

Melina Zylberman

**PROJECT TITLE:** Understanding the impact of HIV among a vulnerable population in south India

**STUDENT'S NAME:** Melina Zylberman

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**SUMMARY:**

India has approximately 5.7 million people living with HIV/AIDS (PLWHA). Karnataka, a southern state in India containing the capital city of Bangalore, is a prime example of an area demonstrating high HIV prevalence. Snehadanaan, a care and support centre for PLWHA in the outskirts of Bangalore, has requested assistance from partners at the Karnataka Health Promotion Trust and the University of Manitoba to understand better the needs of their patients to plan the expansion of their services. A retrospective chart review of 210 charts from an adult population of HIV infected inpatients who died at Snehadanaan between 2010 and 2011 was conducted to describe causes of mortality. Last admission details such as clinical presentation and tuberculosis (TB) and HIV diagnosis and treatment details were also explored. It was found that almost all the patients presented as WHO HIV stage III or IV (96.9%) and 76.4% had CD4 counts less than 200 cells/mm<sup>3</sup>, but only 56.7% were on antiretroviral therapy (ART) at time of admission. Furthermore, almost half (49.6%) died within one year from their date of HIV diagnosis and 70.3% were diagnosed during their last admission with TB, a disease that accounted for 39.6% of the total deaths. These findings show that these patients presented late and at advanced stages in their disease and emphasize the importance of continuing to increase awareness of HIV for earlier testing and treatment and of opportunistic infections such as TB, as they further compromise the health of an already immunocompromised population.

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**Student's Signature**



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**SUMMARY:**

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## **Introduction**

India currently has approximately 5.7 million people living with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), and is the Asian country with the largest number of HIV positive individuals. (1, 2, 3) The spread of the epidemic throughout the country is quite heterogeneous, with HIV rates varying considerably across the states and within districts. (3) Karnataka, a southern state in India containing the capital city of Bangalore, is a prime example of an area demonstrating high HIV prevalence, reaching as high as 8.2% in some rural villages, and significant heterogeneity in the distribution of the infection. (3) Furthermore, although there are about 240,000 individuals estimated to be infected with HIV in Karnataka alone, it is thought that approximately 70% of individuals are unaware of their status. (4)

The high general population prevalence of HIV in south India can perhaps be explained by various modes of transmission observed in different regions. Whereas HIV is most commonly transmitted through injection drug use (IDU) in northeast India, people living with HIV/AIDS (PLWHA) in southern India most commonly acquire the virus through heterosexual transmission, which poses a wider risk for the general population. (2, 5)

In terms of treatment, PLWHA throughout the country have been able to receive free combination antiretroviral therapy (ART) since 2004. (6, 7) Services for ART are provided by the National AIDS Control Organization (NACO), a division of the Ministry of Health and Family Welfare of the Government of India, in the hopes of controlling the growing epidemic. (6, 8) In Karnataka alone, 34 government-run ART centers provide ART as well as T-lymphocyte CD4+ cell (CD4) count testing. (6) ART in India is offered to all HIV positive individuals whose CD4 counts are less than 200 cells/mm<sup>3</sup>. (9) Furthermore, HIV positive individuals with World Health Organization (WHO) clinical stage IV HIV are eligible to start ART irrespective of CD4 counts. (9) However, despite this scale up, tremendous gaps in treatment coverage still exist. According to a WHO HIV/AIDS 2010 Progress Report, the provision of free ART in India only reached approximately 26% of the population in need of ART in 2009. (7)

