DOI:
10.1016/j.jpainsymman.2022.09.008

Document Version
Peer reviewed version

Depressive symptoms and palliative care concerns among patients with non-communicable diseases in two Southern African countries

Eve Namisango, Richard A. Powell, Steve Taylor, Lukas Radbruch, Rachel Freeman, Desderius Haufiku, Beatrice M. Mwagomba, Wilson Acuda, Lameck Thambo, Immaculate Kambiya, Emmanuel BK Luyirika, Faith N. Mwangi-Powell, Richard Harding

***Address correspondence to:**
Eve Namisango
African Palliative Care Association
Plot 850 Dr Gibbons Road
Kampala Uganda and
King's College London, Cicely Saunders Institute of Palliative Care, Policy & Rehabilitation, London, United Kingdom
eve.namisango@africanpalliativecare.org /eve.namisango@kcl.ac.uk
+256772460536

Richard A. Powell
Department of Primary Care and Public Health, School of Public Health, Faculty of Medicine, Imperial College London, London, England
r.powell@imperial.ac.uk

Steve Taylor
Auckland University of Technology, Auckland, New Zealand
steve.taylor.nz@gmail.com

Lukas Radbruch
Department of Palliative Medicine, University Hospital Bonn, Bonn, Germany
Lukas.radbruch@ukbonn.de

Rachel J. Freeman
School of Allied Health Sciences, University of Namibia, Windhoek, Namibia
rfreeman@unam.na

Desiderius Haufiku
School of Public Health, University of Namibia, Windhoek, Namibia
hdesderius@unam.na

Beatrice M. Mwagomba
Lighthouse Trust, Kamuzu Central Hospital, Lilongwe, Malawi
blm3@st-andrews.ac.uk

Wilson Acuda
Institute of Hospice and Palliative Care in Africa, Hospice Africa Uganda, Kampala, Uganda
wsacuda@hospice.or.ug

Lameck Thambo
Palliative Care Association of Malawi, Blantyre, Malawi
lameck.pacam@gmail.com

Immaculate Kambiya
Formerly of Ministry of Health, Malawi

kambiyaimmaculate@yahoo.com

Emmanuel B.K. Luyirika
African Palliative Care Association, Kampala, Uganda
emmanuel.luyirika@africanpalliativecare.org

Faith N. Mwangi-Powell
Girls Not Brides, London, England
mwangi1powell@yahoo.co.uk

Richard Harding
Florence Nightingale Faculty of Nursing Midwifery and Palliative Care, Cicely Saunders Institute, King's College London, London, United Kingdom
richard.harding@kcl.ac.uk

Number of tables: 7

Number of figures: 0

Number of references: 47

Number of words: 3800

Abstract

Context: Non-communicable diseases (NCDs), associated with health-related suffering, can benefit from palliative care in resource-limited settings, where over four-fifths of these deaths occur.

Objective: To measure the prevalence of depressive symptoms, palliative care-related concerns, physical and other psychological symptoms among adult patients with NCDs in Malawi and Namibia.

Methods: This multi-center, cross-sectional study consecutively recruited outpatients from four tertiary referral hospitals. Stepwise regression analysis was used to assess factors associated with physical and psychological symptom burden.

Results: Among 457 participants, primary diagnosis was cancer (n=147, 32%); cardiovascular disease (CVD) (n=130, 28%), chronic respiratory disease (CRESD) (n=73, 16%) or diabetes (n=107, 23%). Over half were female (58.9%; n=269), mean age was 48 (SD=15.7). Clinically significant psychological distress was identified among cancer (57.2%), diabetes (57.0%), CRESD (45.2%) and CVD patients (43.1%), with criterion for major depression symptoms met for cancer (42.9%), diabetes (29.2%), CVD (30.0%) and CRESD (28.8%). Most severe palliative care concerns were: first *sharing feelings* (i.e., not at all/not very often), reported by CVD (28%), CRESD (23%), cancer (22%) and diabetes (21%) patients; second *help and advice* (i.e., none/very little), among cancer (28%), CVD (26%), diabetes (22%), and CRESD (16%) patients. High prevalence of moderate-to-severe pain was reported (cancer 54%, CVD 41%, CRESD 38%, diabetes 38%). Functional status, age and presence of comorbidities were associated with physical and psychological symptom distress.

Conclusion: Irrespective of functional status, patients experience bothersome symptoms. As such, functional status should not be used as an indicator of symptom prevalence or symptom-related distress.

Key words: depressive-symptoms, palliative-care, symptoms, non-communicable diseases, Southern Africa

Running title: Palliative-care symptoms and concerns in NCDs

Key message: This article describes the prevalence of depressive symptoms and other palliative care concerns and their correlates, among patients with cancer, cardiovascular disease, chronic respiratory disease, or diabetes in Southern Africa. The results show a high burden of clinically significant psychological distress and symptom burden and associated distress in this population.

Background

Universal Health Coverage (UHC) identifies palliative care as an essential, quality health service individuals should receive.[1] Deaths from serious health-related suffering (SHS)—suffering associated with a need for palliative care—are projected to almost double by 2060 to approximately 48 million people, 47% of all deaths globally, an 87% increase from 2016.[2] While SHS will increase globally, the largest proportional increase will be in low- and middle-income countries (LMIC), with a 155% increase over the same period, accounting for 83% of SHS deaths and driven in absolute terms by cancer-related deaths. [3]

There is a growing recognition in Africa of the importance of addressing non-communicable diseases (NCDs) such as cancer, and advancing palliative care services to NCD patient groups.[1, 2] While palliative care services have increased significantly since 2005, [4-6] often driven by advocacy,[7] international HIV/AIDS funding has arguably focused palliative care delivery away from non-HIV patients,[8] including those with NCDs[9]. This is despite evidence suggesting patients with end-stage progressive chronic diseases—cancer, heart, chronic obstructive pulmonary, and renal diseases—have similar symptom profiles.[10] Moreover, while similarities in the prevalence of palliative care problems across cancer and non-cancer patients are known,[11] currently available data originate from high-income Western countries.

Additionally, while depressive symptoms are common in palliative care—associated with emotional suffering, increased pain and fatigue, poor treatment adherence, and poorer care outcomes in most physical illnesses[12, 13]—minimal data exists on depression among patients undergoing palliative care or with chronic NCDs within the African context. Addressing patient needs within a concept of total care extending beyond HIV necessitates identifying and understanding presenting problems among other groups with active, life-limiting diagnoses. Negligible work has been undertaken to investigate this in Sub-Saharan Africa,[14, 15] unlike in HIV research,[16, 17] and specifically among patients not receiving palliative care. This study therefore aimed to measure the prevalence of depressive symptoms, palliative care-related concerns and physical and other psycho-social symptoms among adult patients diagnosed with one of the four most prevalent NCDs in Sub-Saharan Africa: cardiovascular disease (CVD), cancer, chronic respiratory disease (CRESD), or diabetes[18].

Methods

Study design

A cross-sectional, bi-national, multi-center study using validated self-report measures.

Study setting

We based our country selection on on-going collaborative work in two countries, providing opportunities for further research and programmatic interventions. Additionally, the two countries have a of high burden of NCDs and hence a need for service integration to relief symptom distress and the associated health suffering. Namibia, with a population of approximately 2.3 million people, is classified as an upper middle-income country[19]. NCDs account for 43% deaths and exert excessive pressure on the already strained health system[20]. CVDs account for 21% of NCD deaths, cancer 5%, and CRESD 4% and diabetes mellitus 4%[20]. Namibia's health system is dual (i.e., public and private), with about 18% of the population served by the private sector (medical aid) and the rest served by the public or by the private sector, where they pay out of pocket [19]. About 76% of the population lives within a 10km radius to a health facility, and service access remains poor in rural areas[19].

As of 2019, Malawi had an estimated population of 18.6 million people, projected to double by 2038[21]. Malawi one of the poorest countries in Africa and NCDs account for over 28% of deaths. CVDs account for 12% of deaths, COPD remains endemic but under reported, and the prevalence of diabetes is estimated to range from 2.5% to 5.7%[22]. In Malawi, health services are largely provided by the government (86.2%) in partnership with private not-for-profit (12.6%) and private not-for-profit partners[23]. The public health services are free to all Malawians at the point of service delivery

or care and 86% of the population can access care within 8km radius of a health facility[23].

Specialist tertiary-level referral centers with established specialized clinics for common NCDs were selected in the two countries. In Malawi, the central region was selected because most patients with NCD conditions are referred to tertiary hospitals located there. Participating hospitals were: Queen Elizabeth Central Hospital and Kamuzu Central Hospital (urban), Mzuzu Central Hospital, and Zomba Central Hospital (peri-urban). In Namibia, specialized clinics were similarly identified, including Windhoek Central Hospital, Katutura Hospital (both urban) and Oshakati Intermediate Hospital (rural).

