


BMJ Open Integrated care experiences and out-of-pocket expenditures: a cross-sectional survey of adults receiving treatment for HIV and hypertension in Malawi

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ABSTRACT

Objectives As HIV-positive individuals' life expectancy extends, there is an urgent need to manage other chronic conditions during HIV care. We assessed the care-seeking experiences and costs of adults receiving treatment for both HIV and hypertension in Malawi.

Design, setting and participants A cross-sectional survey was conducted with HIV-positive adults with hypertension at a health facility in Lilongwe that offers free HIV care and free hypertension screening, with antihypertensives available for purchase (n=199). Questions included locations and costs of all medication refills and preferences for these refill locations. Respondents were classified as using 'integrated care' if they refilled HIV and antihypertensive medications simultaneously. Data were collected between June and December 2017.

Results Only half of respondents reported using the integrated care offered at the study site. Among individuals using different locations for antihypertensive medication refills, the most frequent locations were drug stores and public sector health facilities which were commonly selected due to greater convenience and lower medication costs. Although the number of antihypertensive medications was equivalent between the integrated and non-integrated care groups, the annual total cost of care differed substantially (approximately US\$21 in integrated care vs US\$90 for non-integrated care)—mainly attributable to differences in other visit costs for non-integrated care (transportation, lost wages, childcare). One-third of those in the non-integrated care group reported no expenditure for antihypertensive medication, and six people in each group reported no annual hypertension care-seeking costs at all.

Conclusions Individuals using integrated care saw efficiencies because, although they were more likely to pay for antihypertensive medications, they did not incur additional costs. These results suggest that preferences and experiences must be better understood to design effective policies and programmes for integrated care among adults on antiretroviral therapy.

INTRODUCTION

Low-income and middle-income countries are experiencing a severe 'double burden of

Strengths and limitations of this study

- To our knowledge, this is the first study of patient economic experiences with integrated HIV/non-communicable disease care in Malawi, which is a promising new model of care in high-burden settings but has little empirical data from low-income countries.
- Data collection took a comprehensive approach to measuring patient costs, including both medication and care-seeking expenses, and we collected information on patient choices and reasons for choosing different medication refill locations.
- Such self-reported data are an important source of information and should be supplemented in future research with prospective data collection.
- These surveys were collected at only one site and focused on hypertension care-seeking and medications among adults on antiretroviral therapy; future work should collect data from multiple facilities offering different models of integrated care and should include more detailed information about care for all chronic diseases (including details about HIV treatment patterns).

disease' and, as antiretroviral therapy (ART) extends life expectancy, HIV-positive individuals are exposed to diseases of ageing.^{1 2} Global success in the fight against HIV has thus presented new public health and clinical challenges—and also an opportunity, as HIV programmes may offer a platform for providing other care, including for non-communicable diseases (NCDs).^{3–5}

Although HIV care and treatment programmes have been successfully implemented and scaled up in many high-burden countries, these are predominantly HIV specific ('vertical') and do not offer services for other chronic conditions. Highly fragmented care can introduce enormous out-of-pocket transaction and opportunity costs

for patients,^{6 7} and this is particularly true for people with multiple chronic diseases.⁸

One alternative service delivery model is the provision of integrated care, that is, healthcare that provides a range of services based on each individual's needs.^{9–11} The concept of integrated care is not new but has been reinvigorated in the global push towards Universal Health Coverage and the Sustainable Development Goals.^{9 12} These global goals have stimulated dialogue about new approaches to healthcare delivery, including how to decrease fragmentation and increase efficiency via integration.^{13 14} These discussions about shifting from disease-specific programmes towards integrated services also have particular salience given the growing burden of NCDs, which may require more complex and often life-long care.^{3 15}

Poor access to healthcare contributes to the excess burden of NCDs,¹⁶ and weak health systems face challenges in providing high-quality long-term NCD care¹⁷; however, patient experiences with NCD care in low-income countries are not well understood.¹⁸ The population of individuals on ART who also have an NCD might particularly benefit from integrated care, given the complexity of their simultaneous needs.^{3 4 19–21} In addition, there is emerging evidence about the potential effectiveness and cost-effectiveness of integrated care for HIV and NCDs,^{22 23} but most systems have not yet integrated these services.

