Abstract

People with HIV experience a high prevalence and burden of physical and psychological symptoms throughout their disease trajectory. These have important public and clinical health implications. We aimed to measure (1) the seven-day period prevalence of symptoms (2) the most burdensome symptoms, and (3) determine if self-reported symptom burden is associated with treatment status, clinical stage and physical performance.

We conducted a cross-sectional study among adult (aged at least 18 years) patients with HIV, attending HIV outpatient care in Kenya. Data was gathered through self-report using the Memorial Symptom Assessment Scale-Short Form (MSAS-SF), file extraction (sociodemographic data, treatment status, CD4 count, clinical stage) and through observation using the Karnofsky Performance Scale (KPS). Multivariable ordinal logistic regression assessed the association of symptom burden (MSAS-SF) controlling for demographic and clinical variables.

Of the 475 participants approached, 400 (84.2%) participated. The 10 most prevalent symptoms were pain (61%), feeling sad (58.75%), feeling drowsy (55.25%), difficulty in concentrating (55%), lack of energy (55%), problems with sexual activity (54.24%), worry (49.5%), numbness (46.25%), feeling irritable (45%) and hunger (42.75%). Ordinal logistic regression showed that being on HIV treatment was associated lower global distress index (in quartiles) (odds ratio .45, 95% CI .23 to .88; p=0.019). Patients with KPS scores >80% were associated with lower symptom burden.

Pain and symptom burden still persist in the era of antiretroviral therapy. Holistic pain assessment in needed in clinical setting. It is also important to ensure that opioids are available and prescribed to those in need. Besides pharmacological interventions, self-management interventions are needed in the management of pain, and symptoms for people with HIV.

Introduction and background

Kenya is one of the countries in the sub-Saharan region with a high prevalence of HIV infection. It shares fourth position alongside Mozambique and Uganda in terms of HIV prevalence. UNAIDS estimates that at the end of 2015, there were 1.5 million people living with HIV in Kenya with 5.9% adult prevalence (WHO/UNAIDS, 2015). Kenya has made positive strides in terms of implementing the 90-90-90 UNAIDS policy. At the end of 2015, 64% of the population were on HIV treatment. Death rate declined from 51,000 in 2010 to 36,000 in 2015.

Despite the availability of HIV treatment to optimise care for people living with HIV (PLWA), multi-dimensional problems still persist. Patients with HIV experience physical, psychological, social and spiritual problems from the point of diagnosis (Simms et al., 2011) within two weeks of diagnosis (Simms et al., 2013) and during treatment (Harding et al., 2006, Harding et al., 2010). Our prior evidence from the UK, South Africa and Uganda have demonstrated a high prevalence and burden of problems in outpatient settings alongside ART (Harding et al., 2010, Namisango et al., 2012, Farrant et al., 2012). These problems have negative effects on the life of the patients (Harding et al., 2012a).

Clinicians and policy makers are increasingly recognising that patient self-reported outcomes are essential to ensure optimal health service access and equity in health status (Dawson et al., 2010). A whole person-centred approach to HIV treatment, care and support is essential to optimise outcomes, and is advocated in global policy for those with any stage of HIV infection and alongside treatment (WHO, 2011). WHO advocates for pain and symptom control in HIV clinical care as essential components within the package of care (WHO, 2011).

The clinical and public health relevance of these problems are demonstrated in the relationship between symptom burden (physical and psychological) and sexual risk taking (Harding et al., 2012b) poor adherence to treatment (Sherr et al., 2008), and

viral rebound (Lampe et al., 2010). Symptoms in HIV are present throughout the disease trajectory regardless of CD4 count and stage classification (Peltzer and Phaswana-Mafuya, 2008, Willard et al., 2009). The burden of symptoms has not been carefully examined in terms of its association with clinical staging and treatment status. Symptom burden in HIV is associated with poor drug adherence and poor quality of life (Harding et al., 2010, Hughes et al., 2004, Brechtl et al., 2001, Rosenfeld et al., 1996), We therefore conducted a cross-sectional study on living with HIV in order to examine the seven day prevalence of physical and psychological symptoms among PLWH and determine if symptom burden was associated with treatment status and clinical stage of illness, to inform the development of self-management interventions in HIV and new clinical guidelines in the management of pain and symptoms

Methods

We did a cross-sectional study using self-reported data, file extraction and observer ratings. Participants were included if they were adult (aged at least 18 years) patients with documented HIV diagnosis, and aware of their diagnosis. Participants were recruited at an HIV outpatient care facility (Bomu hospital) in Mombasa, Kenya. Bomu hospital offers a wide range of services for HIV patients such as counselling and testing, inpatient and outpatient treatment of HIV for both adults and children. The hospital also provides medical services for patients with other medical conditions such as lung disease, diabetes, malaria. Ethical approval was obtained from the Kenyan Medical Research Institute (KEMRI/RES/7/3/1).

