

Non-communicable disease risk factors among people living with HIV/AIDS (PLHA) – A relook during the covid-19 pandemic

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ABSTRACT

Background: The Covid-19 pandemic has resulted in syndemic due to factors like overcrowding, loneliness, poor nutrition, and lack of access to health care services. With the ongoing pandemic, people with NCDs, including PLHA, are at high risk for developing severe and even fatal Covid-19 infections. Our study, which was carried out prior to the pandemic gives us an insight into the NCD risk factors profile of PLHAs so that effective interventions could be initiated to protect them from Covid-19 severity and NCDs. **Materials And Methods:** A prospective study was carried out among PLHA in western Maharashtra, where PLHA were selected from five ART centers by means of a systematic random sampling method. Data were collected by means of a pretested questionnaire to assess NCD risk factors and anthropometric measurements were done. Data were collected at the baseline during the time of ART initiation and then after one year. Analysis was done by means of SPSS software (version 20.0). **Results:** The mean age of the study participants was 41.73 years. 59% belonged to rural areas, 21% were illiterate, and 12% belonged to the lower class as per the Modified BG Prasad scale. 33% were laborers by occupation, 66% were married, and 22% were widowed. At baseline, during the start of ART, 26% of the subjects were found to be overweight or obese, 36% had tobacco or smoking habits, and 15% had alcohol consumption habits. Even after one year, despite repeated counseling, about 32% of the subjects were found to be overweight or obese, 28% had tobacco and 8% had alcohol consumption habits, pointing to the need to integrate NCD prevention measures, such as screening routinely as per the national program, even in the PLHAs. 34% had normal BMI, while 35% were underweight, 14% overweight, and 17% obese after one year. 24% of PLHA had abnormal waist circumference at the end of one year. **Conclusion:** These findings indicate the incorporation of early screening for NCD risk factors among PLHA and effective behavior change communication (BCC) strategies to prevent and manage the same at the earliest before it can aggravate the already compromised immune status in these subjects, particularly during this Covid 19 pandemic. It will also act as a guiding article for family physicians or primary care physicians to help them look at specific basic parameters while screening of NCDs among PLHAs.

Keywords: Covid 19 pandemic, HIV/AIDS, non-communicable disease, risk factors

Introduction

Since its origin, HIV is known for its wasting syndrome, an AIDS-defining condition.^[1] But in the last two decades, significant improvements in treatment, care of PLHA, and with the advent of newer Highly active antiretroviral therapy (HAARTs), wasting syndrome is not seen so frequently associated with HIV as

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before,^[2] instead, NCDs, including obesity, are being seen more frequently associated. In fact, at a global scale, an estimated 41 million NCD-related deaths occur annually as per the World Health Organization (WHO).^[3] Hence, HIV has now become a double-edged sword, with one side representing undernutrition and wasting and the other side overweight and obesity. Thus, nutritional factors are essential for PLHA for the improvement of their health conditions. Both undernutrition and obesity have multifaceted factors with chronic innate and adaptive immune activation mechanisms, which have been implicated in the pathogenesis of multiple comorbidities and impaired immune recovery during ART, as shown in Figure 1^[4].

With the ongoing Covid-19 Pandemic, People with NCDs, including PLHA, are at high risk for developing severe and even fatal Covid-19 infections.^[5] NCD risk factors make people very highly susceptible to the risk of severe infections—especially smokers, who have reduced lung capacity—thereby increasing the risk for serious illness.^[6] Similarly, people who don't do yoga, meditation, breathing exercise, carry out regular physical activity, and follow a sedentary lifestyle with obesity superimposed on their lives have reduced lung capacity and impaired immune action, leading to a high risk for severe Covid-19 disease.

NCDs and Covid-19 are reciprocal to each other, while Covid-19 increases the vulnerability to NCDs risk factors, and NCDs increase vulnerability to Covid-19. Therefore, there is a need to understand these syndemic drivers as Covid-19 may not be the last to threaten the world community.^[7] Syndemic refers to the synergistic association between socioecological and biological factors resulting in altered health outcomes.^[8] The Covid-19 pandemic has resulted in syndemic due to factors like overcrowding, loneliness, poor nutrition, and lack of access to health care services.^[9]

As per the prediction made by the modeling study, published in The Lancet Global Health, 1 in 5 individuals in the world is at high risk of severe Covid-19 if they get infected as a result of underlying NCDs.^[10] The risk would be much higher when compared to PLHA. On the other front, due to the enormous

effort to deal with the Covid-19 pandemic, routine regular care has also been hampered.^[10] So the care, treatment, and monitoring of PLHA have also been affected. Therefore, knowing the baseline data of NCD risk factors would help the policymakers and program managers to effectively implement mitigation measures very stringently and on an urgent basis. Screening of NCDs risk factors, early identification of NCDs, prompt counseling, and treatment, if provided by the family physicians or the primary care physicians, will go a long way in the prevention and control of NCDs among PLHAs.

