines [Table 2]. While these findings did not differ significantly ($P = 0.720$), patients with controlled BP were less likely to receive all their medicines compared to patients with uncontrolled BP (OR: 0.64; 95% CI: 0.16, 2.50).

While the stages of hypertension were not taken into consideration, nine (60.0%) of the 15 patients with controlled BP were on one antihypertensive medicine while only 20.7% of those with uncontrolled BP ($n = 29$) were on one antihypertensive medicine, which was significantly different ($P = 0.017$) [Table 3]. Patients with controlled BP were more likely to receive only one medicine compared to patients with uncontrolled BP (OR: 5.75; 95% CI: 1.46, 22.61).

DISCUSSION

While more than half of the patients received all their medicines during the 3-month study, it is a concern that some patients went home without one or all of their prescribed antihypertensive medicines [Table 1], similar to other studies in South Africa.^[17,18]

In addition to negatively impacting on morbidity and mortality, exacerbated by potential worsening of adherence rates, shortages of antihypertensive medicines can have an economic impact if patients have to subsequently purchase their medicines from private suppliers or hospitals are required to purchase medicines at higher mark-ups.^[19,20] Medicine shortages can also trigger frustration, anger, and a feeling of helplessness among patients, potentially further exacerbating their condition,^[19] enhanced by increased defaulting on treatment.^[21] Consequently, medicines availability and health care professional communication are key areas to address to improve patient satisfaction and care.^[21] Failure to address nonavailability will defeat the government's efforts to improve accessibility and availability of medicines in PHC facilities^[12] leading to poor BP control. Consequently, there is a need to improve medicine availability and stock control systems in South Africa, which is on-going.^[12]

This study suggested that patients on one medicine are more likely to have controlled BP compared to those on multiple antihypertensive medicines. Fixed-dose combinations are one potential way forward to decrease the pill burden and help with stock control; however,

Table 1: Patients' demographics, record of antihypertensive medication received and blood pressure recording ($n=55$)

Variable	n (%)
Gender	
Female	49 (89.1)
Male	6 (10.9)
Age (years), mean±SD	61.35±0.87 ^a
Marital status	
Married	26 (47.3)
Divorced	7 (12.7)
Never married	6 (10.9)
Separated	5 (9.1)
Widowed	11 (20.0)
Educational status	
Completed primary	20 (36.4)
Completed secondary	3 (5.5)
Completed tertiary	2 (3.6)
No education	30 (54.5)
Number of antihypertensive medicines prescribed	
Only one	19 (34.5)
More than one	36 (65.5)
Record of prescribed antihypertensive medication received	
All medicines received in all 3 months	37 (67.2)
Some medicines (not all) received in all 3 months	14 (25.5)
No indication that medicines were received or not received, in any of the 3 months	4 (7.3)
BP recorded	
BP recorded in all 3 months	44 (80.0)
BP recorded in some (not all) month (s)	6 (10.9)
No record of BP recorded in any of the 3 months	5 (9.1)

^aMean±SD. SD=Standard deviation, BP=Blood pressure

Table 2: Association between prescribed antihypertensive medicines received and blood pressure control ($n=44$)

Prescribed antihypertensive medicines	Total	BP status, n (%)		P^*
		BP controlled	BP not controlled	
Received all	32	10 (66.7)	22 (75.9)	0.720
Did not receive all	12	5 (33.3)	7 (24.1)	
Total	44	15 (100)	29 (100)	

*Fisher's exact test. BP=Blood pressure

Table 3: Association between the number of antihypertensive medicines prescribed and blood pressure control ($n=44$)

Number of antihypertensive medicines prescribed	Total	BP status, n (%)		P^*
		BP controlled	BP not controlled	
Only one medication	15	9 (60.0)	6 (20.7)	0.017
More than one medication	29	6 (40.0)	23 (79.3)	
Total	44	15 (100)	29 (100)	

*Fisher's exact test. BP=Blood pressure

there can be concerns including high unjustified prices.^[22]