Procedures

The researcher used a random number table each day to select the first patient to approach in the patient outpatient queue. Each patient approached had the information sheet read aloud. They were then asked to make an informed decision to take part in the study. If they were willing to take part, they were asked to sign the consent form. The researcher subsequently approached every consecutive patient. The researcher recorded

the number of acceptances and refusals daily, in order to calculate the response rate. A payment of $5 was made for patient expenses in relation to participation in the study, and a drink/fruit snack was offered. The researcher is a highly experienced Kenyan researcher who has worked in this setting with this population on several previous studies of people living with HIV (Lowther et al., 2012, Lowther et al., 2015), and is fluent in local languages.

Sample size calculation

Sample size calculation was based on HIV prevalence in Kenya. UNAIDS data report that 1.5 million Kenyans are infected with HIV (95% CI 1.3m, 1.6m) (WHO/UNAIDS, 2015). With 95% confidence, 5% margin of error, and a response distribution of 50% for any outcome we estimated that 385 were required to determine prevalence of any outcome. We therefore recruited 400 to allow for any non-completers.

Data collection

The researcher extracted CD4, treatment status for HIV and TB from patient's records. The researcher administered questionnaires to gather self-reported data in a private space at the clinic. All responses were recorded by the researcher and answers given verbally by participants. This helped to reduce any potential response bias by mixing self-completion and researcher-completion. Data were collected using tools previously implemented/validated in African in HIV populations. The tools were:

1. The Memorial Symptom Assessment Scales Short Form (MSAS-SF) was used to assess symptoms. MSAS-SF measured the prevalence and burden of physical and psychological symptoms in the past seven days (Chang et al., 2000). MSAS-SF has three subscale indices of physical symptom distress (MSAS-PHYS), psychological symptom distress (MSAS-PSYCH) and global distress index (MSAS-GDI), each has a score range of 0-4. It is applicable in a wide range of conditions, and enables comparison between conditions (Harding et al., 2010). It was recently used in symptom cluster studies among HIV

patients conducted in Uganda and South Africa (Moens et al., 2015, Namisango et al., 2015).

2. Demographics, socioeconomic status using Demographic and Health Survey (DHS) (Gwatkin et al., 2007), using variables such as house construction, possession of items, fuel supply, and water source. These variables were used to calculate the wealth of the participants. The wealth quintile variable was created in line with the methods of DHS (Gwatkin et al., 2007). We used factor analysis with principal component analysis to create a continuous variable which was then converted into quintile. DHS has previously been used in HIV research in sub-Saharan Africa (Lowther et al., 2012, Harding et al., 2014).

3. The Karnofsky Performance Status (KPS). This is an observer-rated scale widely been used in HIV population (Namisango et al., 2015). It is used to assess the level of physical function of the patient, rated on a scale of 0-100, with 0 corresponding to no physical function (death) and 100 corresponding to maximum independent functioning (Mor et al., 1984). The Karnofsky Performance Scale was previously used in a symptom cluster study among HIV patients in Uganda (Moens et al., 2015, Namisango et al., 2015).

Data analysis

Data was entered into a spreadsheet with a unique identifier for each patient. The spreadsheet was converted into Stata version 14 dataset (StataCorp, 2015).

The prevalence of each symptom and distress associated with each symptom was tabulated. All MSAS-SF subscales were computed and calculated based on the methods of the MSAS-SF. For the presence of physical symptoms they were computed as follows: 0.8 'no distress at all', 1.6 'a little bit', 2.4 'somewhat', 3.2 'quite a bit' and 4.0 'very much'. For the presence of psychological symptoms they were computed as follows: 1 'rarely' 2 'occasionary' 3 'frequently' and 4 'almost constantly'. Most distressing symptoms were calculated, these were symptoms scored using the worst two categories of burden (i.e.,

causes 'quite a bit' or 'very much' distress for physical symptoms and 'frequently' or 'almost constantly' for psychological symptoms). Individuals under these two worst categories were regarded as experiencing high distress.