In view of above, this study, which was carried out prior to the Covid-19 pandemic gives us an insight into the NCD risk factors profile of PLHA so that effective interventions could be initiated to protect them from Covid-19 severity and NCDs. It will also act as a guiding article for family physicians or primary care physicians to look at specific basic parameters while screening of NCDs among PLHAs and give specific counseling, particularly in this Covid era.

Materials and Methods

A Prospective study was carried out among PLHA in western Maharashtra, where the PLHA were selected from five ART centers by means of a systematic random sampling method. The sample size was calculated with the assumption of 50% PLHA having NCD risk factors, so as to get maximum sample size and the acceptable error of the difference between the study results and the true value was kept at 5%—sample size came out to be 375. Finally, 378 PLHA were included in the study. Data was collected by means of a pretested questionnaire to assess NCD risk factors and anthropometric measurements were done as per ISAK standards. Body Mass Index (BMI) was calculated by using the standard formula of weight (Kgs) by height in meters square (m²) and expressed in Kgs/m². Data were collected at the baseline during the time of ART initiation and then after one year. Analysis was done by means of SPSS software (version 20.0). Institutional ethical clearance was taken, and informed consent was taken from all study participants and strict confidentiality was maintained throughout the study.

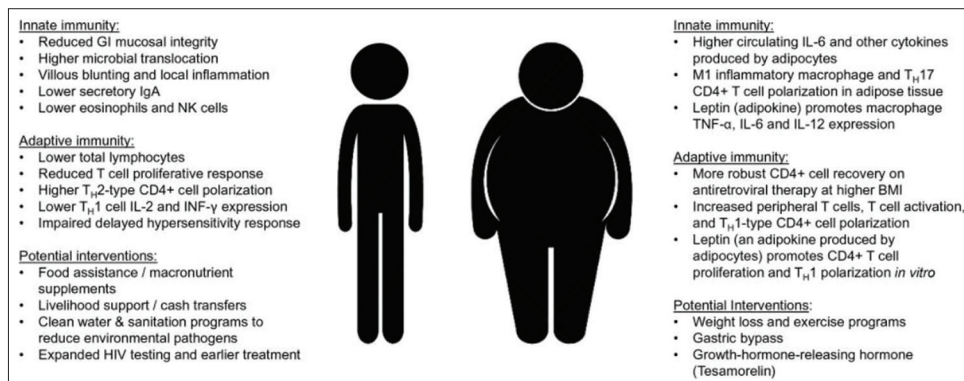


Figure 1: Malnutrition and obesity-related factors potentially affecting chronic immune activation among PLHA

Results

The mean age of the study participants was 41.73 years. 59% belong to rural areas, 21% were illiterate, and 12% belong to the lower Socio-economic class (as per Modified BG Prasad scale, Jan 2018). 33% were laborers by occupation, 66% were married, and 22% were widowed [Table 1].

At baseline, during the start of ART, 26% of the subjects were found to be overweight or obese, with 36% had tobacco/smoking habits and 15% had alcohol consumption habits. Even after one year, despite of repeated counselling, about 32% of the subjects were found to be overweight/obese, with 28% had tobacco and 8% had alcohol consumption habits, pointing the need to integrate NCD prevention measures like screening routinely as per the national programme even in PLHAs. 34% had normal BMI, while 35% were underweight and 14% overweight, 17% obese after one year [Figure 2 and 3]. 24% of PLHA had abnormal waist circumference at the end of one year [Figure 4].

Discussion

NCDs burden has been increasing all over the world and is expected to rise dramatically over the next 20 years, especially in low and mid-income countries.^[11] Similarly, NCDs are also rising among PLHA due to various reasons like HAART, which has made HIV a chronically managed disease while increasing the life span, side effects of HAART cause heart disease risks and altered metabolism as well.^[11] HIV itself has increased the risk of cancers because of opportunistic infections. Apart from the increase in lifespan and use of HAART among PLHA, NCDs are occurring because of chronic immune action, medication side effects, co-infection, and the aging process itself^[11] coupled with modifiable risk factors like smoking, alcohol, tobacco chewing, and lack of physical activity. In our study, we have identified and analyzed selective NCD risk factors profile to have a baseline level of these risk factors and, at the end of the study, to monitor and document the progress and occurrence of NCDs in the future. Our study showed that although PLHA did reduce smoking, tobacco, and alcohol consumption from baseline 5%, 31%, and 15%, to 2%, 26%, and 8% after a year, respectively, smoking and alcohol consumption remained moderately high despite continuous counseling at ART centers. Although few PLHA started yoga (1%) and some form of physical activity (10%), the overweight and obesity prevalence increased from baseline 11% and 15% to 14% and 18% [Table 2 and Figure 2], which was much higher when compared to the general population in India, where the prevalence of obesity is 15% in women and 11% in men.^[12]

