

Unveiling the unseen: Exploring unmet needs among people living with Human Immunodeficiency Virus in Chittoor, Andhra Pradesh, India

Kiranmayi Koni

All India Institute of Medical Sciences

Jayanthi Tarugu

`jayanthi_t@aimsrchittoor.edu.in`

Apollo Institute of Medical Sciences & Research

Sirshendu Chaudhuri

Independent Researcher

Udayasree Kodakinti

All India Institute of Medical Sciences

Hema Kurugundla

Government Maternity Hospital

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Abstract

Aim

This study aims to investigate the perceived unmet needs of people living with Human Immunodeficiency Virus.

Subject and Methods:

This mixed-method study enrolled adult people living with Human Immunodeficiency Virus from Antiretroviral therapy Centres in Chittoor district, Andhra Pradesh. Data collection involved semi-structured interviews using a pre-tested questionnaire. Analysis encompassed descriptive and thematic approaches.

Results

Among the 94 participants, the mean age was 39 years with a standard deviation of 12 years, and the average duration of Human Immunodeficiency Virus diagnosis was 8 years with a standard deviation of 5 years. The majority were female (n = 65, 69%) and residents of rural areas (n = 74, 78.7%). While financial needs were most prevalent, other pressing concerns included employment, child's education, housing, nutrition, healthcare, and travel. Participants voiced apprehensions about administrative hurdles and varying degrees of social challenges, such as stigma and discrimination, when accessing social protection services.

Conclusion

People living with Human Immunodeficiency Virus exhibit diverse socio-economic needs for themselves and their families, many of which remain unmet due to multifaceted bottlenecks, encompassing administrative complexities, social barriers, and perceived stigma.

Introduction

Infection due to Human Immunodeficiency Virus (HIV) is considered a manageable chronic health condition due to the growing availability of effective HIV diagnosis, treatment, and care, including treatment for opportunistic infections (OIs). **(Katz IT & Maughan-Brown B et.al., 2017)** As a result, people living with HIV can enjoy long, healthy lives. With the increase in longevity, the need of the PLWH has changed over time. The needs of PLWH are multifaceted and complex. (Fang L et.al., 2019; Maulsby CH et.al., 2020; Arum C et.al., 2021) Addressing these needs are directly linked to the positive treatment outcome. (Fang L et.al., 2019) Hence, the changing need of this vulnerable group must be accounted for in HIV care policy. The fundamental principle of the Sustainable Development Goals (SDGs) is to ensure

that no one is excluded. To put an end to the AIDS epidemic, it is crucial to address the needs of people living with and affected by HIV, as well as the determinants of health and vulnerability. People living with HIV (PLWH) are frequently discriminated against, marginalized, and affected by inequality and instability, often living in fragile communities. **(Katz IT & Maughan-Brown B et.al., 2017)**

The lack of social support for the people living with HIV in India is a significant barrier to their overall health and well-being. (Steward WT et.al., 2013) Discrimination, stigma, and isolation are prevalent in Indian society, leading to negative impact in HIV care. Social support plays a crucial role in improving treatment outcomes among people living with HIV/AIDS in India. (Steward WT et al 2013; Mukoswa GM et al., 2017; Birore CMS et al., 2022; Damulira C et al., 2019) Access to social support services remains limited, especially in rural areas. (Nyamathi AM et al., 2011) Moreover, there is a lack of knowledge and awareness about HIV/AIDS among the general population, which further perpetuates stigma and discrimination. (Lalhruaimawii I et al., 2022) In India, majority of the high burden states have provision for social security schemes, but these are non-uniform, often top-down and do not consider the need of the group. (Koni et al., 2022) Social support programs that are culturally appropriate and tailored to the specific needs of the people living with HIV are necessary to mitigate the challenges faced by them. (Koni et al., 2022) The aim of the study was to explore the perceived unmet needs of the PLWH. Identifying unmet needs of PLWH can aid in prioritizing evidence-based strategies and planning a roadmap for timely, high-quality reporting. This knowledge can help the policy makers target areas for greatest impact, allocate healthcare resources and public/private assistance, and reduce PLWH unmet needs. It can also improve global understanding of the response to the HIV epidemic, progress towards achieving commitments and global targets that are linked to SDGs.

Methods

Study design: It is an embedded mixed methods design, where qualitative data was collected secondary to quantitative data and the interpretation was qualitatively driven. Embedded design was used to gain more insight about unmet needs of PLWH by combining qualitative and quantitative data.