In 2003, the Karnataka Health Promotion Trust (KHPT), a partnership between the University of Manitoba and the Karnataka State AIDS Prevention Society (KSAPS), was established to help provide HIV education, develop and implement HIV prevention services and expand HIV care throughout Karnataka. (10) Projects and research studies are undertaken with the financial support of both local and international agencies and are achieved through collaborations with local care facilities. One of KHPT's local partners is Snehadanaan, which translated from Kannada is "a source of love." (11) Snehadanaan is a care and support centre for PLWHA located in the outskirts of Bangalore that strives to provide comprehensive and holistic care, mainly to individuals from a lower socioeconomic status (SES). (12) It was created in 1997 by the Sneha Charitable Trust, and currently delivers both inpatient and outpatient services, as well as educational programs. (11) Although the facility's capacity allows for the inpatient care of 50 people, plans to expand have already begun. (12) This is important, as the expansion would allow Snehadanaan to increase its provision of inpatient care, thereby reaching more individuals in the

community in need of care and support. In order to understand the needs of their patients and better plan the expansion of services, Snehadanaan requested assistance for additional research studies from their partners at KHPT and investigators at the University of Manitoba. This research project is one of those endeavours and Snehadanaan has played an active role in the conceptualization, design and implementation of the project.

A previous study gathered and analyzed data from charts at Snehadanaan in 2007 and 2008 to assess common morbidities of PLWHA; however, there were few data exploring the causes of mortality among Snehadanaan's adult inpatients. (4) Given Snehadanaan's intention to expand its services, the knowledge and feedback gained from research in this area will indicate which health services need greater attention. Thus, the objective of this project was to describe the causes of mortality of HIV infected inpatients 18 years old or older who passed away between 2010 and 2011 at Snehadanaan.

## **Materials and Methods**

### ***Study Setting and Population***

The study was conducted through a retrospective chart review of a population of patients admitted to Snehadanaan, a care and support centre for HIV infected adults and children in Bangalore, India. Sections of the charts that were used included clinical datasheets and death certificates completed in English by doctors and nurses at Snehadanaan. Some information documented by social workers was also used to complete the social and family histories. The patient population included all Snehadanaan inpatients 18 years of age or older who died between January 1, 2010 and August 5, 2011 and whose last admission at Snehadanaan took place within one calendar year of their recorded date of death. The total number of charts that were reviewed was 210. Of these, 187 charts fit under the restrictions described above and were thus included in the final analysis. The 23 charts that were excluded had mortalities dated prior to 2010 or had a gap of more than one calendar year between their last admission at Snehadanaan and their recorded date of death.

Ethical approval was obtained from the University of Manitoba Health Research Ethics Board (Bannatyne Campus) and the Ethics Committee at St. John's Medical College Hospital (SJMC) in India. SJMC is a teaching Hospital affiliated with the Bangalore University and the Rajiv Gandhi University of Health Sciences and is the main academic partner for the University of Manitoba and KHPT in Karnataka.

### ***Methods of Data Analysis***

Data extracted from charts included: socio-demographic information such as gender, age, occupation, and HIV details of family members; last admission clinical details such as lab investigations and presenting symptoms and signs; HIV details, both from last and previous admissions; tuberculosis (TB) characteristics for those who were diagnosed with TB on last admission, along with their previous histories of TB diagnosis and treatment; and mortality details, including a focus on primary causes of death. The data extracted from the charts were entered into a Microsoft Excel database for statistical analysis. Data description included proportions and univariate and bivariate analysis was performed for appropriate variable comparisons.

## **Results**

Socio-demographic information including gender, age, district of residence, SES, occupation, marital status and HIV disclosure is shown in Table 1. Over half of the study patients were male (66.8%), and almost half of the patients were in their thirties (48.6%). Furthermore, over half lived within Karnataka but outside of Bangalore (56.7%), close to half belonged to the “middle” SES (52.5%) and the majority were in a relationship at the time of last admission (56.4%). Most of the patients were involved in manual labour (43%), which included Coolie labourers, farmers, painters and carpenters. The other two most common occupations were: service (28%), which included drivers, female sex workers, security guards and mechanics; and commerce (11.8%), which included businessmen, tailors and shop owners. Interestingly, almost all patients reported partial or full disclosure of their HIV status (96.7%). As shown in Table 2, the majority of the patients’ spouses were tested for HIV (88.7%), among whom more than half were HIV positive (54.1%). For those with children, approximately three quarters of the children were tested (74.5%), and 7.7% of them were HIV positive.

