Original Article

Redefining venereology practice in Tamil Nadu, South India – Nakshatra Health – A networking model

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Abstract

Background: Accessing care for sexual health has always been a challenge in our Indian context. The primary reason is a lack of awareness of modes of transmission of sexually transmitted diseases (STD), appropriate testing, and treatment options. The second is taboo associated with the morality of the individual. The third is the accessibility and availability of Quality STD care by allopathic specialists in comparison to the demand. This has paved way for lots of myths and misconceptions among the general public regarding STDs and HIV disease. Compounding it is the mushrooming of nonqualified practitioners and healers who claim to cure all STDs and HIV has led to poor treatment outcomes. Several methods of partnership with qualified allopathic practitioners have been tried for the provision of quality STD care by various donor-funded, HIV and STD prevention programs in the country. The key reasons for the nonsustainability of these clinics were the lack of technical capability to handle the sexual health and STD clinical cases and the huge cost involved in the advertisement and maintenance of the clinics. **Methodology:** Seven clinicians from different geographical locations in Tamil Nadu, who were exclusively qualified in Venereology, conceived the idea of provision of comprehensive clinical care cum counseling and testing services through a networking model from December 01, 2020. The model comprised the following: (1) Dedicated YouTube channel (Nakshatra Health) to provide scientific information on STD and HIV, modes of transmission, clinical symptoms, lab testing, interpretation of results, clinical treatment options, and counseling on prevention, (2) Dedicated telephone helpline was established with WhatsApp to answer the queries of clients by the network venereologists, (3) Dedicated website (www.nakshatra.health) was developed to provide information on STD and HIV and options to clarify doubts and fix appointments online, (4) Clinical consultations were done in a hybrid mode with an option for direct clinic and online consultation. Prescriptions were provided using dedicated software instantly, (5) Networking was done with NABL-accredited labs and collection centers for performing STD and HIV tests with e-test request forms, (6) Networking was done with pharma companies to provide pre- and postexposure prophylaxis (PEP) services to clients through e-prescriptions. Cross referrals were made across the network members to facilitate easy access to clinical services by clients from different parts of Tamil Nadu. The entire concept was branded as "Nakshatra health" with a tagline – "Your sparkling solution for safe sexual health care." Quality STD care and ethical practice were the underlying motos of this concept. **Results:** During the 20 months (December 2020 to July 2022), 6442 phone calls and 9328 WhatsApp messages were received. 82.3% of the calls and messages were queries from clients related to their sexual exposures, and 16.4% were general information seekers. During this period, the Nakshatra Health YouTube channel had 1590 subscribers and nearly 2.4 lakh views of all its 24 videos. Among the viewers, 92.4% were male. 52.29% of viewers were between the ages of 25 and 34 years, 28.25% were between the ages of 18 and 24 years, and 17.25% viewers were between the ages of 35 and 44 years. 86% of the viewers were from India and 13% were Tamil-speaking viewers from Middle East, Southeast Asian countries and 1% were from European, African, and American countries. The most commonly watched videos were related to HIV symptoms and lab

Access this article online

Quick Response Code:

Website: www.ijstd.org

DOI: 10.4103/ijstd.ijstd_13_23

How to cite this article: Periasamy M, Mohankumar V, Shanmugam V, Selvakumar M, Pandian SM, Sridharan L. Redefining venereology practice in Tamil Nadu, South India – Nakshatra Health – A networking model. Indian J Sex Transm Dis 2023;44:56-63.