As per the International Diabetes Federation criteria for South Asians, a waist circumference of >90 cm for men and >80 cm for women is considered abnormal. In our study, we could only measure the waist circumference at the end of one year only, which showed 24% of PLHA had abnormal waist circumference. We could not measure waist circumference in 20% of them, due

Table 1: Socio-demographic profile of study subjects

Socio-demographic variables	Frequency (%)
Sex	
Male	188 (49.9%)
Female	190 (50.1%)
Place of residence	
Rural	224 (59%)
Urban	154 (41%)
Education category	
Illiterate	80 (21.2%)
Upto tenth standard	69 (18.3%)
Pre-university college	169 (44.7%)
Graduation and above	60 (15.9%)
Per capita category (Based on family income, Modified BG prasad Scale - Jan 2018)	
Upper class	36 (9.52%)
Upper middle class	89 (23.5%)
Middle class	116 (30.6%)
Lower middle class	93 (24.6%)
Lower class	44 (11.6%)
Job category	
Laborer	123 (32.5%)
Regular income	35 (9.3%)
Business	43 (11.4%)
No job	114 (30.2%)
Driver	28 (7.4%)
Others	35 (9.3%)
Marital status	
Married	249 (65.9%)
Separated	20 (5.3%)
Single	27 (7.1%)
Widow	82 (21.7%)
Total	378 (100%)

Table 2: NCD Risk profile among study subjects

	Baseline at the start of study	After 1 year
Smoking	20 (5.3%)	08 (2.1%)
Tobacco	114 (30.5%)	98 (26.2%)
Alcohol	55 (14.7%)	31 (8.31%)
Yoga	0 (0%)	02 (0.5%)
Physical activity	12 (3.2%)	36 (9.7%)
Overweight	43 (11.4%)	53 (14%)
Obese	57 (15.1%)	66 (17.5%)

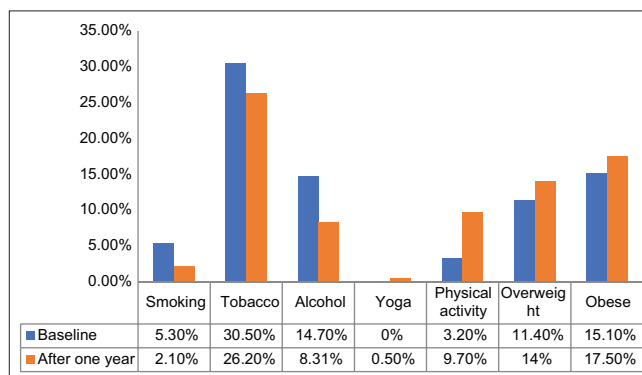


Figure 2: Distribution of NCD risk profile among study subjects at baseline and after one year

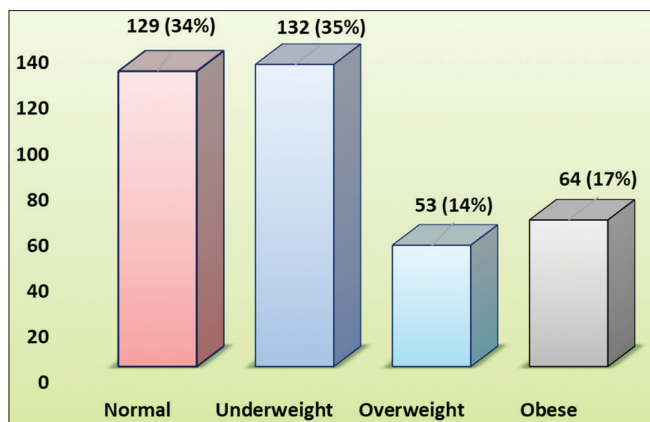


Figure 3: Overweight and obesity status of study subjects (after one year)

to lack of time and few women did not consent to be measured. The increased waist circumference levels may be attributed to their lifestyle and NCD risk factors. If not properly educated about the risks and lifestyle modifications, this number may increase significantly in the coming years. It might be the tip of the iceberg, as few PLHA were hesitant in disclosing their habits and probably didn't disclose the same because of their unwillingness to discontinue the habits and for the fear of spending more time on counseling.

