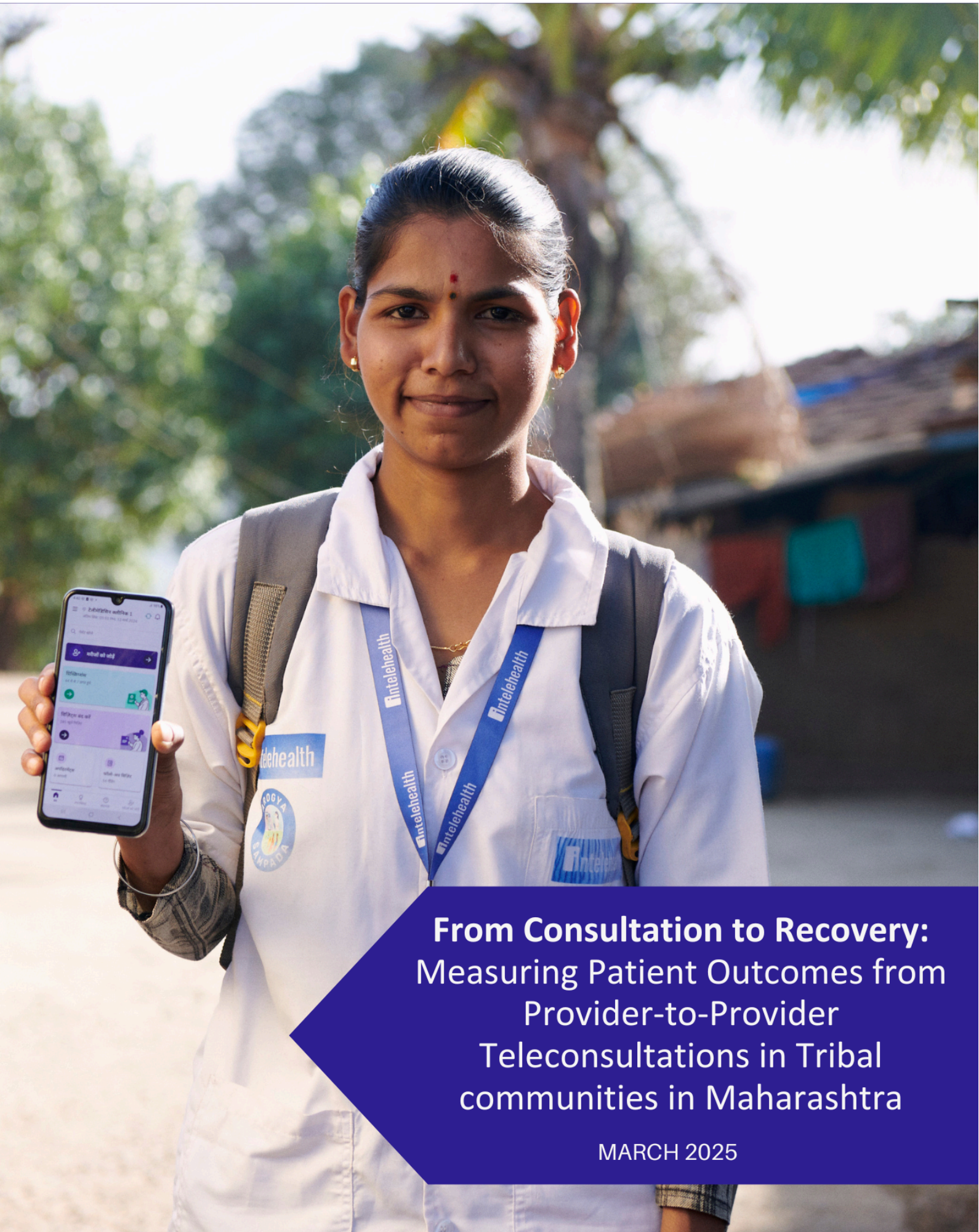


From Consultation to Recovery: Measuring Patient Outcomes from Provider-to-Provider Teleconsultations in Tribal communities in Maharashtra

MARCH 2025

Summary

The Arogya Sampada (AS) telemedicine initiative aims to bridge healthcare access gaps for tribal communities in Nashik district, Maharashtra, by enabling provider-to-provider teleconsultations supported by frontline health workers. This study presents an outcome-focused evaluation of the program, with the objective of assessing clients recovery through doctor follow-up assessments post teleconsultations.

A cross-sectional follow-up study was conducted with 318 clients (374 diagnosed episodes, as some clients had multiple diagnoses) who received teleconsultations between December 2024 and January 2025. Recovery status was assessed approximately one month after consultation and independently verified by a qualified doctor. The study also explored recovery patterns across health condition types, considering their self-limiting (diseases that resolves itself even without medication) or non-self-limiting nature (diseases that won't resolve itself without treatment or medication) and public health importance (PHI) as high/low, using ICD-11 classification.

Key Findings

- **92% of episodes (n=336) fully recovered post teleconsultation** - indicating that telemedicine is a viable healthcare option.
- **96.3% of these episodes where patients experienced a full recovery were for conditions classified as high Public Health Importance** (Public Health Importance) such as Acute Diarrheal Diseases, Acute Respiratory Infections, etc., fully recovered.
- **83.1% of these episodes where patients experienced a full recovery were for non-self-limiting conditions (41.2% of all reported episodes)** —suggesting appropriate clinical management through remote care.
- **99.4% of clients received and adhered to prescribed medication**, supported by strong engagement from community health workers.
- The most frequently diagnosed episodes were of **upper respiratory infections (20.6%), pharyngitis (17.1%), acute rhinitis (10.4%) and scabies (7.22%)** —common illnesses with high community burden.
- **Recovery rate** (based on full recovery) in **infant and neonatal (100%, n=12)**, **reproductive (100%, n=3)**, and **childhood and adolescent (97.6%, n=147) health conditions** was the highest, where as full recovery rate for **elderly care (77.6%, n=67)** and **non-communicable diseases (n=1)** was the lowest, and may require more complex or in-person care pathways.
- **79.6% of referred clients did not seek follow up care at higher facilities at higher facilities**, citing logistical and financial barriers. However, the same logistical and financial barriers would prohibit patients from seeking initial diagnosis and treatment without telemedicine.