Study inclusion and exclusion criteria and sample size

We consecutively recruited ambulatory adult patients attending the clinics using the following inclusion criteria: those aged at least 18 years; having a confirmed primary diagnosis of any of the four most prevalent NCDs[24]: i.e., CVDs (including rheumatic heart disease, hypertensive heart disease, ischemic heart disease, cerebrovascular disease, and inflammatory heart disease), cancers, CRESD (including chronic obstructive pulmonary disease [COPD], occupational lung diseases, persistent asthma, or pulmonary hypertension) or diabetes,[18] regardless of disease stage. Patients had to know about their diagnosis (determined by self-report, confirmed by clinical record in patients' files) and provide written informed consent. Additionally, they were able to read and speak any of the following languages: English or Chichewa in Malawi; English, Afrikaans or Oshiwambo in Namibia (these were local languages in which interviews were to be conducted), and; with sufficient cognitive ability to answer the study questions (e.g., having no demonstrable evidence of dementia, delirium or significant cognitive impairment that might make it difficult to complete the study, as determined by the clinical staff).

We excluded patients with a primary diagnosis of non-progressive asthma (i.e., no progressive worsening of disease) or respiratory allergies, and those that lacked the psychological or physical capacity to consent and engage in study processes.

Given we aimed to profile symptomatology in this population, we sought to recruit approximately 100 patients per diagnostic group; the targeted sample size was therefore 400 patients.

Measures

Socio-demographic and clinical questionnaire

Basic patient demographic (e.g., age, gender) and clinical profiling data were collected using a questionnaire. Clinical questions asked included: year of diagnosis; date of enrolment into facility care; and the presence of co-morbidities (existence of two more chronic life-limiting or -threatening illnesses) taken from patients' medical records. Patients were also asked to list their most pressing problems in living with their primary diagnosis, using an open-ended question.

The Karnofsky Performance Scale (KPS)

The KPS is an observer-rated scale measuring physical function. Patients are rated on a scale of 0-100, with 0 corresponding to no functioning ability (i.e., death) and 100 corresponding to complete, independent functioning[25]. The KPS has been widely used as a valid measure for assessing functional performance in African settings;[26] this study used a modified version of the KPS, adapted from Anderson et al.[27]

APCA African Palliative Outcome Scale (POS)

Data on the nature and severity of palliative care-related needs were assessed using the 10-item, multi-dimensional, validated APCA African POS[28, 29]. The APCA POS is the most commonly used palliative outcome measure in African palliative care settings.[30] Of its ten questions, 7 are for the patient and 3 for the family caregiver. In the absence of the latter in our study, patients answered the 7 questions from which a total APCA African POS score was computed.

Memorial Symptom Assessment Schedule short form (MSAS-SF)

The MSAS-SF is a commonly used patient-rated symptom assessment tool [15, 31] recording the seven-day period prevalence and burden of 28 physical and 4 psychological symptoms.[32] Each physical symptom experienced by the patient is scored for the level of distress it causes on a five-point (0-4) Likert scale (i.e., not at all, a little bit, somewhat, quite a bit, and very much). Subscales are calculated from distress scores: the global distress index (GDI), physical distress (PHYS), and psychological distress (PSY)[33]. The African version used here included additional items: difficulty walking, hunger, difficult seeing, muscle aches, difficulty hearing, bad smell/odor, sores/lumps on genitals, and discharge from genitals [34].

Center for Epidemiologic Studies Depression Scale (CES-D)

The CES-D is a 20-item self-report scale measuring depressive symptomatology in the general population.[35] The CES-D has been validated and previously used in Africa, mostly in HIV populations.[36] [37]

Translation and piloting of data collection tools

All study documentation (information and consent sheets, and questionnaires) were forward and backward translated from English into Chichewa in Malawi and into Oshiwambo and Afrikaans in Namibia. At each clinical site, all translated study materials were cross-checked by bilingual staff members in English and the relevant local language(s). Inconsistencies and difficulties translating terms were discussed at each site to ensure their initial meaning had not been distorted, affecting cultural validity.

Pilot testing was conducted with at least 6 patients in each clinical site, with subsequent revisions made. These revisions included the grading of disease stages for cancer and CVDs, for later categorization. It was also agreed that space should be provided for the data collection teams to specify types of diagnoses not listed. The list generated was based on country-specific data on the most common type of diagnoses. The validated measures were not altered.

Recruitment and data collection

On each clinic day, patients were approached by study interviewers (interviewers were final year medical students) before seeing the medical personnel and briefed about the study and its aims, as detailed in the information sheet. All patients gave written informed consent and thereafter were consecutively recruited into the study. Enrolment lists were compiled at each site and checked, to avoid duplicative re-enrolment.

Ethics

Ethical approval was secured from the Ministry of Health and Social Services in Namibia (Ref: 17/3/3) and the Ministry of Health in Malawi (Ref: NHSRCH #1369). After the interview, each patient was given a transport refund of USD5.

Data analysis

Data analyses were performed using Stata version 16. We described the sample using descriptive analysis, overall and stratified by country and summarized continuous data using means and standard deviations, and categorical data using proportions.

The cut-offs for CES-D depression screening were applied as follows: <16 = no clinically significant psychological distress; 16-20 = mild to moderate depressive symptomatology or clinically significant level of psychological distress; ≥21 = possibility of major depressive symptomatology[35]. The CES-D and the proposed cut-offs have been previously used in Africa, mostly in HIV populations[36] [37]. For the APCA African POS, we reversed items as necessary so that 1=worst and 5 =best. We calculated proportions representing worst intensity as the response levels of intensity and distress. We combined moderate/severe and very severe/overwhelming POS categories because the clinical decisions would be similar. For the MSAS-SF, we calculated the

total number of symptoms, and for each symptom the associated burden and subscales.

To identify correlates of symptom distress, we performed linear regression to assess for associations between symptom distress and other explanatory variables. We conducted multivariate linear regression analysis stratified by symptom distress sub-type, namely: physical and psychological symptom distress. The model included the following explanatory variables: sex, country, education, co-morbidities, HIV serostatus, diagnostic category, age in years, and KPS scores for functionality performance. No model selection procedures were used for these models; instead, the associations were estimated simultaneously so that potential confounding effects would be automatically accounted for. Model assumptions were checked and found to be satisfactory. To adjust for multiple testing, we set a stringent P value of 0.001 as opposed to the traditional value of 0.05.

Findings

Characteristics of study participants

We recruited 457 patients (Malawi n=207; Namibia n=250), with response rates of 90.4% in Namibia and 98.6% in Malawi. Study participants' mean age was 48 (SD 15.7). Over half of respondents were female (58.9%; n=269); just under half (45.5%; n=208) had attained secondary education. Primary diagnoses included 28.4% (n=130) CVD (of whom, 69.7% [n=86] had hypertensive heart disease), 32.2% (n=147) cancer; 16.0% (n=73) CRESD (of whom, 80.6% [n=54] had persistent asthma); and 23.4% (n=107) diabetes (Table 1). See supplementary material 1 online for other details on diagnosis by disease group. Additionally, 43.8% (n=200) reported having co-morbidities, and 17.9% (n=82) self-reported a positive HIV serostatus. For the two countries, the combined median KPS functionality score was 90 (IQR: 80-100). The median number of dependents was 4 (IQR: 2-6), and there were three-fold differences in average expenditure for medication- and laboratory-related costs reported between the two countries (in the last three months). Average expenditure of medicines in the previous 30 days prior to the survey (median, IQR) $3.6 ($1-$8.9) -Malawi $15($5-$40) -Namibia - Average expenditure on laboratory investigations in the previous 30 days prior to the survey (median, IQR) $6.0 ($1.8-$27.5)-Malawi $18.5 ($0-$60)-Namibia.

[Insert table 1 about here]

Prevalence of depressive symptoms by diagnosis

Of the 457 patients recruited, 15.1% (n=69) reported mild-to-moderate psychological distress and 36% (n=165) had scores suggestive of possible major depression. The possibility of major depressive symptoms was highest in cancer patients compared to other diagnostic groups (42.9% vs 30.0% for CVDs, vs 28.8% for CRESD and 39.2% diabetes (Table 2), although the chi-square test was non-significant (see supplementary file 2 online).