Study duration: The study was conducted between February 2021 and January 2022.

Study setting: We conducted the study at three ART centres in Chittoor district, namely Tirupati, Chittoor and Madanapalli.

Study participants: We recruited adult PLWH whose HIV status was diagnosed at least one year before recruitment and registered at ART centers. To explore the ways to meet unmet needs, we conducted in depth interviews with the stake holders who were working for PLWH for a minimum period of five years including the medical officers working at ART, field workers working for PLWH, volunteers working under NGOs and staff at village secretariat.

Sampling technique and sample size: Purposive sampling was done to recruit the participants. We estimated a sample size of 96 PLWH participants considering expected proportion of people expressing unmet need in any form as 0.5, 10% absolute precision at 95% confidence interval and the calculated

size of sample is 96. The number of in-depth interviews was based on the collective judgement of research team about reaching the point of saturation. Saturation monitoring table was made to track the themes and it's frequency identified in each interview. Decision was made when there were no new themes identified out of interviews.

Study variable: Unmet need of PLWH was the main outcome variable. A need is considered unmet when the participants reported a service or support was needed or desired but not received, during the 12 months preceding the interview, whereas a need is considered to be met if it had been fulfilled as per the PLWH self-report. The data is completely based on self-reporting of the participants except for need for finance in the form of pension aid for PLWH, which was verified with the registry maintained at ART center and also cross verified by record maintained by the concerned-outreach worker.

Data collection: Data was collected by the research staff recruited for the study. They were given training about background and aim of the questionnaire with a training protocol. Before actual study, a small-scale preliminary study was conducted for five participants (who were not the participants of actual study), to test the tool and methodological rigour. Necessary modifications were made in the study tool after pilot study. A semi-structured interview schedule was developed by the research team specifically for this study to assess the demographic characteristics and unmet needs of PLWH. The interview schedule included a five-point rating scale to assess unmet needs, followed by open-ended questions to explore participants' experiences in greater depth. The English-language version of the semi-structured interview schedule is provided as Supplementary File 1. Interviews were conducted by using a pre-tested semi-structured interview schedule (programmed in Open data kit (ODK)) in a convenient place as suggested by the participants. Information on demographic details and unmet needs of PLWH were collected. The open-ended questions were audio-recorded after taking written informed consent from the participants. Among all, nine participants preferred telephonic interview, for whom verbal consent was obtained before collecting data. Since these 09 participants were not willing to have face to face conversation, there was no attempt made to meet.

Additionally, five in-depth interviews were conducted among a medical officer working at ART, a field worker working for PLWH, a volunteer working under NGO, a person living with HIV and a staff working at village secretariat. All the interviews were audio recorded with written informed consent of the participants.

Data entry and analysis: Though we recruited 96 participants, during analysis, two sample's data was excluded as there was more than 60% of missing data on average. Hence, results were computed for 94 samples. Quantitative data was analyzed using SPSS version 21 by applying descriptive statistics. Demographic details of study participants, domains of unmet needs including age and gender specific unmet needs and various challenges faced by PLWH were described using frequencies and percentages. Mean and standard deviations were used for continuous data wherever applicable. Qualitative data was analyzed by developing a study specific transcription protocol. One of the researchers (KU) transcribed the qualitative responses manually. A bilingual investigator (KH) in our team listened to the audio files

and followed along with the transcripts to ensure adherence to the transcription requirements specified in the protocol. Two translators (KKR, SC) with expertise in the source (Telugu) and target languages (English) were the translators of the transcribed data. Translation review and verification were done by the project PI (principal investigator) (TJ). Two researchers (KKR, KU) independently coded the translated responses by applying pre-established codes. Through open discussions, disagreements in codes were resolved in the presence of a third researcher (SC) who acted as a referee to resolve the conflicts in coding. The researchers who coded the translated data were native researchers from the study setting. They coded the translated data, addressing linguistic nuances during transcription. A uniform coding plan was applied for all the scripts.

Human participant protection: Institutional ethics committee clearance was obtained from the institutional review board (Ref: IEC07/AIMSR/07/2020 dated 30/05/2020). Written / Verbal informed consent was taken from every participant before data collection. Every member of the project team was trained in Good Clinical Practice (GCP) and the standard operating procedures (SOP).

Results

A total of 94 participants were recruited for the study. The mean age of the participants was 39 years (± 12 years). The majority were females ($n=65$, 69%), residing at rural areas ($n=74$, 78.7%) with an average duration of living with HIV 8 years (± 5 years). Average monthly income was 8930 Indian Rupees (INR) (± 9535 INR).

