Feasibility and Acceptability of the Family Centered Model to Manage and Prevent Non Communicable Diseases in Selected Communities of Lusaka Province”

Perfect Shankalala (shankalalaperfect@gmail.com)
University of Zambia School of Medicine  https://orcid.org/0000-0001-5759-5162

Samuel Bosomprah
Center for Infectious Diseases in Zambia

Roma Chilengi
Center for Infectious Diseases in Zambia

Douglas Heimburger
Vanderbilt University Medical Center

Wilbroad Mutale
The University of Zambia

Research note

Keywords: Hypertension, Family Centered Care, Non Communicable Diseases

DOI: https://doi.org/10.21203/rs.3.rs-38871/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Objective

Our objective was to test the feasibility and acceptability of Family centered model in managing and preventing NCDs in the Zambian context. We used hypertension as our tracer NCD.

Results

Formative stage: Six major themes emerged during intervention design based on community conversation: (1) Willingness, (2) Importance of family support; (3) incentives for CHWs (4) trainings health workers (5) Basic Equipment (6) Medical supplies. Participants found FCM to be acceptable and needed in the community. They emphasized the need for training all people involved (HW, CHW and family members) and providing basic equipment to manage hypertension and other NCDs.

Pilot Feasibility stage: We approached 9 families using an index patient identified at the clinic. One family declined to take part. So 8 families were screened with a total of 32 family members. Hypertension prevalence was 43.8% (14/32) among all those who were screened. During the pilot, four groups were formed based on the FCM, 3 out of the 4 groups managed to form household FCM. Each group had 4–6 members. CHW provided basic training to family members and followed up over a 3 months period, visiting weekly or when needed.

Introduction

Global status of non-communicable diseases

Globally, non-communicable diseases (NCDs) pose a significant public health and economic threat due to the associated disability, loss of productivity and premature deaths from conditions like cardiovascular diseases (CVD), diabetes and chronic respiratory diseases. Among the NCDs, cardiovascular conditions (with Hypertension (HTN) as the major associated risk factor) are the global leading cause of mortality. By 2017, 17 million of the 56 million NCD related deaths were attributed to CVDs and it is estimated that the global cost of CVDs will reach US$47 trillion in 20 years’ time.

Burden of hypertension and its consequences in Sub Saharan Africa LMICs

Hypertension (HTN) is by far the commonest NCD risk factor in LMICs; complications from poorly controlled HTN accounted for 44% of CVD deaths globally. Current evidence indicates that the prevalence is still increasing. Despite HTN being identified by the African Union as a serious health problem second only to HIV/AIDS, the treatment and control remains suboptimal and highly variable across and within African countries.

Burden and capacity to manage hypertension in Zambia
Zambia has recorded an increase in cases of HTN and related complications such as stroke.\textsuperscript{13,14} According to the Ministry of Health, cases of HTN seen in the out-patient department (OPD) increased by 39\% for all age groups in 2017 alone.\textsuperscript{15} A recent population based survey estimated that 19.1\% of the Zambian population had HTN.\textsuperscript{16} Despite the rising burden of HTN and other NCDs, prioritization of these conditions in the country’s agenda has remained poor.

In this paper, we aimed to test the feasibility and acceptability of Family centered model in managing and preventing NCDs in the Zambian context.

**Main Text**

**Methods.**

This was a qualitative study exploring stakeholder perspectives and experience with Family Centered Model (FCM), for NCDs control in Zambia. The study had three phases, initial gaps analysis, intervention discussion and short pilot. We present overall lessons about acceptability and feasibility of FCM using intervention development, Using CHWs.

**Study Procedure**

We conducted the pilot study in two rural sites of Zambia (Kafue district). We identified health workers, community health workers and patients with NCDs mostly hypertensive patients. The initial phase included identifying gaps and developing questions that address gaps and also proposing elements of Family centered care based on literature. We then piloted the initial components in the FCM with the view to refining the intervention further for testing under a future effectiveness clinical trial. In the pilot, the number of people per family recruited ranged from 5–8 people per household in the study areas.

**Sampling and Participants**

We conducted 18 in-depth interviews with key informants at health facility level and in the communities with patients with NCDs and their families. The study participants were drawn from all levels where the intervention was developed and later piloted in three districts of Lusaka Province namely Kafue, Chongwe and Luangwa. The family centered model (FCM) recruited patients who were diagnose with hypertension in the last 6 months from health facilities and with their consent, were then followed to their homes were screening of family members aged 18 years and above was done upon getting consent. We recruited a purposive convenience sample of health care providers and patients with NCDs.