This study was limited to two tribal blocks and a purposively selected subset of cases, without a comparison group. It relied on self-reported, retrospective assessments of recovery at a single point in time. While the findings cannot be generalized beyond similar

rural contexts or assumed to show causal effects, they provide early evidence that teleconsultations, when paired with access to medicines and follow-up, can support recovery for select conditions in underserved areas. However, managing chronic diseases, geriatric care, and effective referrals still require stronger health system integrations. These insights underscore the need to embed telemedicine within broader primary care frameworks, improve referral pathways, and invest in rigorous, prospective research to evaluate long-term outcomes, cost-effectiveness, and scalability.

Factsheet

Health Outcome Assessment-Key Indicators		
Indicators	**December-January (2024-25)**	
	Frequency	**Percentage**
Overall Clients Surveyed	**318**	-
Number of episodes of diagnosis involving multiple health conditions	**374**	-
Clients by Gender		
1. Female	207	65.1
2. Male	111	34.9
Age Group		
3. 0-5 years	64	20.1
4. 6-14 years	63	19.8
5. 15-25 years	30	9.4
6. 26-35 years	45	14.2
7. 36-55 years	52	16.4
8. 56 and above years	64	20.1
Number of Clients by Cluster		
9. Badagi	68	21.4
10. Ghotapada	62	19.5
11. Jambhulpada	130	40.9
12. Surgane	58	18.2
Client Visited with a Number of Chief Complaints		
13. One	124	39.0
14. Two	134	42.1
15. Three	59	18.6
16. Four	1	0.3
Top 10 Chief Complaints Among Clients		
17. Cold, Sneezing	148	-
18. Cough	127	-
19. Fever	56	-
20. Skin disorder	47	-

Health Outcome Assessment-Key Indicators		
Indicators	December-January (2024-25)	
	Frequency	Percentage
21. Leg, Knee or Hip Pain	43	-
22. Headache	39	-
23. Diarrhea	27	-
24. Sick child (under 5years)	15	-
25. Fatigue and General Weakness	14	-
26. Abdominal Pain	12	-
Distribution of Number of Episodes According to Public Health Importance (PHI)		
27. High Public Health Importance	245	65.5%
28. Low Public Health Importance	129	34.5%
Distribution of Number of Episodes as per Disease Conditions		
29. Self-limiting	220	58.8
30. Non Self-limiting	154	41.2
Distribution of Number of Episodes According to CPHC Services		
31. Childhood and adolescent health care services	147	39.3
32. Management of common communicable diseases and outpatient care for acute simple illnesses and minor ailments	82	21.9
33. Elderly and palliative health care services	67	17.9
34. Care for common ophthalmic and ENT problems	56	15.0
35. Neonatal and infant health care services	12	3.2
36. Basic oral health care	5	1.3
37. Family planning, contraceptive services, and other reproductive health care services	3	0.8
38. Screening, prevention, control, and management of non-communicable diseases	1	0.3
39. Emergency medical services	1	0.3
Clients Received Medication from the Health Worker		
40. Yes	316	99.4
41. No	2	0.6

Health Outcome Assessment-Key Indicators		
Indicators	December-January (2024-25)	
	Frequency	Percentage
Clients Take the Medication as Prescribed		
42. Yes	316	99.4
43. No	2	0.6
Doctor-Assessed Client Recovery Status (Across Episodes)		
44. Completely recovered	344	92.0
45. Feeling better but not fully recovered	17	4.6
46. Condition still same	13	3.5
Advised for a referral during the initial consultation		
47. Yes	65	20.4
48. No	253	79.6
Type of referral provided		
49. Refer	31	9.8
50. Refer if the condition does not improve	34	10.7
51. No referral	253	79.6

Contents

Abbreviations and Acronyms

AI	Artificial Intelligence
EHR	Electronic Health Records
HW	Health Workers
ICD	International Classification of Diseases
ISRO	Indian Space Research Organisation
LMICs	Low- and Middle-Income Countries
MOHFW	Ministry of Health and Family Welfare
AS	Arogya Sampada
NCDs	Non-communicable Diseases
PHI	Public Health Importance

Introduction

Access to quality healthcare in low- and middle-income countries (LMICs) remains a persistent challenge, especially in rural and underserved areas where health infrastructure is weak and the shortage of trained professionals is acute. In India, where nearly 70% of the population resides in rural areas but most specialists are concentrated in urban centers, this access gap is especially stark. Telemedicine has emerged as a transformative tool with the potential to bridge these divides by leveraging digital technology to deliver timely, cost-effective care to hard-to-reach populations (Maroju et al., 2023).

Telemedicine is not a new concept in India. As early as the early 2000s, pilot programs by the Indian Space Research Organisation (ISRO) and various public-private partnerships introduced teleconsultation services in remote areas (Kumar & Snigdha, 2019). However, these initiatives were largely fragmented and lacked policy backing, resulting in inconsistent scalability and limited integration into mainstream health systems. The groundwork laid by earlier pilots, combined with rapid digital adoption and policy momentum during COVID-19, has now positioned telemedicine as a scalable solution to India's longstanding healthcare access gaps.

The onset of the COVID-19 pandemic accelerated the adoption of telemedicine globally, and in India, it catalyzed an unprecedented policy shift. In March 2020, the Ministry of Health and Family Welfare issued national telemedicine guidelines, providing a clear legal framework for virtual consultations (Dash et al., 2021). During the pandemic, it was widely used for triage, continuity of care, and parental counselling, especially in remote areas with limited specialist access (Galagali et al., 2021). Since then, platforms like eSanjeevani have facilitated millions of remote consultations, marking a turning point in healthcare delivery. In purely statistical terms, eSanjeevani seems to be a resounding success, having provided over 276 million consultations (and counting), with almost 300,000 consultations daily. However, vast sections of India's population still lack access to care, meaning that these numbers represent only the tip of the iceberg relative to the denominator of need in India (Ghosh et al., 2024).

Beyond acute care, telemedicine has strengthened primary care, chronic disease management, and preventive health services. It is particularly impactful in rural and semi-urban India, where it supports overburdened frontline health workers, enables early diagnosis, and expands access without the need for significant physical infrastructure (Maroju et al., 2023). Emerging evidence also supports the use of telemedicine in managing chronic conditions such as hypertension. A scoping review of telemedicine interventions across LMICs found that most studies reported significant improvements in blood pressure control, indicating telemedicine's potential to support long-term disease management. However, the review also noted methodological limitations such as small sample sizes and short follow-up periods, calling for more rigorous evaluations (Hoffer-Hawlik et al., 2021).