[Insert table 2 about here]

Palliative care-related concerns as measured by the POS

The most burdensome problems identified by the POS were as follows. The first was *shared feelings* (i.e., not at all/not very often), with proportions reporting high intensity of n=37 (28%) for CVDs, n=17 (23%) for CRESD, n=32 (22%) for cancer and n=22 (21%) for diabetes. Second was *help and advice* (i.e., none/very little): n=41 (28%) for cancer, n=34 (26%) for CVDs, n=24 (22%) for diabetes, and n=12 (16%) for CRESD. Third was *worry* (i.e., most/all the time): n=39 (27%) for cancer, n=23 (18%) for CVDs, n=19 (18%) for diabetes, and n=10 (14%) for CRESD (Table 3).

[Insert table 3 about here]

Symptomatology
Using the MSAS-SF, irrespective of diagnosis, the most prevalent physical symptom was pain, reported by 78% (n=115) of cancer patients, 68% (n=89) of patients with CVD; 68% (n=49) of patients with CRESD and 73% (n=78) of patients with diabetes. This was followed by lack of energy, reported by 63% (n=93), 55% (n=71), 68% (n=50) and 74% (n=79) of cancer, CVDs, CRESD and diabetes patients, respectively. The most reported psychosocial symptom was worry, by 73% (n=107) of cancer, 65% (n=84) of CVDs, 77% (n=56) of CRESD and 72% (n=77) of diabetic patients (see Table 4).

The three most prevalent symptoms for cancer patients (n=147) were: pain (n=115, 78%), worry (n=107, 73%) and lack of energy (n=93, 63%). For CVDs it was: pain (n=89, 68%), worry (n=84, 65%) and feeling tired (n=80, 62%). For CRESD it was worry (n=56, 77%), lack of energy (n=50, 68%), jointly with cough (n=50, 68%) and pain (n=49, 68%). For diabetes it was: feeling tired (n=82, 77%), lack of energy (n=79, 74%) and pain (n=78, 73%).

Most distressing symptoms by type of diagnosis
By diagnosis, the top prevalent distressing physical and psychosocial symptoms presented as a percentage of participants who reported their presence in the 30 days prior to the survey were as below.

a) Cardiovascular diseases
The top prevalent distressing physical symptoms were: problems sexual interest (n=30, 60%), difficulty sleeping (n=44, 44%), shortness of breath (n=38, 39%), pain (n=89, 38%) and problems urinating (n=16, 38%). The two most distressing psychosocial symptoms were worry (n=84, 43%) and feeling nervous (n=45, 35%).

b) Cancer
The top prevalent distressing physical symptoms were: problems with sexual interest (n=48, 57%), pain (n=115, 52%), difficulty swallowing (n=24, 44%) and sweats (n=44, 43%). The most distressing psychological symptoms were worry (n=109, 39%) and feeling nervous (n=47, 34%).

c) Chronic respiratory diseases
The top prevalent distressing were: shortness of breath (n=55, 64%), cough (n=50, 56%), problems with sexual interest (n=19, 47%), feeling bloated (n=25, 44%), and feeling dizzy (n=23, 39%). The most distressing psychosocial symptoms were feeling sad (n=40, 35%) and feeling irritable (n=31, 32%).

d) Diabetes
The top prevalent distressing symptoms were: difficulty walking (n=41, 63%), difficulty sleeping (n=57, 58%), pain (n=78, 56%), feeling drowsy (n=72, 49%), numbness and tingling on hands and feet (n=68, 46%). The two most distressing psychosocial symptom was worry (n=77, 51%) and feeling irritable (n=43, 40%).

[Insert table 4 about here]

MSAS Symptom distress indices
All diagnostic groups reported an average of 10 symptoms, except the chronic respiratory diseases group, which reported an average of 9 symptoms. Global symptom distress was highest in patients with diabetes (1.4) and cancer (1.2), compared to patients with CVDs and chronic respiratory diseases (Table 5).

[Insert table 5 about here]

Correlates of symptom distress
Female sex (coefficient 0.174, P=0.005 95% CI 0.05-0.29) and physical functional performance status (coefficient 0.003, P<0.001,95% CI -0.002-0.001) were associated with increased symptom distress. The absence of co-morbidities was associated with reduced physical symptom distress (coefficient -0.169, P=0.007, 95% CI-0.29-0.005). Female sex, physical functional performance and presence of comorbidities were also associated with increased psychosocial symptom distress (Tables 6 and 7).

[Insert tables 6 and 7 about here]

Discussion
This study aimed to profile the depressive symptoms, palliative care concerns and other symptomatology in patients diagnosed with one of the four most prevalent NCDs in Sub-Saharan Africa: CVDs, cancers, CRESD and diabetes. There are several interesting findings. First, the mean age for the study population was 48 years. This has serious implications for developing economies, suggesting NCDs occur at a young age in the most economically productive age group.[38] It may also be a risk factor for future multiple morbidity in this population[38].

Second is the significant prevalence of co-morbidities in this patient population (44%) and the self-reported prevalence of HIV (18%). The problem of multi-morbidity from patients having more than one NCD, and the convergence between NCDs and communicable diseases, is increasingly being recognized in resource-limited settings[28] as an emerging concern and there is an urgent need to strengthen health systems from the primary care level to ensure such patients receive appropriate, unfragmented care. Given symptoms must be interpreted in the context of underlying conditions and the complexity of patient needs, a multi-disciplinary approach to care should start sooner than later.

Additionally, this study reports a high prevalence of psychological distress, and evidence of major depressive symptoms. Depression and pain are both prevalent and often coexist in patients with chronic medical conditions[39]. Their coexistence has been shown to incur additive adverse effects on patient outcomes, including poor functioning and reduced response to treatment. Furthermore, depression and other psychosocial problems, including spiritual and cultural issues, intensify pain. This burden can be reduced through improved detection and treatment of depression. The need for mental health services in this population should therefore be taken seriously, as unresolved mental health concerns impact on adherence to treatment and care outcomes[40, 41]. Given the complexity involved in diagnosing and managing depression in patients with serious illness,[41] training of health workers and routine screening for early detection and management of psychological problems among this population is strongly recommended as advanced symptoms are more complex to manage and, if missed, psychological co-morbidity negatively impact patient and family well-being.

Palliative care is needed to manage pain and other complex symptoms faced by patients and their families and is cost effective[42]. For example, in countries where appropriate medication is available, diabetes can be managed effectively and in most cases patients may not require palliative care. However, it is important to address diabetes through the lens of palliative care alongside standard treatment where it is available in resource-limited settings. They face complex symptoms and concerns, as highlighted by this study and, moreover, medicines are commonly unavailable. Consequently, patients unable to afford them can die from the disease or must live with disease-related complications. As posited by the WHO, palliative care should be part of the UHC package for equitable access to patients that need it[43]. A minimum package for UHC in Africa has been proposed,[44] with several African countries developing tailored packages to suit their respective contexts[45]. The African UHC package emphasizes access to prevention, promotion, treatment, rehabilitation, and palliation of sufficient quality while also ensuring the use of these services does not expose users to catastrophic costs. Integral to palliative care is the impeccable assessment and effective management of symptoms to improve patient and family wellbeing and optimizes care outcomes and improve patient and family quality of life

The prevalence of very severe pain is also worth mentioning. Twenty percent of the 147 diabetic patients reported severe/overwhelming pain on the day of the interview, yet pain is not commonly taken as a serious problem in this patient group. Moreover, 10% of 130 patients with CVDs also reported severe/overwhelming pain. These findings warrant attention as this is an outpatient population which is meant to have less complex symptoms and concerns. The findings also point towards the need to provide effective pain management services based on need as opposed to commonly held beliefs that pain is a problem in cancer patients alone, although the seriousness of pain as a distressing symptom is also emerging in HIV.[11]. The high symptom burden is notable in this patient population and these symptoms are associated with high distress. For example, all patient groups reported a high prevalence (33-51%) of symptom distress which is associated with avoidable suffering. To alleviate the health-related suffering associated with the broad range of multi-dimensional symptoms faced by patients, it is recommended that services adapt person-centered models of care which promote a holistic approach to patient care as this mirrors their multi-dimensional needs[46]. Person-centered care takes a family-centered approach, given that families are the centre of patient support and care, and incorporates patient views or feedback when it comes to assessing service effectiveness[46].

