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Exploring Causes of Mortality among HIV/AIDS Patients: A Comprehensive Study at SLN Medical College and Hospital, Odisha

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ABSTRACT

Background: The global impact of the AIDS pandemic is particularly pronounced in resource-poor tropical areas, where the intersection of human immunodeficiency virus (HIV) infection and other tropical diseases, notably Tuberculosis (TB), presents a significant challenge. This study focuses on the heightened morbidity, mortality, and social disruptions in Odisha, India, due to the acquired immunodeficiency syndrome (AIDS) pandemic, necessitating an in-depth understanding of the complex dynamics of causes of mortality in HIV/AIDS patients. This research specifically delves into the recent temporal trends in AIDS mortality.

Methods: This study was conducted at SLN Medical College and Hospital, Odisha, India. The study leverages medical records from the Antiretroviral Therapy (ART) center. A standardized questionnaire documenting detailed information about circumstances leading to mortality, was employed during regular follow-up assessments of 400 HIV/AIDS patients. The analysis involves both descriptive and stratified approaches, with data stratification based on CD4 counts, a crucial parameter indicative of the immune status of HIV/AIDS patients.

Results: The study analyzes 400 cases, revealing a diverse array of conditions contributing to mortality. TB emerges as a significant threat, constituting 44.5% of reported deaths, emphasizing the persistent danger of TB to individuals with HIV/AIDS. The distribution of causes of mortality is detailed in this study, highlighting the multifaceted nature of health challenges faced by this vulnerable population.

Conclusion: The findings serve as a foundation for future research and interventions, contributing to improved strategies for patient care and management in resource-constrained healthcare settings. Further insights into the distribution based on CD4 counts are presented, emphasizing the interplay between immunological status and disease susceptibility.

Key-words: HIV/AIDS, Tuberculosis, Causes of Mortality, CD4 counts, Resource-poor areas, Antiretroviral Therapy

INTRODUCTION

The global impact of the AIDS pandemic is particularly pronounced in resource-poor areas in the tropics, where the intersection of HIV infection and other tropical infectious diseases presents a significant challenge.

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TB stands out as the most common opportunistic infection among individuals living with HIV/AIDS, and the bidirectional and synergistic interaction between HIV and TB accentuates the progression of both diseases [1,2].

In regions such as Odisha, India, the morbidity, mortality, and social disruptions caused by the AIDS pandemic are heightened due to limited resources and healthcare infrastructure. Understanding the complex dynamics of causes of mortality among HIV/AIDS patients in this context becomes imperative. This study, conducted at SLN Medical College and Hospital, Odisha seeks to comprehensively investigate and understand the factors

contributing to mortality in this vulnerable population [3,4].

Despite a decline in death rates due to AIDS in the United States and Western Europe following the introduction of highly active antiretroviral therapy (HAART), there is a growing number of deaths attributed to non-HIV-related or non-AIDS-related causes among patients with AIDS. The landscape of AIDS-related mortality is evolving, necessitating a closer examination to identify current trends and contributing factors [5,6].

The study aims to shed light on the recent temporal trends in AIDS mortality at a population level. The region, marked by its resource constraints, poses unique challenges in managing the complex interplay of HIV and co-infections, demanding a tailored understanding of the causes of mortality.

MATERIALS AND METHODS

Research Design- The study was conducted at SLN Medical College and Hospital, Odisha, India from September 2022 to August 2023. With the aim of comprehensively investigating and understanding the causes of mortality in HIV/AIDS patients. The research leveraged the medical records maintained by the ART center, which routinely documents the health status and outcomes of HIV/AIDS patients.

The causes of death were meticulously documented using a standardized questionnaire during regular follow-up assessments of HIV/AIDS patients. The questionnaire aimed to capture detailed information about the circumstances and contributing factors leading to mortality. The study included a total of 400 cases, ensuring a robust sample size for a comprehensive analysis of causes of death in this vulnerable population.

The use of medical records and a structured questionnaire allowed for a systematic and detailed examination of each case, enabling the researchers to categorize the causes of mortality accurately. The study focused on capturing both the frequency and percentage distribution of specific causes of death, providing a holistic overview of the health challenges faced by HIV/AIDS patients at SLN Medical College and Hospital.