Unmet needs of PLWH:

People living with HIV expressed different unmet needs which were categorised into certain domains. As per the NACO annual report and the literature available, the major domains which were considered under the study are financial, employment, housing, nutrition, health, travel and need for child education.

Whereas need for addressing administrative challenges, social stigma and assistance for marriage were identified in the present study. (Table 1: Domains of unmet needs expressed by people living with HIV in Chittoor District, Andhra Pradesh, India, 2021) While the need is largely met in the areas of travel and health; financial need is the most prominent in this population which is mostly unmet. (Table 3: Age- and gender-specific unmet needs of people living with HIV in Chittoor District, Andhra Pradesh, India, 2021) The participants have expressed concern on administrative challenges in availing the services that include- inadequate information ($n=76$, 80.8%), and slow processing of application ($n=71$, 75.5%). (Table 2: Administrative challenges and stigma faced by people living with HIV in Chittoor District, Andhra Pradesh, India, 2021) Also, the participants faced varying degree of social challenges including stigma and discrimination in availing such services. (Table 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

Financial need

The commonest need expressed by the participants was financial assistance (n=55, 58.5%) either in terms of pension benefit or subsidized bank loans. A 28-year-old female participant at Chittoor ART said *"I am 28 years old having a girl child, tested positive three years back during my antenatal check-ups. My husband left me after knowing my HIV status. I am alone with my child now. I don't even have a house to stay. I used to sell flowers at a temple but during COVID-19 pandemic we were not allowed to sell, which made me struggle a lot. I spent days with single meal in a day (participant started crying). It is a great help for me if I receive some monetary assistance either in terms of pension or bank loan."*

When enquired with a health care worker (HCW), she replied that, *"no newly diagnosed PLWH are receiving financial benefit since 2012"*. The village secretariat staff (VSS) who is responsible to apply for pension aid at village-level, mentioned that *"Though the state official website shows ART pension benefit for the PLWH, none of them are receiving the benefit for the past six months. In the online application process, the pension eligibility category for PLWH is not active in the drop-down box"*.

It is given to understand from a VSS that, due to recent policy changes, the PLWH who were receiving double pension (Pensions under two different schemes) have been excluded from one of the benefits due to policy change in eligibility criteria. There were incidences where a PLWH receiving ART pension alone were also excluded from benefit without a clear reason. A District program manager at the State AIDS Control Society (SACS) said- *"A uniform state and central monitoring system helps to address these changes in policies."* The participants also expressed their concerns on stoppage of the existing services, requirement of double pension and importance of continuation of the existing services. (Table 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

Child education

Majority of the participants (n=81, 86%) had at least one living child. They expressed the need for assistance in their child's education in terms of reservation or HIV quota in seat allotments or fee waivers.

A health care worker says *"Eligible students are given Amma vodi, Vasathi deevena and Vidya deevena as a monetary aid for education. No additional assistance in education is available for HIV infected or affected children."* [6] A 35-years-old woman participant expressed her concern *"I have two sons who are studying in 8th and 10th classes. We are very much afraid thinking about the financial burden of their higher studies. They are very much interested to study. I feel that there should be special scheme for children with HIV for their higher education in the form of reservation or HIV quota or fee waivers, which will reduce the burden on our family."* One participant even expressed that pension is crucial for children's need. (Table 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

Employment

A few (n=8, 8.5%) have expressed a need for employment, for which participants commonly asked for bank loans to start small-scale business, or skill development training. (Table 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

A participant who tried getting bank loan to start a tiffin center expressed that- *"I did not receive a bank loan despite applying for many times. Finally, I took money from a pawn broker shop and started a tiffin center. It will be helpful if people suffering from HIV are given priority in availing loans"*.

Housing

Housing is another domain of need expressed (n=6, 6.3%) asking for allotment of plot for house construction with 'land patta' (legal document issued by the government in the name of the actual owner of a particular plot of land) and housing loan to construct a house and few participants especially orphan children affected or infected with HIV and elderly asked care shelter/care homes. A 20-years-old participant said- *"My parents passed away due to HIV when I was 10 years. Since then I am residing with my aunty (Mother's sister) at her place. It is a huge burden for them to bear my expense. I understand that they are uncomfortable with me as I am HIV positive as well. I have no other option to stay. If available, care homes can really help people like me."* Another participant expressed that the amount given for making house is inadequate,