Our data also revealed the economic burden of NCDs from the patient perspective, with costs as one of the main pressing problems for patients living with NCDs. Costs related to transport and medication were a common theme under the most pressing problems domain. Indeed, in Malawi and Namibia, the total expenditure per capita on NCDs as a percentage of GDP is 11.4% and 8.9%, respectively,[33] which is too low to meet medication and medical investigation costs. Evidence shows that despite advances made in increasing access to medicines for NCDs in the economically developed world, access to medicines in low-income countries with weak health care infrastructure is a major barrier to controlling chronic diseases[47]. As such, patients have to pay for medications and investigations that cannot be provided within mainstream public health services, costs that are very high for a typical patient in a developing economy. There is a need to think of care models that achieve similar outcomes, with affordable transport for medical investigations and medication costs for patients. Potential options in this regard are investments in decentralized, community-focused services that are more rural based rather than predominantly urban, with limited geographic coverage and empowering nurse practitioners to take on necessary additional roles as part of a task shifting agenda. Potential barriers for integrating palliative care into NCD care include the shortage of health workforce especially in Namibia[19] and limited funding for NCD care amidst competing health priorities. Integrating palliative care into NCD care at all levels of service delivery requires effective coordination at the different levels of service delivery and this requires funding, political will and a critical mass of trained health workforce, which remain a challenge in the two countries.

Conclusion

Our paper presents novel findings on the palliative care-related problems self-reported by a broad range of patients with NCDs. These findings attest to the imperative to focus on the need for palliative care in the response to the NCD pandemic.

Acknowledgements

The authors thank all patients who participated in this study, the medical students who supported the data collection, the ministries of health for their collaboration and all the participating clinical sites.

Disclosures

All the authors declare that they have no conflict of Interest. This study was funded by the Open Society Initiative for Southern Africa, grant number 5700. This article presents independent research that is partly funded by the National Institute for Health and Care Research (NIHCR) under the Applied Health Research program for Northwest London. The views expressed in this publication are those of Richard A. Powell and not necessarily those of the NIHCR or the Department of Health and Social Care.

References

1. Knaul, F., et al., *Palliative care: an essential facet of universal health coverage.* Lancet Glob Health, 2019. **7**(11): p. e1488.
2. Sleeman, K.E., et al., *The burden of serious health-related suffering among cancer decedents: Global projections study to 2060.* Palliat Med, 2021. **35**(1): p. 231-235.
3. Knaul, F.M., et al., *Alleviating the access abyss in palliative care and pain relief-an imperative of universal health coverage: the Lancet Commission report.* Lancet, 2018. **391**(10128): p. 1391-1454.
4. Grant, L., et al., *Palliative care making a difference in rural Uganda, Kenya and Malawi: three rapid evaluation field studies.* BMC Palliative Care, 2011. **10**: p. 8-8.
5. Lynch, T., S. Connor, and D. Clark, *Mapping Levels of Palliative Care Development: A Global Update.* Journal of Pain and Symptom Management, 2013. **45**(6): p. 1094-1106.
6. Powell, R.A., et al., *Palliative care development in Africa: how can we provide enough quality care?* BMJ Support Palliat Care, 2011. **1**(2): p. 113-4.
7. Rhee, J.Y., et al., *Factors Affecting Palliative Care Development in Africa: In-Country Experts' Perceptions in Seven Countries.* J Pain Symptom Manage, 2018. **55**(5): p. 1313-1320.e2.
8. Lemoine, M., et al., *In the shadow of HIV/AIDS: forgotten diseases in sub-Saharan Africa: global health issues and funding agency responsibilities.* J Public Health Policy, 2012. **33**(4): p. 430-8.
9. Powell, R.A., et al., *Out of the shadows: non-communicable diseases and palliative care in Africa.* BMJ Support Palliat Care, 2017. **7**(2): p. 128-132.
10. Solano, J.P., B. Gomes, and I.J. Higginson, *A comparison of symptom prevalence in far advanced cancer, AIDS, heart disease, chronic obstructive pulmonary disease and renal disease.* J Pain Symptom Manage, 2006. **31**(1): p. 58-69.
11. Moens, K., I.J. Higginson, and R. Harding, *Are there differences in the prevalence of palliative care-related problems in people living with advanced cancer and eight non-cancer conditions? A systematic review.* J Pain Symptom Manage, 2014. **48**(4): p. 660-77.
12. Hotopf, M., et al., *Temporal relationships between physical symptoms and psychiatric disorder. Results from a national birth cohort.* Br J Psychiatry, 1998. **173**: p. 255-61.
13. Hotopf, M., et al., *Depression in advanced disease: a systematic review Part 1. Prevalence and case finding.* Palliat Med, 2002. **16**(2): p. 81-97.
14. Harding, R., et al., *The prevalence and burden of symptoms amongst cancer patients attending palliative care in two African countries.* Eur J Cancer, 2011. **47**(1): p. 51-6.
15. Harding, R., et al., *Palliative care-related self-report problems among cancer patients in East Africa: a two-country study.* Support Care Cancer, 2014. **22**(12): p. 3185-92.
16. Farrant, L., et al., *Maintaining wellbeing for South Africans receiving ART: the burden of pain and symptoms is greater with longer ART exposure.* S Afr Med J, 2014. **104**(2): p. 119-23.
17. van Niekerk, L. and P.J. Raubenheimer, *A point-prevalence survey of public hospital inpatients with palliative care needs in Cape Town, South Africa.* S Afr Med J, 2014. **104**(2): p. 138-41.
18. World Health Organization, *Noncommunicable diseases: Fact sheet*. 2017.
19. Christians, F., *Country profile - Primary healthcare and family medicine in Namibia.* Afr J Prim Health Care Fam Med, 2020. **12**(1): p. e1-e3.
20. Ministry of Health and Social Services, *National Multisectoral Strategic Plan for Prevention and Control of Non-Communicable Diseases (NCDs) in Namibia 2017/18 – 2021/22*. 2017: Namibia
21. World Bank. *The World Bank in Malawi*. 2019 [cited 2022 July 2022]; Available from: https://www.worldbank.org/en/country/malawi/overview.
22. Gowshall, M. and S.D. Taylor-Robinson, *The increasing prevalence of non-communicable diseases in low-middle income countries: the view from Malawi.* International journal of general medicine, 2018. **11**: p. 255-264.
23. Ministry of Health Malawi. *The health care system*. 2016 [cited 2022 July 2022]; Available from: https://www.health.gov.mw/index.php/2016-01-06-19-58-23/national-aids.
24. Gouda, H.N., et al., *Burden of non-communicable diseases in sub-Saharan Africa, 1990-2017: results from the Global Burden of Disease Study 2017.* Lancet Glob Health, 2019. **7**(10): p. e1375-e1387.
25. Karnofsky, D. and J. Burchenal, *The clinical evaluation of chemotherapeutic agents in cancer*. Evaluation of chemotherapeutic agents, ed. M. CM. 1949, New York: Columbia University Press.
26. Katwere, M., et al., *Clinical presentation and aetiologies of acute or complicated headache among*

HIV-seropositive patients in a Ugandan clinic. J Int AIDS Soc, 2009. **12**: p. 21.
27. Anderson, F., et al., *Palliative performance scale (PPS): a new tool.* J Palliat Care, 1996. **12**(1): p. 5-11.
28. Powell, R.A., et al., *Development of the APCA African Palliative Outcome Scale.* J Pain Symptom Manage, 2007. **33**(2): p. 229-32.
29. Harding, R., et al., *Validation of a core outcome measure for palliative care in Africa: the APCA African Palliative Outcome Scale.* Health Qual Life Outcomes, 2010. **8**: p. 10.
30. Downing, J., et al., *Outcomes 'out of africa': the selection and implementation of outcome measures for palliative care in Africa.* BMC Palliative Care, 2012. **11**: p. 1-1.
31. Namisango, E., et al., *Symptoms and Concerns Among Children and Young People with Life-Limiting and Life-Threatening Conditions: A Systematic Review Highlighting Meaningful Health Outcomes.* Patient, 2019. **12**(1): p. 15-55.
32. Chang, V.T., et al., *The memorial symptom assessment scale short form (MSAS-SF).* Cancer, 2000. **89**(5): p. 1162-71.
33. Chang, V.T., et al., *Shorter symptom assessment instruments: the Condensed Memorial Symptom Assessment Scale (CMSAS).* Cancer Invest, 2004. **22**(4): p. 526-36.
34. Wakeham, K., et al., *Symptom burden in HIV-infected adults at time of HIV diagnosis in rural Uganda.* J Palliat Med, 2010. **13**(4): p. 375-80.
35. Radloff, *The CES-D scale: A self report depression scale for research in the general population.* Applied Psychological Measurements, 1977. **1**: p. 385-401.
36. Myer, L., et al., *Common mental disorders among HIV-infected individuals in South Africa: prevalence, predictors, and validation of brief psychiatric rating scales.* AIDS Patient Care STDS, 2008. **22**(2): p. 147-58.
37. Nakasujja, N., et al., *Depression symptoms and cognitive function among individuals with advanced HIV infection initiating HAART in Uganda.* BMC Psychiatry, 2010. **10**(44).
38. World Health Organisation, *Global status report on noncommunicable diseases 2010*. 2019.
39. Rayner, L., et al., *Depression in patients with chronic pain attending a specialised pain treatment centre: prevalence and impact on health care costs.* Pain, 2016. **157**(7): p. 1472-9.
40. Rayner, L., et al., *The development of evidence-based European guidelines on the management of depression in palliative cancer care.* Eur J Cancer, 2011. **47**.
41. Rayner L, H.I., Price A, Hotopf M, *The Management of Depression in Palliative Care: European Clinical Guidelines*. 2010, Cicely Saunders Institute, King's College London and Palliative Care Research Collaborative London
42. Gomes, B., et al., *Effectiveness and cost-effectiveness of home palliative care services for adults with advanced illness and their caregivers.* Cochrane Database Syst Rev, 2013. **6**(6).
43. WHA. *Strengthening of palliative care as a component of integrated treatment within the continuum of care*. 134th Session of the World Health Assembly EB134.R7 May 2014 2014.
44. Association, A.P.C. *Essential Palliative Care Package for Universal Health Coverage P*. 2019 [cited 2022 July 2022]; Available from: https://www.africanpalliativecare.org/images/stories/pdf/PC_in_UHC_package.pdf.
45. Palliative Care Association of Uganda. *Essential Palliative Care Package for Universal Health Coverage in Uganda*. 2021 [cited 2022 July 2022].
46. Santana, M.J., et al., *How to practice person-centred care: A conceptual framework.* Health Expect, 2018. **21**(2): p. 429-440.
47. Abegunde, D., *Essential Medicines for Non-Communicable Diseases(NCDs)*. WHO.