Submitted: 05-Feb-2023 **Revised:** 15-Mar-2023
Accepted: 22-Mar-2023 **Published:** 06-Jun-2023

tests for STD and HIV. 16% of the viewers repeatedly watched the various videos in the series. The network laboratories provided testing services for 1082 clients with 2423 various STD/HIV tests. Totally 3328 clients availed of online consultation and 924 clients accessed clinic-based services across the network members. Among these cases, 18 cases of Syphilis (primary and secondary) and 12 cases of acute gonococcal urethritis, and 10 cases of genital warts were diagnosed and treated. 12 cases of phimosis and 4 cases of anal warts were surgically treated in collaboration with a surgeon. Through this initiative, PEP and PreP services were provided to 228 and 8 individuals. **Conclusion:** Designing a comprehensive sexual health service package is crucial to ensure the availability and ease of access to services to the general public. Provision of correct scientific information, networking and cross-referral of cases with like-minded dermatovenereologists/clinicians interested in venereology sexually transmitted infections, easily accessible clinical, laboratory, and treatment services including PreP and PEP medications, and ethical practice are the key factors for scaling this concept.

Key words: Mobile health, networking model, redefining venereology practice

Introduction

Accessing care for sexual health has always been a challenge in our Indian context. The primary raising lack of awareness of modes of transmission of sexually transmitted diseases (STD), appropriate testing, and treatment options. The second taboo associated with the morality of the individual third the accessibility and availability of Quality STD care by allopathic specialists in comparison to the demand. This has paved way for lots of myth misconceptions among the general public regarding STDs and HIV disease. Counting to it is the mushrooming of nonqualified practitioners and healers who claim to cure all STDs and HIV has led to poor treatment outcomes. Several methods of partnership with qualified allopathic practitioners have been the tried for provision of quality STD care donor-funded or funded, HIV and STD prevention programs in the country (Key clinic, etc.). The key reasons for the nonsustainability of these clinics were the lack of technical capability to handle the sexual health and STD clinical cases and the huge cost involved in the advertisement and maintenance of the clinics.

During the COVID pandemic physical medical consultations were restricted but the sexual behavior of high-risk individuals and clients remained the same. New avenues opened up for online sex chatting, dating, and clandestine sexual encounters. This had led to the gap between the increased need for sexual health services and accessibility to the same. Several nontraditional models of the provision of health information have been tried out using technology across the globe. Gold *et al*., in 2010[1] studied the use of mobile phones in sexual health promotion in Australia. This study documents health promotion in low-cost settings for large numbers mainly by short message service (SMS). Using better message methods, language, contents, and delivery timings relevant to the need produced better acceptability and efficient behavior change in adolescents. Brody *et al*.,[2] conducted a randomized controlled trial of a mobile-phone-based behavior change intervention using SMS/voice messages (VMs) to support linkage to sexual reproductive health services for the hard-to-reach female entertainment workers in Cambodia. It measured an improvement in self-reported testing of HIV and sexually transmitted infections (STIs) and treatment, condom use, contraceptive use, and gender-based violence (GBV). Middleton *et al*.,[3] studied mobile phone messaging to increase the responsiveness of HIV and HIV testing in the UK construction Employees during the COVID-19 pandemic documented the increase in approval and appointment, and low levels of lost for follow-up, enthusiastically interacting with messages, access to the general health, sexual health, and HIV-related websites and accessed details of home HIV testing services and also increase in the repeat testing, which was higher than the national average and they also have positive changes in sexual health behaviors. Agarwal *et al*.,[4] reviewed the guidelines for mobile phone-based health-care interventions. It depends on the what, where, how; what was the content of the intervention, where-environment-it was being implemented, how it was implemented, and what were the technical features to support the replication of the intervention. Ames *et al*.,[5] systemic review, recognized that e n in the low resource setting and high usage mobile phones the world, digital health interventions based on client-oriented communication improved the patient's adherence, increase adherence, relevance, and usefulness of these interventions in the patients' point of view also. The World Health Organization meetings guided the prerequisites of digital or mobile interventions "digital health solutions complement and enhance existing health service delivery models, strengthen integrated, people-centered health services and contribute to improved population health, and health equity, including gender equality." (WHO May [2018]). In any setting, the mobile interventions had some blockades such as network influences, accessibility, device issues, and client data confidentiality and privacy.