MSAS-GDI, MSAS-PHYS and MSAS-PSYCH scores were not normally distributed. They were therefore converted into quartiles (MSAS-GDI) and quintiles (MSAS-PHYS and MSAS-PSYCH). The KPS scores were skewed and were therefore converted into binary variable with two groups: (1) with a score of ≤80%, unable to carry normal activity or work (2) with a score of >80% ability to carry normal activity and work. This was based on a study by Peus et al (2013) who recommended to use an algorithm with a minimum of two and a maximum of three variables to facilitate an adequate and efficient evaluation of the KPS (Péus et al., 2013). Descriptive statistics were used to profile the demographic, socioeconomic and clinical characteristics of participants.

The dependent outcomes were global distress index (MSAS-GDI), physical symptom distress (MSAS-PHYS) and psychological symptom distress (MSAS-PSYCH). Covariates were demographic variables (age, gender, education, and wealth in quintiles), clinical variables (HIV stage, CD4 count in quintiles, TB treatment: yes/no, ART treatment: yes/no and KPS). Initially we conducted a univariate analysis for demographic, and clinical variables. We then conducted adjusted analysis for demographic variables falling within less than 25% p value (Altman, 1991). Clinical variables (HIV treatment status, CD4 count, HIV clinical stage, TB treatment status) were forced into the multivariate models regardless of the outcome of the univariate analysis. All these are confounding variables, which are frequently associated with HIV illness. Pain and physical symptoms are common in HIV at any stage of infection. Physical symptoms such as pain occur due to HIV illness or HIV treatment (Marcus et al., 2000, Vogl et al., 1999), peripheral neuropathy due to TB infection and treatment (Chen et al., 2013, Evans et al., 2011, Ellis et al., 2010) CD4 count (Aouizerat et al., 2010, Richardson et al., 2009) and clinical stage (Martin et al., 1999, Dobalian et al., 2004, Nair et al., 2009) are frequently associated with HIV illness. We conducted a 'brant' test of parallel regression

assumption. A non-significant test statistic provided evidence that the parallel regression assumption were met. All cases with missing data were excluded from the models.

Results

Table 1 presents the demographic and clinical characteristics of the participants. Of the 475 participants approached, 400 (84.2%) participated. The mean age was 39.4 years (SD 9.9), range 18-74 years. The majority were females (n=280, 70%). Just over half of the sample (n=213, 53.25%) as attended primary school, and just over a quarter (n=113, 28.25%) attended secondary school.

Treatment variables

Treatment variables are presented on table 1. Most of the patients were currently on ART (n=366, 91.5%), with (n=61, 15.64%) also on TB treatment. The mean CD4 count was 393.7(SD=238.2). Most of the participants were on stage 3 of HIV infection (n=343, 85.75%). The majority of the patients disclosed their status to someone (n=373, 93.25%). In relation to the physical performance score (KPS) n=298 (74.5%) were above 80%.

Symptoms reported

The mean symptom distress subscale indices were: global distress index (GDI) 13.34 (SD=10.06), physical symptom distress (PHYS) 12.52 (SD= 9.88) and psychological symptom distress (PSYCH) was 8.44 (SD=7.22). The ten most prevalent symptoms are presented on table 2. Pain was the most prevalent symptom reported (n=244, 61%), followed by feeling sad (n=235, 58.75%). Manifestations of fatigue were also most common, such as feeling drowsy (55.25%), difficulty in concentrating (55%) and lack of energy (55%). Other most prevalent symptoms were problems with sexual activity (54.24%), worry (49.5%), numbness (46.25%), feeling irritable (45%) and hunger (42.75%).

The ten most distressing symptoms (worst two categories reported as "quite a bit" or "very much" for physical symptoms and "frequently" or "almost constantly" for psychological symptoms) were problems with sexual activity (38.75%), feeling sad (37.5%), worry (29.5%), hunger (29.25%), feeling irritable (28.5%), feeling nervous (28.25%), feeling drowsy (27.5%), pain (26.25%), difficulty concentrating (26%), and lack of energy (25%).

Predictors of symptom prevalence and distress

Univariate and multivariate ordinal logistic regression models were constructed as shown on tables 3, 4 and 5.

ART treatment, age, gender and KPS were significantly associated with global distress index (see table 3). Being on ART was associated with lower (better) global distress index (odds ratio .45, 95% CI .23 to .88; p=0.019. Women experienced worse global distress index (odds ratio 2.97, 95% CI 1.95 to 4.52; p<0.001). Age predicted lower global symptom distress (odds ratio .98, 95% CI .96 to 1.00; p=0.048). Participants with KPS >80% had lower (better) global distress index (odds ratio .32, 95% CI .20 to .50; p<0.001).