There was though no significant association between patients receiving all their antihypertensive medications and BP control [Table 2], similar to other studies.^[8] This finding is important as it raises concerns regarding ongoing initiatives in South Africa to improve medicines availability among patients with chronic diseases through the CCMDD program without addressing other key issues such as adherence, which can be very variable in practice.^[3,5,12] Our findings also raise concerns regarding patients' knowledge about hypertension and its treatment as far as BP targets and objectives are concerned.^[2] This needs to be followed up given current concerns with adherence rates to antihypertensive medicines in South Africa,^[5,15] and there appeared to be an association between the number of antihypertensive medicines patients were taking and BP control in our study [Table 3]. The lack of other associations in our study may be pointing to more serious challenges in our health care system, which can only be identified and prevented if professionals in PHC facilities are monitoring key facility indicators together with treatment coverage and BP control.^[23] Facility indicators could include: (i) incidence of new hypertensive patients diagnosed among health care facilities in the quarter/year; (ii) the proportion of patients on treatment; (iii) the proportion of patients with their BP taken at every visit; (iv) the proportion of patients with normal BP; (v) reasons for not taking BP at routine follow-up visits recorded in patients' notes; and (vi) routine availability of antihypertensive medicines on the day hypertensive patients are being followed-up in their PHC facility.^[23]

Such indicators could help address the fact that 20% of patients in our study did not have their BP taken on all occasions when visiting PHC facilities [Table 1]. This may be due to lack of BP measuring devices and lack of finances at the clinics to repair or buy new devices, or buy batteries, all of which can contribute to poor disease management. Further studies are needed to ascertain the exact reasons, which we plan to undertake. Finally, it may be necessary, in addition to patients coming to public PHC facilities, to consider using the current dispensing and delivery of medicines to a point closest to the patient (CCMDD services) together with utilizing community pharmacies to address key issues surrounding medication accessibility, availability, and adherence.^[12,15,24] Furthermore, patient satisfaction surveys can also be used to improve the future management of hypertensive patients in the public health care system in South Africa.^[24]

We acknowledge that there are limitations with this study. First, only one rural district was included and

some data, including which prescribed medicines were unavailable on the day of consultation, were not collected. The small sample size emanating from the operational challenges was also a concern. However, the findings are congruent with previous studies in South Africa and elsewhere, and provide directions for moving forward.

As a conclusion to our study, it is a concern that a third of hypertensive patients visiting rural PHC facilities went home without their antihypertensive medication. This needs to be addressed through improved supply chain management, considering that the use of herbal medicines and uncontrolled BP contribute to increasing morbidity and mortality from cardiovascular diseases in South Africa, which is now a high priority area in South Africa. Further studies are also needed to fully explore the association between medicines availability, its use, and BP control, among a larger group of patients attending PHC facilities given the recent introduction of the CCMDD program in South Africa. The placement of pharmacists or pharmacist assistants within PHC facilities may also improve future availability and use of antihypertensive medicines, which is recommended for follow-up in future studies.

AUTHORS' CONTRIBUTION

Enos M. Rampamba, Johanna C. Meyer, and Elvera Helberg conceptualized the study, developed the questionnaire, and Enos M. Rampamba collected the data. Enos M. Rampamba and Brian Godman undertook the literature review. Enos M. Rampamba and Johanna C. Meyer undertook the initial analysis. Enos M. Rampamb, Johanna C. Meyer, and Brian Godman undertook the first draft of the paper, with all authors involved in subsequent revisions.

Acknowledgment

We would like to thank all the patients for participating in this study willingly. All PHC facilities' personnel are appreciated for their support during the research and a special appreciation to all pharmacists who devoted their time and professional skills during data collection. Prof. HS Schoeman is acknowledged for his assistance with the analysis of the data.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Lloyd-Sherlock P, Beard J, Minicuci N, Ebrahim S, Chatterji S. Hypertension among older adults in low- and middle-income