Table 1: Socio-demographic characteristics of the study participants (N=457)

Variable	Country		TOTAL	Test statistic	P value
	MALAWI (n=207)	NAMIBIA (n=250)	(n=457)		
Age					
Mean (sd)	50.16 (14.6)	46.35 (16.4)	48 (15.7)	t = 2.63	P=0.0089
Sex					
Male	80 (38.7%)	108 (43.2%)	188	χ^2= 0.79	P=0.37
Female	127 (61.4%)	142 (56.8%)	269		
Education					
None	25 (12.1%)	12 (4.8%)	37	Wilcoxon rank sum test=17634	P<0.001
Attended primary	101 (48.8%)	70 (28.0%)	171		
Attended secondary	73 (35.3%)	135 (54.0%)	208		
Diploma/degree or higher	8 (3.9%)	33 (13.2%)	41		
Primary diagnosis					
Cardiovascular diseases	63 (30.4%)	67 (26.8%)	130	χ^2= 22.9	P= 4.1
Cancer	83 (40.1%)	64 (25.6%)	147		
Chronic respiratory diseases	17 (8.2%)	56 (22.4%)	73		
Diabetes	44 (21.3%)	63 (25.2%)	107		
Does patient have co-morbidities?					
Yes	92 (44.2%)	108 (43.2%)	200	χ^2= 0.0297	P= 0.86
No	115 (55.6%)	142 (56.8%)	257		
Patients' HIV sero-status by self-report					
Positive	50 (24.2%)	32 (12.8%)	82	χ^2= 20.7	P= 3.205
Negative	134 (64.7%)	154 (61.6%)	288		
Unknown+	23 (11.1%)	64 (25.6%)	87		
Karnofsky functional performance score (KPS)					
Median (IQR)	80 (70-90)	90 (80-100)	90 (80-100)	Wilcoxon rank sum test =15924	P= 8.813
Time since diagnosis in years - mean (SD)					
Cardiovascular diseases	9.30 (4.5)	7.58 (4.70)		Wilcoxon rank sum test= 19024	P= 0.017
Cancer	10.11 (4.13)	10.44 (5.9)			
Chronic respiratory diseases	10.65 (4.28)	9.57 (4.9)			
Diabetes	9.11 (3.8)	12.22 (4.66)			
Time since enrolled in care at the facility -years					
Cardiovascular diseases	4.9 (6.6)	3.37 (4.11)	4.09(5.46	Wilcoxon rank sum test = 19776	P=0.019
Cancer	2.21 (3.6)	2.34 (3.34)	2.27(3.48		
Chronic respiratory diseases	7.58 (9.82)	4.88 (5.94)	5.55(7.11		
Diabetes	3.34 (3.61)	5.98 (8.20)	4.91(6.82		
Median number of dependents					
Median (IQR)	5 (3-7)	3 (1-6)	4 (2-6)	Wilcoxon rank sum test=30802	P= 5.3e-09
Healthcare costs					
Average cost of round-trip journey to health facility (median, IQR) – in US dollars	$1.8 ($1-$3.6)	$3 ($2-$6)	NC		

Variable	Country		TOTAL		
	MALAWI (n=*207)*	NAMIBIA *(n=250)*	*(n=457)*	Test statistic	P value
Average expenditure of medicines in the previous 30 days prior to the survey (median, IQR)	$3.6 ($1-$8.9)	$15 ($5-$40)	NC		
Average expenditure on laboratory investigations in the previous 30 days prior to the survey (range)	$6.0 ($1.8-$27.5)	$18.5 ($0-$60)	NC		

NC: Not computed - (we defined costs as out-of-pocket expenses)
Note: [a] 16 missing values, [b] 30 missing values,
KPS-functional performance as measured by the Karnofsky Performance Scale
IQR -Interquartile range +this was based on self-report

Table 2: Psychological distress by diagnosis (CES-D) (N=457)

	Cardiovascular diseases (N=130)	Cancer (N=147)	Chronic respiratory diseases (N=73)	Diabetes (N=107)	All groups N=457
CES-D categories	n (%)	n (%)	n (%)	n (%)	Total n (%)
No clinically significant psychological distress (<16) (n=223)	74 (56.9%)	63 (42.9%)	40 (54.8%)	46 (43.0%)	223 (48.8%)
Mild-to-moderate psychological distress ≥16-20 (n=69)	17 (13.1%)	21 (14.3%)	12 (16.4%)	19 (17.8%)	69 (15.1%)
Possibility of major depression symptoms ≥21 (n=165)	39(30.0%)	63 (42.9%)	21 (28.8%)	42 (39.2%)	165 (36.1%)

Column percentages are presented for disease specific statistics

Table 3: Intensity of palliative care-related problems as measured by the APCA African POS (N=457)

POS Item	Rating	Cancer (N=147)		Cardiovascular diseases		Chronic respiratory		Diabetes (N=107)	
		n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Pain	No pain at all	26	18%	38	29%	17	23%	29	27%
	Slight pain	17	12%	26	20%	22	30%	16	15%
	Moderate pain/severe	79	54%	53	41%	28	38%	41	38%
	Combined levels of Very severe /worst/overwhelming	25	17%	13	10%	06	08%	21	20%
Other symptoms	No, not at all	48	33%	45	35%	11	15%	31	29%
	Slightly	31	21%	36	28%	17	23%	31	29%
	Moderate /severe	61	41%	43	33%	37	51%	35	33%
	Very severe /worst/overwhelming	07	5%	06	5%	08	11%	10	9%
Worry	Not at all	31	21%	34	26%	14	19%	30	28%
	Very occasionally	20	14%	15	12%	14	19%	18	17%
	Some/a lot of the time	57	39%	58	44%	35	48%	40	37%
	Most /all the time	39	27%	23	18%	10	14%	19	18%
Shared feelings	Not at all/not very often	32	22%	37	28%	17	23%	22	21%
	Occasionally/fairly frequently	65	44%	41	32%	19	26%	30	28%
	Often	26	18%	17	13%	10	14%	15	14%
	Yes freely talked	24	16%	35	27%	27	37%	40	37%
Life worthwhile	Not at all/not very often	20	14%	16	12%	05	07%	14	13%
	Occasionally/some of the time	40	27%	31	24%	18	25%	24	22%
	Most of the time	38	26%	23	18%	8	11%	29	27%
	All of the time	49	33%	60	46%	42	58%	40	37%
Felt at peace	Not at all/not very often	32	22%	22	17%	06	08%	18	17%
	Occasionally /some of the time	53	36%	43	33%	19	26%	31	29%
	Most of the time	34	23%	25	19%	16	22%	26	24%
	All of the time	28	19%	40	31%	32	44%	32	30%
Help and advice	None/very little	41	28%	34	26%	12	16%	24	22%
	For a few/several things	39	27%	29	22%	23	32%	32	30%
	For most things	48	33%	25	19%	15	21%	15	14%
	As much as wanted	19	13%	42	32%	23	32%	36	32%