Table 3 describes clinical data collected regarding patients’ presentations upon last admission. Functional status upon presentation was fairly evenly divided between ambulatory and bedridden (48.1% and 45.9%, respectively). The most prevalent symptoms and signs upon presentation included fatigue (82.3%), oral candidiasis (76.1%), fever (64.9%), and undefined weight loss (52.3%). Almost half (48.3%) presented with a cough, of which the majority (93.5%) was with sputum, while only 26.2% of patients presented with diarrhea. Furthermore, lab investigations identified that 97.7% of the patients were anemic (cause not specified), while physical examinations established that 75% of patients were underweight (body mass index (BMI) less than 18.5).

HIV clinical status is shown in Table 4. Almost all patients who were admitted to Snehadan were staged at either WHO clinical stage III or IV at last admission (96.9%), of whom over half were stage IV (60.5%). In addition, about three quarters of the patients had CD4 counts less than 200 cells/mm<sup>3</sup> (76.4%). In spite of this, only about half of patients (56.7%) were on ART at time of admission. Among those with CD4 counts less than 200 cells/mm<sup>3</sup>, the majority (86.7%) had received co-trimoxazole (TMP/SMX) prophylaxis upon last admission.

Characteristics for those diagnosed with TB during last admission are found in Table 5. A large proportion of patients (70.3%) were diagnosed with TB, among whom 56.1% were already on anti-TB therapy (ATT) at time of admission. The most prevalent type of TB diagnosed was extra-pulmonary TB (EPTB) (43.6%), of which over half were cases of tuberculous meningitis (TBM). Isolated pulmonary TB (PTB) was also common (37.6%), while 11.1% had a mixture of both PTB and EPTB, and 7.7% had disseminated TB. Some of the presenting symptoms in this population included: cough (54.8%), of which 69.4% was prolonged (lasting more than one month); undefined weight loss (49.1%); generalized lymphadenopathy (45.5%); and fever (42.9%). In addition, more than three quarters (78.5%) of the patients who were diagnosed with TB on last admission were underweight (BMI <18.5).

Mortality details are shown in Table 6. Primary causes of death were identified using death certificates, although not all the charts had death certificates available for review. Only 106 of the 187 charts (56.7%) had available death certificates, implying that 43.3% of the cases could not be analyzed for cause of death (data not shown). Among the 43.3% of death certificates that were unavailable, the majority (92.9%) belonged to patients who had been discharged and had therefore not died at Snehadanaan (data not shown). Over half of the total deaths (67.3%) took place at Snehadanaan, while the remainder (32.7%) passed away elsewhere, either at home or other medical facilities. In terms of duration of stay at Snehadanaan upon last admission, one third of patients stayed for less than one week (33.3%), while most patients were there for less than one month (76.7%). The majority of patients had only one admission in the year leading up to their death (86.4%), from which most (69%) were never discharged (data not shown). Almost half of the study patients died within a year of HIV diagnosis (49.6%), and 72% in less than two years. Among the causes of death that were known to Snehadanaan, the majority were infectious (77.4%), with TB (39.6%), sepsis (14.2%) and respiratory causes (9.4%) representing the largest proportions. Among the deaths from TB, a large proportion were due to PTB (40.5%), while one third were due to TBM. The remainder of the deaths from TB were due to disseminated TB (11.9%) and other types of EPTB (9.5%); in a small number of cases (4.8%), the TB type was not specified in the death certificates (data not shown). The majority of the deaths due to respiratory causes were due to *Pneumocystis carinii pneumonia* (PCP) (data not shown). Among the non-infectious causes of death (22.6%), cardiovascular causes (13.2%) were most prevalent. Among the cardiovascular causes of death, acute myocardial infarction accounted for 21.4%, congestive heart failure for 21.4%, cerebrovascular accident for 14.3% and pulmonary thromboembolism for 14.3% (data not shown).