Nutrition

A very few (n=3, 3.5%) people expressed their concern on nutrition. Additional nutrition either through extra ration (Anthyodaya Anna Yojana (AAY)) or nutritious diet supplementation are the expressed needs in this domain. A VSS says *"Anthyodaya Anna Yojana (AAY) scheme is availed by only old beneficiaries and no new registrations are getting this facility"*. A HCW said *"No additional nutritional support is given for people with HIV. [6] This is a very important point as the HIV medications weaken them. So, it is further emphasized that some nutritional support is considered for this group"*. The major concerns of the participants include- inadequate quantity, and poor-quality ration. (Table 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022) A 40-year-old female participant expressed her concern on inadequate nutritional support- *"My husband passed away due to HIV in 2016. Then I got to know about my disease. Since then, I am the only earning person in the family. There are 3 people including my children who are dependent on me. ART medications make me feel very weak. In certain days, on waking up from bed, I feel very tiresome and fail to resume even my routine works which is affecting my income as I am a daily wager (expressed with tears in her eyes). I can't afford buying vegetables also sometime because my income is very low. It would be very helpful if I get some nutritional support in the form of nutritious powders, from government by which I regain some strength and can go for my work regularly."*

Health

All PLWH receive free consultation, medication, and investigations. But a few participants (n=2, 2.5%) expressed that sometimes at government facilities, they are sending them to private labs for getting their investigations done, especially monthly haemoglobin.

Travel

Two (n=2, 2.5%) elderly participants expressed their concern on non-existence of travel benefit for this vulnerable group. One of the participants receiving medications from Tirupati ART center expressed that, *"My son, my daughter and I are on ART medications. We visit the treatment centre three times in a month. A visit costs 500 rupees which is a big burden to us. It will be of great help if we receive free travel benefit"*. Health care worker at ART centre said– *"There are families having more than one HIV patients."* The ART staff explained that- *"There are individual management plans for each family member with HIV. They must visit the ART centre on their scheduled days to get tested and receive the appropriate medicines. Hence, assigning a same-day visit for all the family members is sometimes inappropriate."*

Support to avail Government social protection schemes (GSPS)

Majority participants (n=80, 85%) expressed that they are failing to avail the existing GSPS due to insufficient information about the schemes (n=76, 80.8%), and administrative delay in processing the applications (n=71, 75.5%). A few participants (n=55, 58.5%) also expressed that they feel shy or guilty to avail the benefit and sometimes they were asked to give bribe (n=15, 16%) to avail GSPS which is preventing them in following up their applications. (Table 2: Administrative challenges and stigma faced by people living with HIV in Chittoor District, Andhra Pradesh, India, 2021, 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

A 50-year male participant said, *"I don't know about the availability of a pension. I am visiting treatment centre for the past seven years but no one informed me about it"*. Another person said *"though I know about the provision of travel card, I don't know where to go and how to apply. There should be a designated person for giving such information at each ART centre"*.

Need for de-stigmatization

A few participants expressed their concern about prominent existence of discrimination among the common people towards the PLWH. Even some health care workers indirectly spread discrimination by breaching the confidentiality of HIV status as expressed a few (n=17, 18%) of them. A participant at Chittoor ART said *"Kuppam government hospital is the nearest center for me to get my medication, but I don't want to transfer my registration from Chittoor (120 kms away from Kuppam) as many people at the Kuppam hospital may identify my HIV status"*. Another female participant aged 45 years stated that- *"I don't want to reveal the HIV status by applying for housing loan or ART pension. The village secretariat will call or announce my name in the public to get it enquire as a part of procedure by which my HIV status is revealed. Once HIV status is revealed we cannot stay in the same community, because they may isolate us"*. The participants were even concern in availing any scheme that might reveal the HIV status. (Table

4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

At least eight participants (8.6%) experienced discrimination in the form of refusal of treatment. A female participant aged 55 years old stated that - *“When I wanted my cataract to be operated, one of the speciality hospitals in Tirupati (A district in Andhra Pradesh) refused to operate because of my HIV status, for which I had to travel around 270 kms to Anantapur (Adjacent district) to undergo surgery in a trust hospital”*. They also felt that gender discrimination exists in providing GSPS (n=8, 8.6%). (Table 2: Administrative challenges and stigma faced by people living with HIV in Chittoor District, Andhra Pradesh, India, 2021)

A health care worker highlighted that “Gender plays a critical role in choosing the place of treatment between government and private. We see men are often registered with the private facilities for getting the treatment than women. We have also seen situation where both husband and wife are HIV positive. While the wife is sent to government ART center for treatment, the husband got registered in private centers”, One participant even expressed that family support, as well as people awareness is critical in HIV social support. (Table 4: Thematic analysis of the unmet needs of people living with HIV in Chittoor, Andhra Pradesh, India, 2021–2022)

Six participants (6.4%) wished to avail the benefits of the schemes only if confidentiality of HIV status is ensured.