Methodology

During the COVID-19 pandemic, physical consultations had reduced but the usage of mobile phones and internet services for various basic life needs had increased. Mobile application usage for health care had improved. Based on the impact of the pandemic and the new normal needs of the common public, seven clinicians from different geographical locations in Tamil Nadu State, who were exclusively qualified in venereology, conceived an idea of provision of comprehensive clinical care cum counseling and testing services through a networking model during December 01, 2020.

> In contrast to the entire country, the south Indian state of Tamil Nadu, had an exclusive medical postgraduate course to specially focus on diagnosis and clinical management of Venereal diseases. The post graduates were trained and qualified from Madras and Madurai Medical College (in South India) since the early 1970s.

The model comprised the following:

1. Dedicated YouTube channel (Nakshatra Health) [Figure 1] to provide scientific information on STD and HIV. The channel had a series of short videos to clarify doubts regarding six major topics related to STD/HIV/

AIDS mainly (1) disease transmission, (2) symptoms, (3) Investigations and interpretation, (4) Treatment, (5) Prevention techniques, (6) Counseling. These videos were prepared and circulated for the purpose of providing correct scientific information and clarifying doubts. These short videos were branded as "six for sex" which were 6 min. In each video, six questions that were commonly asked by viewers were answered by experts in a simple understandable vernacular language style. Queries from clients were answered in the comment section of the videos, within a maximum duration of 1 day

2. A dedicated helpline was established with WhatsApp to answer the queries of clients through the network of venereologists. The WhatsApp number was promoted through the YouTube channel. Clients had the opportunity to chat, send VM, and share photos of STD symptoms and laboratory reports, and prescriptions. All WhatsApp messages were replied to within an average period of 10 min
3. A website (www.nakshatra.health) [Figure 2] was developed to provide information on STD and HIV and options to clarify doubts. The key highlights of the website were
    a. Details of the STD consultants and their experience in the field of STD and HIV
    b. Details of STD/HIV-related laboratory tests with a transparent rate card
    c. Options for fixing up appointments online
    d. Frequently asked questions related to STD and HIV
    e. Risk assessment questionnaire to check if they were at risk.
4. Two options were provided for clinical consultation with the Network doctors' clinics – direct and online. Direct appointments were fixed through WhatsApp messaging with the complete address and geo-location of the clinics. Cross referrals were made across the network members to facilitate easy access to clinical services by the clients to their nearest specialists. Online appointments were done through WhatsApp with designated time slots. E-prescriptions were provided using templates with provisions for clinical diagnosis, duration of treatment, general instructions, and dates for follow-up
5. Networking was done with NABL-accredited labs and collection centers performing STD and HIV tests with e-test request forms. Sample collection was tagged with multiple collection centers across the state. Samples were collected using the trained staff of the laboratory, processed, and transported to the main lab in Chennai for testing and reporting. Designated Lab IMS was provided to the team to track the status of the sample transport, testing, and reports. Reports could be downloaded online and shared with the clients through WhatsApp
6. Networking was done with pharmaceutical companies to provide pre and postexposure prophylaxis (PEP) services for HIV, to clients through e-prescriptions. Drugs were delivered at the convenient places of the clients by the pharmaceutical representatives or through private courier agencies
7. Payment for clinical consultations, laboratory tests, and pharmaceutical drugs was done by the clients through UPI/payment gateways – Google pay/Phone pay/Paytm
8. The entire networking concept was branded as "Nakshatra health" with a tagline – Your sparkling solution for safe sexual health care. Quality STD care and ethical practice were the underlying motos of this concept.

Results

A prospective observational study was conducted on the outputs of this concept, in the south Indian state of Tamil Nadu. Data used in this analysis were retrieved from the online test request forms, prescriptions, and YouTube studio analytics database. During the 20 months (December 2020–July 2022), 6442 phone calls and 9328 WhatsApp messages were received.

[Figure 3] provides the details of the quarter-incremental increase in the number of phone calls and WhatsApp messages. 82.3% of the calls and messages were queries from clients related to their sexual exposures, 16 and 0.4% were general information seekers.

