

Assessment of Care Provision for Hypertension at Emergency Department of an Urban Hospital in Mozambique

Neusa Vanessa Amad Bay

Mozambique Institute for Health Education and Research MIHER <https://orcid.org/0000-0001-7710-0526>

Edna JUGA

Instituto Nacional de Saúde

Carlos MACUACUA

Hospital Geral de Mavalane

Jose JOAO

Hospital Geral de Mavalane

Maria ANIBAL

Hospital Geral de Mavalane

Simon STEWART

Torrens Universty

Ana Olga MOCUMBI (✉ amocumbi@gmail.com)

<https://orcid.org/0000-0002-9564-2860>

Research article

Keywords: Systemic Hypertension; Management Cascade; Drug Availability; Affordability

Posted Date: October 11th, 2019

DOI: <https://doi.org/10.21203/rs.2.15910/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Version of Record: A version of this preprint was published on December 18th, 2019. See the published version at <https://doi.org/10.1186/s12913-019-4820-8>.

Abstract

Background: Management of hypertension in Mozambique is poor, and rates of control are amongst the lowest in the world. Health system related factors contribute at least partially to this situation, particularly in settings where there is scarcity of resources to address the double burden of infectious and non-communicable diseases. This study aimed to assess the management of hypertension in an emergency department (ED).

Methods: During a pragmatic and prospective 30-day snapshot study (with 24 hour surveillance) and random profiling of one-in-five presentations to the ED of Hospital Geral De Mavalane, Maputo, we assessed patient's flow, infrastructure and resources through direct observation, and reports from pharmacy and laboratory stocks were used to assess availability of diagnostics and medicines needed for hypertension management.

Results: Hypertensive patients had several stops during their journey inside the health facility, and followed a non-standardized flow. No clinical protocols or algorithms for risk stratification of hypertension were available. Stock-outs of basic diagnostic tools for risk stratification and medicines were registered. The availability of medicines was 28% on average.

Conclusions: Critical gaps in health facility readiness to address arterial hypertension seen in ED were uncovered, including lack of clinical protocols, insufficient availability of diagnostics and essential medicines, as well as low affordability of the families to guaranty continuum of care. Innovative financing mechanisms are needed to support the health system to address hypertension.

Background

Hypertension is the leading risk factor for premature death and disability, and constitutes an important cause of health services demand worldwide.[4] Global disparities in its prevalence and awareness have been increasing [1,2].

In Mozambique, hypertension prevalence is among the highest in developing countries, and has increased in people aged 25–64 from 33.1 in 2005 to 38.9% in 2015 (p 0.048) with low awareness (14.5%), treatment among those aware (50.1%) and control among the treated (44.5%) [3,4]. In this country hypertension is an important driver of heart failure and stroke [5,6] and thus constitutes a priority in the Mozambique's strategic plan for non-communicable diseases (NCD) prevention and control [7]. However, the national health information system still does not systematically perform surveillance of hypertension and its complications.

Initial surveillance data on NCD targeted by the World Health Organization (WHO) global strategy showed prominence of hypertension as a cause of poor outcomes [8]. Due to the continuing need for major efforts to control infectious endemic diseases in Mozambique, the burden imposed by NCD constitutes a high risk for the sustainability of the health system. Moreover, because no funding mechanisms are available to sustain national NCD program's activities within the National Health Service (NHS) in Mozambique, insufficient investments have been made on health facilities to address this double burden of disease. Our study aimed at describing care provision for hypertensive patients assisted at the emergency department (ED) of a first-referral urban hospital, often an entry point for patients into the NHS.

Methods

We performed an assessment of hypertension care in patients assisted at the emergency department of a first-referral hospital in Mozambique's capital city - *Hospital Geral de Mavalane*. This is an urban secondary level 265-bed hospital that services a population of nearly 800,000 and has the four major specialties (Internal Medicine, Surgery-Traumatology, Pediatrics and Gynecology-Obstetrics), serving as a pilot sentinel site for NCD. Its emergency department does not have patient electronic management system, and hospital identification cards are only given to patients after discharge from the ED, when they need follow up for a chronic condition such as arterial hypertension.