**Data collection and analysis**

Two experienced local Zambian interviewers (one male, one female) lead the interviews in the local language (Nyanja, Bemba, or English) using semi-structured interview guides. Topics focused on content acceptability of the family centered model, including family health topics, and considerations for conducting NCDs screening within communities. The interviews were conducted in a separate private
room at the health facility or in another private location (e.g., participant's home). Interviews were audio-recorded using digital recorders, translated, and transcribed by local Zambian research assistants. Transcripts and audio-files were uploaded onto a secure server and imported into NVivo version 11 for analysis.

**Ethical considerations:**

The University of Zambia Biomedical Research Committee (UNZBREC) approved the proposal. All participant were informed about the study and provided written consent to take part in the study. Confidentiality was maintained throughout data collection process.

**Results**

**Intervention design**

The following 6 themes emerged during intervention design based on community conversation: (1) Willingness, (2) Importance of family support; (3) incentives for CHWs (4) trainings health workers (5) Basic Equipment (6) Medical supplies

**Willingness to have FCM implemented**

During the process of intervention development, we received positive feedback about the FCM in relation to willingness for stakeholders to have the FCM implemented to support service delivery in the Zambian context.

"Yes it will be nice to have people coming to our homes to test us at least once a month for checking our BP's, and sugar levels........sometimes this side you find old people sometimes they can’t even manage to come to the clinic because of distance and so coming to our homes will be a good thing". NCD_indexpatient004

"We are yet to implement screening of NCDs in the communities ....we are in the process like right now....ummmm we've identified those people with such problems (NCDs) and all we need is to provide services right in the communities. If we form groups and identified people that have those conditions and also if we have like door to door visitations we can be able to identify people with NCD's and link them to care?. Healthworker_001

**Importance of Family support.**

It was acknowledged that chronic care was a big problem in the community and that families played a central role in providing care for sick family members. Therefore, training of family members was seen as a crucial ingredient of FCM.

*If only they .......(family member) can receive sensitization of these NCDs and how we can prevent them, it can be good for our family because they are the ones who cook and put salt and cooking oil to our food*
and so they need to be educated also. NCD_indexpatient009.

Family empowerment was seen as an effective way to address shortages in human resources and supporting health system. Talking about this issue, one of the hypertensive patient said:

They are a lot of people suffering from hypertension, it even leads to stroke but they have no one to come and talk to them, even at church or within the communities…I think what you are proposing will work better than at the hospital because some of these old people fear going to the hospital but home they will be that confidentiality. NCD_indexpatient006.

Incentives for CHWs.

Incentives for the CHWs was seen as a crucial part of FCM. This was closely linked to the need to provide training of CHWs as a form of incentive.

“Indeed the use of mobile phones made our work even easier because we were able to contact family members and coordinate the screening process and delivery of essential drugs for hypertensive patients….we had challenges with health facilities in terms of drug stock out, but if this can be addressed, we can reach a lot of people” Healthworker_005

Re-training of health workers.

The importance of having trained health worker in NCDs was emphasized, noting that most of them needed refresher training as NCDs were not seen as a priority from donors. It was also reported that most in-service training provided by government or partners was tailored towards HIV.

“Training in new methods of managing NCDs at facility level and refresher courses for facility staff would be good for us. Currently we have no training opportunities for NCDs, we usually participates in infectious diseases training like HIV, TB and in some cases cervical cancer screening but we equally need refresher training for NCDs” Healthworker_007.

Need for basic Equipment

The majority of participants indicated that most health facilities had limited basic equipment to manage NCDs at health facility level. Most of the equipment’s were either not available or mal-functional

….like diabetes, we don’t have any equipment for that and hypertension we only have the high blood pressure machines…equipment’s are inadequate and in cases where a diabetes patient comes, we just examine them clinically in the lab and send them to Chongwe to have their blood sample checked. Healthworker_001

Medical supplies
From both providers and patients, medical supplies were seen as a bridge between the community and health facilities. The lack of medical supplies especially drugs undermined trust in the health system. One participant had this to say…

*We usually experience drug stock out especially essential drugs to manage NCDs has been a challenge for our facility, most often we write prescriptions for the patients to buy on their own. .... Our facility is about 40 plus kilometers from the district pharmacy so if we have a shortage we have to go that far.*

**Healthworker_006**

**Intervention Feasibility:**

**Recruitment and group formation**

Recruitment of patients was easy and several were happy to act as point of contact persons for others to test for blood pressure in the community. The number of people ranged from 5–8 people per household in the study areas. We approached 9 families. One family declined to take part. So 8 families were screened with a total of 32 family members. Hypertension prevalence was 43.8% (14/32) among all those who were screened.