Table 4: Physical and psychological symptom prevalence in the previous 7 days

	Cancer (N=147)		Cardiovascular diseases		Chronic respiratory		Diabetes (N=107)	
	Prevalence	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*
Physical symptoms								
Pain	115 (78%)	52%	89 (68%)	38%	49 (68%)	33%	78 (73%)	56%
Lack of energy	93 (63%)	35%	71 (55%)	25%	50 (68%)	36%	79 (74%)	37%
Feeling drowsy/ tired	87 (59%)	24%	80 (62%)	26%	46 (63%)	33%	82 (77%)	49%
Weight loss	85 (58%)	35%	41 (32%)	14%	33 (45%)	18%	50 (47%)	32%
Difficulty sleeping	72 (49%)	40%	59 (45%)	44%	44 (60%)	39%	57 (53%)	58%
Difficulty	70 (48%)	27%	64 (49%)	25%	35 (48%)	26%	51 (48%)	38%
Muscle aches*	70 (48%)	20%	55 (42%)	29%	23 (32%)	17%	43 (40%)	30%
Numbness / tingling in	65 (44%)	37%	63 (48%)	24%	19 (26%)	11%	68 (64%)	46%
Lack of appetite	63 (43%)	21%	41 (32%)	38%	23 (32%)	22%	31 (29%)	39%
I don't look like myself	62 (42%)	29%	28 (22%)	11%	16 (22%)	25%	30 (28%)	23%
Cough	61 (42%)	16%	43 (33%)	19%	50 (68%)	56%	42 (39%)	19%
Hunger*	60 (41%)	38%	43 (33%)	35%	21 (29%)	20%	75 (70%)	44%
Nausea	59 (40%)	24%	23 (18%)	4%	28 (38%)	7%	32 (30%)	34%
Dizziness	57 (39%)	25%	55 (42%)	25%	23 (32%)	39%	59 (55%)	34%
Changes in skin	53 (36%)	37%	16 (12%)	25%	6 (8%)	17%	21 (20%)	29%
Dry mouth	54 (37%)	24%	34 (26%)	21%	35 (48%)	23%	65 (61%)	32%
Problems with sexual interest /	48 (33%)	57%	30 (23%)	60%	19 (26%)	47%	42 (40%)	40%
Feeling bloated	45 (31%)	24%	32 (25%)	31%	25 (34%)	44%	34 (32%)	44%
Swelling of arms or	46 (31%)	27%	39 (30%)	31%	07 (10%)	14%	27 (25%)	26%
Sweats	44 (30%)	43%	31 (24%)	29%	17 (24%)	6%	63 (59%)	43%
Itching	42 (29%)	20%	23 (18%)	17%	10 (14%)	20%	28 (26%)	50%
Changes in way food tastes	42 (29%)	33%	20 (15%)	30%	15 (21%)	20%	37 (35%)	27%
Difficulty seeing well, poor vision*	39 (27%)	23%	61 (47%)	30%	19 (26%)	6%	68 (64%)	57%
Difficulty moving*	37 (25%)	0%	34 (26%)	41%	11 (15%)	0%	34 (32%)	50%
Hair loss	35 (24%)	43%	1 (1%)	0%	1 (1%)	0%	6 (6%)	50%
Constipation	34 (23%)	31%	22 (17%)	18%	13 (18%)	16%	29 (27%)	31%
Vomiting	33 (22%)	27%	7 (5%)	29%	10 (14%)	0%	10 (9%)	40%
Bad smell or odor*	32 (22%)	44%	3 (2%)	33%	0 (0%)	0%	8 (7%)	38%

	Cancer (N=147)		**Cardiovascular diseases**		**Chronic respiratory**		**Diabetes (N=107)**	
	Prevalence	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*
Discharge from private parts*	31 (21%)	35%	3 (2%)	33%	1 (1%)	0%	4 (4%)	25%
Problems urinating	29 (20%)	38%	16 (12%)	38%	4 (5%)	20%	31 (29%)	42%
Shortness of breath	28 (19%)	21%	38 (29%)	39%	55 (75%)	64%	28 (26%)	25%
Diarrhea	26 (18%)	22%	12 (9%)	25%	5 (7%)	0%	27 (25%)	25%
Difficulty	24 (16%)	44%	8 (6%)	0%	8 (6%)	0%	7 (7%)	26%
Difficult hearing,	20 (14%)	25%	22 (17%)	18%	4 (5%)	0%	22 (21%)	36%
Sores or lumps in private parts*	18 (12%)	44%	3 (2%)	100%	1 (1%)	0%	8 (7%)	13%
Mouth sores	14 (10%)	36%	12 (09%)	8%	2 (3%)	0%	16 (15%)	26%
Psychological symptoms								
Feeling sad	93 (63%)	24%	64 (49%)	33%	40 (55%)	35%	57 (53%)	39%
Worrying	107 (73%)	39%	84 (65%)	43%	56 (77%)	29%	77 (72%)	50%
Feeling irritable	77 (52%)	22%	45 (35%)	31%	31 (42%)	32%	43 (40%)	40%
Feeling nervous	47 (32%)	34%	54 (42%)	35%	28 (38%)	29%	42 (39%)	29%

*Note: High distress is defined as patients reporting 'quite a bit' or 'very much' for physical symptoms / 'frequently or almost constantly' for psychological symptoms, expressed as a percentage of those with the symptom. * African items*

Table 5: Symptom distress scores by type of diagnosis (N=457)

	Cardiovascular diseases	**Cancer**	**Chronic respiratory diseases**	**Diabetes**	**Significance test**
MSAS subscale	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	F statistic and P value
Total number of symptoms	9.58 (5.45)	12.3 (6.11)	11.0 (5.45)	12.6 (5.55)	F=6.19, P=0.0004*
MSAS distress index	0.78 (0.57)	1.07 (0.77)	0.93 (0.63)	1.18 (0.71)	F=7.99, P=<0.001*
MSAS psychological distress Index	1.13 (0.90)	1.2 (0.8)	1.2 (0.81)	1.3 (0.95)	F=0.81, P=0.4885
MSAS global distress index	1.07 (0.74)	1.25 (0.70)	1.18 (0.69)	1.40 (0.7)	F=4.26, P=0.005

*Statistically significant p value set at 0.001

Table 6: Main effects step-wise regression model physical symptom distress

Variable	Variable category	Estimate	P_value	95% CI
Sex	Male	Ref.		
Sex	Female	0.174	0.005	(0.05, 0.29)**
Country	Malawi	0.000		
Country	Namibia	0.348	0.000	(0.21, 0.48)***
Education	Primary /none	Ref.		
Education	secondary	-0.055	0.419	(-0.19, 0.08)
Education	Tertiary	-0.101	0.380	(-0.33, 0.12)
Comorbidities	Yes	Ref.		
Comorbidities	No	-0.169	0.007	(-0.29, -0.05)**
HIVsero	HIV positive	0.000		
HIVsero	HIV negative	0.028	0.759	(-0.15, 0.20)
HIVsero	Unknown	-0.030	0.781	(-0.24, 0.18)
Diagnosis	Cancer	Ref.		
Diagnosis	Cardiovascular diseases	-0.226	0.066	(-0.47, 0.01)
Diagnosis	Chronic persistent respiratory disease	-0.047	0.725	(-0.31, 0.22)
Diagnosis	Diabetes	0.172	0.168	(-0.07, 0.42)
Stage	Unknown	Ref.		
Stage	Early	-0.123	0.490	(-0.47, 0.23)
Stage	Late	0.082	0.569	(-0.20, 0.37)
Stage	Advanced	0.169	0.225	(-0.10, 0.44)
Age	per unit increase	0.002	0.469	(-0.00, 0.01)
Karnofsky	per unit increase	-0.017	0.000	(-0.02, -0.01)***

*Ref- reference category * p<0.05 ** p<0.01; *** p<0.001*

Table 7: Main effects- stepwise regression model psychological symptom distress

Variable	Variable category	Estimate	P_value	95% CI
Gender	Male	Ref		
Gender	Female	0.044	0.596	(-0.12, 0.21)
Country	Malawi	Ref		
Country	Namibia	0.234	0.011	(0.05, 0.41)*
Education	Primary/none	Ref.		
Education	Secondary	-0.224	0.014	(-0.40, -0.05)*
Education	Tertiary	-0.190	0.217	(-0.49, 0.11)
Comorbidities	Yes	Ref		
Comorbidities	No	-0.202	0.016	(-0.37, -0.04)*
HIVsero status	HIV positive	Ref.		
HIVsero status	HIV negative	0.004	0.972	(-0.23, 0.24)
HIVsero status	Unknown	-0.144	0.317	(-0.43, 0.14)
Diagnosis	Cancer	0.000		
Diagnosis	Cardiovascular	-0.111	0.498	(-0.43, 0.21)
Diagnosis	Chronic persistent respiratory disease	-0.024	0.895	(-0.37, 0.33)
Diagnosis	Diabetes	0.064	0.703	(-0.26, 0.39)
Stage	Unknown	Ref.		
Stage	Early	-0.343	0.149	(-0.81, 0.12)
Stage	Late	-0.021	0.914	(-0.40, 0.36)
Stage	Advanced	-0.008	0.964	(-0.37, 0.35)
Age	per unit increase	Ref.	0.911	(-0.01, 0.01)
Karnofsky	per unit increase	-0.014	0.000	(-0.02, -0.01)***