During the study period, Nakshatra Health's YouTube channel had 1590 subscribers and nearly 2.4 lakh views of all its 24 videos. Among the viewers, in [Figure 4], 92% were male. 52.29% of V1 ewers were between the ages of

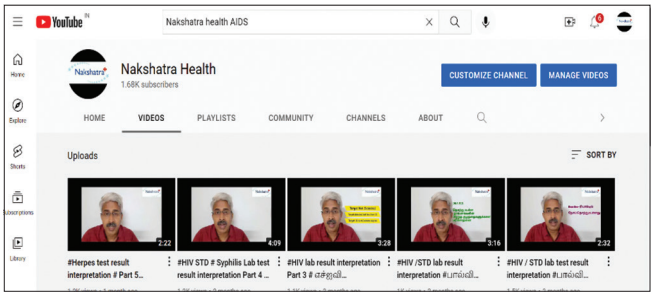

Figure 1: YouTube Channel – Nakshatra Health

Figure 2: Website – Nakshatra Health

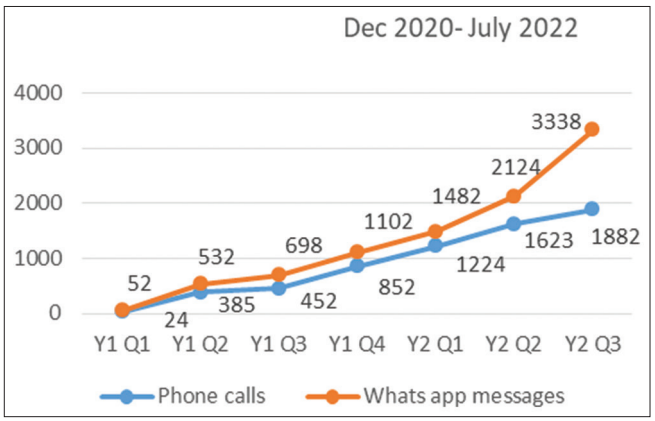

Figure 3: Quarter wise trends of phone calls and messages

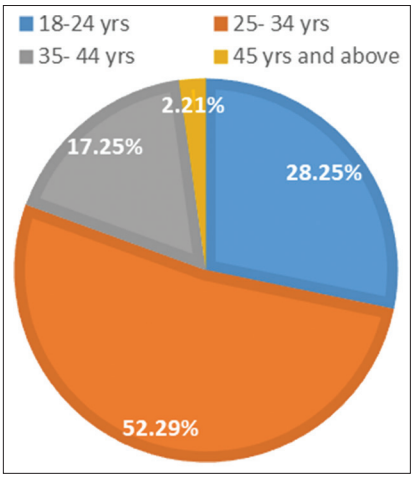

Figure 4: Age group of viewers (n = 240,022)

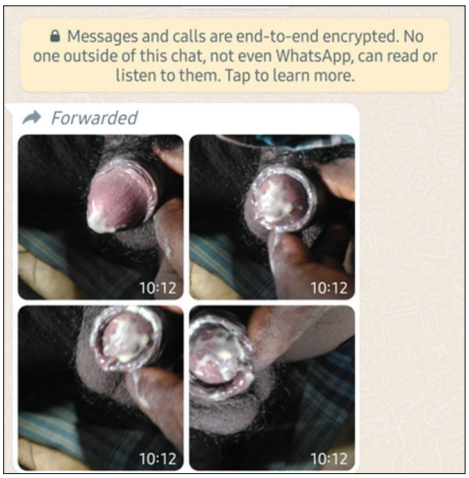

Figure 6: WhatsApp consultation – Acute gonococcal urethritis

25 and 34 years, 28.25% were between the ages of 8 and 24 years, and 17.25% of V1 ewers were between the ages of 35 and 44 years.

86% of the viewers were from India and 13% were Tamil (the regional language of Tamil Nadu) speaking viewers from Middle East, and South East Asian countries, and 1% were from European, African, and American countries.

The most commonly watched videos were related to HIV symptoms and laboratory tests for STD and HIV. 16% of the viewers repeatedly watched the various videos in the series.