## **Discussion**

Almost all of the patients who died presented to Snehadanaan on their last admission as WHO clinical stage III or IV (96.9%) and close to three quarters (76.4%) had CD4 counts less than 200 cells/mm<sup>3</sup>. According to 2007 NACO guidelines, this means that at least 76.4% of patients were eligible for ART, yet only about half of them (56.7%) were on it at the time of admission. (9) Together, the above observations show that the majority of patients admitted to Snehadanaan presented very late and at very advanced stages in their disease. It is a reminder of the importance of continuing to increase ART awareness and availability among patients, given that decreases in

viral load through the appropriate use of ART would not only benefit the patients' well-being, but would also reduce HIV transmission, further enhancing prevention. (7) Also, the majority of the patients (70.3%) were diagnosed with TB during their last admission, an infectious disease that accounted for 39.6% of the total deaths. This emphasizes the need for heightened awareness of TB co-infection among HIV positive individuals, as well as increased TB screening for earlier detection and treatment. Furthermore, almost half of the patients (49.6%) passed away within one year from the time of their HIV diagnosis, and 72% in less than two years (Table 6). This highlights the need to promote and increase HIV testing in order to make earlier diagnoses and link people to care and support sooner.

The fact that over half (60%) of the patients were in their thirties or younger at the time of death shows a significant decrease in life expectancy, robbing patients of their prime years of productivity (Table 1). (13) Surprisingly, over half of the patients (56.7%) came to Snehadan from parts of Karnataka outside of Bangalore, emphasizing the span of Snehadan's impact on the care and support of PLWHA far from its location in the outskirts of Bangalore.

HIV testing and status information of patients' spouses and children as reported by the patient was reviewed in an attempt to explore issues around disclosure. Although some patients had had previous spouses, only current spouses at the time of their last admission were considered. Interestingly, although a larger proportion of males (92%) reported their spouses had been tested, a larger proportion of females (70.6%) reported their spouses were HIV positive. This may reflect the greater difficulties women may face upon disclosure of their HIV status. Reasons for lack of disclosure are many, including embarrassment, blame, fear of rejection and stigma, the threat of violence, and expulsion from their families as they may be labeled as the 'vectors' of the infection. (14) To further aggravate the situation, if they are widowed, women who are suspected of being HIV positive may not inherit the family's property, leaving the entire family destitute. (14) Interestingly enough, however, the majority of the Snehadan patients in the study had either partial or full HIV disclosure (96.7%). In regards to the patients' children, a couple of observations may be made. Given that all of the patients in this study passed away and that almost half of them (49.6%) died within a year of their HIV diagnosis date, their children, of whom 97.7% were alive, were left either orphaned or in single-parent families in a relatively short span of time, significantly increasing their vulnerability. Furthermore, a large proportion of the patients' children were HIV positive (7.7%), most of whom (66.7%) were related to male patients. One potential explanation for this may be that their wives may have been unaware of their husbands' HIV status; therefore, they may not have been tested themselves and, consequently, may not have been able to utilize any strategies to prevent transmission of HIV from mothers to children.

A few observations can be made regarding patients' presentations upon last admission as described in Table 3. Only 6% of patients presented with a "working" functional status, almost all were anemic (97.7%) (cause not specified), 82.3% complained of fatigue and three quarters were underweight (BMI <18.5), all of which demonstrate how ill these patients were upon presentation. In comparison to a cross-sectional study that collected data on living Snehadan patients from 2007 to 2008, we found a higher proportion of patients with oral candidiasis

(76.1% compared to 42.6%), fever (64.9% compared to 50.2%), and generalized lymphadenopathy (35.3% compared to 9.7%). (4) Surprisingly, lab investigations identified that only 1.8% of patients were positive for hepatitis B antigen, which is fairly low considering that hepatitis B is endemic in India. (9)