**Communication by WhatsApp in the groups**

The groups were coordinated by the WhatsApp whose administrator was a CHWs. The major issues raised related to information about hypertension and new people wanting to join the group from the community. Mobile network coverage was good with internet connectivity working as long as bundles were bought for the groups.

**Use of automated blood pressure machines at community level.**

The use of automated BP measurements was acceptable, with few encounters of finished batteries and technical problems with cuff placement. With support from CHW, these errors were not reported by the third month in all the four groups.

**Refresher training of health workers**

From the health system side, we conducted a short refresher course for the Health workers at each health center using national guidelines for hypertension management in Zambia. Most clinicians were aware about the management and just needed few reminders especially consistence in management of patients.

Refresher training in hypertension was very refreshing... currently we have no training opportunities for NCDs, we usually participates in infectious diseases training like HIV, TB and in some cases cervical cancer screening but we equally need refresher training for NCDs
Discussion

Our study has demonstrated that it is feasible to use family support and structures to address NCDs in low-income settings. We have also shown how feasible it is for an index hypertensive patient to act as a link between health system and the family, when given appropriate community and technological support. This approach has potential to increase detection and management of hypertension in the community, thus, opening opportunities and possibilities for utilizing local and family resources to tackle the growing burden of NCDs in Africa. 42,43.

In our study, family members of index patient were happy to screen for hypertension and learned how to measure blood pressure. Training of family members and patient required dedicated community health workers, who were available for trouble shooting within their local communities after initial training. Similar studies conducted in Sub-Saharan Africa have reported the importance of training for patient centered care to improve confidence in self-management and overall care for patients with chronic conditions 44.

Another innovation we added to our feasibility study, was social media platform which was led by community health workers for communication and sharing information. Despite initial concerns about practicality of using WhatsApp for this purpose, our study revealed that this is acceptable and feasible. However, we recommend that future studies focus on developing innovations that not only easy to use but also have capability to protect personal information, thus being ethically acceptable to collect patient level data.

45 46.

In this study, we found that, the major motivation for community health workers was not the stipend but the training, support and equipment to carry out their work. We noted that providing basic training in hypertension management, preventive strategies and use of mobile phone was valued more than the stipends. Similar studies conducted in resource limited communities also indicated the importance of none financial incentives 46.

Conclusion:

In this study, we applied a qualitative study exploring stakeholder perspectives and experience with family FCM for NCDs control in Zambia. Generally, the FCM was found to be feasible in the Zambian rural health care settings, with most of our concerns about technology and linkage to care being unfounded. Health workers found it acceptable and complementary to their work while the community felt empowered and used the model to share information about hypertension in the community. Future studies should focus on the effectiveness of FCM and long-term implementation challenges as this pilot was limited to few sites and for a short period of time.
Limitations

Firstly, being a qualitative study with short term follow-up time, we cannot generalize our findings outside our settings and we are were unable to determine whether the FCM can actually lead to controlled hypertension in our study participants. A more robust study design is required to determine the long impact of such an intervention.

Abbreviations

ART Antiretroviral Treatment
AIDS Acquired Immunodeficiency Syndrome
BMI Body Mass Index
CIRDZ Center for Infectious Diseases Research in Zambia
FCM Family Centered Model
NHRA National Health Research Authority
HCW Health Care Workers
HIV Human Immunodeficiency Virus
NCDs Non Communicable Diseases
OPD Out-Patient Department
SSA Sub Saharan Africa
WHO World Health Organization
ZDHS Zambia Demographic and Health Survey

Declarations

Ethics approval and consent to participant

The University of Zambia Biomedical Research ethics committee approved the protocol (I.R.B No. 00005948). Permission to conduct the study was granted by, Ministry of Health (MoH) through the National Health Research Authority (NHRA) and the district authorities in Lusaka province. All respondents in the survey provided individual written informed consent and the study was undertaken in compliance with declaration of Helsinki and key tenets of good clinical practices. There is no risk of confidentiality, as the data cannot be linked to the participating patients.
Availability of data

Data for this study can be made available upon request to the corresponding author. The request should state the title and aim of the research for which the data is being requested.

Funding

This study was funded by the National Institute of Health (NIH)

Acknowledgements

We would like to acknowledge National Institute of Health (NIH) for providing research funds. Our gratitude also goes to Ministry of Health and the District Medical Office's for Lusaka, Kafue and Chongwe districts for allowing us to use their facilities to conduct this study. We would also like to acknowledge Centre for Infectious Disease in Zambia (CIRDZ) for their collaboration and partnership.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

Author’s contributions

PS, WM, RC SB conceived and designed the study. PS WM performed the statistical analysis. PS, SB, RC, DH WM interpreted the results. PS, WM drafted the manuscript. All authors revised the manuscript critically for important intellectual content. All authors read and approved the final version of the manuscript.

