

## Opportunistic Infections Continue to be the Leading Cause of Hospitalization in People Living with HIV/AIDS in India

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# Opportunistic Infections Continue to be the Leading Cause of Hospitalization in People Living with HIV/AIDS in India

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## BACKGROUND

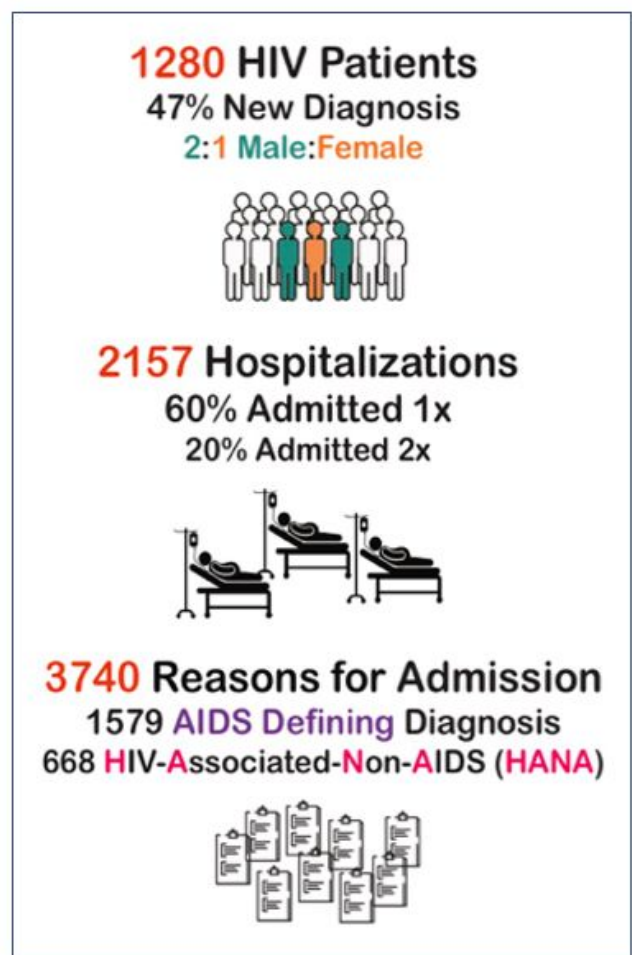
With the advent of highly active antiretroviral therapy (HAART), rates of AIDS-defining hospitalizations are decreasing among People Living with HIV/AIDS (PLWHA) worldwide [1]. However, data is lacking among developing countries [2,3]. This study evaluates the reasons for hospitalization among PLWHA in Manipal, India, and analyzes the association between HAART and AIDS-defining hospitalizations.