TMP/SMX prophylaxis has been proven to reduce morbidity and mortality among PLWHA and TB, providing protection against opportunistic infections such as PCP and several organisms that cause diarrhea. (9, 7) According to WHO 2007 guidelines, HIV positive patients who are classified as stage II, III or IV or have CD4 counts less than 350 cells/mm<sup>3</sup> should receive TMP/SMX prophylaxis. (15) Based on these guidelines, all (100%) of the study patients were eligible for TMP/SMX prophylaxis (data not shown). According to 2007 NACO guidelines, all patients that are either diagnosed with TB, identified as WHO stage III or IV, symptomatic with CD4 counts <350 cells/mm<sup>3</sup>, or have CD4 counts less than 200 cells/mm<sup>3</sup> regardless of stage should receive primary TMP/SMX prophylaxis for opportunistic infections. (9) Based on these guidelines, considering the HIV stages of the study patients alone, 96.9% of patients were eligible for TMP/SMX prophylaxis (data not shown). Of the total number of study patients, 82.8% received TMP/SMX prophylaxis during their last admission (Table 4). Furthermore, using the 2007 NACO guidelines for eligibility criteria, among those diagnosed with TB on their last admission, 86.8% received prophylaxis; among those identified as WHO stage III or IV, 84.1% received prophylaxis; and among patients with CD4 counts less than 200 cells/mm<sup>3</sup>, 86.7% received it (Table 4). Although these proportions don't meet expectations according to the WHO and NACO guidelines, they are still fairly high, considering that in 2007 the WHO estimated that the TMP/SMX prophylaxis coverage was 67%. (7) However, given that we don't know when the study patients were started on the medication, it is unknown whether these individuals received maximal benefit from TMP/SMX prophylaxis.

As previously mentioned, the majority of the study patients (70.3%) were diagnosed with TB during their last admission. As overwhelming as this proportion seems, it has been recognized that over 60% of PLWHA develop TB, with a risk that is 20 – 37 times higher than in the general population. (9, 7) This again highlights the importance of awareness of TB among HIV positive individuals. In addition, the fact that over half of the study patients had a previous history of TB (61%) is a reminder of the importance of thorough history taking. The types of TB that these patients developed on last admission, with EPTB being most common (43.6%) and PTB second most common (37.6%), comes as no surprise considering that 96.9% of the patients who presented to Snehadaan were HIV stage III or IV, for which PTB and EPTB make up a part of their WHO staging criteria, respectively (Tables 4 and 5). (9) Since all those diagnosed with TB were also HIV stage III or IV, it follows that 78.1% had a CD4 cell count of less than 200 cells/mm<sup>3</sup> (Table 5). Together, all these factors further increase their vulnerability. According to the WHO, HIV positive adults reporting with any one of the symptoms of current cough, weight loss, fever or night sweats may have active TB. (16) In our study, over half of the patients with TB presented with a cough (54.8%), of which 69.4% was prolonged (greater than one month's duration), and a large proportion were underweight (78.5%). Yet less than half of them were febrile (42.9%) upon presentation. It is unknown whether these patients were experiencing night sweats, as this information was unavailable in the charts.