Gender and KPS were associated with physical and psychological symptom distress. Women reported higher (worse) physical symptom distress (odds ratio 2.28, 95% CI 1.52 to 3.41; p<0.001). Participants with KPS scores of >80% had lower physical symptom distress (odds ratio .28, 95% CI .18 to .45; p<0.001) (see table 4).

Likewise on table 5, women experienced higher (worse) psychological symptom distress (odds ratio 3.17, 95% CI 2.11 to 4.78; p<0.001). Patients with KPS scores of >80% were associated with lower psychological symptom distress (odds ratio .43, 95% CI .28 to .67; p<0.001).

In summary gender and KPS were associated with all the symptom subscales (GDI, PHYS and PSYCH).

Discussion

Data from this study shows that people with HIV attending outpatient clinic reported high prevalence of physical and psychological symptoms. Compared to other studies conducted in Uganda using the same measure in similar populations, our results are comparable in terms of the most prevalent symptoms (Wakeham et al., 2010, Namisango et al., 2013), although the prevalence was much higher in the Ugandan studies for pain (Wakeham et al., 2010), feeling drowsy, lack of energy (Namisango et al., 2013, Wakeham et al., 2010), numbness of feet and hands (Wakeham et al., 2010). However the prevalence was lower in another Ugandan study compared to our study for pain and difficulty concentration (Namisango et al., 2013). Interestingly problems with sexual activity were rated the top most distressing symptom in all the studies. Other most distressing symptoms were feeling sad, worry, pain and lack of energy. Compared with similar work done in the UK, similar symptoms were reported and most prevalent were lack of energy, worry, problems with sexual activity and pain (Harding et al., 2010). However, prevalence rates were higher in the UK study. The prevalence and burden of symptoms reported in our study are similar to those reported in a review by Solano and colleagues (Solano et al., 2006).

Pain prevalence was high and among the most burdensome physical symptoms in our study. Several studies in HIV (Huang et al., 2013, Kolawole Wasiu and Alakija Kazeem, 2011, Richardson et al., 2009, Kimball and McCormick, 1996, Wakeham et al., 2017) and cancer (Huang et al., 2013) population have reported high prevalence of pain alongside ART. Several authors have reported that pain and other physical and psychological symptoms persist in HIV alongside ART (Harding et al., 2010, Lowther et al., 2014).

Female sex and KPS >80% were associated with all the three MSAS subscales. Similarly a cross-sectional study conducted in Uganda reported that KPS>70% were associated with symptom burden of each MSAS subscale (Namisango et al., 2013). In our study being female was associated with higher physical, psychological and global distress and

burden. Likewise a multi-country study in sub-Saharan Africa and an American sample concluded that females experienced higher symptom burden (Potter et al., 2003, Koole et al., 2016), however in the Ugandan study, being male was associated with psychological symptom distress (Namisango et al., 2013).

Our results show that being on ART was associated with lower global distress index scores, however there was no significant association with physical and psychological distress measures. Similarly a recent longitudinal study conducted in Uganda among HIV patients using the same tool concluded that symptom prevalence and distress indices reduced after ART was initiated (Wakeham et al., 2017). However, our results are at odds with previous cross- sectional study conducted in UK and Uganda that reported that ART treatment is not associated with any symptom distress measure (Namisango et al., 2013, Harding et al., 2010).

Our findings show that prevalence and distress of symptoms were not associated with CD_4 count and clinical stage. Similarly a cross-sectional study conducted in Uganda in the same population reported that CD_4 count and clinical stage were not associated with symptom burden (Wakeham et al., 2010). This is contrary to findings from a heterogeneous HIV infected American population that reported higher pain prevalence among patients with low CD_4 count (Richardson et al., 2009, Aouizerat et al., 2010) and higher pain prevalence among patients with advanced HIV infection (Martin et al., 1999, Dobalian et al., 2004, Nair et al., 2009) and higher symptom burden at stage IV (Namisango et al., 2013). Our findings therefore are important to inform policy that pain and symptom management is critical at each stage of the infection and regardless of CD_4 count.