While most studies have focused on access and utilization, there is limited evidence on client-reported health outcomes following teleconsultation, especially in real-world, rural

settings. Whether clients recover effectively, understand and follow medical advice, or face gaps in follow-up care remains under-explored. This study aims to address that gap by evaluating health outcomes reported by clients post-teleconsultation under "Arogya Sampada project", with the goal of generating actionable insights to improve teleconsultation quality and inform future policy.

About the project

Despite its potential, telemedicine in India continues to face significant implementation challenges. A systems-level review of the country's telemedicine rollout during the COVID-19 pandemic identified several persistent barriers, including lack of infrastructure, low levels of digital literacy, inadequate language customization, concerns about data privacy, and insufficient integration with clinical workflows. Healthcare providers also reported ethical concerns and disruptions to service delivery due to unclear reimbursement mechanisms and medico-legal ambiguities (Singh et al., 2022).

In response to these challenges, Intelehealth launched the Arogya Sampada project—a provider-to-provider telemedicine initiative designed to pilot and evaluate both technological and programmatic innovations aimed at strengthening healthcare delivery in remote tribal regions. The project connects frontline health workers with remote doctors via a telemedicine platform, ensuring access to quality care for underserved tribal communities in Nashik, Maharashtra. The intervention spans 30 villages, organized into four geographic clusters—Ghotapada, Surgana, Badagi, and Jambhulpada—across the Peth and Surgana blocks, collectively covering approximately 2,800 households. These villages were selected due to their poor healthcare access, influenced by dense forest cover and a range of socio-demographic vulnerabilities such as low income, high unemployment, significant out-migration, and lack of land ownership.

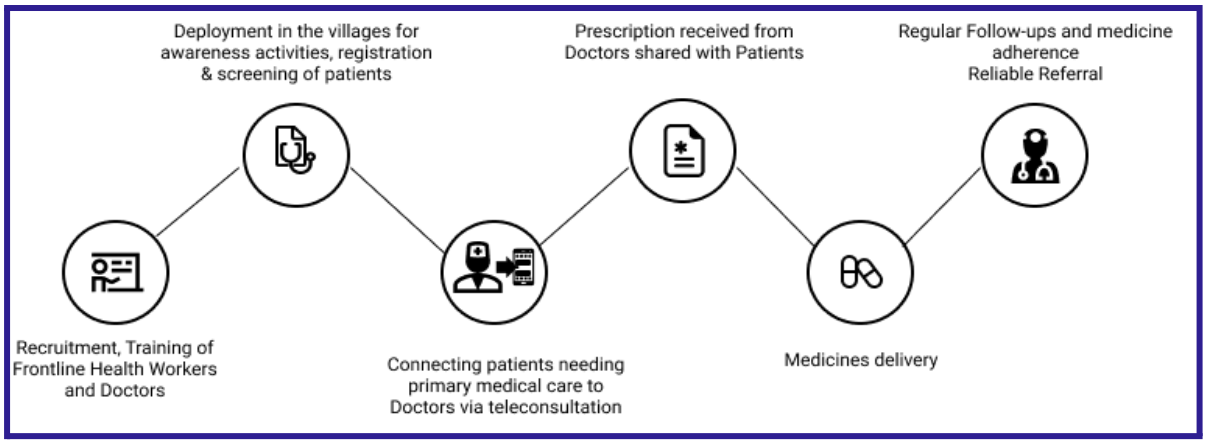


Figure 1: Healthcare Delivery Model of Arogya Sampada Program

Rationale

The Arogya Sampada (AS) program is a provider-to-provider telemedicine initiative aimed at bridging healthcare access gaps in remote tribal communities of Nashik District,

Maharashtra. Through virtual consultations, the program connects frontline health workers in villages with remote doctors, enhancing the quality of clinical assessments and client history-taking. By leveraging telemedicine, the initiative seeks to provide timely, accessible, and equitable care to populations that face geographic, infrastructural, and socio-demographic barriers to healthcare access.

Evaluating the effectiveness of this intervention is essential to understanding whether such telemedicine-based approaches lead to measurable improvements in client recovery and health outcomes. To ensure objectivity and credibility in evaluation, client recovery assessments were independently conducted by a qualified doctor not involved in the delivery of teleconsultations.

Objective

The primary objective of this study is to assess the impact of the Arogya Sampada telemedicine program on client health outcomes, in terms of client recovery, following virtual consultations.

Secondary Objectives

1. To examine the distribution of health conditions treated through the Arogya Sampada program and their associated recovery status, stratified by public health importance.
2. To assess recovery patterns among clients with non-self-limiting health conditions.
3. To analyze recovery outcomes by ICD-11-coded diagnoses to understand condition-specific impacts of the telemedicine intervention.

Research Questions

Primary Research Questions

1. How does the Arogya Sampada telemedicine program impact the health outcomes of clients in remote tribal populations of Nashik, and to what extent does it facilitate recovery for those seeking care through the program?

Secondary Research Questions

2. What is the distribution of health conditions based on their level of public health importance and their recovery status in the Arogya Sampada program?

3. What percentage of non-self-limiting health conditions show different recovery outcomes in the Arogya Sampada program?

4. How are various health conditions, categorized by ICD-11 codes, distributed according to their recovery status in the Arogya Sampada program?

Methodology

Study Design and Setting

This study follows a cross-sectional follow-up design with retrospective outcome assessment, aimed at evaluating health outcomes among clients who accessed telemedicine services through the Arogya Sampada (AS) program. The primary outcome of interest was client recovery, assessed approximately one month after the initial teleconsultation. To ensure objectivity and eliminate bias, recovery assessments were independently conducted by a qualified doctor who was not involved in the original consultations.

Study Period and Sample Selection

The sample includes clients who received teleconsultation services between December 16, 2024, and January 30, 2025. A total of 668 consultations were recorded during this period. An initial eligibility screening was conducted using the following inclusion and exclusion criteria:

Inclusion Criteria

1. Individuals who accessed telemedicine care under the AS program.
2. Clients with a clearly documented primary provisional or confirmed diagnosis.
3. Clients who had an adequate recovery window, i.e., sufficient time (at least 30 days) had passed since consultation to observe recovery based on their diagnosis.