Hypertension is extremely prevalent in Malawi: it is estimated that approximately one-third of adults are hypertensive, and nearly all these cases are undiagnosed and unmanaged.^{24 25} Approximately 10% of the adult population is infected with HIV,²⁶ and studies indicate that hypertension prevalence among adults with HIV in Malawi may be between 24% and 46%.^{27 28} The national clinical HIV guidelines in Malawi recommend annual blood pressure measurement for adults on ART and management of hypertension with lifestyle measures and medication according to blood pressure severity classification.²⁹ However, the availability of integrated HIV-NCD care—where multiple diseases are managed during a single care interaction—is limited in Malawi and primarily (if not exclusively) offered at higher-level, high-volume health facilities.³⁰ In addition, although HIV treatment programmes in Malawi screen all individuals on ART for hypertension annually, antihypertensive medications are often only available for purchase (while HIV medications are free).

This study presents quantitative data collected from a population of HIV-infected, hypertensive adults receiving ART at a large, urban health facility in Malawi. This site screens for hypertension during ART visits (as recommended by Malawi HIV treatment guidelines) and provides clinical management when indicated. We sought to understand experiences of people receiving care for hypertension and HIV as a case study that can offer insights about the opportunities and challenges of integrated care for adults receiving ART in low-resource settings.

METHODS

Site and sample selection

Surveys were conducted at Partners in Hope Medical Center, an urban, PEPFAR (President's Emergency Plan for AIDS Relief)-USAID-supported HIV-treatment site in Malawi, with an active ART cohort of approximately 5000 adults. Partners in Hope has both an outpatient clinic that operates on a fee-for-service model and an HIV clinic that provides free care (including testing and treatment). Other health services are also offered in this HIV clinic. Screening and clinical consultations for the management of hypertension are free of charge, but antihypertensive medications are only available for purchase. Private sector health facilities and drug shops in Malawi charge a fee for antihypertensive medications; public sector health facilities do not charge for these medications. During the time of this study, Partners in Hope had the following antihypertensive medications available with no stock-outs reported: first-line treatments (hydrochlorothiazide, furosemide and spironolactone), second-line treatments (amlodipine and nifedipine), third-line treatments (atenolol, captopril, enalapril and losartan) and fourth-line treatment (propranolol).

Adults (aged 18 and above) receiving treatment for HIV and hypertension were invited to participate in the survey. Eligible participants were those who had been prescribed both ART and at least one antihypertensive for at least 1 year, in order to capture data from treatment-experienced clients who would have had enough time on hypertensive medications to develop routine refill patterns. Potential participants were identified by clinicians and study staff at Partners in Hope during routine visits and referred to study staff for screening. All participants who met the eligibility criteria were given a short introduction to the study and provided an opportunity to ask questions before providing oral consent to participate. Participants were given 1500 Malawi Kwacha (approximately US\$2), a reimbursement for expenses they may have incurred due to their participation in the study, and a small refreshment.

Data collection

Survey questions were designed to gather information on behaviours related to care-seeking and prescription refills: for each medication, respondents were asked where they obtained a refill, why this location, how often, and associated costs, both direct costs, such as medication and transportation, as well as indirect costs, such as lost wages. Basic demographic data were also collected for all respondents. The survey instrument was first developed in English then translated into the local language (Chichewa) by research assistants. All questions were multiple-choice or short-response (see guide in online supplementary appendix 1). Each question was read aloud in Chichewa by an experienced interviewer, who then recorded the participant's response using tablet-based data collection software linked with secure cloud-based data storage (SurveyCTO). (The surveys were programmed as dual

language in SurveyCTO, so that all responses were stored as both Chichewa and English language once entered into the tablets.) With permission from the respondent, data were also abstracted from clinical records and included most recent systolic and diastolic blood pressure measurements, years since antihypertensive medication initiation, names of all antihypertensive medications and ART, and quantities of these medications given at the three most recent refill appointments. Data collection occurred between June and December 2017.

Key variables and data analysis

Defining care integration: Respondents were classified as using 'integrated care' if they reported that they refilled antihypertensive medications and ART during the same clinic visit. Any one antihypertensive medication refill outside of Partners in Hope, or at Partners in Hope but not at the same time as an ART visit, resulted in the client being classified as a non-integrated client. Reason for choice of refill location was summarised; all responses for a given location were included (if a respondent refilled at multiple locations, each reason contributed to its respective location).