Purposeful surveillance of ED presentations was conducted during the pilot phase of the *MOZambique snapshot of emerging Trends (MOZART) Disease Surveillance Study* cohort [9], in October 2017. We did a pragmatic and prospective, single centre, 30-day snapshot study (with 24 hour surveillance) with random profiling of one-in-five presentations to the ED of Hospital Geral De Mavalane, Maputo. Electronic surveys captured patient's socio-demographic and clinical profile. Elevated BP was defined by systolic >140 mmHg and/or diastolic BP >90 mmHg for adolescents and adults. During the study period 1911 patients were registered in the ED, of which 883 (54%) were females and 231 (14%) adolescents. Overall 331 (20%) had hypertension—23 adolescents—with 59 (4%) having grade II-III hypertension, of which 3 were adolescents. From these hypertensive patients 37 were transferred to the hospital's intensive care unit, 6 (2%) were admitted to hospital wards, and 3 (1%) needed transfer for specialized care in referral hospitals due to acute complications.

To describe the management of hypertension we used direct observation of patient's flow during the study [9], including collection of data on the infrastructure and human resources. Using the Package of Essential NCD interventions for primary health care in low-resource settings (PEN)[10] we selected diagnostic tools and medicines that are needed for hypertension management; we then consulted the reports from pharmacy and laboratory stocks to assess availability of diagnostics and medicines. The WHO target of 80% was used to define availability, and we used the national minimum wage to determine the number of days of work a patient needs to obtain the medicines prescribed, using external reference pricing available at the WHO/HAI database of medicine prices, availability, affordability and price components [11].

Data Analysis: Data was analysed using descriptive statistics (percentages and proportions); patient's flow in the health facility and availability/affordability are presented graphically.

Ethical Issues: The study had ethical approval by the National Bioethics Committee in Mozambique (IRB 0002657). Informed consent was obtained from all patients participating in the MOZART study.

Results

Flow of Patients Within the ED: Hypertensive patients had several stops during their journey inside the health facility. After initial triage at entry they could be sent directly to the ICU in case of hypertensive emergency/crisis. All other cases would wait for doctor's evaluation, blood collection for biological profiling at the laboratory, eventually performing chest X-ray and, finally, returning the results to the assisting doctor, who would decide if they were sent to the ICU, transferred to a specialized hospital, admitted to the wards or discharged. (*Figure 1*)

Facility Resources: Basic clinical equipment for diagnosis was available (sphygmomanometers, scales/altimeters, oxymeters, electrocardiograph, X-ray machine and ultrasound). However, no rapid tests were available (urine, blood glucose or HbA1c) for prompt risk stratification, and occasional stock-outs were registered for cholesterol and uric acid. Regarding human resources availability, the hospital had 38 general practitioners working around the clock at

the ED who assisted patients and took decisions on: admitting them to the intensive care unit or transfer them to a referral hospital; admitting them into the hospital wards; sending them to book appointments for outpatient clinic for follow up with specialists within the hospital; or send them to a satellite health centers and the ED. The staff of the whole hospital is presented in *Figure 2*. No guidelines for risk stratification of hypertension were available in the consultation rooms, nor were manuals or algorithms.

Availability & Affordability of Medicines: The availability of medicines was 28% on average; 3% to 6% for calcium channel blockers (amlodipine) and aldosterone antagonist (spironolactone), respectively; between 51% to 70% for adrenergic modifier/alpha-2 agonist (methyldopa), loop diuretic (furosemide) and angiotensin converting enzyme inhibitor (enalapril); only nifedipine 30mg was available in reaching the WHO essential medicines availability target of 80% (availability 145%). Beta-blockers, angiotensin-II receptors antagonists, angiotensin converting enzyme inhibitor (lisinopril) and the combination (Hydrochlorothiazide and Amiloride) had 0% availability during the study period (*Table*). If obtained on a private pharmacy the most affordable medicines were Hydrochlorothiazide, Methyldopa, Atenolol and Furosemide. Furosemide - used to treat hypertension complications was the most affordable medicine -while Nifedipine corresponded to 11.2% of the monthly minimum wage, approximately 3.4 days of work. (*Figure 3*)

Discussion

This study unveils health facility barriers to good quality of care for hypertensive patients, particularly i) the lack of availability of guidelines and clinical protocols for management for use by health professionals; ii) the absence of standardized risk stratification, follow up and referral; iii) deficient strategies to ensure continuum of care; and iv) low availability of key consumables for laboratorial diagnosis and medicines. These organizational weaknesses increase the risk of poor outcomes, particularly in patients already with complications, or who have grade II hypertension and/or associated risk factors.