The network laboratories provided testing services for 1082 clients with 2423 various STD/HIV tests. [Figure 5], Commonly requested tests were HIV 4th Generation (p24+ Antibody), HIV Qualitative polymerase chain reaction (PCR), RPR, TPHA, HSV 2 IgG/IgM antibody and urine PCR for NG/CT. e-test requisition forms were provided to the labs by the network clinicians through WhatsApp and payment for laboratory tests was done by payment gateways. Test reports were handed over to the clients through E-mail/WhatsApp within the specified turnaround time.

Totally 3328 clients availed of online consultation and 924 clients accessed clinic-based services across the network

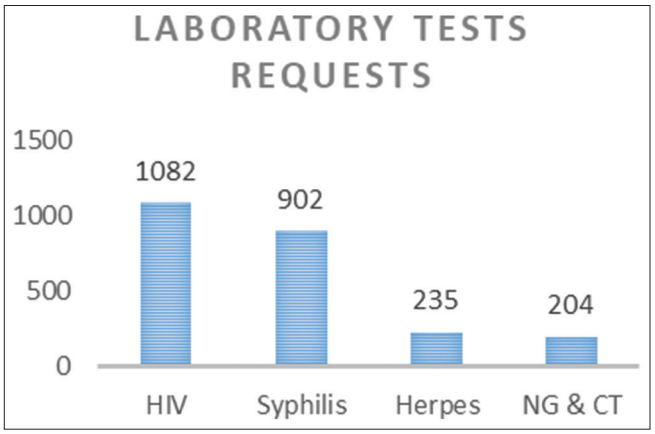

Figure 5: Laboratory test requests

Figure 7: WhatsApp consultation – Perianal warts

members. Among these cases, 18 cases of syphilis (primary and secondary) and 12 cases of acute gonococcal urethritis [Figure 6], and 10 cases of genital warts [Figure 7], were diagnosed and treated [Figures 8,9]. Twelve cases of phimosis and 4 cases of anal warts were surgically treated in collaboration with a surgeon. Through this initiative, PEP (Post-exposure prophylaxis) and PreP (Pre-exposure prophylaxis) services were provided to 228 and 8 individuals respectively. E-prescriptions were provided through WhatsApp and payment for consultation was done through payment gateways.

[Figure 10] shows the disaggregated data of the diagnosis made against the clients who availed of online and or direct consultation services. Among the online clients, 7.5% had Venereophobia symptoms d 57% requested lab testing, 10.6% had classical venereal diseases and 17.2% had genital dermatosis. This percentage was almost comparable to those who availed of direct consultation.

[Figure 11] above shows the disaggregated data of the classical STD diagnosis made among the 355 online and 178 direct clients mentioned in Figure 10. Mixed infection was not observed in any of the cases.

The number of cases mentioned in Figures 10 and 11 are exclusively referred to by the Nakshatra channel, helpline, and website. This did not include the existing patient cohort seen by the network doctors.

Discussion

Accessibility

Nourimand *et al*.[6] systemic review documented eHealth's advantages in the prevention of STIs, emphasized the need to use eHealth's modes to promote sexual health and support susceptible people which cannot be ignored anymore mainly the young population who routinely use