The current study shows that hunger was one of the top ten prevalent symptoms and top five most distressing symptoms. This requires holistic patient-centred care and more attention because hunger may result in poor drug adherence (Harding et al., 2010). A recent longitudinal study reported that prior to starting ART hunger prevalence was 43%, and it remained the same after one year, suggesting that hunger does not

decrease with ART (Wakeham et al., 2017). In an African context hunger is due to poverty and long distance to access the clinic including long waiting time to meet the doctor (Hardon et al., 2007). A recent multi-country study conducted in Zambia, Uganda and Tanzania concluded that besides ART, not having enough food were the cause of hunger, and this led to poor drug adherence (Koole et al., 2016). ART provision and food integration should be encouraged in Kenya. A systematic review reported that provision of food supplements alongside ART reduces poor drug adherence (Singer et al., 2015).

Numbness of hands and feet was among the most prevalent physical symptoms. A recent systematic review of self-management interventions on pain and physical symptoms for people living with HIV concluded that self-management interventions delivered face-to-face or group based are effective in reducing prevalence and severity of symptoms (Nkhoma et al., 2018). Therefore, we recommend further work on the management of numbness of hands and feet.

Study strengths and limitations

We used questionnaires validated in local population and researcher administered the questionnaires. Our study provides novel data on symptom prevalence and burden among HIV patients through self-report. Our study had a response rate of 84.2 %.

This study however has some limitations. This data was cross-sectional therefore, we can only determine associations. Data on viral load was missing in the patient records. This data would have been useful to assess the relationship between CD_4 count and viral including the relationship between symptom burden and viral load. 92% of the participants were on ART. This is good development reflecting a wide rollout of ART; however, this has limitations in terms of interpretation of the findings because we cannot compare the participants who were on ART vs those who were not on ART.

Our novel data informs care delivery to support the guidelines for providing pain and symptom management for patients with HIV.

Conclusion

The prevalence and burden of physical and psychological symptoms persist in HIV particularly among women. The burden of hunger needs attention and further work to identify strategies to deal with this symptom in order to prevent poor drug adherence and attrition from HIV care. Pain assessment focussing on physical, psychological social and spiritual aspects is needed in clinical setting when managing HIV in order to come up with effective interventions. It is also important to ensure that opioids are available and prescribed to those experiencing high burden of pain and symptoms. This has been proved to be a useful model in Uganda for pain management (Logie and Harding, 2005). This model could be replicated in Kenya. Besides pharmacological interventions, self-management interventions are needed in the management of pain and symptoms in HIV population. Self-management interventions can be delivered using locally available resources and have shown to be effective (Nkhoma et al., 2018).

Conflict of interest

No conflicts of interests to declare.

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Table 1: Demographic and clinical characteristics (N=400)

Values are numbers (percentages) unless stated otherwise

Demographic characteristics	
Sex	
Male	120 (30)
Female	280 (70)
Mean age (SD)	39.4 (9.9)
Median age (IQR)	39 (Q1-Q3=32.5-46)
Relationship[1]	
In a relationship	209 (52.38)
Not in relationship	190 (47.62)
Education	
Primary	258 (64.50)
Secondary	113 (28.25)
Tertiary	29 (7.25)
Wealth quintile	
Poorest	101 (25.25)
Middle poor	59 (14.75)
Middle	80 (20)
Middle wealthy	80 (20)
Wealthiest	80 (20)
Clinical characteristics	
Physical Performance Status (KPS)	
≤80%	102 (25.50)
>80%	298 (74.50)
CD_4 count (cells/mm^3)	
Median (IQR)	349.5 (Q1-Q3=223.5-519)
CD4 count (cells/mm^3)	
Very low (<200)	70 (17.50)
Low (200/499)	217 (54.25)
Normal (≥500(cells/mm^3)	113 (28.50)
WHO Stage	
Stage 1/2	52 (13)
Stage 3/4	348 (87)
Patient on ART	
Yes	366 (91.50)
No	34 (8.50)
Patient on TB treatment[2]	
Yes	61 (15.64)
No	329 (84.36)
Behavioural characteristics	
Told someone HIV Status	
Yes	373 (93.25)
No	27 (6.75)
GDI(MSAS-GDI) mean(SD) (0-40)[3]	13.34 (10.06)
Physical symptom subscale (MSAS-PHYS) mean(SD) (0-48)[e]	12.52 (9.88)
Psychological symptom subscale (MSAS-PSYCH)mean(SD)(0-24)[e]	8.44 (7.22)