Mozambique's low rates of medical doctors and trained specialists [12,13]- as well as nurses and allied professionals - are among the lowest in the world. To address the lack of workforce to tackle endemic infectious diseases (such as malaria, tuberculosis, HIV/AIDS and neglected parasitic diseases) the NHS has accommodated cadres with basic- and mid-level training who are trained for triage and management of simple cases, using algorithms for diagnosis, management and referral [14] Most of these clinical guidelines are recommended or endorsed by the WHO, and are easily incorporated in the health systems due to being largely subsidized by international funding organizations. In contrast, for NCD clinical protocols and management algorithms are still not consensual, and rarely used in our setting, despite their known role in improving the quality of care. While recognizing that the number of cadres is reduced, lack of risk-based management, unavailability of standard evidence-based clinical protocols and low access to essential anti-hypertensive drugs [15]-all essential to ensure high quality of care and prevent complications - are major gaps in hypertension care. Addressing these gaps would allow standardization of care provided by front-line health workers and probably improve outcomes in secondary level health facilities. Indeed, the fact that hypertension-related complications have become more diagnosed at secondary and tertiary care levels in some settings in Africa, is probably indicative of poor management of hypertensive patients at primary health care level.

Because ED in low-income settings are often the first contact point of patients with the health system, strategies to reduce lost opportunities for early diagnosis, prompt management and secondary prevention are needed. ED may be the only or most used form of contact with the health system for certain population groups in our health system,

particularly adolescents and men who are not covered by the strong maternal and child health care programs. Owing to the high prevalence of hypertension in Mozambique [3], point-of-care diagnostics tools—for instance rapid testing for biomarkers, portable electrocardiography and bedside ultrasound –should be used to facilitate risk stratification, detection of co-morbidities and identification of complications such as heart failure and kidney disease. In addition, clinical protocols must be made available to allow immediate treatment of those at high risk of target organ damage. Moreover, despite recognizing that ED are not the ideal setting for patient health education, counseling on healthy lifestyle, risk-free behavior and adherence to therapy to selected populations should probably be considered in such setting, to avoid loss of opportunities to prevent complications, to reduce hypertension-related morbidity and mortality, as well as to support continuity of treatment after diagnosis. The use of preventive medicine health workers - who are currently involved in maternal and child health disease prevention—would probably be an important step towards better control of hypertension, if these professionals are trained to provide counseling and non-pharmacological therapy inside the health facility.

Inadequate supply of medicines is a major determinant for inadequate anti-hypertensive treatment and catastrophic spending in poor households, and may (at least partially) explain the low levels of control in Mozambique. [3,6,16] Access to public hospitals is virtually free; patients pay \$0.02 at entry points for all procedures within the health facility and \$0.08 per full prescription, the total amount charged corresponding to 0.1% of the country's minimum wage [17]. However, out-of-pocket expenditure for continuum of care in hypertension may be prohibitively expensive for the poorest households, as communities have high levels of poverty and informal employment, and almost no access to affordable private health insurance mechanisms. In Bangladesh, NCD-afflicted families allocate a greater share of household expenditures for medical care than households without NCDs, and have almost seven times higher probability of incurring catastrophic medical expenditure, as well of selling assets or borrowing from informal sources to finance treatment cost [18].

A considerable proportion of the household budget for families living on the national minimum wage is used to buy anti-hypertensives (*Figure 3*), taking in account that one patient does more than one hypertensive medicine. Medical therapy entails large out-of-pocket expenditures and increases the likelihood of household impoverishment as shown in Kyrgyzstan, where households with an hypertensive patients had significantly higher total expenditure on health and drug therapy, thus being more prone to catastrophic health spending.[16] Similarly, it has been shown that patient costs associated with obtaining care for hypertension in public health care facilities in Kenya include substantial direct and indirect costs, as well as high rates of catastrophic costs.[19] Therefore, systems to assess the unmet needs of anti-hypertensive drugs, improve the whole supply chain in the public sector and financial risk protection for patients from these poor communities are needed.

Health System related factors impact on the capacity to control blood pressure control [20–22] In African countries Health Systems are primarily oriented to managing infectious diseases, and therefore health professionals are unprepared to deal with NCD, given the scarcity of resources in health facilities [23]. The strategy of task-shifting - defined as the rational distribution of health care duties from physicians to non-physicians health care providers - is one of the effective approaches that has been used to address lack of human resources in Africa [24], including for management of HTN [25,26]. Considering the experience of the Mozambique's NHS in task shifting in obstetrics, surgery and mental health [14, 27], we strongly believe that targeted context-specific changes to the Health System in Mozambique can also be done to allow task-shifting for the diagnosis and management of hypertensive patients to occur, in order to improve rates of control and outcomes.