Figure 8: Secondary syphilis

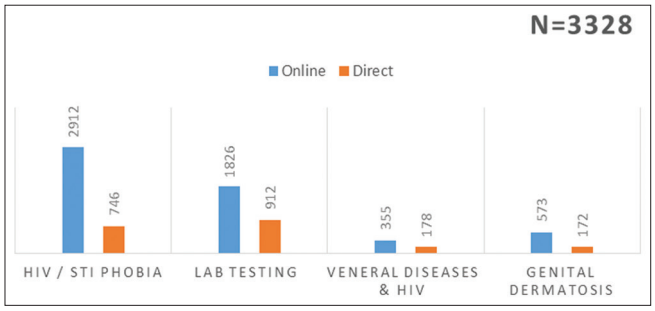

Figure 10: Disaggregated data of online/direct consultation diagnosis

the mobile phone as well as tech-savvy and common users, they also vulnerable to STDs, related myths and misconceptions. All mobile health initiatives should be acceptable, feasible, cost-effective, appropriate, adaptable, and effective to address the needs of the service utilizer and providers. This review approach was based on the indicators such as attitude toward STI prevention, knowledge of STI control, condom use, STI testing rate, intention to practice safer sex, and rate of risky sexual behaviors. Along similar lines, the Nakshatra model had the motto of providing quality, scientific information to clients in a pleasing and nonthreatening manner. The network doctors were easily available and approachable over phone/WhatsApp messages. In our study also the clients used our services to get clarity from the network doctors, following their risky sexual encounters, prejudiced concepts in sexual health, condom use issues, and infections in sex organs.

Confidentiality

Johnson *et al*.[7] study at the University of Chicago outcomes recommend that in family planning visits, In the loop mobile application was feasible and acceptable, clients were included in the design process service delivery also improved the PrEP knowledge and uptake among PrEP-eligible young Black women. In the loop followed important doctrines of developing effective mHealth interventions, including incorporating ease of modification and tailoring to the target population ensuring privacy and confidentiality. Similarly, this model aimed at providing quality service by maintaining the confidentiality of the client's identity and reports.

Figure 9: Primary syphilitic chancre

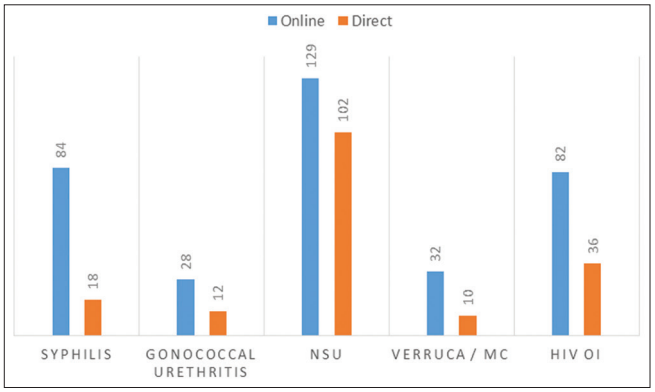

Figure 11: Disaggregated data of venereal diseases and HIV across online/direct consultation

Feasibility

In low- and middle-income countries, mobile health interventions for HIV/STI prevention among youth, outcomes were systematically reviewed by Nwaozuru *et al*.[8] It finds that studies with the most frequently evaluated implementation outcomes such as acceptability (100%), appropriateness 6 (100%), and feasibility (83%). This model also wished to understand the feasibility of providing comprehensive quality STI services.

Community participation

Leluțiu-Weinberger *et al*.[9] study using the Facebook-based intervention was the initial step in addressing Romanian Young Gay Bisexual Men's sexual, behavioral, and mental health through mHealth interventions laid a foundation. This study reported significant increases in HIV-related knowledge and recent HIV testing, increases in the self-efficacy of condom use. This intervention yielded high acceptability and feasibility with a focus on community participation was rewarding and an "eye-opener" about HIV risk reduction, healthy identity development, and partner communication. In our intervention also the clients had an open arena on YouTube, where they can post questions in the comments section and get responses within a day from the network clinicians.

Goldstein *et al*.,[10] review article based on the mHealth Interventions for adolescent and young adult (AYA) HIV prevention and the adolescent HIV continuum

of care in low to middle-income countries (LMIC), evidenced that the practice of mHealth technology is a likely application approach to address the differences along the HIV continuum of prevention and care, high degree of acceptability and feasibility of mHealth among AYA. Since most of the studies were uncontrolled-single arm studies that need more adequately powered randomized trials with better design, evaluation, and eventually scale, delivery of effective mHealth interventions for AYA in LMIC. Our observational study also has only a single intervention based on YouTube communications followed by one-to-one online or offline consultations needs a more refined design for scaling up in the larger perspectives.