Unmet needs of the PLWH are specific to age and gender.

Gender specific unmet needs: Both the genders mainly expressed the need for financial aid (females (n=40) 61.5%) males (n=28) 29.8%) followed by need for housing (n=6, 9.2%) among females; employment (n=5, 17.8%) and child’s education (n=5, 17.8%) among males. The only transgender participant expressed the need for employment. (Table 3: Age- and gender-specific unmet needs of people living with HIV in Chittoor District, Andhra Pradesh, India, 2021)

Age specific unmet needs:

Participants expressed their need for financial aid in terms of pension aid or subsidized bank loans. Elder populations (41 to 60 years (n=29, 72.5%) and > 60 years (n= 3, 75%)) had a higher need than the younger populations (18 to 40 years (n=25, 50%). Participants aged 18 to 40 years expressed a need for employment (n=5, 10%), housing aid (n=5, 10%) and child’s education (n=4, 8%). A few participants (Between 41 and 60 years) (n=4, 10%) of group have expressed their concern on child’s education. However, the elderly participants expressed their concern only for financial aid. (Table 3: Age- and gender-specific unmet needs of people living with HIV in Chittoor District, Andhra Pradesh, India, 2021)

The other domains of concerns/needs expressed are insufficient provision through available GSPS, failure to avail GSPS, lack of support from family, neighbours and health care workers in availing GSPS and stigmatization towards PLWH. (Table 2: Administrative challenges and stigma faced by people living with HIV in Chittoor District, Andhra Pradesh, India, 2021.)

Discussion

The study sheds light on the unmet needs of People Living with HIV (PLWH) in a high HIV burden region of Southern India. Government assistance is vital for their daily living, encompassing financial, nutritional, housing, educational, health, and travel needs, yet these needs remain largely unmet, presenting significant challenges for PLWH. These challenges are influenced by age and gender, affecting their daily lives.

Social protection plays a crucial role in overcoming hurdles for PLWH. Free and decentralized HIV services help mitigate barriers to access, including economic obstacles such as expenses for sustenance, transportation, and income loss due to antiretroviral therapy (ART) appointments. **(Tenim M et al., 2010; Kyaw NTT et al., 2017; Gowtham Ghosh B et al., 2020)** Globally, several countries have endorsed and actively implemented HIV-sensitive social protection strategies, with India also making efforts through various schemes. **(UNAIDS, 2018)** In India, the HIV and AIDS Act of 2017 mandates both central and state governments to implement welfare schemes for PLWH, covering financial aid, employment, nutrition, travel concessions, insurance, and child-focused initiatives. However, the effectiveness of these schemes is criticized for their top-down nature and variation in implementation across states. **(Koni et al., 2022)** This study reaffirms that the social support for PLWH in this context is mostly top-down and not sufficiently need-based.

In resource-poor settings, a dynamic relationship exists between HIV/AIDS and economic hardship, acting as mutual instigators and consequences. **(International Labour Organization n.d.)** This study identified economic crisis as the predominant need, underlying other unmet needs such as housing, education, nutrition, and transportation. **(Kalichman SC et al., 2023)** In the Indian context, higher socio-economic status correlates with improved quality of life for PLWH **(Nyamathi AM et al., 2011; Arjun BY et al, 2017)**, emphasizing the role of poverty reduction in HIV treatment outcomes. **(Kalichman SC et al., 2023)** Socioeconomic factors like homelessness, food insecurity, and transportation challenges significantly impede HIV treatment goals. **(Chen NE et al., 2013; Leaver CA et al., 2007; Milloy MJ et al., 2012; Anema A 2009; Franke MF 2011; McLinden T 2020; Lankowski AJ 2014)** The study anticipates an escalating need with increasing age in this relatively young population, highlighting the necessity for appropriate interventions. **(Kalichman SC et al., 2023)** Unfortunately, healthcare workers reported discontinuation of multiple schemes, including double pension, further exacerbating these challenges.