Limitations: Despite the acknowledging that the “snapshot” taken during one month cannot be fully representative of the situation, we believe that this description of hypertension care in ED constitutes an initial step towards addressing poor outcomes and understanding the organizational changes needed to improve care in our setting. Moreover, this model can be ameliorated and replicated for assessment of health care for other risk factors and NCD, thus supporting priority setting and selection of the most efficient interventions and health services changes that can be done to create of context-tailored NCD clinics in Africa.

Conclusions

Critical gaps in health facility readiness to address arterial hypertension seen in ED were uncovered in this highly prevalent low-income urban setting, including lack of clinical protocols, insufficient availability of diagnostics and essential medicines, as well as low affordability of the families to guaranty continuum of care. Our results show opportunities for improvement at the provider’s level, particularly of the organizational and managerial processes. Innovative financing mechanisms for the health system are need to support the poorest, improve the rates of hypertension control and prevent poor outcomes.

List Of Abbreviations

ED - Emergency Department

HbA1c - Glycated hemoglobin

HC - Health Centers

HGM - Mavalane General Hospital (Hospital Geral de Mavalane)

HIV - Human Imuno deficiency Virus

INS - National Health Institute (Instituto Nacional de Saúde)

LMC - Low monthly cost

MZN - Mozambican New Metical (Mozambican currency)

NCD - Non-Communicable Diseases

NHS - National Health Institute

NMF - National Medicines Formulary

PEN - Package of Essential NCD interventions for primary health care in low-resource settings

STEPS - World Health Organization (WHO) Stepwise Approach to Chronic Disease Risk Factor Surveillance

WHO - World Health Organization

Declarations

Ethics approval and consent to participate

This study was approved by Mozambique's National Bioethics Committee (IRB 00002657).

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

Not applicable

Funding/support

The MOZART Study was co-funded by the Instituto Nacional de Saúde of Mozambique, the National Health and Medical Research Council of Australia (1044897) and a Pfizer Investigator Initiated Research Grant (WT221693)

AUTHORS' CONTRIBUTIONS

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

AOM and SS had the original idea for and designed the study. NB and EJ participated in data extraction from the database and wrote the initial report. All authors participated in data interpretation and analysis. AOM and NB prepared the final manuscript. All authors contributed to subsequent revisions and have read and approved the manuscript.

Acknowledgments

We sincerely thank all the staff at Hospital Geral de Mavalane and members of *Instituto Nacional de Saúde*, Mozambique, who participated in data collection for the MOZART study. Finally, our gratitude to Professor Virgílio do Rosário for his comments to initial draft of the manuscript.

References

1. Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K, et al. Global Disparities of Hypertension Prevalence and Control: A Systematic Analysis of Population-Based Studies From 90 Countries. *Circulation*. 2016;134(6):441–50.
2. Gómez-Olivé FX, Ali SA, Made F, Kyobutungi C, Nonterah E, Micklesfield L, et al. Regional and Sex Differences in the Prevalence and Awareness of Hypertension. *Global Heart*. 2017;12(2):81–90.
3. Jessen N, Damasceno A, Silva-Matos C, Tuzine E, Madede T, Mahoque R, et al. Hypertension in Mozambique: trends between 2005 and 2015. *Journal of Hypertension*. 2018;36(4):779–84.
4. Damasceno A, Azevedo A, Silva-Matos C, Prista A, Diogo D, Lunet N. Hypertension Prevalence, Awareness, Treatment, and Control in Mozambique: Urban/Rural Gap During Epidemiological Transition. *Hypertension*. 2009;54(1):77–83.