An important note regarding the mortality details shown in Table 6 is that the 32.7% of patients who died outside of Snehadanaan make up 92.9% of the cases for which a cause of death was unavailable. This means that for the majority of the cases in which the patient died at Snehadanaan, a doctor was able to record the cause of death in the death certificate. On the other hand, in the majority of cases in which the patient passed away post-discharge, Snehadanaan did not have access to death certificates or details of their deaths. Among the causes of death that were known to Snehadanaan, the majority were infectious (77.4%), with TB being responsible for the largest proportion (39.6%) of all causes of death. This percentage is quite high, considering that the WHO reported that in 2008, among the estimated 2 million deaths from HIV, 26% were due to TB. (7) Sepsis (14.2%) and respiratory causes (9.4%) represented the second and third largest proportions of infectious deaths. This may be explained by the fact that the majority of the patients were HIV stage III or IV and were thus extremely immunocompromised, putting them at higher risk for opportunistic infections. Among the non-infectious causes of death (22.6%), cardiovascular causes (13.2%) were the most prevalent, and were actually responsible for the third largest proportion among all causes of deaths. A study on the causes of mortality of HIV positive patients has proposed that an explanation for this phenomenon may be that with the introduction of ART, people are beginning to live longer, and causes of death due to non-HIV related diseases, such as cardiovascular diseases like myocardial infarction and stroke, have been rising. (17) Yet our data shows that the majority of patients (72%) passed away in less than two years from the time of their HIV diagnosis, in spite of 41.1% of them already being on ART at the time of admission (data not shown). This may suggest that ART had not really had an opportunity to impact the patients' outcomes. The gravity of the state of the patients upon their last admission is further highlighted by the fact that 69% of the patients who were admitted only once in the year leading up to their death never returned home (data not shown).

A number of limitations apply to the study, both from the source of the information as well as the method in which the data was captured. In terms of paperwork and services provided, Snehadanaan, although a tremendous care facility and a leader among the Community Care Centres (CCCs), is limited in its infrastructure and resources. (18) Simple, accurate medical equipment required to conduct basic physical examinations such as modern sphygmomanometers are not routinely available, and there are no electronic medical records. As this was a retrospective chart review, data was sometimes missing. Thus, several variables originally included in the data capturing tool were discarded from the final analysis due to lack of sufficient available data. Likewise, the variables that were not discarded also had instances in which the patients' charts were missing data, thereby explaining the variability in "n" values within the tables found below. Also, while some data in the charts was acquired by skilled doctors and lab technicians, the data on certain chart sections was reported by the patient. As a result, some of the data such as HIV testing and status of spouse and children may not have been completely accurate. In addition, some of the variables under analysis lacked clear category definitions, which made it difficult to understand how patients were classified in the charts. For example, there are conflicting views on how to define SES; it is known that Snehadanaan focuses on providing care to those from a lower SES, but strict financial definitions for the various SES categories were unavailable.

In conclusion, this study describes the impact of HIV among a vulnerable population in south India. The causes of mortality of HIV infected inpatients 18 years old and older who died between 2010 and 2011 at Snehadanaan were explored, and it was found that among the known causes of death, the majority were due to infectious causes (77.4%), with TB being the most prevalent (39.6%) cause. Socio-demographic and clinical data and outcomes were also discussed, such as gender differences, HIV status of patients' family members, as well as presenting symptoms, signs and investigations. Of importance, it was noted that almost all patients presented to Snehadanaan late in their disease stage, with the majority (96.9%) being HIV stage III or IV, yet only close to half (56.7%) were on ART at the time of admission. An overwhelming majority (70.3%) were also found to have a co-infection with TB on their last admission, yet only close to half (56.1%) were on ATT at the time of admission. These observations highlight the challenges ahead: continuing to increase awareness of not only HIV for earlier testing and treatment, but also of opportunistic infections such as TB, as they further compromise the health of this already immunocompromised population.

Taking into consideration the motive behind the initial conception of this study, additional analysis and knowledge translation is planned in collaboration with Snehadanaan. The intention is to discuss ways in which Snehadanaan's already evolving process of history taking and book-keeping may be further refined, as well as findings highlighting medical conditions and social circumstances that may require more attention in terms of investigation and care in the future. Ultimately, the goal is to use this information to gain a better understanding of the needs of their patients in order to find ways to improve inpatient care.