Exclusion Criteria

1. Clients are unwilling or unable to participate in follow-up assessments.
2. Individuals with severe cognitive impairment hindering participation.
3. Clients with terminal illnesses

Subsequently, cases were screened based on the likelihood of being non-self-limiting and of higher Public Health Importance (PHI). This determination was made by an independent medical professional through a review of prescription data, symptoms, chief complaints, and advice given during the consultation. Cases coded during pre-screening as likely to be self-limiting and low-PHI were excluded from the follow-up.

After applying these criteria, 384 clients were identified as eligible for follow-up. Of these, 318 clients responded to follow-up data collection efforts, resulting in 374 analyzable episodes (some clients had multiple diagnoses).

Data Collection

Follow-up data were collected by an independent doctor via structured questionnaires administered telephonically. All data were collected using the KoBoToolbox platform and mapped to corresponding Electronic Health Record (EHR) data to ensure completeness and consistency. After follow-up, prescriptions and notes from the original consultation were independently reviewed and coded by the doctor to assess the quality of care, treatment appropriateness, and alignment with standard protocols.

Data Analysis

The primary outcome variables included:

- Type of morbidity
- ICD-11-coded diagnosis
- Public Health Importance (PHI) rating
- Classification as a self-limiting or non-self-limiting condition
- Recovery status (full, partial, or no recovery)
- Referral outcomes
- Medicine adherence

Data analysis was conducted using Microsoft Excel and STATA Version 15.0. Descriptive statistics were used to summarize client characteristics, types of morbidities, and outcome distributions. Univariate and bivariate analyses were performed to examine associations between key variables such as diagnosis category, recovery status, and PHI level.

Ethical Considerations

This study titled **"Assessing Health Status in the Tribal Populations and Training Gen AI for Improving Telemedicine Services, Maharashtra, India",** was reviewed and approved by the **Altezza Institutional Ethics Committee, India**, an independent ethics committee. The study was conducted in accordance with the national ethical guidelines for biomedical and health research involving human participants.

- **Principal Investigator (PI):** Dr. Neha Verma – Chief Executive Officer, Intelehealth
- **IRB Number:** Intele/24/25/001
- **Date of IRB Meeting:** 23 June 2024
- **Date of IRB Approval:** 23 June 2024
- **Approval Valid Through:** 22 June 2025

The Ethics Committee reviewed the study protocol, informed consent procedures, data protection mechanisms, and risk mitigation strategies.

This study adhered to the ethical principles outlined in relevant guidelines and regulations. Measures were implemented to protect client confidentiality and privacy throughout the data collection and analysis process. To protect participants' privacy, all data collected were anonymised, and personal identifiers were removed during data analysis and reporting. Confidentiality was rigorously maintained throughout the study, and data were stored securely.

Data Sharing Policy

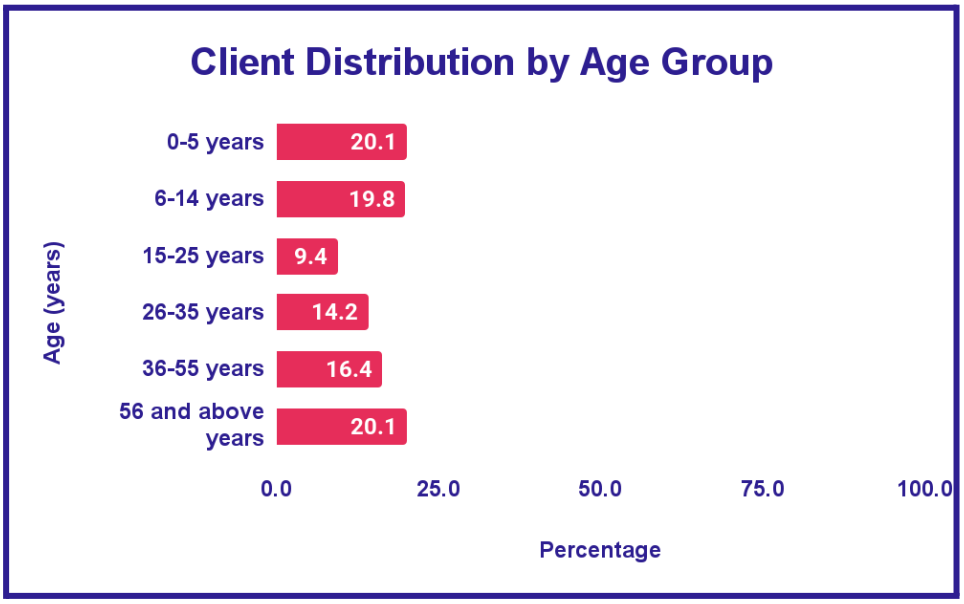
The research study findings will be disseminated through a multifaceted approach with the government stakeholders of Maharashtra. The study findings will be further used to collaborate with multi-stakeholders and ensure that the findings will be incorporated into programs. Abstracts will be presented with the key findings to a diverse audience of researchers and policymakers. The shared findings will be incorporated into health department policies and programs, contributing to evidence-based decision-making in public health initiatives.