Inclusion Criteria

- ✓ The study included participants who had regular follow-up exams at the ART facility to document their health status and outcomes.
- ✓ Participants were HIV/AIDS patients receiving ART center therapy or follow-up.
- ✓ Only informed consent for medical record use and study participation was obtained.

Exclusion Criteria

- ✓ Patients who did not consent to the study and medical record use were excluded.
- ✓ Incomplete or insufficient medical records that prevented a full evaluation of the events and contributing factors before death were removed.
- ✓ Poor follow-up assessments that did not reveal mortality causes were excluded.

Statistical analysis- Analysis of the collected data involved both descriptive and stratified approaches. Furthermore, the data were stratified based on CD4 counts, a critical parameter indicative of the immune status of HIV/AIDS patients. This stratification facilitated a nuanced understanding of how different causes of death varied across different CD4 count categories. The robust methodology employed in this study ensures the reliability and validity of the findings, offering valuable insights into the complex factors contributing to mortality within the HIV/AIDS patient population.

Ethical Approval- This study has been approved by the Ethical Committee of the SLN Medical College & Hospital, Koraput, Odisha, India.

RESULTS

A total of 400 cases were meticulously analyzed to provide a detailed overview of the distribution of causes of death, shedding light on the multifaceted nature of health challenges faced by this vulnerable population.

Table 1 elucidates the distribution of causes of mortality in HIV/AIDS patients, showcasing both the frequency and percentage of cases attributed to each specific cause. The findings underscore the diversity of conditions contributing to mortality, with bacterial pneumonia (6.25%), suicide (5.5%), TB (44.5%), and extrapulmonary tuberculosis (EPTB) (20.75%) emerging as prominent factors. Other notable contributors include hepatitis (7.75%), bacterial infections (4.5%), liver disease (3.75%), accidents (2.25%), alcohol-related issues (2.25%), diarrhea (1.75%), and cardiovascular diseases (0.75%) (Fig. 1).

Table 1: Distribution of causes of mortality in HIV/AIDS patients

Mortality cause	Number	Percentage
Bacterial pneumonia	25	6.25
Suicide	22	5.5
TB	178	44.5
EPTB	83	20.75
Hepatitis	31	7.75
Bacterial infection	18	4.5
Liver disease	15	3.75
Accident	9	2.25
Alcohol related	9	2.25
Diarrhea	7	1.75
Cardiovascular disease	3	0.75
Total	400	100