Reference category
** p<0.05; *** p<0.001*

Table 1: Socio-demographic characteristics of the study participants (N=457)

Variable	Country		TOTAL (n=457)	Test statistic	P value
	MALAWI (n=207)	NAMIBIA (n=250)			
Age					
Mean (sd)	50.16 (14.6)	46.35 (16.4)	48 (15.7)	t = 2.63	P=0.0089
Sex					
Male	80 (38.7%)	108 (43.2%)	188	χ^2= 0.79	P=0.37
Female	127 (61.4%)	142 (56.8%)	269		
Education					
None	25 (12.1%)	12 (4.8%)	37	Wilcoxon rank sum test=17634	P<0.001
Attended primary	101 (48.8%)	70 (28.0%)	171		
Attended secondary	73 (35.3%)	135 (54.0%)	208		
Diploma/degree or higher	8 (3.9%)	33 (13.2%)	41		
Primary diagnosis					
Cardiovascular diseases	63 (30.4%)	67 (26.8%)	130	χ^2= 22.9	P= 4.1
Cancer	83 (40.1%)	64 (25.6%)	147		
Chronic respiratory diseases	17 (8.2%)	56 (22.4%)	73		
Diabetes	44 (21.3%)	63 (25.2%)	107		
Does patient have co-morbidities?					
Yes	92 (44.2%)	108 (43.2%)	200	χ^2= 0.0297	P= 0.86
No	115 (55.6%)	142 (56.8%)	257		
Patients' HIV sero-status by self-report					
Positive	50 (24.2%)	32 (12.8%)	82	χ^2= 20.7	P= 3.205
Negative	134 (64.7%)	154 (61.6%)	288		
Unknown+	23 (11.1%)	64 (25.6%)	87		
Karnofsky functional performance score (KPS)					
Median (IQR)	80 (70-90)	90 (80-100)	90 (80-100)	Wilcoxon rank sum test =15924	P= 8.813
Time since diagnosis in years - mean (SD)					
Cardiovascular diseases	9.30 (4.5)	7.58 (4.70)		Wilcoxon rank sum test= 19024	P= 0.017
Cancer	10.11 (4.13)	10.44 (5.9)			
Chronic respiratory diseases	10.65 (4.28)	9.57 (4.9)			
Diabetes	9.11 (3.8)	12.22 (4.66)			
Time since enrolled in care at the facility -years					
Cardiovascular diseases	4.9 (6.6)	3.37 (4.11)	4.09(5.46	Wilcoxon rank sum test = 19776	P=0.019
Cancer	2.21 (3.6)	2.34 (3.34)	2.27(3.48		
Chronic respiratory diseases	7.58 (9.82)	4.88 (5.94)	5.55(7.11		
Diabetes	3.34 (3.61)	5.98 (8.20)	4.91(6.82		
Median number of dependents					
Median (IQR)	5 (3-7)	3 (1-6)	4 (2-6)	Wilcoxon rank sum test=30802	P= 5.3e-09
Healthcare costs					
Average cost of round-trip journey to health facility (median, IQR) – in US dollars	$1.8 ($1-$3.6)	$3 ($2-$6)	NC		

Variable	Country		TOTAL		
	MALAWI (n=*207*)	NAMIBIA *(n=250)*	*(n=457)*	Test statistic	P value
Average expenditure of medicines in the previous 30 days prior to the survey (median, IQR)	$3.6 ($1-$8.9)	$15 ($5-$40)	NC		
Average expenditure on laboratory investigations in the previous 30 days prior to the survey (median,	$6.0 ($1.8-$27.5)	$18.5 ($0-$60)	NC		

(we defined costs as out-of-pocket expenses)
NC: Not computed -
Note: [a] 16 missing values, [b] 30 missing values,
KPS-functional performance as measured by the Karnofsky Performance Scale
IQR -Interquartile range +this was based on self-report

Table 2: Psychological distress by diagnosis (CES-D) (N=457)

	Cardiovascular diseases (N=130)	Cancer (N=147)	Chronic respiratory diseases (N=73)	Diabetes (N=107)	All groups N=457
CES-D categories	n (%)	n (%)	n (%)	n (%)	Total n (%)
No clinically significant psychological distress (<16) (n=223)	74 (56.9%)	63 (42.9%)	40 (54.8%)	46 (43.0%)	223 (48.8%)
Mild-to-moderate psychological distress ≥16-20 (n=69)	17 (13.1%)	21 (14.3%)	12 (16.4%)	19 (17.8%)	69 (15.1%)
Possibility of major depression symptoms ≥21 (n=165)	39(30.0%)	63 (42.9%)	21 (28.8%)	42 (39.2%)	165 (36.1%)

Column percentages are presented for disease specific statistics

Table 3: Intensity of palliative care-related problems as measured by the APCA African POS (N=457)

POS Item	Rating	Cancer (N=147)		Cardiovascular diseases		Chronic respiratory		Diabetes (N=107)	
		n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Pain	No pain at all	26	18%	38	29%	17	23%	29	27%
	Slight pain	17	12%	26	20%	22	30%	16	15%
	Moderate pain/severe	79	54%	53	41%	28	38%	41	38%
	Combined levels of Very severe /worst/overwhelming	25	17%	13	10%	06	08%	21	20%
Other symptoms	No, not at all	48	33%	45	35%	11	15%	31	29%
	Slightly	31	21%	36	28%	17	23%	31	29%
	Moderate /severe	61	41%	43	33%	37	51%	35	33%
	Very severe /worst/overwhelming	07	5%	06	5%	08	11%	10	9%
Worry	Not at all	31	21%	34	26%	14	19%	30	28%
	Very occasionally	20	14%	15	12%	14	19%	18	17%
	Some/a lot of the time	57	39%	58	44%	35	48%	40	37%
	Most /all the time	39	27%	23	18%	10	14%	19	18%
Shared feelings	Not at all/not very often	32	22%	37	28%	17	23%	22	21%
	Occasionally/fairly frequently	65	44%	41	32%	19	26%	30	28%
	Often	26	18%	17	13%	10	14%	15	14%
	Yes freely talked	24	16%	35	27%	27	37%	40	37%
Life worthwhile	Not at all/not very often	20	14%	16	12%	05	07%	14	13%
	Occasionally/some of the time	40	27%	31	24%	18	25%	24	22%
	Most of the time	38	26%	23	18%	8	11%	29	27%
	All of the time	49	33%	60	46%	42	58%	40	37%
Felt at peace	Not at all/not very often	32	22%	22	17%	06	08%	18	17%
	Occasionally /some of the time	53	36%	43	33%	19	26%	31	29%
	Most of the time	34	23%	25	19%	16	22%	26	24%
	All of the time	28	19%	40	31%	32	44%	32	30%
Help and advice	None/very little	41	28%	34	26%	12	16%	24	22%
	For a few/several things	39	27%	29	22%	23	32%	32	30%
	For most things	48	33%	25	19%	15	21%	15	14%
	As much as wanted	19	13%	42	32%	23	32%	36	32%