Defining care-seeking costs: Total annual care-seeking costs were calculated by adding together the components as included in the survey (ie, self-reported costs of medication, transport, lost wages and other costs, like food or childcare) in Malawi Kwacha and converted to 2017 US dollars using average exchange rate (725 Kwacha per US dollar).³¹ A respondent was classified as having zero expenditures in any component if they reported no expenditure on that component, or zero total costs if zero for all components. For 'integrated care' users, we analysed only medication costs since all other costs (transport, lost wages and other costs) were incurred regardless for the ART visit. For 'non-integrated care' respondents, we analysed all cost categories since there was no cost sharing with the ART visit. 'Refill visits' refer to visits for obtaining antihypertensive medications, as this was the focus of our study. Costs are presented for each type of expenditure, and a total (which adds together all expenditures: medications, transport, lost wages, and food or childcare).

Categories of hypertension severity and medication regimens (first-line diuretic, second-line addition of a calcium channel blocker, third-line addition of an ACE inhibitor, fourth-line addition of a beta blocker) were defined per Malawi HIV clinical guidelines.²⁹

Differences (eg, between the 'integrated' and 'non-integrated' groups) were calculated using t-tests for continuous variables and χ^2 tests for categorical variables; analyses were conducted in Stata V.14.

Patient and public involvement

The study instruments were designed and developed by a team of US and Malawian researchers and clinicians. The survey was administered by a Malawian research assistant and underwent pilot testing with patients; feedback from these pilot interviews informed revisions. Findings from

the research have been disseminated back to the clinical and patient communities at the study site.

RESULTS

In total, 299 individuals were approached and 199 were both eligible and provided consent to participate. Most of the attrition (64 individuals) was due to ineligibility because the respondent was not taking HIV or antihypertensive medication for at least 1 year; the rest were not interested in participating.

Approximately half of respondents (50.3%, n=100) received integrated care, refilling their antihypertensives and HIV medication during the same visit at Partners in Hope. Among the patients who were receiving non-integrated care (n=99), the most common locations for refilling antihypertensive medications were drug stores and government healthcare facilities. Only 18 respondents visited more than one location to refill their different antihypertensive medications (18.2%).

Participant characteristics did not differ significantly between the integrated and non-integrated care groups (table 1), with the exception of time on hypertension treatment which was, on average, 2 years longer among the non-integrated care group (6.8 years vs 4.8 years in the integrated care group). Overall, nearly two-thirds of respondents were women (n=130), and the average age was 52 years. Most respondents were working either formally or informally (66.8%, n=133), and median estimated annual household income was US\$840.

On average, respondents reported receiving medical treatment for hypertension for 5.8 years (median 4 years). Most individuals (over 80%, n=168) had elevated blood pressure as noted in their medical chart on the day of data collection—defined as blood pressure ≥ 140 systolic or ≥ 90 diastolic. The population of respondents with elevated blood pressure at the study visit was approximately equally split between mild, moderate and severe hypertension per categories used in the Malawi HIV clinical guidelines.²⁹ The proportion with elevated blood pressure was not significantly different in integrated versus non-integrated care participants (86% vs 84%, respectively). Neither the reported frequency of refill visits over 1 year nor the number of antihypertensive medications prescribed was different between integrated and non-integrated care patients.

Men and women in this sample were not significantly different on background characteristics except age (women were significantly younger at 51 years vs 55 years on average for men) and employment status (more men were employed) (see online supplementary appendix 1).

Antihypertensive medications: Consistent with what is recommended by the Malawi treatment guidelines for hypertension, the most commonly reported antihypertensive medications were hydrochlorothiazide, a diuretic, taken by 90.5% of respondents (n=180), followed by amlodipine, a calcium channel blocker, taken by 53.3%

Table 1 Description of the sample (n=199)