NCDs risk factors, HIV infections, ART, and socio-demographic factors act in a complex way to alter the PLHA health status.^[13] These complex webs of causation are primarily based on high-income countries' data, while in developing nations, data regarding NCDs and their risk factors are largely unavailable. Our findings are consistent with a study carried out by Mathebula *et al.*,^[14] in African province, wherein overweight and obesity rates increased from baseline 18% and 11% to 21% and 20%, respectively, within 3.6 years, while our study period was only one year, indicating that the rates of overweight and obesity observed, may still go up in the coming years if corrective measures are not undertaken by individuals and integrated into ART care and counseling. Similarly, the overall prevalence of Overweight and obesity as per cutoff levels of waist circumference for Indians was 32%, which was higher than observed in our study (24%). Smoking and alcohol consumptions were 11% and 22%, which was higher compared to our study.

Another study in Tanzania by Kagaruki *et al.*^[15] also showed an increased prevalence of overweight or obesity (61%) and abnormal waist circumference (61%) when compared to a baseline of 39% and 38%, respectively, which is much higher than our study within the same period. The authors also concluded that factors like abnormal waist circumference, overweight/obesity, male gender, and age >40 years, were strong predictors for hypertension. significantly higher among those on ART than compared to those not on ART.

Tate *et al.*,^[16] in Birmingham, in a study among 681 patients, showed 44% PLHA were overweight or obese with a mean baseline BMI of $25.4 \pm 6.1\%$. There was a 20% increase in

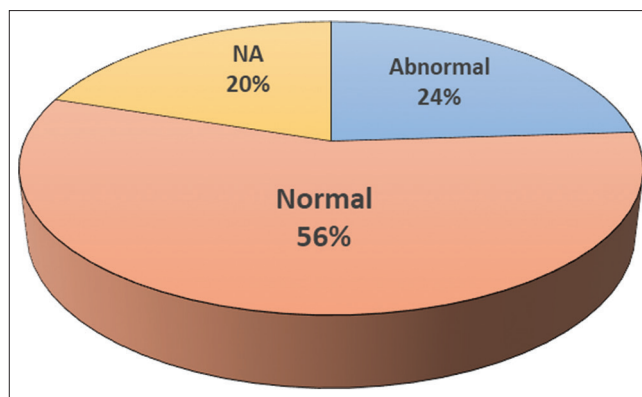


Figure 4: Waist circumference distribution of study subjects. NA – Data not available as PLHA didn't have time. Abnormal waist. Circumference: - Men >90cm, Women >80cm

overweight or obesity rate from normal after two years, which was quite high compared to our study.

In another study, in South Africa by Heerden *et al.*,^[17] carried out on communities with a high burden of HIV, 71% were overweight or obese and 80% of both were HIV positive, and HIV negative people had one or more NCDs risk factors. In one of the largest studies in sub Saharan Africa in 2019, in 44 countries by Coetzee *et al.*,^[18] the prevalence of overweight or obesity was 14.7% increased among PLHA than compared to people without HIV/AIDS, and those who were on ART were observed to have 14% increased rates of overweight or obesity than compared to those who are not on ART. All these studies have highlighted the importance of NCDs risk factor screening and early detection and have recommended interventions to tackle and control the occurrence of NCDs among PLHA.

To summarize, our study showed quite a high proportion of PLHA had NCD risk factors in terms of obesity, tobacco smoking habits, abnormal waist circumference, and alcohol consumption habits at baseline. Even after one year of ART and despite repeated counseling, there was no significant drop in the NCD risk factors rate, implying immediate measures had to be carried out. Thus, our study recommends screening of NCD risk factors among PLHA at an early stage, during the start of ART and regular monitoring. It needs to be emphasized and implemented at the earliest, such as TB and diabetes screening. Appropriate behavior change communication (BCC) for maintaining a healthy lifestyle and effective psycho-social counseling should be undertaken and responsibility, accountability should be assigned to all concerned. With the ongoing pandemic, every month during ART collection and delivery, PLHA should be emphasized and repeatedly enforced regarding the reduction of NCD risk factors and stringent monitoring. They should practice self care and consult whenever needed. Necessary actions as discussed above are the need of the hour and to be incorporated into our HIV/AIDS program to comprehensively target ill-health among PLHA, to mitigate the undernutrition and obesity-related adverse effects on chronic immune activation, and maintain their health outcomes at the highest level possible.