- countries: Prevalence, awareness and control. *Int J Epidemiol* 2014;43:116-28.
2. Rampamba EM, Meyer JC, Helberg E, Godman B. Knowledge of hypertension and its management among hypertensive patients on chronic medicines at primary health care public sector facilities in South Africa; findings and implications. *Expert Rev Cardiovasc Ther* 2017;15:639-47.
 3. Nashilongo MM, Singu B, Kalemeera F, Mubita M, Naikaku E, Baker A, *et al.* Assessing adherence to antihypertensive therapy in primary health care in Namibia: Findings and implications. *Cardiovasc Drugs Ther* 2017;31:565-78.
 4. Irazola VE, Gutierrez L, Bloomfield G, Carrillo-Larco RM, Dorairaj P, Gaziano T, *et al.* Hypertension prevalence, awareness, treatment, and control in selected LMIC communities: Results from the NHLBI/UHG network of centers of excellence for chronic diseases. *Glob Heart* 2016;11:47-59.
 5. Rampamba EM, Meyer JC, Godman B, Kurdi A, Helberg E. Evaluation of antihypertensive adherence and its determinants at primary healthcare facilities in rural South Africa. *J Comp Eff Res* 2018;7:661-72.
 6. Boima V, Ademola AD, Odusola AO, Agyekum F, Nwafor CE, Cole H, *et al.* Factors associated with medication nonadherence among hypertensives in Ghana and Nigeria. *Int J Hypertens* 2015;2015:1-8.
 7. Cameron A, Roubos I, Ewen M, Mantel-Teeuwisse AK, Leufkens HG, Laing RO. Differences in the availability of medicines for chronic and acute conditions in the public and private sectors of developing countries. *Bull World Health Organ* 2011;89:412-21.
 8. Wirtz VJ, Kaplan WA, Kwan GF, Laing RO. Access to medications for cardiovascular diseases in low- and Middle-income countries. *Circulation* 2016;133:2076-85.
 9. Kapwata T, Manda S. Geographic assessment of access to health care in patients with cardiovascular disease in South Africa. *BMC Health Serv Res* 2018;18:197.
 10. Patel P, Ordunez P, DiPette D, Escobar MC, Hassell T, Wyss F, *et al.* Improved blood pressure control to reduce cardiovascular disease morbidity and mortality: The standardized hypertension treatment and prevention project. *J Clin Hypertens* 2016;18:1284-94.
 11. Wirtz VJ, Moucheraud C. Beyond availability and affordability: How access to medicines affects non-communicable disease outcomes. *Lancet Public Health* 2017;2:e390-1.
 12. Meyer JC, Schellack N, Stokes J, Lancaster R, Zeeman H, Defty D, *et al.* Ongoing initiatives to improve the quality and efficiency of medicine use within the public healthcare system in South Africa; A preliminary study. *Front Pharmacol* 2017;8:751.
 13. World Health Organization. SDG 3: Ensure Healthy Lives and Promote Wellbeing for all at all Ages. World Health Organization; 2019. Available from: <https://www.who.int/sdg/targets/en/>. [Last accessed on 2020 Jul 18].
 14. Steyn K, Levitt NS, Patel M, Fourie J, Gwebushe N, Lombard C, *et al.* Hypertension and diabetes: Poor care for patients at community health centres. *S Afr Med J* 2008;98:618-22.
 15. Rampamba EM, Meyer JC, Helberg EA, Godman B. Empowering hypertensive patients in South Africa to improve their disease management: A pharmacist-led intervention. *J Res Pharm Pract* 2019;8:208-13.
 16. Dzudie A, Rayner B, Ojji D, Schutte AE, Twagirumukiza M, Damasceno A, *et al.* Roadmap to achieve 25% hypertension control in Africa by 2025. *Glob Heart* 2018;13:45-59.
 17. Zuma SM, Modiba LM. Managers' perceptions of the availability of medicines in the Free State district health services. *AJNM* 2017;19:107.
 18. Ameh S, Klipstein-Grobusch K, D'ambruoso L, Kahn K, Tollman SM, Gómez-Olivé FX. Quality of integrated chronic disease care in rural South Africa: User and provider perspectives. *Health Policy Plan* 2017;32:257-66.
 19. Phuong JM, Penm J, Char B, Oldfield LD, Moles R. The impacts of medication shortages on patient outcomes: A scoping review. *PLoS One* 2019;14:e0215837.
 20. Cutler RL, Fernandez-Llimos F, Frommer M, Benrimoj C, Garcia-Cardenas V. Economic impact of medication non-adherence by disease groups: A systematic review. *BMJ Open* 2018;8:e016982.
 21. Bezuidenhout S, Ogunsanwo DA, Helberg EA. Patient satisfaction at accredited antiretroviral treatment sites in the Gert Sibande District. *Afr J Prim Health Care Fam Med* 2014;6:E1-6.
 22. Godman B, McCabe H, D Leong T. Fixed dose drug combinations-are they pharmaco-economically sound? Findings and implications especially for lower- and middle-income countries. *Expert Rev Pharmacoecon Outcomes Res* 2020;20:1-26.
 23. Massyn N, Peer N, English R, Padarath A, Barron P, Day C. District Health Barometer 2015/16 – HST 2016. p. 626. Available from: https://www.hst.org.za/publications/District%20Health%20Barometers/District%20Health%20Barometer%202015_16.pdf. [Last accessed on 2020 Jul 10].
 24. Govender N, Suleman F. Comparison of patient satisfaction with pharmaceutical services of postal pharmacy and community pharmacy. *Health SA* 2019;24:1105.