	Total sample (n=199)	Integrated care users (n=100)	Non-integrated care users (n=99)	P value of difference
Age, mean years (median)	52 (53)	52 (52)	53 (53)	0.85
Female, n (%)	130 (65.3%)	66 (66.0%)	64 (64.7%)	0.84
Estimated household annual income, mean USD (median)	3276 (840)	3073 (798)	3481 (1260)	0.74
Employment status, n (%)				
Working (formally or informally*)	133 (66.8%)	66 (66.0%)	67 (67.7%)	0.97
Not working but looking for work	4 (2.0%)	2 (2.0%)	2 (2.0%)	
Not working and not looking for work	62 (31.2%)	32 (32.0%)	30 (30.3%)	
Years on hypertension treatment, mean (median)	5.8 (4)	4.8 (4)	6.8 (4)	0.03
BP \geq 140 systolic and/or \geq 90 diastolic, n (%)	168 (84.9%)	86 (86.0%)	82 (83.7%)	0.65
Among those with elevated BP, n (%):				
Mild (140–159 systolic and/or 90–99 diastolic)	63 (37.5%)	33 (38.4%)	30 (36.6%)	0.66
Moderate (160–179 systolic and/or 100–109 diastolic)	54 (32.1%)	25 (29.1%)	29 (35.4%)	
Severe (\geq 180 systolic and/or \geq 110 diastolic)	51 (30.4%)	28 (32.6%)	23 (28.1%)	
No of antihypertensive medications, mean (median)	2 (2)	2 (2)	2 (2)	0.69
No of visits each year for antihypertensive care and medication refills, mean (median)	9 (12)	8 (12)	9 (12)	0.24

P value based on t-test for continuous measures and χ^2 test for categorical measures.

*‘Working informally’ refers to those who do not have regular/routine employment in a single job in the formal sector.

BP, blood pressure.

of respondents (n=106), and enalapril, an ACE inhibitor, taken by 25.1% of respondents (n=50) (table 2).

Medication costs: Respondents who used non-integrated care were significantly more likely to report no expenditure on medications (33.3% vs only 6% of respondents in the integrated care group). In both groups, among those who did spend money on medications, this totalled approximately US\$20–24 annually (table 3). Respondents taking more medications also reported higher overall costs (see online supplementary appendix 1).

Other care-seeking costs: Approximately half of those using non-integrated care faced additional costs (ie, beyond costs already incurred for ART visits), costs of transportation to refill visits and lost wages during refill visits. Only 11% reported paying for childcare in order to attend refill visits. Among those with these costs, transportation was on average US\$6 annually, lost wages were on average US\$106 annually and childcare was on average US\$ 181 annually.

Table 2 Self-reported antihypertensive medication use (n=199)

	Taking this medication*, n (%)	Among those on each medication: Years since initiating, mean (range)	Integrated care users taking this medication, n (%) (n=100)	Non-integrated care users taking this medication, n (%) (n=99)
Hydrochlorothiazide	180 (90.5%)	4.6 (0–24)	92 (92.0%)	88 (88.9%)
Amlodipine	106 (53.3%)	1.9 (0–8)	62 (62.0%)	44 (44.4%)
Enalapril	50 (25.1%)	1.7 (0–9)	27 (27.0%)	23 (23.2%)
Atenolol	23 (11.6%)	3.8 (0–9)	9 (9.0%)	14 (14.1%)
Nifedipine	14 (7.0%)	2.6 (0–7)	4 (4.0%)	10 (10.1%)
Propranolol	12 (6.0%)	3.4 (1–7)	1 (1.0%)	11 (11.1%)
Losartan	4 (2.0%)	3 (2–4)	1 (1.0%)	3 (3.0%)
Captopril	4 (2.0%)	2.5 (0–5)	0	4 (4.0%)

*Participants could report more than one medication.

Table 3 Care-seeking costs for patients receiving integrated vs non-integrated care

	Integrated care (n=100)	Non-integrated care (n=98)	P value for difference
Respondents reporting zero care-seeking costs per category:			
Zero expenditure on antihypertensive medication, n (%)	6 (6.0%)	33 (33.3%)	<0.001
Zero expenditure on refill visit transportation, n (%)	n/a	48 (48.5%)	n/a
Zero lost wages due to refill visit, n (%)	n/a	52 (53.1%)	n/a
Zero refill visit childcare expenditure, n (%)	n/a	88 (88.9%)	n/a
Zero total hypertension care-seeking expenditure/costs, n (%)	6 (6.0%)	6 (6.1%)	0.99
Among those with reported care-seeking costs per category:			
Annual mean (range) refill visit medication expenditure (n=159)	US\$21 (3–87)	US\$24 (4–92)	0.24
Annual mean (range) refill visit transportation expenditure (n=50)	n/a	US\$6 (1–28)	n/a
Annual mean (range) refill visit lost wages (n=46)	n/a	US\$106 (3–852)	n/a
Annual mean (range) refill visit childcare expenditure (n=10)	n/a	US\$181 (13–511)	n/a
Annual mean (range) total hypertension care-seeking expenditure/cost (n=186)	US\$21 (3–87)	US\$90 (2–872)	<0.001