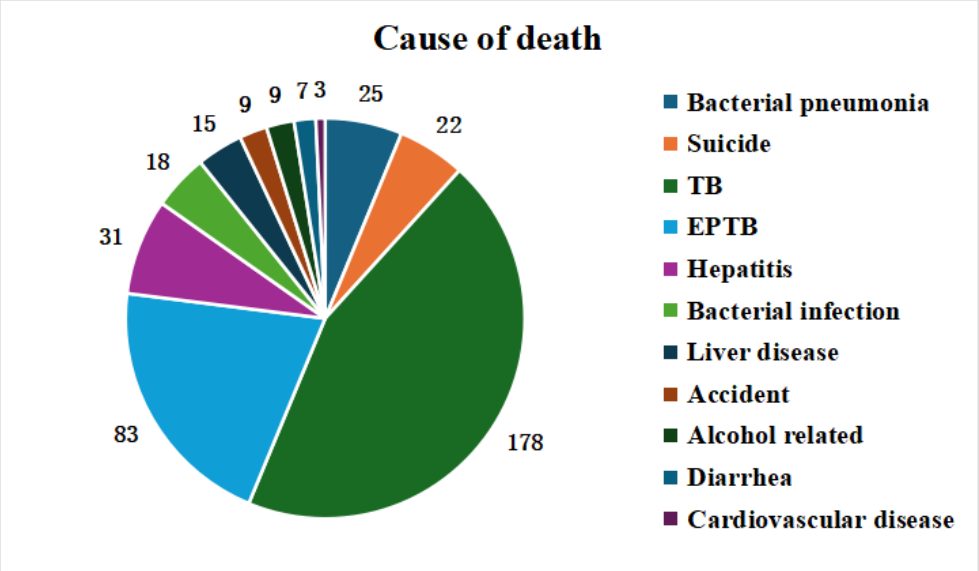

Fig. 1: Distribution of causes of mortality

Delving deeper into the data, Table 2 provides insights into the distribution of causes of mortality based on CD4 counts, a crucial parameter indicative of the immune status of HIV/AIDS patients. This stratification allows for a nuanced understanding of how different causes of death may vary across CD4 count categories. In Fig. 2, for instance, TB, a major contributor to mortality, shows a distinct distribution, with 45.6% of cases occurring in patients with CD4 counts of 0-350 and 13.2% in those with CD4 counts above 350. Similarly, EPTB exhibits a shift in prevalence, with 21.5% in the lower CD4 count category and 21.1% in the higher CD4 count category. These nuances highlight the importance of considering immune status when analyzing causes of mortality in HIV/AIDS patients.

Table 2: CD4 counts among the HIV/AIDS patients

Cause of death	CD4 counts				Total
	0-350 (n)	0-350 (%)	350-above (n)	350-above (%)	
Bacterial	19	5.2	4	10.5	23
Suicide	19	5.2	5	13.2	24
TB	165	45.6	5	13.2	170

EPTB	78	21.5	8	21.1	86
Hepatitis	25	6.9	5	13.2	30
Bacterial infection	16	4.4	1	2.6	17
Liver disease	11	3.0	3	7.9	14
Accident	9	2.5	1	2.6	10
Alcohol related	8	2.2	3	7.9	11
Diarrhea	8	2.2	0	0.0	8
Cardiovascular	4	1.1	3	7.9	7
Total	362	100	38	100	400

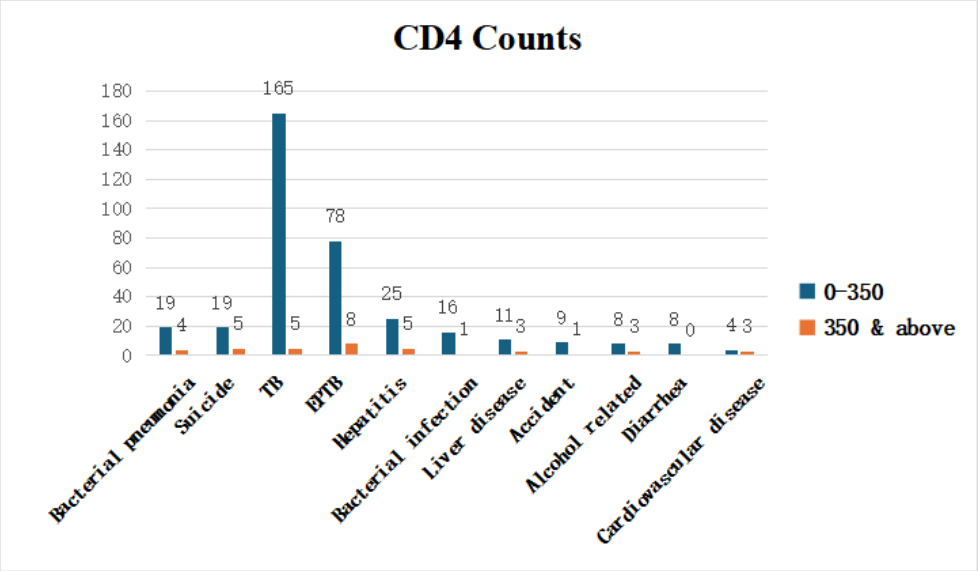

Fig. 2: CD4 count distribution among HIV/AIDS patients

The results emphasize that TB remains a significant threat to the well-being of HIV/AIDS patients, comprising nearly half of the reported deaths. The prevalence of specific causes across different CD4 count categories indicates the complex interplay between immunological status and the likelihood of succumbing to conditions.

DISCUSSION

This study provide valuable insights into the intricate landscape of causes of mortality among HIV/AIDS patients at SLN Medical College and Hospital, Odisha, India. The comprehensive analysis of 400 cases sheds light on the multifaceted nature of health challenges faced by this vulnerable population.