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**Table 1. Demographic characteristics at time of last admission**

<b>Variable</b>	<b>No. (%)</b>
<b>Gender (n = 187)</b>	
Male	125 (66.8%)
Female	61 (32.6%)
Transgender	1 (0.5%)
<b>Age (years) (n = 185)</b>	
<29	21 (11.4%)
30 – 39	90 (48.6%)
40 – 49	38 (20.5%)
50 – 59	22 (11.9%)
>60	14 (7.6%)
<b>District of residence (n = 187)</b>	
Bangalore (urban & rural)	74 (39.6%)
Other (within Karnataka)	106 (56.7%)
Outside Karnataka	7 (3.7%)
<b>Socioeconomic Status (SES) (n = 177)</b>	
Poor SES	66 (37.3%)
Low Middle SES	17 (9.6%)
Middle SES	93 (52.5%)
Upper Middle SES	1 (0.6%)
<b>Occupation (n = 186)</b>	
Manual Labour	80 (43%)
Service	52 (28%)
Commerce	22 (11.8%)
Professional	13 (7%)
Unemployed	11 (5.9%)
Domestic	6 (3.2%)
Student	2 (1.1%)
<b>Marital Status (n = 186)</b>	
Married	99 (53.2%)
Remarried	5 (2.7%)
Common Law	1 (0.5%)
Widowed/Divorced/Separated	59 (31.7%)
Single	22 (11.8%)
<b>HIV Disclosure (n = 118)</b>	
None (no one knows)	4 (3.4%)
Partial (close family knows)	56 (47.5%)
Full (close and extended family, friends, and peers know)	58 (49.2%)

**Table 2. HIV testing and status of patients' family members at time of last admission**

<b>Variable</b>	<b>No. (%)</b>
<b>Patients' Spouses at time of last admission</b>	

Spouse Tested (n = 97)	86 (88.7%)
Male patient (n = 75)	69 (92%)
Female patient (n = 22)	17 (77.3%)
HIV Status Positive (n = 85)	46 (54.1%)
Male Patient (n = 68)	34 (50%)
Female patient (n = 17)	12 (70.6%)
<b>Patients' Children</b>	
Children Alive (n = 299)	292 (97.7%)
Children Tested (n = 157)	117 (74.5%)
HIV Status Positive (n = 117)	9 (7.7%)
Male patient (n = 9)	6 (66.7%)
Female patient (n = 9)	3 (33.3%)

**Table 3. Clinical presentation upon last admission**

Variable	No. (%)
<b>Functional Status (n = 183)</b>	
Working	11 (6%)
Ambulatory	88 (48.1%)
Bedridden	84 (45.9%)
<b>Fatigue (n = 175)</b>	144 (82.3%)
<b>Weakness (n = 175)</b>	33 (18.9%)
<b>Headache (n = 176)</b>	76 (43.2%)
Prolonged (>1 month) (n = 39)	13 (33.3%)
<b>Diarrhea (n = 172)</b>	45 (26.2%)
<b>Oral candidiasis (n = 109)</b>	83 (76.1%)
<b>Undefined weight loss (n = 172)</b>	90 (52.3%)
<b>Fever (n = 174)</b>	113 (64.9%)
<b>Cough (n = 174)</b>	84 (48.3%)
With sputum (n = 62)	58 (93.5%)
Prolonged (>1 month) (n = 49)	29 (59.2%)
<b>Hypotension (n = 170)</b>	71 (41.8%)
<b>Generalized lymphadenopathy (n = 136)</b>	48 (35.3%)
<b>Menigismus (n = 157)</b>	28 (17.8%)
<b>Anemia (n = 171)</b>	167 (97.7%)
<b>Body mass index (BMI) (n = 164)</b>	
Underweight (BMI <18.5)	123 (75%)
<b>Hepatitis B antigen (n = 164)</b>	
Positive	3 (1.8%)
Test performed during last admission	144 (87.8%)

**Table 4. HIV details obtained during last admission**

Variable	No. (%)
<b>WHO clinical HIV Stage (n = 162)</b>	
I	1 (0.6%)