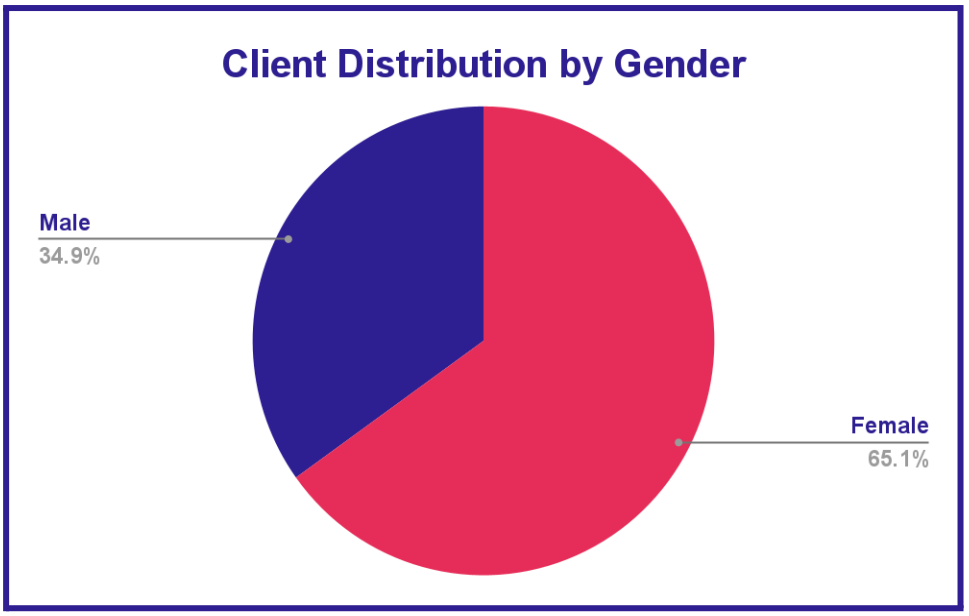
Results

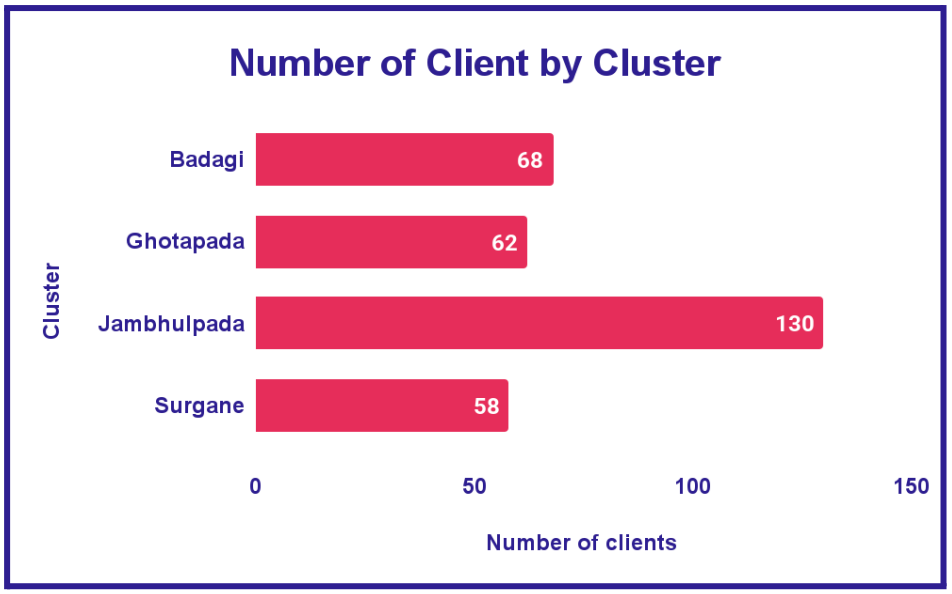
The Arogya Sampada (AS) telemedicine program provides consultations to clients with various health conditions. This study evaluated the health outcomes of **318 clients**, accounting for **374 recorded episodes** of diagnosis involving multiple health conditions.

Client's Socio-Demographic Profile

The **majority of teleconsultation clients were female (65.1%, n=207),** with men comprising **34.9% (n=111).** Age distribution showed **the highest consultations among children (0-14 years: 39.9%, n=127) and older adults (56+ years: 20.1%, n=64).** Geographically, most clients were from cluster Jambhulpada (n=130), followed by Badagi (n=68), Ghotapada (n=62), and Surgane (n=58).