5. Damasceno A, Mayosi BM, Sani M, Ogah OS, Mondo C, Ojji D et al. The causes, treatment, and outcome of acute heart failure in 1006 Africans from 9 countries. *Arch Intern Med.* 2012;172(18):1386–94.
6. Damasceno A, Gomes J, Azevedo A, Carrilho C, Lobo V, Lopes H et al. An epidemiological study of stroke hospitalizations in Maputo, Mozambique: a high burden of disease in a resource-poor country. *Stroke.* 2010;41(11):2463–9.
7. Ministério da Saúde: Plano estratégico nacional de prevenção e controlo das doenças não transmissíveis para o período 2008–2014.
8. Mocumbi AO, Cebola B, Muloliwa A, Sebastião F, Sitefane SJ, Manafe N et al. Differential patterns of disease and injury in Mozambique: New perspectives from a pragmatic, multicenter, surveillance study of 7809 emergency presentations. *PLoS One.* 2019;14(7):e0219273. doi: 10.1371/journal.pone.0219273.
9. Mocumbi AO, Langa DC, Chicumbe S, Schumacher AE, Al-Delaimy WK. Incorporating selected non-communicable diseases into facility-based surveillance systems from a resource-limited setting in Africa. *BMC Public Health.* 2019;19(1):147.
10. WHO/HAI Database of medicine prices, availability, affordability and price components. Available from: <https://haiweb.org/what-we-do/price-availability-affordability/price-availability-data/>
11. WHO. Package of Essential Noncommunicable (PEN) Disease Interventions for Primary Health Care in Low-Resource Settings, World Health Organization 2013, ISBN: 978 92 4 150655 7.
12. Mocumbi AO, Carrilho C, Aronoff-Spencer E, Funzamo C, Patel S, Preziosi M et al. Innovative strategies for transforming internal medicine residency training in resource-limited settings: the Mozambique experience. *Acad Med.* 2014;89(8 Suppl):S78–82.
13. Noormahomed EV, Mocumbi AO, Ismail M, Carrilho C, Patel S, Nguenha A, et al. The Medical Education Partnership Initiative Effect on Increasing Health Professions Education and Research Capacity in Mozambique. *Ann. Glob Health.* 2018;84(1):47.
14. Bergström S, McPake B, Pereira C, Dovlo D. Workforce Innovations to Expand the Capacity for Surgical Services. In: Debas HT, Donkor P, Gawande A, Jamison DT, Kruk ME, Mock CN, editors. *Essential Surgery: Disease Control Priorities, Third Edition (V1)*. Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2015.
15. World Health Organization HEARTS Technical package for cardiovascular disease management in primary health care: evidence-based treatment protocols. Geneva: World Health Organization; 2018 (WHO/NMH/NVI/18.2). Licence: CC BY-NC-SA 3.0 IGO. ISBN 978 92 4 151137 7
16. Murphy A, Jakab M, McKee M, Richardson E. Persistent low adherence to hypertension treatment in Kyrgyzstan: How can we understand the role of drug affordability? *Health Policy Plan.* 2016;31(10):1384–1390.
17. Boletim da República N° 96, I série, 16 de Maio de 2018, Diplomas Ministeriais n.º 40/2018 a n.º 47/2018, de 16 de Maio
18. Datta BK, Husain MJ, Husain MM, Kostova D. Noncommunicable disease-attributable medical expenditures, household financial stress and impoverishment in Bangladesh. *SSM Popul Health.* 2018;6:252–258
19. Oyando R, Njoroge M, Nguhiu P, Kirui F, Mbui J, Sigilai A et al. Patient costs of hypertension care in public health care facilities in Kenya. *Int J Health Plann Manage.* 2019:e1166-e1178.. doi: 10.1002/hpm.2752
20. Doroodchi H, Abdolrasulnia M, Foster JA, Foster E, Turakhia MP, Skelding KA, et al. Knowledge and attitudes of primary care physicians in the management of patients at risk for cardiovascular events. *BMC Fam Pract.* 2008;9:42.

21. Lulebo AM, Mapatano MA, Kayembe PK, Mafuta EM, Mutombo PB, Coppieters Y. Assessment of hypertension management in primary health care settings in Kinshasa, Democratic Republic of Congo. *BMC Health Serv Res.* 2015;15:573.
22. Pellegrini F, Belfiglio M, De Bernadis G, Franciosi M, Di Nardo B, Grienfield S, et al. Role of organizational factors in poor blood pressure control in patients with type 2 diabetes. *Arch Intern Med.* 2003;163:473–80.
23. Alleyne G, Hancock C, Hughes P. Chronic and non-communicable diseases: a critical challenge for nurses globally. *Int Nurs Rev.* 2011;58:328–31.
24. Ogedegbe G, Gyamfi J, Plange-Rhule J, Surkis A, Rosenthal MD, Airhihenbuwa C, et al. Task Shifting interventions for cardiovascular risk reduction in low-income and middle-income countries: a systematic review of randomized controlled trials. *BMJ Open.* 2014;4:e005983. doi:10.1196/bmjopen–2014–005983.
25. Mendis S, Johnston SC, Fan W, Oladapo O, Cameron A, Faramawi FM. Cardiovascular risk management and its impact on hypertension control in primary care in low –resource settings: a cluster randomized trial. *Bull World Health Organ.* 2010;88:412–9.
26. Adeyemo A, Tayo BO, Luke A, Ogedegbe O, Durazo-Arvizu R, Cooper RS. The Nigerian-Antihypertensive Adherence Trial (NA-HAT): a community- based randomized trial. *J Hypertens.* 2013;31(1):201–7.
27. Oquendo MA, Duarte C, Gouveia L, Mari JJ, Mello MF, Audet CM et al. Building capacity for global mental health research: challenges to balancing clinical and research training. *Lancet Psychiatry.* 2018;5(8):612–613.