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[1] 1 missing

[2] 10 missing

[3] Low scores better status

Table 2: Physical and psychological symptoms with highest 7-day period prevalence and their associated distress (MSAS-SF) (n=400). *Values are numbers (percentages)*

Physical symptom	Did not have symptoms	Prevalence	Burden of prevalent symptoms				
			Not at all (1)	A little bit (2)	Somewhat (3)	Quite a bit (4)	Very much (5)
Pain	156 (39)	244 (61)	1 (0.25)	80 (20)	58 (14.50)	7 (1.75)	98 (24.50)
Feeling drowsy	179 (44.75)	221 (55.25)	0	57 (14.75)	54 (13.50)	13 (3.25)	97 (24.25)
Difficulty concentrating	180 (45)	220 (55)	0	85 (21.25)	31 (7.75)	9 (2.25)	95 (23.75)
Lack of energy	180 (45)	220 (55)	0	48 (12)	72 (18)	14 (3.50)	86 (21.50)
Problems with sexual activity	183 (45.75)	217 (54.25)	0	27 (6.75)	35 (8.75)	16 (4)	139 (34.75)
Numbness (tingling in hands/feet)	215 (53.75)	185 (46.25)	0	54 (13.50)	35 (8.75)	14 (3.50)	82 (20.50)
Hunger[1]	229 (57.25)	171 (42.75)	2 (0.50)	23 (5.75)	27 (6.75)	8 (2)	111 (27.25)
Lack of appetite	237 (59.25)	163 (40.75)	2 (0.50)	47 (11.75)	43 (10.75)	9 (2.25)	62 (15.50)
Weight loss	240 (60)	160 (40)	0	68 (17)	29 (7.25)	7 (1.75)	56 (14)
Itching	242 (60.50)	158 (39.50)	0	50 (12.50)	40 (10)	14 (3.50)	54 (13.50)
Cough	251 (62.75)	149 (37.25)	0	72 (18)	33 (8.25)	17 (4.25)	27 (6.75)
Difficulty sleep	257 (64.25)	143 (35.75)	2 (0.50)	30 (7.50)	35 (8.75)	14 (3.50)	62 (15.50)
Nausea	262 (65.50)	138 (34.50)	0	50 (12.50)	32 (8)	9 (2.25)	47 (11.75)
Dizziness	265 (66.25)	135 (33.75)	0	41 (10.25)	46 (11.50)	8 (2)	40 (10)
Dry mouth	268 (67)	132 (33)	1 (0.25)	40 (10)	33 (8.25)	11 (2.75)	47 (11.75)
Changes in skin	276 (69)	124 (31)	0	30 (7.50)	28 (7)	13 (3.25)	53 (13.25)
Changes in food taste	277 (69.25)	124 (30.75)	0	35 (8.75)	37 (9.25)	8 (2)	43 (10.75)
Muscle aches[1]	278 (69.50)	122 (30.50)	1 (0.25)	33 (8.25)	37 (9.25)	8 (2)	43 (10.75)
Feeling bloated	284 (71)	116 (29)	0	31 (7.75)	26 (6.50)	6 (1.50)	53 (13.25)
Difficulty walking[1]	285 (71.25)	115 (28.75)	1 (0.25)	32 (8)	30 (7.5%)	5 (1.25)	47 (11.75)
Poor vision[1]	293 (73.25)	107 (26.75)	1 (0.25)	40 (10)	30 (7.50)	10 (2.50)	26 (6.50)
I don't like myself	296 (74)	104 (26)	0	33 (8.25)	19 (4.75)	6 (1.50)	46 (11.50)
Sweats	297 (74.25)	103 (25.75)	0	29 (7.25)	29 (7.25)	13 (3.25)	32 (8)
Difficulty moving[1]	307 (76.75)	93 (23.25)	1 (0.25)	36 (9)	25 (6.25)	5 (1.25)	26 (6.50)
Shortness of breath	309 (77.25)	91 (22.75)	1 (0.25)	31 (7.75)	33 (8.25)	10 (2.50)	16 (4)
Urinating problems	311 (77.75)	89 (22.25)	1 (0.25)	30 (7.50)	28 (7)	10 (2.50)	20 (5%)
Swelling of arms/legs	326 (81.50)	74 (18.50)	2 (0.50)	30 (7.50)	23 (5.75)	4 (1)	15 (3.75)
Constipation	327 (81.75)	73 (18.25)	2 (0.50)	13 (3.25)	23 (5.75)	9 (2.25)	26 (6.50)
Bad/body odour[1]	332 (83)	68 (17)	3 (0.75)	17 (4.25)	20 (5)	11 (2.75)	17 (4.25)
Hair loss	332 (83)	68 (17)	1 (0.25)	28 (7)	21 (5.25)	7 (1.75)	11 (2.75)
Mouth sores	335 (83.75)	65 (16.25)	0	24 (6)	14 (3.50)	5 (1.25)	22 (5.50)
Difficulty swallowing	336 (84)	64 (16)	1 (0.25)	18 (4.50)	23 (5.75)	3 (0.75)	19 (4.75)
Diarrhoea	336 (84)	64 (16)	1 (0.25)	28 (7)	24 (6)	3 (0.75)	8 (2)
Discharge from private parts[1]	337 (84.25)	63 (15.75)	0	26 (6.50)	14 (3.50)	4 (1)	19 (4.75)
Vomiting	338 (84.50)	62 (15.50)	1 (0.25)	22 (5.50)	17 (4.25)	9 (2.25)	13 (3.25)
Sore lumps on private parts[1]	341 (85.25)	59 (14.75)	1 (0.25)	28 (7)	17 (4.25)	3 (0.75)	10 (2.50)
Poor hearing[1]	348 (87)	52 (13)	0	25 (6.25)	18 (4.50)	6 (1.50)	3 (0.75)