## PROBLEM STATEMENT

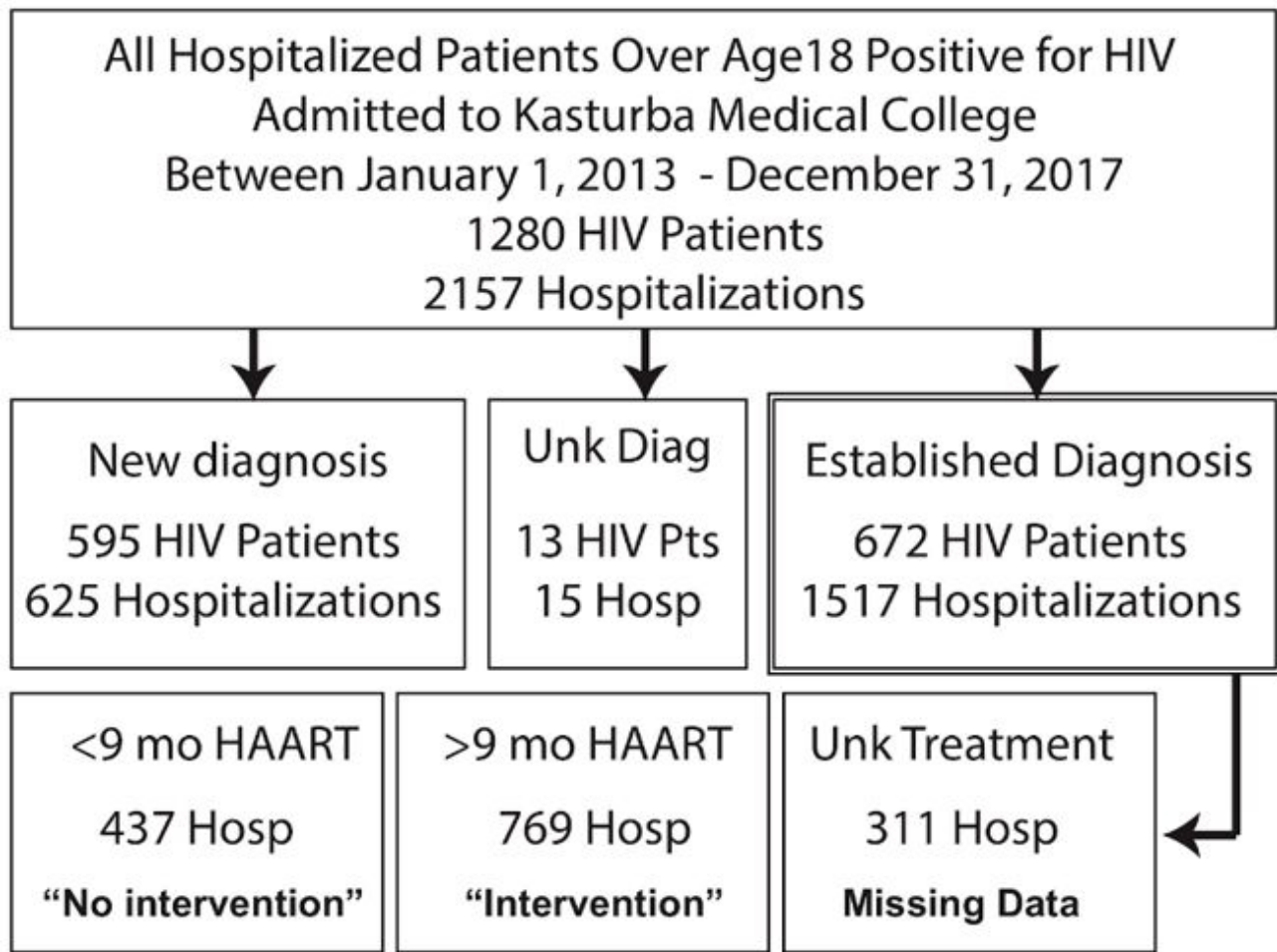
Evaluate whether opportunistic infections continue to be the leading cause of hospitalization in people living with HIV/AIDS in India with the advent of HAART therapy.

## METHODS

- 2157 medical records were reviewed using patient charts of 1280 HIV patients over the age of 18 who were admitted to Kasturba Hospital between January 1, 2013 and December 31, 2017
- Demographic data and reasons for hospitalization were collected for all hospital admissions.
- Patients were categorized into those who self-reported over 9 months on HAART and those under 9 months on HAART (including those with no therapy) to calculate the odds of AIDS-defining illness as a cause for hospitalization over non-AIDS illness when on HAART [4].
- Missing data analysis was conducted to gain insight into potential misclassification bias [5].