Table 1

Table - Hypertension medicines availability

Obs: The availability was calculated for all patients (527) reported to have hypertension assisted in October 2017 (considering that this number includes the patients transferred from the ED, and medication should be available for all of them). SDG EM: Sustainable Development Goals Essential Medicines

Figures

Therapeutic Group	Generic Name / International Nonproprietary Name	Pharmaceutical form	Strength	Posology	Estimated need for one month	% of medicines available	SDG EM Target Availability
Thiazide diuretic + potassium sparing diuretic	Hydrochlorothiazide + Amiloride	Tablets	50 mg + 5 mg	0,5	7905	0%	< 80%
Angiotensin Converting Enzyme Inhibitor	Lisinopril	Tablets	20mg	1	15810	0%	< 80%
Calcium Channel Antagonists	Nifedipine	Tablets	30mg	1	15810	145%	> 80%
Calcium Channel Antagonists	Nifedipine	Tablets	60mg	1	15810	0%	< 80%
Beta blocker	Bisoprolol	Tablets	5 mg	1	15810	0%	< 80%
Beta blocker	Atenolol	Tablets	50mg	0,5	7905	0%	< 80%
Angiotensin-II Receptor Antagonist	Irbesartan	Tablets	300 mg	1	15810	0%	< 80%
Angiotensin Converting Enzyme Inhibitor	Enalapril	Tablets	20 mg	1	15810	60%	< 80%
Adrenergic modifier / alpha 2 agonist	Methyldopa	Tablets	250 mg	1	15810	51%	< 80%
Aldosterone antagonist	Spirolactone	Tablets	25 mg	1	15810	6%	< 80%
Loop diuretic	Furosemide	Tablets	40 mg	1	15810	70%	< 80%