Psychological symptoms	Did not have symptoms	Prevalence	Rarely	Occasionally	Frequently	Almost constantly
Feeling sad	165 (41.25)	235 (58.75)	31 (7.75)	54 (13.50)	32 (8)	118 (29.50)
Worrying	202 (50.50)	198 (49.50)	17 (4.25)	63 (15.75)	34 (8.50)	84 (21)
Feeling irritable	220 (55)	180 (45)	21 (5.25)	45 (11.25)	32 (8)	82 (20.50)
Feeling nervous	231 (57.75)	169 (42.25)	18 (4.50)	38 (9.50)	37 (9.25)	76 (19)
Feeling suicidal	342 (85.50)	58 (14.50)	10 (2.50)	17 (4.25)	12 (3)	19 (4.75)

1: African symptoms

To compute distress of symptoms each participant was asked if they experienced a particular symptom or not (yes or No). If they experienced the symptom (if they said yes), participants were asked to rate the severity of that symptom on a scale of 1 to 5 for physical symptoms and 1 to 4 for psychological symptoms.

For example, the prevalence of pain was 61%. This means that 100-61=39% did not experience pain. For the 61% who were in pain, (24.5% experienced 'very much pain', 1.75% 'quite a bit', 14.5% 'somewhat', 20% 'a little bit' and 0.25% were in pain but was not burdensome 'not at all').

Table 3: Association of Global distress index (MSAS-GDI) with demographic and clinical factors

Independent variables	Univariate analysis		Multivariate analysis	
	0dds ratio (95% CI)	P value	0dds ratio (95% CI)	P value
Age	.98 (.96 to .99)	0.008*	.98 (.96 to 1.00)	0.048*
Men vs women (ref female)	2.51 (1.69 to 3.72)	<0.001**	2.97 (1.95 to 4.52)	<0.001**
Clinical stage (ref stage 1/2)	.78 (.46 to 1.32)	0.35	.76 (.44 to 1.33)	0.34
ART (ref yes)	.42 (.22 to .80)	0.008*	.45 (.23 to .88)	0.019*
CD_4 count category (<200 vs 200-499)	.68 (.42 to 1.11)	0.12	.69 (.42 to 1.15)	0.15
CD_4 count category (<200 vs ≥500)	.78 (.45 to 1.33)	0.36	.83 (.47 to 1.47)	0.52
TB treatment (ref yes)	1.05 (.66 to 1.69)	0.83	.72 (.43 to 1.20)	0.21
Education: primary school vs secondary	.69 (.46 to 1.03)	0.068	.86 (.56 to 1.32)	0.48
primary vs tertiary)	.95 (.49 to 1.83)	0.88	1.23 (.60 to 2.51)	0.58
Wealth: poorest vs middle poor	.77 (.42 to 1.39)	0.38	1.05 (.57 to 1.93)	0.88
Poorest vs middle	.80 (.47 to 1.36)	0.41	.96 (.55 to 1.67)	0.88
Poorest vs middle wealthy	.85 (.50 to 1.42)	0.53	.87 (.50 to 1.52)	0.63
Poorest vs wealthiest	.68 (.40 to 1.13)	0.13	.71 (.41 to 1.26)	0.25
KPS (≤80 vs >80)	.40 (.26 to .60)	<0.001**	.32 (.20 to .50)	<0.001**
Tests of parallel regression assumption			Brant=23.58 p=0.09	