II	4 (2.5%)
III	59 (36.4%)
IV	98 (60.5%)
<b>Anti-Retroviral Therapy (ART) (n = 187)</b>	
On ART at time of admission	106 (56.7%)
Ever received ART (before/during last admission)	118 (63.1)
<b>Last CD4 count taken (cells/mm<sup>3</sup>) (n = 161)</b>	
<100	76 (47.2%)
100 – 199	47 (29.2%)
200 – 350	24 (14.9%)
>350	14 (8.7%)
<b>Last CD4 count taken &lt; 200 cells/ mm<sup>3</sup> (n = 161)</b>	<b>123 (76.4%)</b>
Male patient (n = 106)	78 (73.6%)
Female patient (n = 54)	45 (83.3%)
<b>TMP/SMX prophylaxis*</b>	
Received during last admission (n = 180)	<b>149 (82.8%)</b>
With CD4 count <200 cells/mm <sup>3</sup> (n = 120)	<b>104 (86.7%)</b>
With WHO stage III or IV (n = 151)	<b>127 (84.1%)</b>
With TB diagnosis on last admission (n = 121)	<b>105 (86.8%)</b>
Received in previous admissions (n = 102)	80 (78.4%)

*\*Of those eligible for TMP/SMX prophylaxis according to NACO 2007 guidelines. (9)*

**Table 5. Tuberculosis (TB) characteristics of patients during last admission**

<b>Variable</b>	<b>No. (%)</b>
<b>TB diagnosis (n = 175)</b>	123 (70.3%)
With past history of TB (n = 118)	72 (61%)
On ATT at time of admission (n = 123)	69 (56.1%)
<b>TB type (n = 117)</b>	
PTB	44 (37.6%)
EPTB	51 (43.6%)
TBM (n = 50)	30 (60%)
PTB + EPTB	13 (11.1%)
Disseminated	9 (7.7%)
<b>Presenting symptoms</b>	
Cough (n = 115)	63 (54.8%)
Prolonged (>1 month) (n = 36)	25 (69.4%)
Generalized lymphadenopathy (n = 88)	40 (45.5%)
Fever (n = 49)	21 (42.9%)
Undefined weight loss (n = 112)	55 (49.1%)
Underweight (BMI <18.5) (n = 107)	84 (78.5%)
<b>Last CD4 count (cells/mm<sup>3</sup>) (n = 105)</b>	
<100	50 (47.6%)
100 – 199	32 (30.5%)
200 – 350	17 (16.2%)
>350	6 (5.7%)

<b>HIV stage upon presentation (n = 113)</b>	
Stage III	40 (35.4%)
Stage IV	73 (64.6%)

**Table 6. Mortality details**

<b>Variable</b>	<b>No. (%)</b>
<b>Location of death (n = 162)</b>	
Snehadaan	109 (67.3%)
Other	53 (32.7%)
<b>Total days spent at Snehadaan on last admission (n = 180)</b>	
<7	60 (33.3%)
7 – 13	39 (21.7%)
14 – 28	39 (21.7%)
>28	42 (23.3%)
<b>Total admissions in year before death (n = 184)</b>	
1	159 (86.4%)
2	18 (9.8%)
≥3	7 (3.8%)
<b>Years from HIV diagnosis to death (n = 125)</b>	
<1	62 (49.6%)
1 – <2	28 (22.4%)
2 - <3	12 (9.6%)
3 – 5	10 (8%)
>5	13 (10.4%)
<b>Primary cause of death (n = 106)</b>	
<b>Infectious (compared to total)</b>	<b>82 (77.4%)</b>
TB	42 (39.6%)
Sepsis	15 (14.2%)
Respiratory	10 (9.4%)
CNS infection	9 (8.5%)
Diarrhea	4 (3.8%)
Cytomegalovirus infection	2 (1.9%)
<b>Non-infectious (compared to total)</b>	<b>24 (22.6%)</b>
Cardiovascular	14 (13.2%)
Neurological	3 (2.8%)
Renal	2 (1.9%)
Malignancy	1 (0.9%)
Other**	4 (3.8%)

\*\*Includes massive hematemesis and severe anemia.