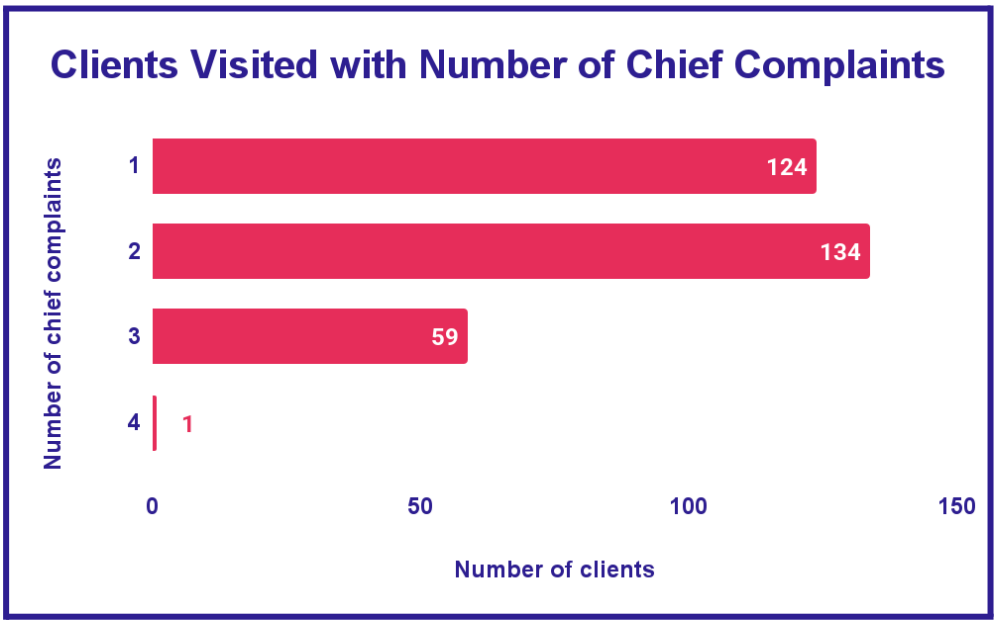
Morbidity Profiling

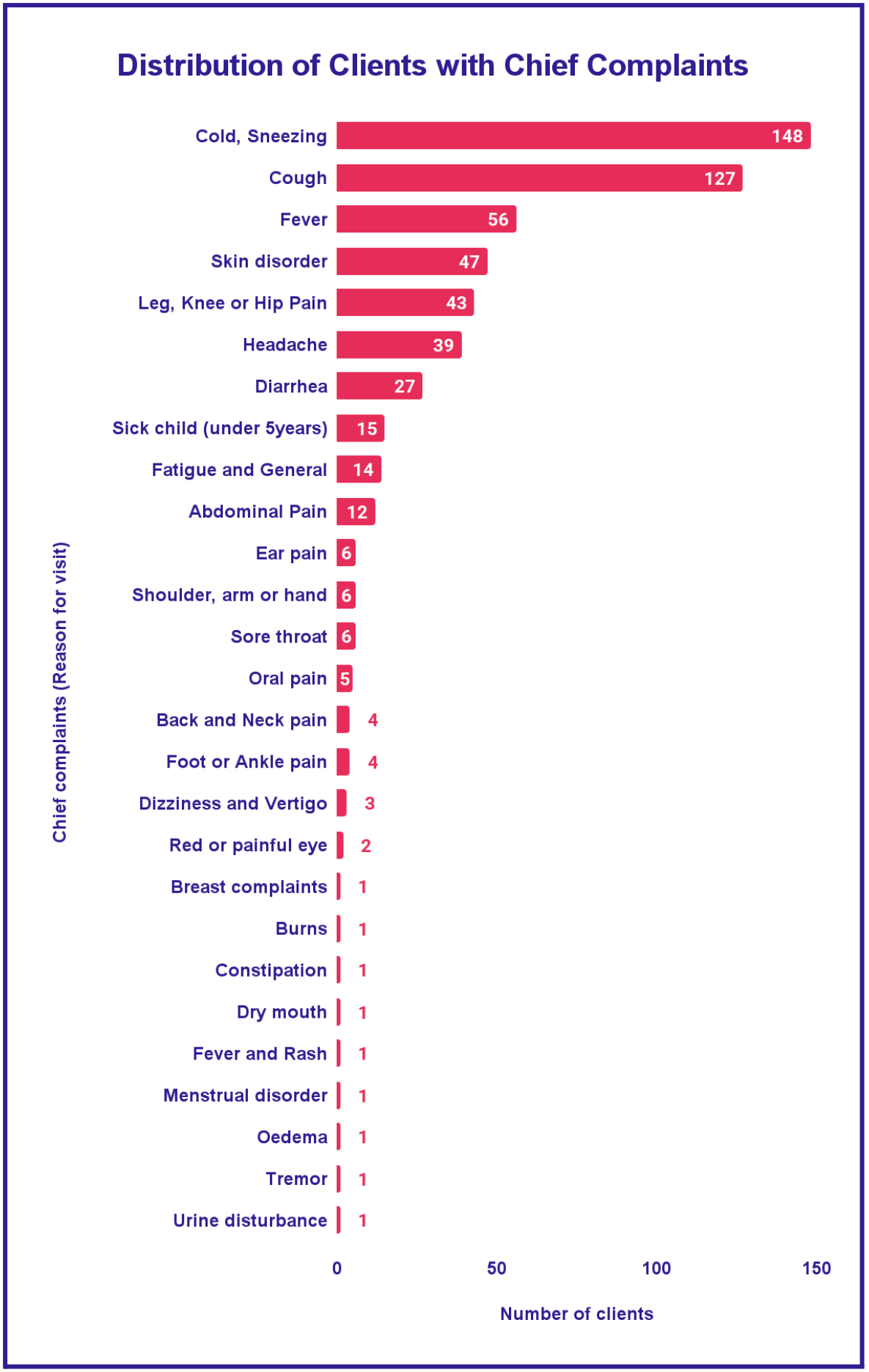
Chief Complaints (Reason for Visit)

Respiratory issues were the most common reasons for teleconsultations, with cold and sneezing (148 cases) and cough (127 cases) leading, followed by fever (56). Other frequent complaints included skin disorders (47), joint pain (43), headaches (39), and diarrhea (27). Pediatric cases (sick children under five) accounted for 15 visits. Less common issues ranged from ear pain (6) to specific conditions like dizziness (3) and menstrual disorders (1), totaling 573 complaints.

Clients with Multiple Chief Complaints

Among the 318 clients, 134 (42.1%) reported two chief complaints, while 124 (39%) had a single complaint. Additionally, 59 (18.6%) presented with three complaints, and only 1 client reported four complaints.




Distribution of Clients with Chief Complaints
Cold, Sneezing 148
Cough 127
Fever 56
Skin disorder 47
Leg, Knee or Hip Pain 43
Headache 39
Diarrhea 27
Sick child (under 5years) 15
Fatigue and General 14
Abdominal Pain 12
Ear pain 6
Shoulder, arm or hand 6
Sore throat 6
Oral pain 5
Back and Neck pain 4
Foot or Ankle pain 4
Dizziness and Vertigo 3
Red or painful eye 2
Breast complaints 1
Burns 1
Constipation 1
Dry mouth 1
Fever and Rash 1
Menstrual disorder 1
Oedema 1
Tremor 1
Urine disturbance 1
Chief complaints (Reason for visit)
0
50
100
150
Number of clients

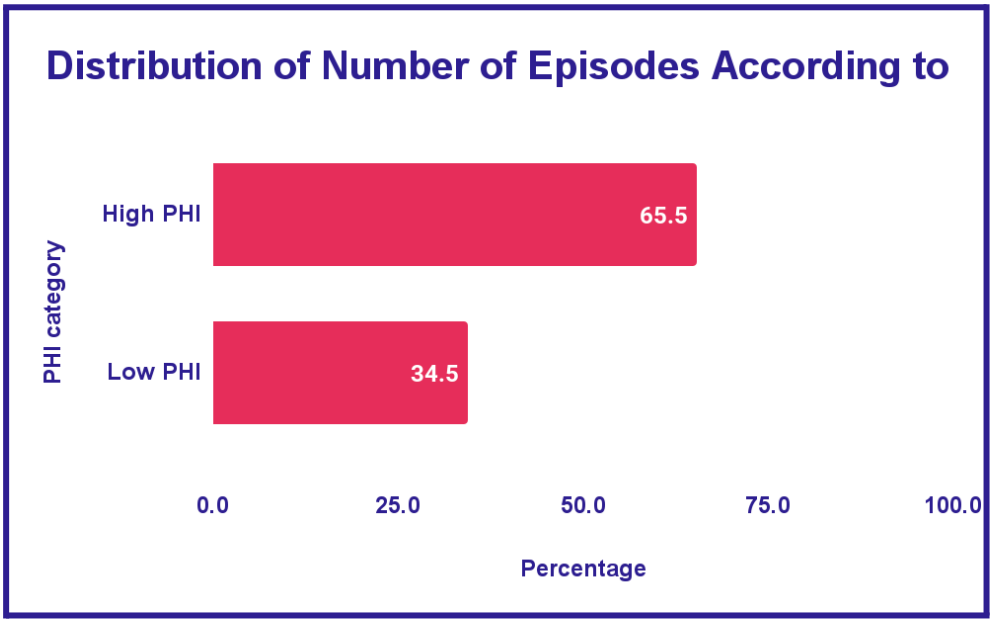
Public Health Importance and Disease Conditions

Public Health Importance (PHI) categorizes diseases based on their potential impact on community health. Conditions that are highly transmissible, cause significant morbidity, or require immediate public health intervention are classified as High PHI.