Administrative hurdles and social stigma compound these issues. A previous study in Rajasthan highlighted administrative bottlenecks as a major cause of unmet needs. **(UNAIDS, 2018)** Inadequate information and application processing delays deter PLWH from utilizing services, amplifying the unmet need. **(Lalhruaimawii I et al., 2022)** Concerningly, many participants felt their HIV status was disclosed by healthcare and administrative staff, leading to reduced service utilization due to perceived confidentiality breaches. **(Bayisa L et al., 2022; Dapaah JM et al., 2016)** Moreover, family, and social support, crucial for care and treatment outcomes, were notably lacking for the study participants. **(Birore CMS et al., 2022)** Addressing these multifaceted challenges is imperative to enhance the overall well-being of PLWH in this

setting. Adoption of a pilot tested Global HIV Stigma reduction framework adopted by United Nations Development Program will help in reduction of stigma. Ensuring the confidentiality of patient details throughout, providing adequate information about available schemes by the counsellors and volunteers working for HIV would help to address these issues. Guidance to decision makers, staff training to work effectively, facilitating adequate staff, managing staff turnover are certain ways to overcome administrative hurdles.

The study had a few limitations. First, the participants were selected non-randomly and hence, the selection methods are expected to reduce the generalizability of the study finding. To overcome this problem, we selected participants from all the three centres of the district. Also, we interviewed the health personnel to triangulate the responses of the PLWH. To avoid interviewers' bias, a structured questionnaire and an interviewers' guide was used to avoid leading questions.

Conclusion

This study highlights the unmet needs of People Living with HIV (PLWH) in Southern India and underscores the pivotal role of social protection. Despite government assistance, crucial needs in finance, nutrition, housing, education, and health remain largely unfulfilled, shaped by age and gender dynamics. Effective, decentralized, and need based HIV services help mitigate the barriers. Economic support emerges as a fundamental need, necessitating poverty reduction strategies for improved HIV treatment outcomes. Mitigating administrative obstacles, countering social stigma, and ensuring confidentiality for this vulnerable populations emerge as the vital policy implication in this region.

Declarations

Funding: Nil

Conflicts of interest /Competing interests: All the authors declare no financial or non-financial competing interest.

Ethics approval: Institutional ethics committee clearance was obtained from the institutional review board (Ref: IEC07/AIMSR/07/2020 dated 30/05/2020).

Consent to participate: Written / Verbal informed consent was obtained from every participant before data collection.

Consent for publication: Not applicable. No individual's data or image are included in the manuscript.

Data Availability: The datasets generated during the current study are not publicly available due to ethical and confidentiality reasons but are available from the corresponding author on reasonable request, subject to Institutional Ethics Committee approval.

Authors' contributions: All the authors contributed to the study methodology, data collection, analysis, interpretation, and manuscript preparation.

Ethics approval and consent to participate:

Ethical approval for the study was obtained from the Institutional Ethics Committee of Apollo Institute of Medical Sciences, Chittoor, Andhra Pradesh, India, with approval number IEC07/AIMSR/07/2020 dated 30/05/2020. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and the National Ethical Guidelines for Biomedical and Health Research Involving Human Participants issued by the Indian Council of Medical Research. Written informed consent was obtained from all participants before data collection. Participation was voluntary, and confidentiality and anonymity were maintained throughout the study.

Consent for publication:

Not applicable. No individual's data or image are included in the manuscript.

Availability of data and materials:

The datasets generated and/or analysed during the current study are not publicly available because they contain participant-level information collected under Institutional Ethics Committee approval. The data are available from the corresponding author upon reasonable request and subject to approval by the Institutional Ethics Committee and the Principal Investigator, in accordance with institutional policies and applicable ethical guidelines.

Competing Interests

The authors have no competing interests as defined by BMC, or other interests that might be perceived to influence the results and/or discussion reported in this paper.

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Author Contributions:

KK and TJ conceptualized and designed the study. KK coordinated the study implementation, collected and curated the data, performed the statistical analysis, interpreted the findings, and prepared the first draft of the manuscript. TJ, as the corresponding author and Principal Investigator, supervised the overall conduct of the study, provided methodological guidance, critically reviewed the manuscript for important intellectual content, and approved the final version for submission. SC contributed to the study design, provided expert guidance on public health methodology and interpretation of findings, and critically revised the manuscript. UK assisted in data collection, data verification, literature review, and manuscript

preparation. HK contributed to participant recruitment, field coordination, data collection, and validation of study records. All authors reviewed, revised, approved the final manuscript, and agreed to be accountable for all aspects of the work.

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Tables

Tables 1 to 4 are available in the Supplementary Files section.

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