Acceptability

Ihesie[11] review article documented that mobile phones can be an operative instrument for appealing to teenagers who tend to be passionate and familiar with new technology. Although mHealth is not a "magic bullet," it has a strong potential to address blockades, progresses sexual reproductive health information, and endorse positive sexual behavior among adolescents and young people. Our study also had success in addressing the needy population in an accessible, affordable, and acceptable with privacy concerns.

Avoiding stigma

Feroz *et al*.,[12] systemic review narrated that based on the various health care setting in LMIC, mobile phone-based interventions barriers, and facilitators both in the rural and urban populations. It documented the positive responses in overcoming the client and provider prejudice, stigma discrimination, fear of refusal, lack of privacy and confidentiality, cost prohibitions, and transportation challenges. Our mobile intervention also plays a major role in addressing prejudice, stigma-related concerns, confidentiality, and affordability issues.

Drug adherence

Motivational Enhancement System for PrEP Uptake and Adherence, 2-sitting, technology-delivered, motivational interviewing-based intervention to focus on PrEP use in transgender women in Thailand with Enhanced YaCool app enabled the client's self-management of gender and sexual health (including PrEP).[13] The feasibility and acceptability of the intervention are on the better side based on the results like an increase in the level of adherence to PrEP. Our intervention also documents the adherence to the treatment including partner management.

Repeat clients

Burns *et al*.[14] review findings suggest interventions delivered by SMS interventions, statistically important enhancements in the acceptance of sexual health services using SMS reminders, increased knowledge on the reproductive tract infections, and gathering of sexual health information using mobile technology was acceptable, compared to controls. Our study documents the improvement in knowledge-seeking habits and nearly 16% were repeat clients.

Prevention messaging

Girl2Girl comprehensive text messaging-based interventions, seem to be related to rises in multiple pregnancy preventive behaviors for lesbian, gay, bisexual, and transgender girls, short-term gains were documented. This does not seem to be operative in encouraging sexual abstinence or a return to abstinence among newly sexually active girls mainly due to messages purposely sex-positive and focused on building healthy relationships and use of barriers and testing, rather than exclusively stressing abstinence.[15] Our intervention focused on preventive messaging to help people from engaging in high-risk behavior.

Easily understandable language

Rawat *et al*.'s[16] study in Mumbai, as internet and mobile phone use expands in India, there is a scope to develop mobile health (mHealth) interventions for marginalized populations, including men who have sex with men and hijras (transgender women), hesitant to access traditional health care systems. Mobile health intervention content provided sex education for younger community members, information about STIs, and provided information and social support for persons living with HIV. Interface developed with presentations with pictures, and videos to present stories of role models, push notifications for the testing, appointment, and medication notices; geolocation to link to just-in-time services; and telemedicine to rise access to health service providers and community services. The content delivery with keep it fun-based, with gaming mechanics, regional languages usages, privacy, and linked to social networking apps. This study participants documented that the intervention was simple with a lot of content and feature, using pictures of graphic STIs, not fear-based messaging skills for HIV prevention, would have been ineffective. Our study also used simple, regional language, with graphics and pictures in the YouTube videos, which were accepted by the clients.

Chattu *et al*.,[17] narrated in the COVID-19 pandemic disturbed sexual reproductive healthcare services throughout the world, faced many unwanted pregnancies, stillbirths, maternal and neonatal deaths, and undesirable impacts on mental health outcomes for women. These trials put some countries and settings to leveraged health technologies to safeguard the access and delivery of healthcare, creating the way to a digital health future. In those lockdown months, mHealth and telemedicine gained prime importance in the entire world to see through their potential outside serving marginalized and underserved communities. Hence, in post-COVID days also, there are openings to advance healthcare access and endorse gender equality. Digital health interventions should be developed based on digital health equity in health policies to talk about the issues of equity, access, and affordability, especially in remote settings. Our study also developed based on the thought process with concerns over equity, access, affordability, and addressing the concerns in the remote areas.