One respondent did not report a complete set of cost data so is omitted from this table. P value based on t-test for continuous measures and χ^2 test for categorical measures.

*For people receiving integrated care, ‘total costs’ represents medications only since transport, lost wages and childcare costs would be expended during the HIV visit.

n/a, not applicable.

Total care-seeking costs (medication plus other): Only 6% of respondents in each group reported having zero expenditures associated with their antihypertensive medication care-seeking, and this was not significantly different between the groups. Those in the integrated care group had significantly lower annual care-seeking costs (US\$21 on average) than those in the non-integrated care group (US\$91 on average) ($p < 0.001$) (table 3). Average reported refill visit duration was not significantly different between the care groups (approximately 110 min per visit) (data

not shown). See online supplementary appendix 1 for all median cost values.)

Reasons for refill location choice: Respondents were asked why they chose each refill location (figure 1). Non-integrated care at public facilities and drug stores was much more likely to be reportedly selected due to medication cost (56.7% and 36.0% of all reasons given for patients in these groups) and convenience to home or work. Nearly all reasons for using the integrated model (approximately 80%) relate to having received care at the

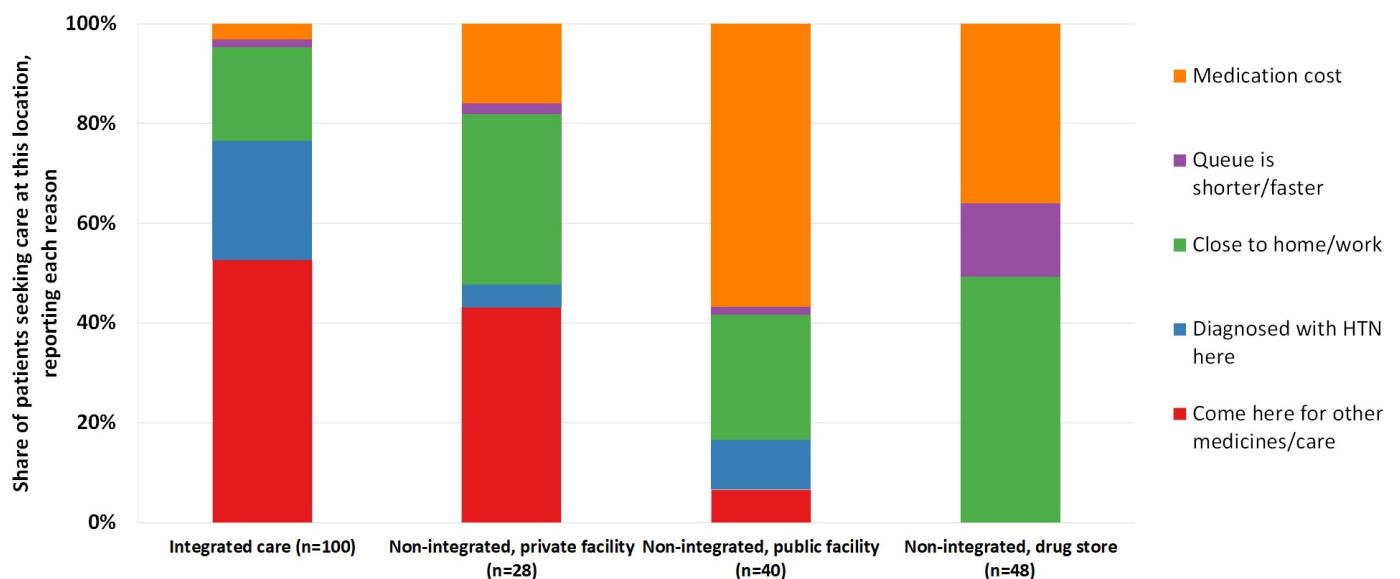


Figure 1 Reasons for choosing refill location. Self-reported reason for choosing each location for antihypertensive medication refills. HTN, hypertension.

location previously. The overall pattern of reasons looks very similar between men and women (see online supplementary appendix 1).