**Figure 1.** Demographic data for PLWHIV in Manipal, India.



**Figure 2.** Flowchart with categorization of hospital admissions for PLWHIV in Manipal, India.

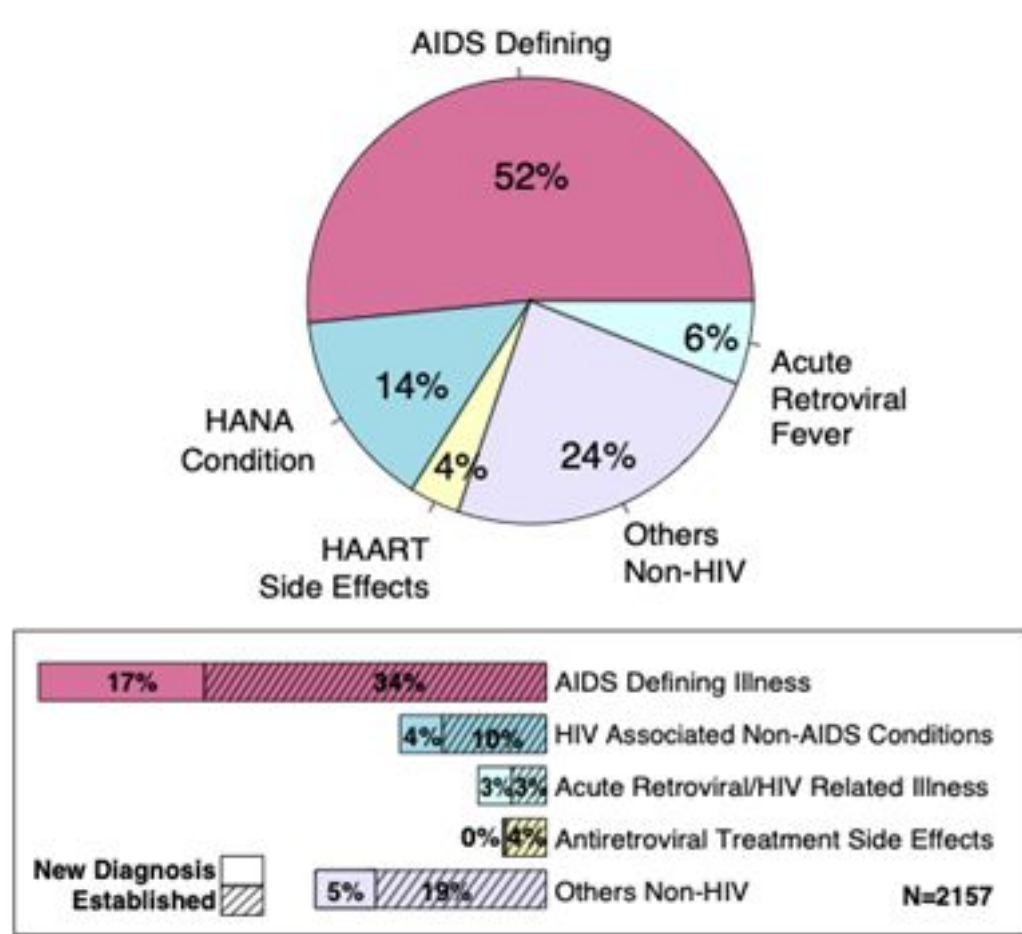
## RESULTS

**Table 1.** Baseline Characteristics for 1280 HIV Positive Patients at Index Hospital Admission

Characteristics	All patient, n= 1280 (100%)	Previous HIV diagnosis, n=685 (54%)	AIDS-defining illness, n=711 (56%)
Median Age (Range)	44 (18-80)	44 (18-75)	43 (18-80)
Gender (Male)	867 (68%)	454 (68%)	491 (69%)
New Diagnosis	595 (46%)	-	346 (49%)
Unk Duration of Treatment	324 (15%)	203 (30%)	114 (16%)
9 mo + on HAART	214 (17%)	320 (48%)	158 (22%)
Tobacco Use	8%	8%	8%
Alcohol Use	11%	11%	11%
History of Hypertension	11%	12%	11%
History of Diabetes	10%	12%	12%
History of Coronary Artery Disease	2%	2%	2%
History of Chronic Kidney Disease	2%	3%	3%