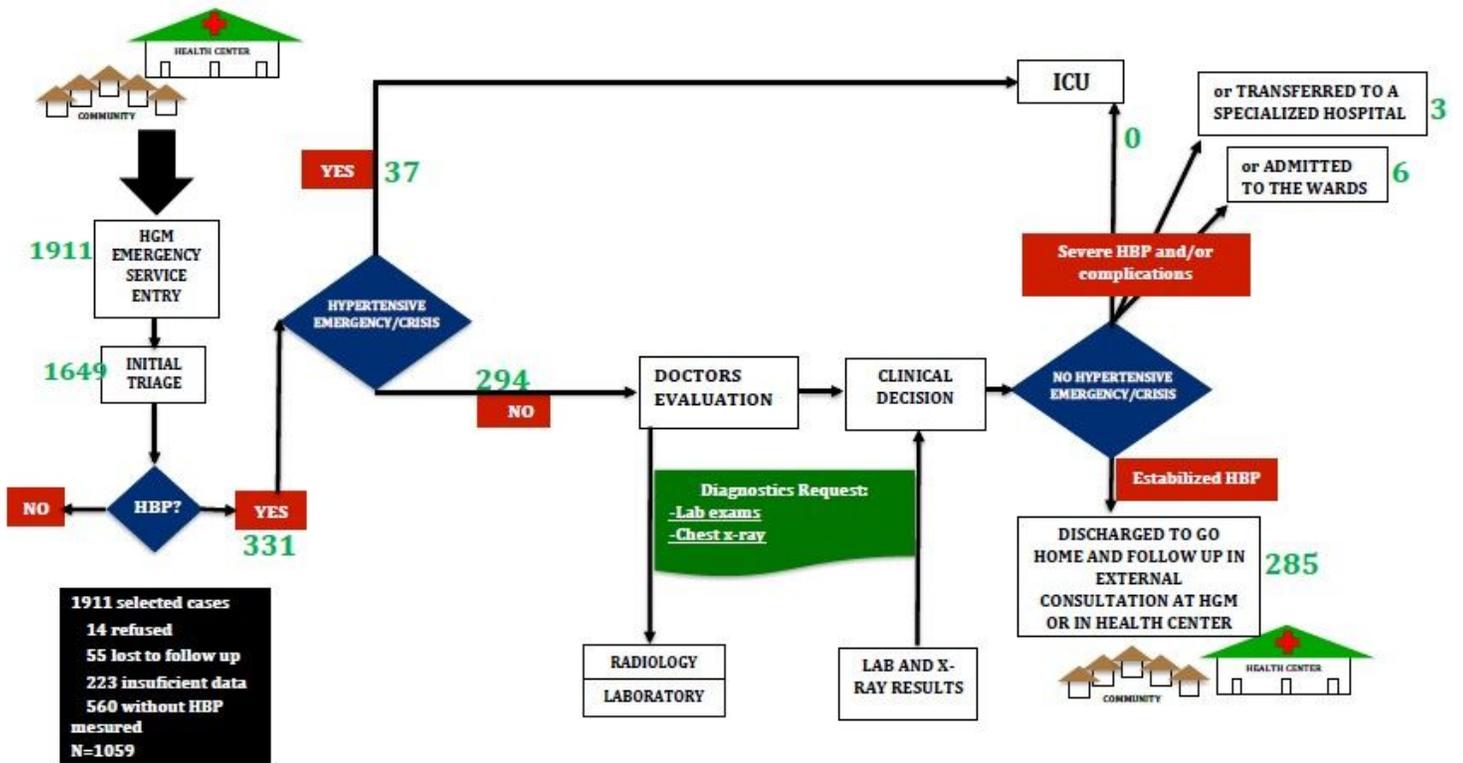


Figure 1

FLOWCHART. Describes the flow of the patient with hypertension from arrival at the ED to discharge, indicating the number of hypertensive patients that were seen during the MOZART study.