Table 4: Physical and psychological symptom prevalence in the previous 7 days

	Cancer (N=147)		Cardiovascular diseases		Chronic respiratory		Diabetes (N=107)	
	Prevalence	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*
Physical symptoms								
Pain	115 (78%)	52%	89 (68%)	38%	49 (68%)	33%	78 (73%)	56%
Lack of energy	93 (63%)	35%	71 (55%)	25%	50 (68%)	36%	79 (74%)	37%
Feeling drowsy/ tired	87 (59%)	24%	80 (62%)	26%	46 (63%)	33%	82 (77%)	49%
Weight loss	85 (58%)	35%	41 (32%)	14%	33 (45%)	18%	50 (47%)	32%
Difficulty sleeping	72 (49%)	40%	59 (45%)	44%	44 (60%)	39%	57 (53%)	58%
Difficulty	70 (48%)	27%	64 (49%)	25%	35 (48%)	26%	51 (48%)	38%
Muscle aches*	70 (48%)	20%	55 (42%)	29%	23 (32%)	17%	43 (40%)	30%
Numbness / tingling in	65 (44%)	37%	63 (48%)	24%	19 (26%)	11%	68 (64%)	46%
Lack of appetite	63 (43%)	21%	41 (32%)	38%	23 (32%)	22%	31 (29%)	39%
I don't look like myself	62 (42%)	29%	28 (22%)	11%	16 (22%)	25%	30 (28%)	23%
Cough	61 (42%)	16%	43 (33%)	19%	50 (68%)	56%	42 (39%)	19%
Hunger*	60 (41%)	38%	43 (33%)	35%	21 (29%)	20%	75 (70%)	44%
Nausea	59 (40%)	24%	23 (18%)	4%	28 (38%)	7%	32 (30%)	34%
Dizziness	57 (39%)	25%	55 (42%)	25%	23 (32%)	39%	59 (55%)	34%
Changes in skin	53 (36%)	37%	16 (12%)	25%	6 (8%)	17%	21 (20%)	29%
Dry mouth	54 (37%)	24%	34 (26%)	21%	35 (48%)	23%	65 (61%)	32%
Problems with sexual interest /	48 (33%)	57%	30 (23%)	60%	19 (26%)	47%	42 (40%)	40%
Feeling bloated	45 (31%)	24%	32 (25%)	31%	25 (34%)	44%	34 (32%)	44%
Swelling of arms or	46 (31%)	27%	39 (30%)	31%	07 (10%)	14%	27 (25%)	26%
Sweats	44 (30%)	43%	31 (24%)	29%	17 (24%)	6%	63 (59%)	43%
Itching	42 (29%)	20%	23 (18%)	17%	10 (14%)	20%	28 (26%)	50%
Changes in way food tastes	42 (29%)	33%	20 (15%)	30%	15 (21%)	20%	37 (35%)	27%
Difficulty seeing well, poor vision*	39 (27%)	23%	61 (47%)	30%	19 (26%)	6%	68 (64%)	57%
Difficulty moving*	37 (25%)	0%	34 (26%)	41%	11 (15%)	0%	34 (32%)	50%
Hair loss	35 (24%)	43%	1 (1%)	0%	1 (1%)	0%	6 (6%)	50%
Constipation	34 (23%)	31%	22 (17%)	18%	13 (18%)	16%	29 (27%)	31%
Vomiting	33 (22%)	27%	7 (5%)	29%	10 (14%)	0%	10 (9%)	40%
Bad smell or odor*	32 (22%)	44%	3 (2%)	33%	0 (0%)	0%	8 (7%)	38%

	Cancer (N=147)		Cardiovascular diseases		Chronic respiratory		Diabetes (N=107)	
	Prevalence	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*	*Prevalence*	*% reporting*
Discharge from private parts*	31 (21%)	35%	3 (2%)	33%	1 (1%)	0%	4 (4%)	25%
Problems urinating	29 (20%)	38%	16 (12%)	38%	4 (5%)	20%	31 (29%)	42%
Shortness of breath	28 (19%)	21%	38 (29%)	39%	55 (75%)	64%	28 (26%)	25%
Diarrhea	26 (18%)	22%	12 (9%)	25%	5 (7%)	0%	27 (25%)	25%
Difficulty	24 (16%)	44%	8 (6%)	0%	8 (6%)	0%	7 (7%)	26%
Difficult hearing,	20 (14%)	25%	22 (17%)	18%	4 (5%)	0%	22 (21%)	36%
Sores or lumps in private parts*	18 (12%)	44%	3 (2%)	100%	1 (1%)	0%	8 (7%)	13%
Mouth sores	14 (10%)	36%	12 (09%)	8%	2 (3%)	0%	16 (15%)	26%
Psychological symptoms								
Feeling sad	93 (63%)	24%	64 (49%)	33%	40 (55%)	35%	57 (53%)	39%
Worrying	107 (73%)	39%	84 (65%)	43%	56 (77%)	29%	77 (72%)	50%
Feeling irritable	77 (52%)	22%	45 (35%)	31%	31 (42%)	32%	43 (40%)	40%
Feeling nervous	47 (32%)	34%	54 (42%)	35%	28 (38%)	29%	42 (39%)	29%

*Note: High distress is defined as patients reporting 'quite a bit' or 'very much' for physical symptoms / 'frequently or almost constantly' for psychological symptoms, expressed as a percentage of those with the symptom. * African items*

Table 5: Symptom distress scores by type of diagnosis (N=457)

	Cardiovascular diseases	**Cancer**	**Chronic respiratory diseases**	**Diabetes**	**Significance test**
MSAS subscale	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	F statistic and P value
Total number of symptoms	9.58 (5.45)	12.3 (6.11)	11.0 (5.45)	12.6 (5.55)	F=6.19, P=0.0004*
MSAS distress index	0.78 (0.57)	1.07 (0.77)	0.93 (0.63)	1.18 (0.71)	F=7.99, P=<0.001*
MSAS psychological distress Index	1.13 (0.90)	1.2 (0.8)	1.2 (0.81)	1.3 (0.95)	F=0.81, P=0.4885
MSAS global distress index	1.07 (0.74)	1.25 (0.70)	1.18 (0.69)	1.40 (0.7)	F=4.26, P=0.005

*Statistically significant p value set at 0.001

Table 6: Main effects step-wise regression model physical symptom distress

Variable	Variable category	Estimate	P_value	95% CI
Sex	Male	Ref.		
Sex	Female	0.174	0.005	(0.05, 0.29)**
Country	Malawi	0.000		
Country	Namibia	0.348	0.000	(0.21, 0.48)***
Education	Primary /none	Ref.		
Education	secondary	-0.055	0.419	(-0.19, 0.08)
Education	Tertiary	-0.101	0.380	(-0.33, 0.12)
Comorbidities	Yes	Ref.		
Comorbidities	No	-0.169	0.007	(-0.29, -0.05)**
HIVsero	HIV positive	0.000		
HIVsero	HIV negative	0.028	0.759	(-0.15, 0.20)
HIVsero	Unknown	-0.030	0.781	(-0.24, 0.18)
Diagnosis	Cancer	Ref.		
Diagnosis	Cardiovascular diseases	-0.226	0.066	(-0.47, 0.01)
Diagnosis	Chronic persistent respiratory disease	-0.047	0.725	(-0.31, 0.22)
Diagnosis	Diabetes	0.172	0.168	(-0.07, 0.42)
Stage	Unknown	Ref.		
Stage	Early	-0.123	0.490	(-0.47, 0.23)
Stage	Late	0.082	0.569	(-0.20, 0.37)
Stage	Advanced	0.169	0.225	(-0.10, 0.44)
Age	per unit increase	0.002	0.469	(-0.00, 0.01)
Karnofsky	per unit increase	-0.017	0.000	(-0.02, -0.01)***

*Ref- reference category * p<0.05 ** p<0.01; *** p<0.001*

Table 7: Main effects- stepwise regression model psychological symptom distress

Variable	Variable category	Estimate	P_value	95% CI
Gender	Male	Ref		
Gender	Female	0.044	0.596	(-0.12, 0.21)
Country	Malawi	Ref		
Country	Namibia	0.234	0.011	(0.05, 0.41)*
Education	Primary/none	Ref.		
Education	Secondary	-0.224	0.014	(-0.40, -0.05)*
Education	Tertiary	-0.190	0.217	(-0.49, 0.11)
Comorbidities	Yes	Ref		
Comorbidities	No	-0.202	0.016	(-0.37, -0.04)*
HIVsero status	HIV positive	Ref.		
HIVsero status	HIV negative	0.004	0.972	(-0.23, 0.24)
HIVsero status	Unknown	-0.144	0.317	(-0.43, 0.14)
Diagnosis	Cancer	0.000		
Diagnosis	Cardiovascular	-0.111	0.498	(-0.43, 0.21)
Diagnosis	Chronic persistent respiratory disease	-0.024	0.895	(-0.37, 0.33)
Diagnosis	Diabetes	0.064	0.703	(-0.26, 0.39)
Stage	Unknown	Ref.		
Stage	Early	-0.343	0.149	(-0.81, 0.12)
Stage	Late	-0.021	0.914	(-0.40, 0.36)
Stage	Advanced	-0.008	0.964	(-0.37, 0.35)
Age	per unit increase	Ref.	0.911	(-0.01, 0.01)
Karnofsky	per unit increase	-0.014	0.000	(-0.02, -0.01)***

*Reference category- * p<0.05; *** p<0.001*