Conclusion

On the one hand, undernutrition is of vital concern regarding the health of PLHA. With the development of quality ART, the risk of NCDs has apparently increased according to the current estimates available in the literature. These findings indicate the incorporation of early screening for NCD risk factors among PLHA and effective behavior change communication (BCC) strategies to prevent and manage the same at the earliest before it can aggravate the already compromised immune status in these subjects, particularly during the Covid-19 pandemic. Every month during ART collection and delivery, PLHA should be emphasized and repeatedly enforced with attention to the reduction of NCD risk factors and strictly monitored. They should practice self-care and consult whenever required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Erlandson KM, Li X, Abraham AG, Margolick JB, Lake JE, Palella FJ, *et al.* Long-term impact of HIV wasting on physical function. *AIDS* 2016;30:445-54.
2. Crum-cianflone N, Tejjidor R, Medina S, Barahona I, Ganesan A. Obesity among patients with HIV: The latest epidemic. *AIDS Patient Care STDS* 2008;22:925-30.
3. WHO. Global Health Observatory Data. NCD mortality and morbidity. 2018. Available from: http://www.who.int/gho/ncd/mortality_morbidity/en/. [Last accessed on 2021 Jan 01].
4. Koethe JR, Heimbürger DC, PrayGod G, Filteau S. From wasting to obesity: The contribution of nutritional status to immune activation in HIV infection. *J Infect Dis* 2016;214(Suppl 2):S75-82.
5. WHO. Addressing noncommunicable diseases in the COVID-19 response. Available from: <https://apps.who.int/iris/handle/10665/331923>. [Last accessed on 2021 Jan 01].
6. Pan American Health Organization. NCDs and COVID-19. Available from: <https://www.paho.org/en/ncds-and-covid-19>. [Last accessed on 2021 Jan 01].
7. Narayan UY, Binod R, Kanti SM, Shradha SP, Kumar MS. A syndemic perspective on the management of non-communicable diseases amid the COVID-19 pandemic in low- and middle-income countries. *Front Public Health* 2020;8:508.
8. Bamba C, Riordan R, Ford J, Matthews F. The COVID-19 pandemic and health inequalities. *J Epidemiol Community Health* 2020;74:964-8.
9. Brown E, Gray R, Lo Monaco S, O'Donoghue B, Nelson B, Thompson A, *et al.* The potential impact of COVID-19 on psychosis: A rapid review of contemporary epidemic and pandemic research. *Schizophr Res* 2020;222:79-87.
10. Editorial. COVID-19: A new lens for non-communicable diseases. *Lancet* 2020;396:649.
11. Narayan KM, Miotti PG, Anand NP, Kline LM, Harmston C, Gulakowski R 3rd, *et al.* HIV and noncommunicable disease comorbidities in the era of antiretroviral therapy: A vital agenda for research in low- and middle-income country settings. *J Acquir Immune Defic Syndr* 2014;67(Suppl 1):S2-7.
12. Luhar S, Timæus IM, Jones R, Cunningham S, Patel SA, Kinra S, *et al.* Forecasting the prevalence of overweight and obesity in India to 2040. *PLoS One* 2020;15:e0229438.
13. Petersen, Yiannoutsos M, Justice C, Egger M. Observational research on NCDs in HIV-positive populations: Conceptual and methodological considerations. *JAIDS J Acquir Immune Defic Syndr* 2014;67:S8-16.
14. Mathebula RL, Maimela E, Ntuli NS. The prevalence of selected non-communicable disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge sub-district, Mpumalanga province. *BMC Public Health* 2020;20:247.
15. Kagaruki GB, Mayige MT, Ngadaya ES, Kimaro GD, Kalinga AK, Kilale AM, *et al.* Magnitude and risk factors of non-communicable diseases among people living with HIV in Tanzania: A cross sectional study from Mbeya and Dar es Salaam regions. *BMC Public Health* 2014;14:904.
16. Tate T, Willig AL, Willig JH, Raper JL, Moneyham L, Kempf MC, *et al.* HIV infection and obesity: Where did all the wasting go? *Antivir Ther* 2012;17:1281-9.
17. Heerden VA, Barnabas RV, Norris SA, Micklesfield LK, van Rooyen H, Celum C. High prevalence of HIV and non-communicable disease (NCD) risk factors in rural KwaZulu-Natal, South Africa. *J Int AIDS Soc* 2017;20:e25012.
18. Coetzee L, Bogler L, De Neve JW, Bärnighausen T, Geldsetzer P, Vollmer S. HIV, antiretroviral therapy and non-communicable diseases in sub-Saharan Africa: Empirical evidence from 44 countries over the period 2000 to 2016. *J Int AIDS Soc* 2019;22:e25364. doi: 10.1002/jia2.25364.