DISCUSSION

In this cross-sectional study, only half of patients receiving treatment for both HIV and hypertension reported using the integrated care model available at their HIV treatment facility. Among those respondents who reported using non-integrated care, annual costs were much higher on average due to costs of additional visits, such as transport and opportunity costs (lost wages). More people in the non-integrated care group reported zero expenditure on medicines, but among those who did pay, the annual cost of antihypertensive medications was not significantly different between the integrated care and non-integrated care groups. However, when asked about antihypertensive medication refill locations and preferences, the most common locations (public health facilities and drug stores) were selected primarily due to perceived lower medication costs and proximity/convenience.

The results presented here indicate that ART patients' decision-making process for NCD care-seeking is complex—and that, in addition to the system and implementation barriers already identified in the literature, integrated care models may face individual-level challenges. Respondents who spread out their care seemed to be optimising the near-term 'savings' of money and time. They report choosing the most convenient location and/or the location where they feel that the medication was least expensive—but, in fact, these patients experienced higher total annual costs (both direct and indirect). Strategies should be attentive to the range of costs borne by patients and should seek to lower the cost of the entire care-seeking experience over time.

Care-seeking choices and preferences are not well understood in the context of financial burden—for example, a recent study found that, despite being more expensive, most surveyed households in south India were reliant on private facilities for diabetes and hypertension care due to constraints (laboratory availability and medication stockouts) in the public sector.³² However, studies in sub-Saharan Africa have reached varying conclusions about whether there is a private sector preference for adult healthcare services,^{33–36} and there may be health system and other contextual and structural challenges that constrain a person's ability to act on their care-seeking preferences.

These findings suggest there is considerable room for improvement in the delivery of health services for people with HIV and NCDs in low-income countries. A robust system has been developed and deployed to provide free ART, but these health facilities do not yet have sufficient resources to offer free medications for high-burden NCDs. In 2010, WHO identified a number of NCD 'best buys', that is, highly impactful and cost-effective approaches for the prevention and management of NCDs, which included

hypertension treatment. However, a recent review found that these have scarcely been evaluated in low-income and lower-middle-income countries, and such evaluations from sub-Saharan Africa are particularly lacking.³⁷ In addition, although this analysis focused on hypertension due to its high prevalence, other NCDs—such as diabetes, cardiovascular disease, cancer and chronic respiratory diseases—are also of concern and should be considered when designing integrated care models.

More research is needed about how to effectively, efficiently and equitably manage the double burden of disease, including the potential of integrated care approaches.^{38,39} The evaluation of an integrated HIV-NCD model in South Africa, which found only very small clinical improvements, identified implementation challenges related to health systems and processes.^{40,41} There have been demonstration projects for integrated HIV-NCD care in Malawi,^{42,43} including incorporating hypertension care into services at high-volume HIV treatment sites in Lilongwe; but with reported implementation challenges, including the need to develop treatment guidelines, establish a referral network and train health workers—and, after 6 months of integrated care, rates of blood pressure control remained under 40% for these patients.⁴² In addition, in our study, overall costs were positively associated with more antihypertensive medications, so particular attention should be paid to the increased burden that multiple medications may impose. Future studies should also longitudinally examine the different costs of delivering integrated and non-integrated care; this paper reports only on the patient perspective in the cross-section, but a health systems perspective that conducts a robust accounting of supply-side costs (health worker time, supply chain and storage, commodities, space etc) is also critically needed. Few studies on NCD care integration have examined costs,^{44,45} and only one study has taken a patient or societal perspective to costing.⁴⁶

Crucially, effective models for managing NCDs among adults with HIV must be contextualised within health systems. For example, an intervention that used lay health workers to assist nurses at health centres in South Africa for the provision of hypertension care was effective at improving patients' clinic attendance but not their health status (controlled blood pressure); this was hypothesised to be due to health system challenges, such as insufficient nursing workforce and space, drug stockouts and equipment failures.⁴⁷ Integrated services require the co-ordination of multiple health system inputs, and this must be carefully considered before implementing and scaling up new models of care.^{9,39} Also, in this analysis, 'integration' was defined as providing HIV and NCD medications simultaneously, but other integrated models might offer HIV testing to people being seen for NCDs, screening for multiple conditions in a general patient population or counselling on lifestyle management for NCD risk factors (in individuals on ART or the general patient population)—and future studies should explore these additional potential synergies as well.