Mobile phone technology-based health care delivery is evolving, the wide-ranging form of electronic communication which is customarily and communally practicable and proper for the establishment of the health system. In any public health program, the world of mobile-based interventions is just started and moving towards the higher ends.[18]

Mobile phones and other mobile devices become an essential part of daily life, people are prepared a better way hand to emergencies, check with peers and health professionals about health issues as and when they occur, and use health service delivery based on the mobile phone including the remote patient monitoring. The term mobile health or mHealth, also written as mhealth defined in various ways like "the use of mobile telecommunication and multimedia technologies as they are integrated within increasingly mobile and wireless health care delivery systems or "mobile computing, medical sensor, and communications technologies for health care." The present trends of mobile phone-based technologies are more

reachable and beneficial to healthcare providers, and the general public even in remote areas. Using computers, the Internet, satellite, and personal digital assistants with more and more availability of free and open-source software, it is possible to extend the welfare of higher quality, targeted mHealth solutions to LMIC. The mobile phone's most distinguished feature is its volume, accuracy, privacy, and capacity to communicate and handover information to both literate and illiterate populations, mobile phones are with simple useful functional, and structural characteristics making them to it in the daily routines of the health sector in LMIC.[19]

The WHO guidelines on digital health interventions emphasize that "The use of digital technologies offers new opportunities to improve people's health," "If digital technologies are to be sustained and integrated into health systems, they must be able to demonstrate long-term improvements over the traditional ways of delivering health services," "Digital interventions, depend heavily on the context and ensuring appropriate design," "Digital health interventions are not sufficient on their own," "Digital health is not a silver bullet," "WHO is working to make sure it's used as effectively as possible." WHO points out that this is a valuable complement to face-to-face interactions, but it cannot replace them entirely."[20]

Gold *et al*.'s study[21] in Australia find out that text messages (small, attractive, educational, where possible, and knotted into specific events) offer a novel method of sexual health promotion to young people who are attracted to new technology and are also at the highest risk of STIs. It documented that it is a possible and feasible effective method for improving sexual health knowledge and STI testing. These previous decade's study findings are reemphasized with our study on the usage of YouTube.

Conclusion

In the pandemic and following days of the COVID era, designing a comprehensive sexual health service package using the internet latest mobile technology is crucial to ensure the availability and ease of access of services to the general public. Provision of correct scientific information by using the commonly utilized mobile phones apps such as YouTube, networking and cross-referral of cases with like-minded dermatovenereologists/clinicians interested in venereology STI, easily accessible clinical, laboratory, treatment services including PreP and PEP medications, ethical practice are the key factors for scaling up this concept in various clinical settings.

Limitation

This study had the following limitations:

1. All the healthcare clinic settings were based out of simple private clinics owned by individual STD/HIV clinicians
2. Clients belonged to Tamil-speaking community mostly from Tamil Nadu. This had been a barrier for viewers from other states, who did not know Tamil
3. This health model was purely dependent on YouTube and Web site based on information dissemination. No active advertisements/promotions were done in the project
4. Client-based short-term output was studied. Long-term viability of this model needs to be studied. Satisfaction indicators need to be verified.

Recommendations

1. A more all-inclusive study with heterogeneous facilities and faculty, essential characteristics of the study design to address the needs of populations all over the state and country populations with multilingual, regional-specific issues in different countries and cultures
2. More inclusive studies to examine the impact of mobile Health's long-term follow-up and outcome are strongly recommended
3. More inclusive studies to examine the various mobile health technologies from low-income come in high-income settings.

Ethics statement

No personal information is included in this observational study, written consent was obtained for the clinical photographs and the results were submitted and presented at the 46th IASSTD and AIDS conference, Hyderabad, September 2022.

Acknowledgment

We would like to thank the IASSTD and AIDS and 46th IASSTD and AIDS conference, ASTICON Hyderabad September 2022 for selecting this abstract for oral presentation under the IUSTI-IASSTD and AIDS scholarship.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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