## RESULTS

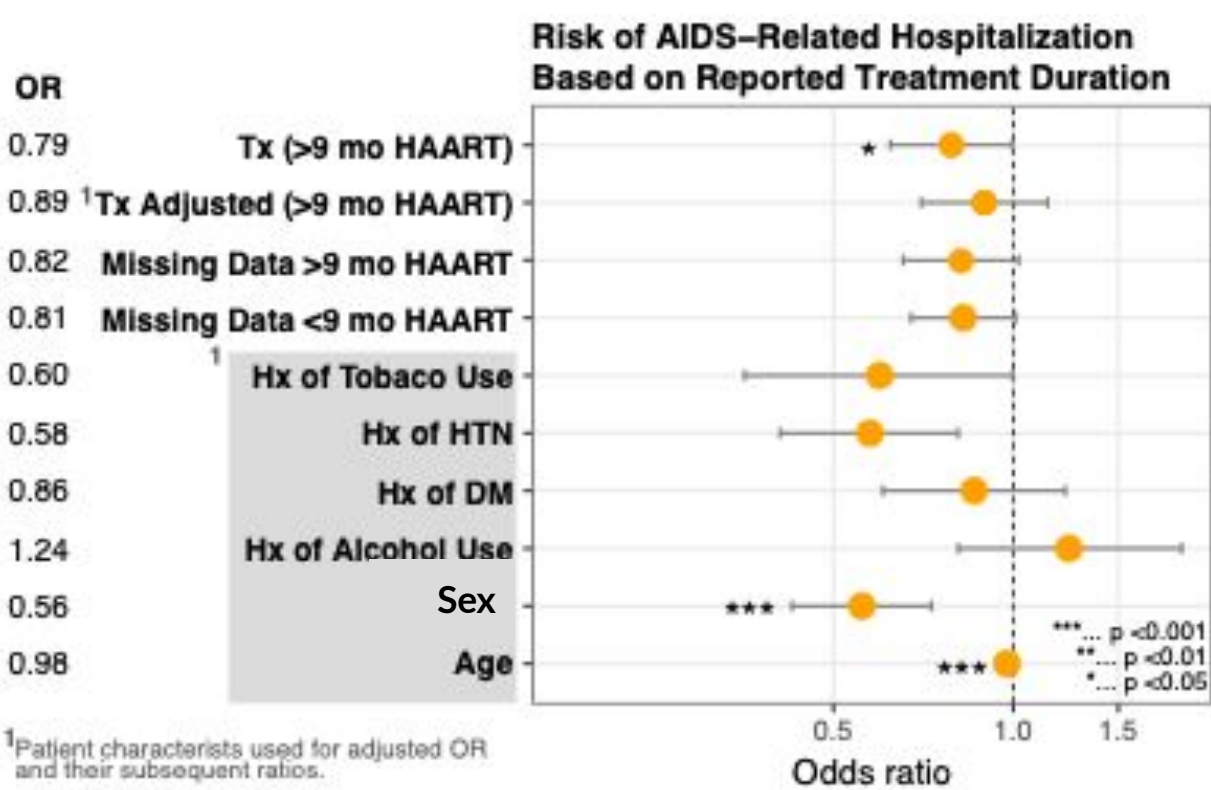
- Patients' median age was 44 (18-80) years; 68% male.
- AIDS-defining illness accounted for 52% of all primary reasons for hospitalization [1105/2157] with median age at 43 (18-75) years compared with HANA (14% of hospitalizations) at 48 (21-80) years.
- Being on HAART for at least 9 months lowered the odds of being hospitalized for AIDS-defining illnesses over non-AIDS conditions by 21% [OR 0.79 CI: 0.62-0.99, p<0.05] amongst established HIV patients with well documented treatment duration [56%, 1206/2157], reports of being on HAART for at least 9 months lowered the odds of being hospitalized for AIDS-defining illnesses over non-AIDS conditions by 21% [OR 0.79 CI: 0.62-0.99, p<0.05].
- Age and gender increase risk of AIDS-related hospitalization over non-AIDS hospitalization.



**Figure 3.** Primary reasons for hospitalization among PLWHA in Manipal, India. Total number of hospitalizations (N = 2157) were categorized into five groups and recorded as percentages. Each group was further broken down into those hospitalizations with new diagnosis and established diagnosis.

**Table 2.** Top 10 AIDS-defining illnesses causing hospitalization among PLWHIV in Manipal, India.

AIDS-defining Illness	Percentage of All Admissions (%)
Extrapulmonary Tuberculosis	10.5
Pulmonary Tuberculosis	7.3
Oral Candidiasis	4.5
Bacterial Pneumonia	4.4
AIDS-Defining Cancers (NHL, DLBCL)	3.2
Chronic Diarrhea	2.4
Bacteremia/Sepsis	2.2
PJP Pneumonia	1.9
Cryptomeningitis	1.8
Esophageal Candidiasis	1.7



**Figure 4.** Patient medical history and demographic odds ratios for HANA-Related hospitalizations for PLWHIV in Manipal, India. HAART Therapy and Odds of AIDS-Related hospitalizations within PLWHA in Manipal, India. Hospitalizations (all established diagnosis, N=1517) were categorized into less than 9 months on HAART (<9 mo, N=437) & more than 9 months on HAART (>9 mo, N=769). Odds ratio and adjusted odds ratio were calculated with Pearson's chi-squared analysis to determine statistical significance (p<0.05). Missing data analysis (missing data, N=311) was conducted for both outcomes. Error bars represent 95% confidence intervals.

## DISCUSSION

- Using the lean six-sigma tools acquired in SELECT, we defined, measured and analyzed the reasons for hospitalization amongst HIV patients in Manipal to help KMC maximize their resources.
- Results of our study were consistent with others from the South Asian region that show tuberculosis and candidiasis to be the most common OIs, implicating the continued need for the development of widespread screening programs for early HIV diagnosis and swift HAART intervention.
- Age and gender play important role in increasing the risk of AIDS-related hospitalization. SELECT teachings in VBPC and health systems inform our understanding of how biases and maladaptive social constructs may be contributing to these health disparities, and how to these findings to guide our care accordingly [6].



## CONCLUSIONS

AIDS-defining illnesses continue to be the major cause of hospitalization among HIV patients in India. However, being on HAART therapy for at least 9 months decreased the odds of being hospitalized with an AIDS-defining illness. Tackling social barriers to effective treatment with HAART is essential in decreasing AIDS-related hospitalizations in low-resource settings.

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