The financial burden of NCD care is a critically important area, and future research should work to better characterise the impact of treatment costs on individuals and households, including affordability and catastrophic expenditure.⁴⁸ Service and medicine costs may be a substantial barrier to care in several lower-income countries, especially among poorer households.^{36 49} According to a recent systematic review, having more NCDs is associated with higher out-of-pocket payments, particularly for older adults and those from lower income groups.⁸ In 2013, WHO set target levels for the availability and affordability of NCD medicines in the public and private sectors of low-income and middle-income countries,⁵⁰ but much progress remains to be achieved: a recent analysis found that fewer than 25% of surveyed facilities in low-income countries met the availability and affordability criteria for cardiovascular medications.⁵¹ Recent data from the Prospective Urban Rural Epidemiological study indicate that high costs of antihypertensive medications may be associated with lower use of these medications and with worse blood pressure control for people in low- and middle-income countries.^{52 53}

This study offered new insights into patient experiences with integrated HIV-NCD care—but some limitations should be noted. First, these data were collected at only one site in urban Malawi, so should be seen as formative research. Additional data collection across sites (including those offering integrated care and not) should be undertaken as well, and such research should be accompanied by robust information on availability and price of antihypertensive medications at different outlets. Six of the ‘integrated care’ users reported zero medicine costs (although the study site charges a fee for antihypertensive medications) which may have been attributable to periodic one-off medicine donations—and more detailed information on supply and price would help clarify such dynamics. Second, there may be response bias including recall bias, particularly if respondents are most likely to recall dramatic events like very high costs and social desirability bias. By using well-trained and highly experienced data collectors, we tried to mitigate this; in addition, we have no reason to think these biases would differ by whether a respondent was using integrated care. One-third of participants declined to participate in the study, and it is unknown whether there was sample selection bias due to participants’ availability and engagement—for example, if those who did not participate faced time pressures due to employment constraints, or if this group included more people who go elsewhere for their medications. Third, we did not ask about whether patients chose to stagger their refills due to financial or other constraints; this would be an excellent area for future research, particularly a qualitative study. Lastly, we did not have information on clinical outcomes such as CD4 or viral suppression, time since HIV or hypertension diagnosis, or other patient characteristics that may influence care-seeking and adherence to these medications. We also did not ask about ART refill behaviours nor preferences.

The data on blood pressure was also only a cross-sectional, single measure due to the nature of the study design. Therefore, we cannot characterise participants as having controlled versus uncontrolled blood pressure over time. Future research should examine long-term clinical and cost outcomes and undertake mixed-methods studies that use deductive methods to understand the interplay of social, behavioural and clinical variables within the context of managing multimorbidity in low-resource settings.

CONCLUSIONS

There is a growing population of ageing adults in low-income countries; life expectancy has increased from 49 years on average in 1990 to over 60 years by 2015.⁵⁴ These gains are largely attributable to improvements in diagnosis and treatment of infectious diseases including HIV,⁵⁵ following large investments in scaling up HIV treatment, for example, by PEPFAR and the Global Fund to Fight AIDS, Tuberculosis and Malaria. This success means that many countries are experiencing a double burden of disease among adults, and the HIV-focused vertical model may no longer be the most successful strategy for addressing diseases of ageing and improving health outcomes in high-burden settings. This study finds high care-seeking costs for adults with hypertension and HIV in Malawi, and complex preferences for medication refill decisions. Integrated care is a promising approach for addressing comorbidities, but these findings suggest that co-locating services may not necessarily result in less economic burden for clients. Investments in NCDs are estimated to be cost-saving and life-saving,⁵⁶ so global health policy-makers and financiers, both external and domestic, should consider this a strategic priority, and consider approaches that incorporate patient preferences and experiences in order to maximise impact and ensure equity.

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Patient consent for publication Obtained.

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Data availability statement Data are available on reasonable request. Please contact the corresponding author if you are interested in accessing data from this study.

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