- **High PHI (HPI):** Includes conditions such as Acute Diarrheal Diseases (Acute Gastroenteritis, Dysentery) and Acute Respiratory Infections (ARIs)/Influenza-Like Illnesses (ILI) in both children and adults, as defined by the Integrated Disease Surveillance Program (IDSP) Surveillance Reference (P Form). These illnesses are closely monitored due to their potential for outbreaks and public health consequences.

- **Low PHI (LPI):** Includes conditions that are less likely to cause outbreaks or require urgent public health interventions**.**

Out of 374 episodes, **65.5% (n=245) were High PHI conditions**, while **34.5% (n=129) were Low PHI conditions.**



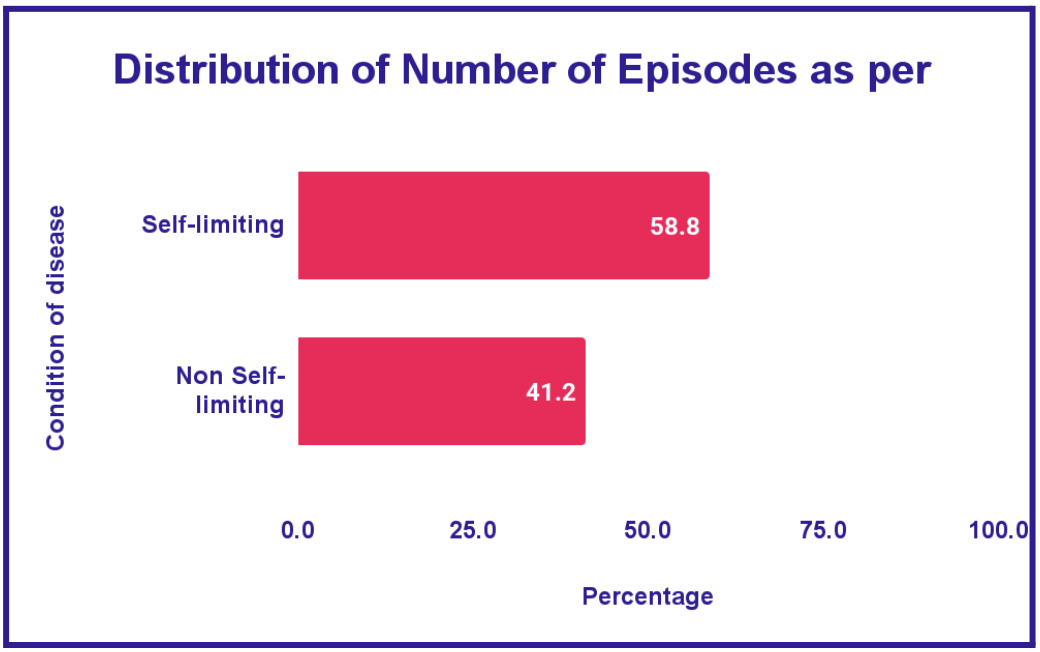
Disease Conditions: Self-Limiting vs. Non-Self-Limiting

Diseases are also categorized based on their natural course and need for medical intervention:

- **Self-Limiting Conditions:** These diseases resolve on their own without the need for extensive medical intervention.

- **Non-self-limiting Conditions:** These require medical management and may not improve without treatment.

Out of 374 episodes, **58.8% (n=220) were self-limiting**, while **41.2% (n=154) were non-self-limiting conditions.**



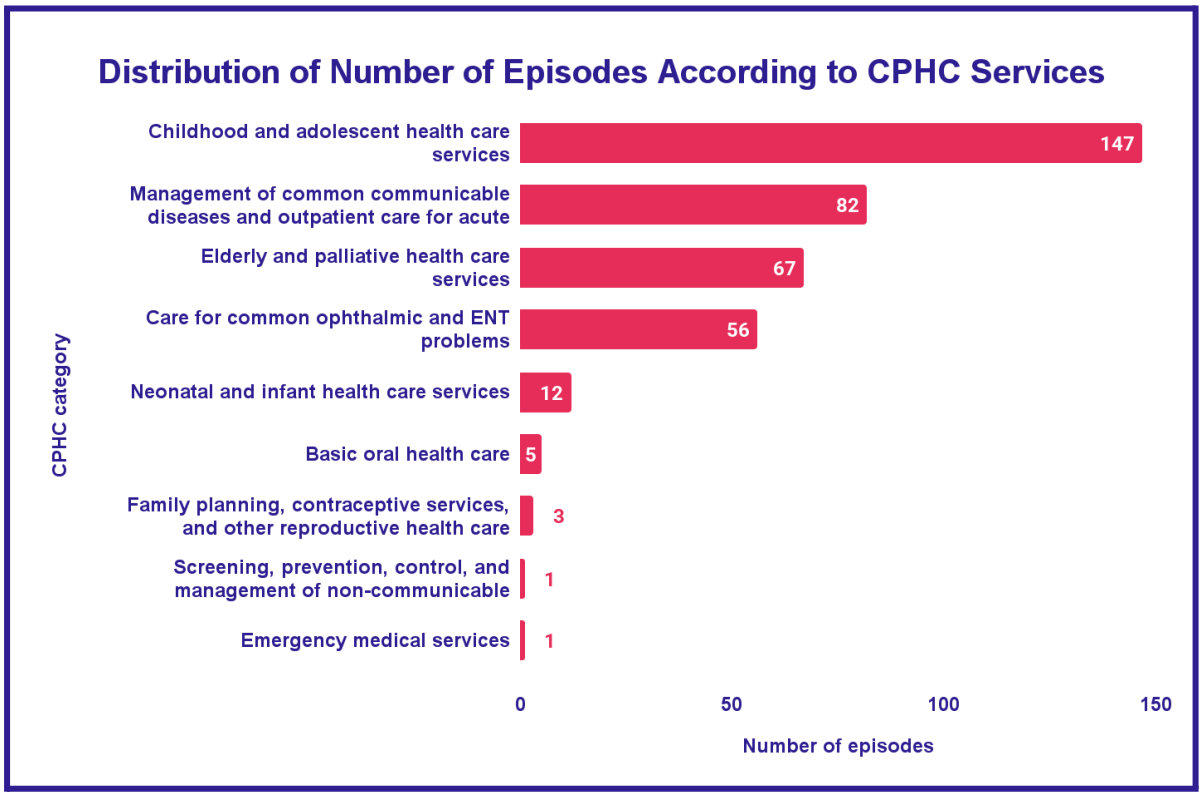
Distribution of Disease Conditions by Public Health Importance (PHI)