On the other hand, in 2004, India had an estimated 100,000 deaths from HIV infection among adults aged 15-59. In contrast to WHO's 2003 estimate of 270k deaths, our findings align with past indirect estimates of mortality in India, and WHO's revised estimate of 127k HIV-related deaths in 2004 based on 2005/6 HIV survey results [6]. Since 1995, high-HIV states have seen more short-course tuberculosis therapy than low-HIV states. However, HIV infection likely played a significant role in causing a significant lack of progress between 1990 and 2000 in the percentage of deaths from tuberculosis compared to total deaths in men aged 25-44 in urban areas of states with high HIV prevalence. Furthermore, it contributed to an increase in overall mortality among individuals aged 25-34 between 1997 and 2002. It led to a higher number of deaths, specifically from tuberculosis among men, in our mortality survey conducted from 2001 to 2003 [7].

Our findings reveal a diverse array of conditions contributing to mortality, with pulmonary tuberculosis (TB), extrapulmonary tuberculosis (EPTB), hepatitis, and suicide standing out as notable factors. Pulmonary TB and EPTB are particularly significant contributors, with 44.5% of the reported deaths attributed to TB-related complications. This aligns with the broader literature,

emphasizing the persistent threat that TB poses to individuals living with HIV/AIDS [8-10].

Delving deeper into the data, the stratification based on CD4 counts underscores the importance of considering immune status in understanding the distribution of causes of mortality. TB, a leading cause of death, exhibits distinct patterns with higher prevalence in patients with CD4 counts of 0-350, emphasizing the interplay between immunological status and disease susceptibility [11-14].

Comparisons with previous studies offer valuable contextualization. Our study aligns with the findings of Charlotte *et al*. [3], highlighting AIDS-related illnesses as a substantial cause of mortality. The variations observed in causes of death in different CD4 count categories resonate with the temporal trends reported by Danforth *et al*. [15]; Becker *et al*. [16]; Grover *et al*. [17]; Pati *et al*. [18], emphasizing the dynamic nature of HIV/AIDS-related mortality.

The study contributes to the ongoing discourse on causes of death in HIV/AIDS patients, offering a local perspective that aligns with global trends. The high prevalence of TB-related deaths warrants targeted interventions, including early diagnosis and appropriate management. The significant proportion of deaths due to extrapulmonary manifestations underscores the need for a comprehensive approach to tuberculosis control [19-21].

Our study also provides a foundation for future research endeavors, calling for further in-depth analysis to unravel the intricate factors contributing to mortality within this population. Drawing on insights from other studies, such as Seyoum *et al*. [22]; Akhter *et al*. [23]; Bates *et al*. [24], which highlighted late-stage liver disease as a major cause of death, suggests that addressing comorbidities remains a crucial aspect of HIV/AIDS patient care.

The findings from this study contribute to the growing body of knowledge regarding causes of mortality in HIV/AIDS patients, offering valuable information for healthcare practitioners and policymakers. As observed in studies by Dominique *et al*. [6] and Antonio *et al*. [7], co-infections and comorbidities continue to play a significant role in the mortality landscape, necessitating a holistic approach to patient care [25].

CONCLUSIONS

In conclusion, this study serves as a foundation for future research and interventions, ultimately contributing to improved strategies for patient care and management in similar healthcare settings. The intricate factors contributing to mortality unveiled in our findings underscore the need for ongoing efforts to address the healthcare needs of HIV/AIDS patients comprehensively. In unraveling the complex tapestry of causes of mortality among HIV/AIDS patients at SLN Medical College and Hospital, Odisha, India, this study provides crucial insights into the multifaceted challenges faced by this vulnerable population. The findings underscore the persistent threat of pulmonary tuberculosis (TB) and extrapulmonary tuberculosis (EPTB), with TB-related complications comprising a substantial 44.5% of reported deaths. This aligns with global patterns, emphasizing the ongoing menace that TB poses to individuals living with HIV/AIDS, especially in resource-poor areas.

Further in-depth analysis and interpretation of these findings are warranted to unravel the intricate factors contributing to mortality within this population.

CONTRIBUTION OF AUTHORS

Research concept- Dr Chandan Kumar Gantayat
Research design- Dr. Sangram Kishore Sabat
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Materials- Dr. Hemanta Kumar Sahoo
Data collection- Dr. Sangram Kishore Sabat
Data analysis and Interpretation- Dr. Hemanta Kumar Sahoo
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