Author details

1 The University of Zambia, School of Public Health, P.O Box 50110, Lusaka

2 Centre for Infectious Diseases Research in Zambia, 5032 Great North Road, Lusaka, Zambia.

3 Department of Biostatistics, School of Public Health, University of Ghana, Legon, Accra, Ghana.
4. Vanderbilt University, Nashville, Tennessee, United States of America.

References

1. WHO. (World Health Organization, Geneva, 2005).

2. Lim SS, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The lancet. 2012;380:2224–60.

3. Lozano R, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. The lancet. 2012;380:2095–128.

4. Aantjes CJ, Quinlan TK, Bunders JF. Practicalities and challenges in re-orienting the health system in Zambia for treating chronic conditions. BMC Health Serv Res. 2014;14:295. doi:10.1186/1472-6963-14-295.

5. WHO. Global status report on noncommunicable diseases 2014,<http://apps.who.int/iris/bitstream/handle/10665/148114/9789241564854_eng.pdf?sequence=1> (2014).

6. Bloom DE, et al. The global economic burden of noncommunicable diseases. (Program on the Global Demography of Aging, 2012).

7. Cappuccio FP, Miller MA. Cardiovascular disease and hypertension in sub-Saharan Africa: burden, risk and interventions. Intern Emerg Med. 2016;11:299–305.

8. Kayima J, Wanyenze RK, Katamba A, Leontsini E, Nuwaha F. Hypertension awareness, treatment and control in Africa: a systematic review. BMC Cardiovasc Disord. 2013;13:54.

9. Sarki AM, Nduka CU, Stranges S, Kandala N-B, Uthman OA. Prevalence of hypertension in low-and middle-income countries: a systematic review and meta-analysis. Medicine 94 (2015).

10. Chow CK, et al. Prevalence, awareness, treatment, and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. Jama. 2013;310:959–68.

11. Twagirumukiza M, et al. Current and projected prevalence of arterial hypertension in sub-Saharan Africa by sex, age and habitat: an estimate from population studies. Journal of hypertension. 2011;29:1243–52.

12. Kaneu HT, Saksena P, Xu K, Evans DB. The financial burden from non-communicable diseases in low-and middle-income countries: a literature review. Health Research Policy Systems. 2013;11:31.

13. Goma FM, et al. Prevalence of hypertension and its correlates in Lusaka urban district of Zambia: a population based survey. International archives of medicine. 2011;4:34.

14. Siziya S, et al. Prevalence and correlates of hypertension among adults aged 25 years or older in a mining town of Kitwe, Zambia. J Hypertens. 2012;1:2167–1095. 1000105.

15. MOH. The 2012 Annual Health Statistical Bulletin. 42–47 (Directorate of Policy and Planning, Monitoring and Evaluation Unit. Zambia: Ministry of Health, Lusaka; 2014.)
16. MOH. WHO STEPs survey for non-communicable diseases and risk factors 2017. Lusaka: Ministry of Health; 2018.
17. Brown MT, Bussell JK. in Mayo clinic proceedings. 304–314 (Elsevier).
18. Karakurt P, Kaşıkçı M. Factors affecting medication adherence in patients with hypertension. Journal of vascular nursing. 2012;30:118–26.
19. Kilic M, Uzunçakmak T, Ede H. The effect of knowledge about hypertension on the control of high blood pressure. International Journal of the Cardiovascular Academy. 2016;2:27–32.
20. Gwadry-Sridhar FH, et al. Impact of interventions on medication adherence and blood pressure control in patients with essential hypertension: a systematic review by the ISPOR medication adherence and persistence special interest group. Value in Health. 2013;16:863–71.
21. Mpinda J, Tumbo J, Govender I, Mills B. The knowledge and beliefs of hypertensive patients attending Katleho District Hospital in Free State province, South Africa, about their illness. South African Family Practice. 2014;56:229–34.
22. Pearson TA, et al. AHA guidelines for primary prevention of cardiovascular disease and stroke: 2002 update: consensus panel guide to comprehensive risk reduction for adult patients without coronary or other atherosclerotic vascular diseases. Circulation. 2002;106:388–91.
23. Azahar NMZM, Krishnapillai ADS, Zaini NH, Yusoff K. Risk perception of cardiovascular diseases among individuals with hypertension in rural Malaysia. Heart Asia. 2017;9:e010864.
24. Ferdinand KC, et al. Community-based approaches to prevention and management of hypertension and cardiovascular disease. The Journal of Clinical Hypertension. 2012;14:336–43.
25. Joshi R, et al. Task shifting for non-communicable disease management in low and middle income countries—a systematic review. PloS one. 2014;9:e103754.
26. Mishra SR, Neupane D, Preen D, Kallestrup P, Perry HB. Mitigation of non-communicable diseases in developing countries with community health workers. Globalization health. 2015;11:43.
27. Hallberg I, Ranerup A, Kjellgren K. Supporting the self-management of hypertension: Patients’ experiences of using a mobile phone-based system. J Hum Hypertens. 2016;30:141.
28. Vedanthan R, et al. Innovative approaches to hypertension control in low-and middle-income countries. Cardiology clinics. 2017;35:99–115.
29. Campbell TL, Patterson JM. The effectiveness of family interventions in the treatment of physical illness. Journal of Marital Family Therapy. 1995;21:545–83.
30. Mills KT, et al. Comprehensive approach for hypertension control in low-income populations: rationale and study design for the hypertension control program in Argentina. Am J Med Sci. 2014;348:139–45.
31. Wild SH, et al. Supported Telemonitoring and Glycemic Control in People with Type 2 Diabetes: The Telescot Diabetes Pragmatic Multicenter Randomized Controlled Trial. PLoS Med. 2016;13:e1002098. doi:10.1371/journal.pmed.1002098.
32. García-Huidobro D, Bittner M, Brahm P, Puschel K. Family intervention to control type 2 diabetes: a controlled clinical trial. Family practice. 2010;28:4–11.