CI: confidence interval; KPS: Karnofsky Performance Status, Significance at *5% level **<1% level

Table 4 Association of Physical symptom distress (MSAS-PHYS) with demographic and clinical factors

Independent variables	Univariate analysis		Multivariate analysis	
	0dds ratio (95% CI)	P value	0dds ratio (95% CI)	P value
Age	.99 (.97 to 1.00)	0.13	.99 (.98 to 1.01)	0.50
Men vs women (ref female)	2.00 (1.37 to 2.93)	<0.001**	2.28 (1.52 to 3.41)	<0.001**
Clinical stage (ref stage 1/2)	.77 (.48 to 1.23)	0.27	.77 (.44 to 1.35)	0.36
ART (ref yes)	.51 (.27 to .95)	0.034*	.56 (.29 to 1.05)	0.07
CD$_4$ count category (<200 vs 200-499)	.66 (.41 to 1.04)	0.08	.64 (.39 to 1.03)	0.07
CD$_4$ count category (<200 vs ≥500)	.65 (.39 to 1.10)	0.11	.69 (.40 to 1.19)	0.18
TB treatment (ref yes)	1.21 (.75 to 1.94)	0.43	.74 (.44 to 1.24)	0.25
Education: primary vs secondary	.74 (.50 to 1.09)	0.14	.87 (.58 to 1.32)	0.52
primary vs tertiary	1.07 (.55 to 2.09)	0.84	1.23 (.60 to 2.54)	0.57
Wealth: poorest vs middle poor	.69 (.39 to 1.24)	0.22	.89 (.49 to 1.61)	0.69
Poorest vs middle	.80 (.47 to 1.35)	0.40	.83 (.48 to 1.43)	0.51
Poorest vs middle wealthy	.85 (.50 to 1.43)	0.54	.84 (.48 to 1.46)	0.54
Poorest vs wealthiest	.81 (.49 to 1.36)	0.43	.78 (.45 to 1.37)	0.39
KPS (≤80 vs >80)	.33 (.23 to .50)	<0.001**	.28 (.18 to .45)	<0.001**
Tests of parallel regression assumption			Brant=17.95; p=0.65	

CI: confidence interval; KPS: Karnofsky Performance Status, Significance at *5% level **<1% level

Table 5: Association of psychological symptom distress (MSAS-PSYCH) with demographic and clinical factors

Independent variables	Univariate analysis		Multivariate analysis	
	0dds ratio (95% CI)	P value	0dds ratio (95% CI)	P value
Age	.98 (.96 to .99)	0.05*	.98 (.96 to 1.00)	0.053
Men vs women (ref female)	2.81 (1.89 to 4.18)	<0.001**	3.17 (2.11 to 4.78)	<0.001**
Clinical stage (ref stage 1)	1.03 (.65 to 1.63)	0.89	1.00 (.59 to 1.71)	0.99
ART (ref yes)	.73 (.39 to 1.38)	0.34	.81 (.42 to 1.54)	0.52
CD_4 count category (<200 vs 200-499)	.78 (.49 to 1.25)	0.30	.78 (.48 to 1.26)	0.30
CD_4 count category (<200 vs ≥500)	.92 (.55 to 1.55)	0.76	.95 (.55 to 1.66)	0.87
TB treatment (ref yes)	.99 (.62 to 1.58)	0.97	.75 (.46 to 1.24)	0.26
Education: primary vs secondary	.82 (.55 to 1.21)	0.32	-	-
primary vs tertiary	1.04 (.54 to 2.01)	0.90	-	-
Wealth: poorest vs middle poor	.85 (.48 to 1.52)	0.58	-	-
Poorest vs middle	.91 (.54 to 1.55)	0.74	-	-
Poorest vs middle wealthy	.91 (.55 to 1.52)	0.73	-	-
Poorest vs wealthiest	.93 (.56 to 1.54)	0.78	-	-
KPS (≤80 vs >80)	.52 (.35 to .77)	0.001*	.43 (.28 to .66)	<0.001**
Tests of parallel regression assumption			Brant=14.3, p=0.86	

CI: confidence interval; KPS: Karnofsky Performance Status, Significance at *5% level **<1% level