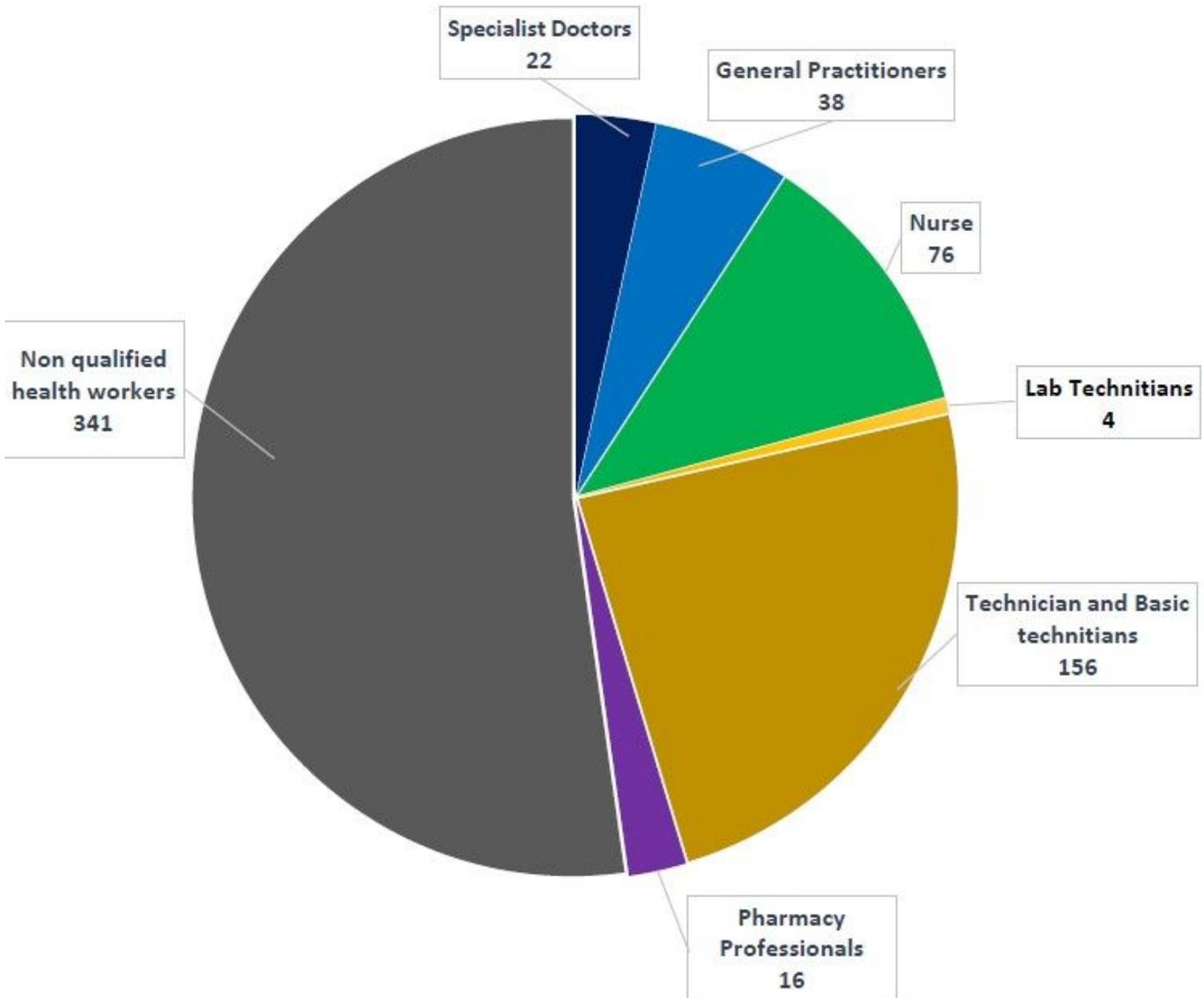


Figure 2

Human Resources Availability. The distribution of cadres involved in patient care and administrative roles in this health facility is presented, including personnel allocated to NCD complementary services. The numbers are shown per type of services needed.

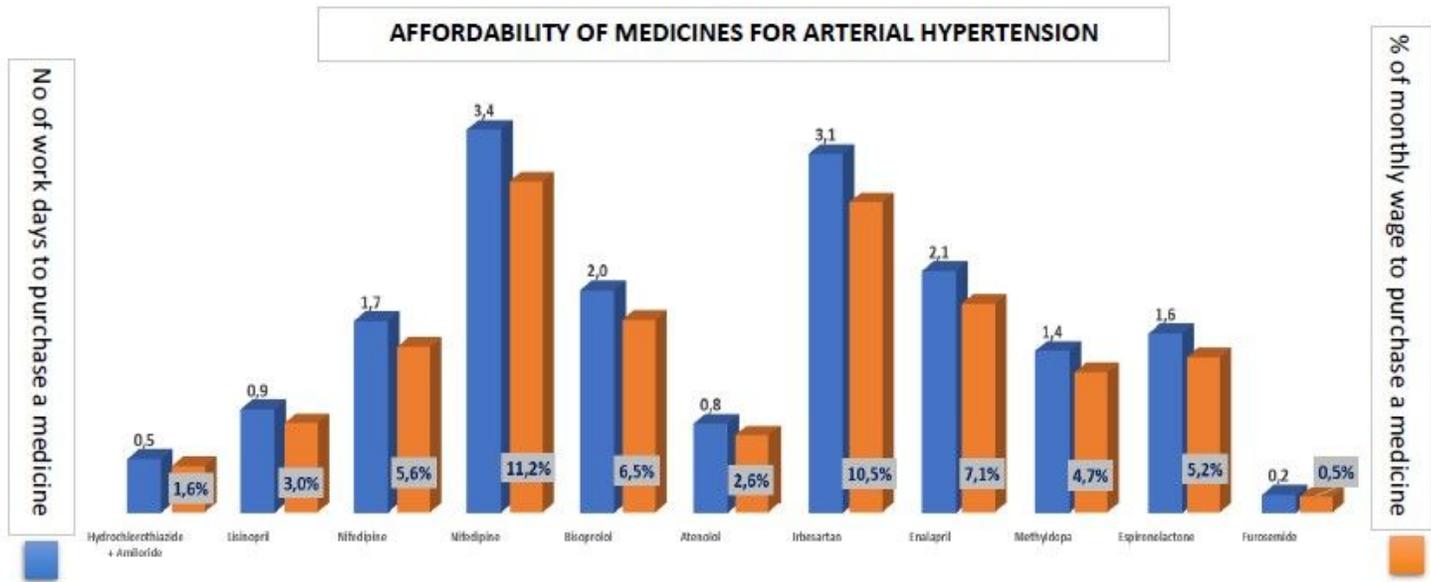


Figure 3

Work days & Affordability of MEDICINES. The medicines selected corresponded to the different lines of treatment for arterial hypertension and its complications available at first-referral hospitals according to the national medicines formulary (NMF). The graph presents data on affordability of anti-hypertensive drugs (if obtained outside the health facility).