33. Tabasi HK, Madarshahian F, Nikoo MK, Hassanabadi M, Mahmoudirad G. Impact of family support improvement behaviors on anti diabetic medication adherence and cognition in type 2 diabetic patients. Journal of Diabetes Metabolic Disorders. 2014;13:113.

34. Sinclair KA, et al. Outcomes from a diabetes self-management intervention for Native Hawaiians and Pacific People: Partners in Care. Ann Behav Med. 2012;45:24–32.

35. Vincent D. Culturally tailored education to promote lifestyle change in Mexican Americans with type 2 diabetes. Journal of the American Association of Nurse Practitioners. 2009;21:520–7.

36. Kardia SL, Modell SM, Peyser PA. Family-centered approaches to understanding and preventing coronary heart disease. Am J Prev Med. 2003;24:143–51.

37. Po'e EK, Heerman WJ, Mistry RS, Barkin SL. Growing Right Onto Wellness (GROW): a family-centered, community-based obesity prevention randomized controlled trial for preschool child–parent pairs. Contemp Clin Trials. 2013;36:436–49.

38. Johnson HM, et al. MyHEART: a non randomized feasibility study of a young adult hypertension intervention. Journal of hypertension and management 2 (2016).

39. McManus RJ, et al. Telemonitoring and self-management in the control of hypertension (TASMINH2): a randomised controlled trial. The Lancet. 2010;376:163–72.

40. Agarwal R, Bills JE, Hecht TJ, Light RP. Role of home blood pressure monitoring in overcoming therapeutic inertia and improving hypertension control: a systematic review and meta-analysis. Hypertension. 2011;57:29–38.

41. Mutale W, et al. Exploring community participation in project design: application of the community conversation approach to improve maternal and newborn health in Zambia. BMC Public Health. 2017;17:277. doi:10.1186/s12889-017-4187-x.

42. Wouters E, Masquillier C, le R Booysen. F. The Importance of the Family: A Longitudinal Study of the Predictors of Depression in HIV Patients in South Africa. AIDS Behav. 2016;20:1591–602. doi:10.1007/s10461-016-1294-0.

43. Mukwato K, Mweemba P, Makukula M, Makoleka M. Stress and coping mechanisms among breast cancer patients and family caregivers: A Review of literature. Medical Journal of Zambia. 2010;37:40–5.

44. Siddharthan T, et al. Implementation of patient-centered education for chronic-disease management in Uganda: an effectiveness study. PloS one. 2016;11:e0166411.

45. Woods J, Moorhouse M, Knight L. A descriptive analysis of the role of a WhatsApp clinical discussion group as a forum for continuing medical education in the management of complicated HIV and TB clinical cases in a group of doctors in the Eastern Cape, South Africa. South Afr J HIV Med. 2019;20:982. doi:10.4102/sajhivmed.v20i1.982.

46. Zhang XH, et al. Implementation of World Health Organization Package of Essential Noncommunicable Disease Interventions (WHO PEN) for Primary Health Care in Low-Resource
Settings: A Policy Statement From the World Hypertension League. The Journal of Clinical Hypertension. 2016;18:5–6.