The bivariate analysis using cross tabulation of Public Health Importance (PHI) and the self-limiting nature of diagnosed conditions reveals important patterns relevant to clinical prioritization and program design. Among conditions categorized as high PHI, the majority (76.3%) were also self-limiting, suggesting that a significant portion of teleconsultations addressed illnesses with both high community burden and relatively short natural course—such as respiratory infections or acute gastrointestinal illnesses. In contrast, 74.4% of low PHI conditions were non-self-limiting.

	Condition of Disease		
PHI category	Self-limiting	Non Self-limiting	Total
High PHI	76.3	23.7	100
Low PHI	25.6	74.4	100
Total	58.8	41.2	100

CPHC Service Categories

Teleconsultations addressed a broad range of **Comprehensive Primary Health Care (CPHC) services**. The highest proportion of cases fell under **childhood and adolescent health care (39.3%, n=147)**, followed by **management of communicable diseases and minor ailments (21.9%, n=82)** and **elderly/palliative care (17.9%, n=67)**. Additionally, **ophthalmic and ENT care accounted for 15% (n=56)**, while **neonatal and infant care (3.2%, n=12)** and **basic oral health care (1%, n=5)** were less frequent. **Family planning services (0.8%, n=3), non-communicable disease management (0.3%, n=1), and emergency medical services (0.3%, n=1)** were the least represented categories.



Types of Health Issues Assessed

Out of the 374 total cases analyzed through the Arogya Sampada (AS) telemedicine program, the top ten most frequently diagnosed conditions accounted for a significant proportion of consultations. The most prevalent diagnosis was Upper Respiratory Tract Infection (URTI), representing 77 cases, followed by Acute Pharyngitis (64 cases) and Acute Rhinitis (39 cases)—highlighting the dominance of respiratory infections, which together comprised over 45% of the total diagnoses.

Other common conditions included Scabies (27 cases), Lower Respiratory Tract Infections (19 cases), and Osteoarthritis (17 cases), reflecting a mix of infectious diseases and chronic conditions. Gastritis and Gastroenteritis (13 and 10 cases, respectively) also appeared frequently, indicating a notable burden of gastrointestinal issues. Additionally, Tinea

Corporis (13 cases) and Viral Fever (11 cases) were recorded, suggesting the persistence of skin infections and non-specific febrile illnesses in these communities. Refer to the annexure for the complete list of diagnosis from 374 episodes.

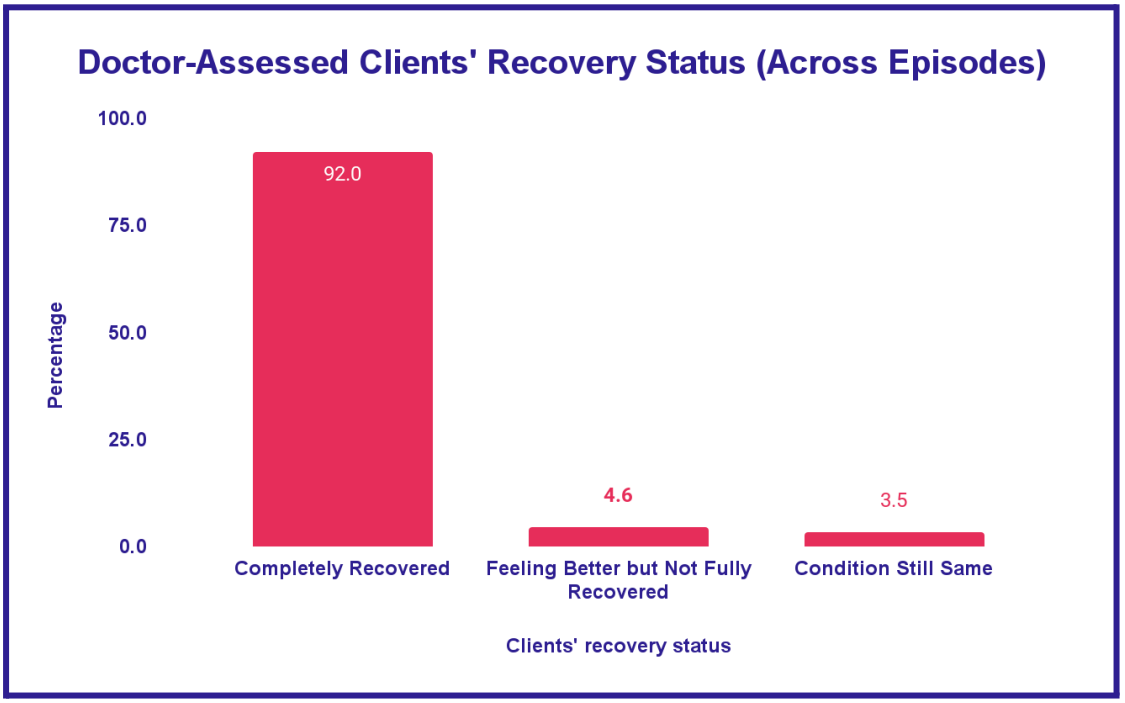
Client Medication Adherence

In the **Arogya Sampada (AS) program**, frontline health workers provide prescribed medications **free of cost** to clients following teleconsultation, ensuring access to essential treatment.

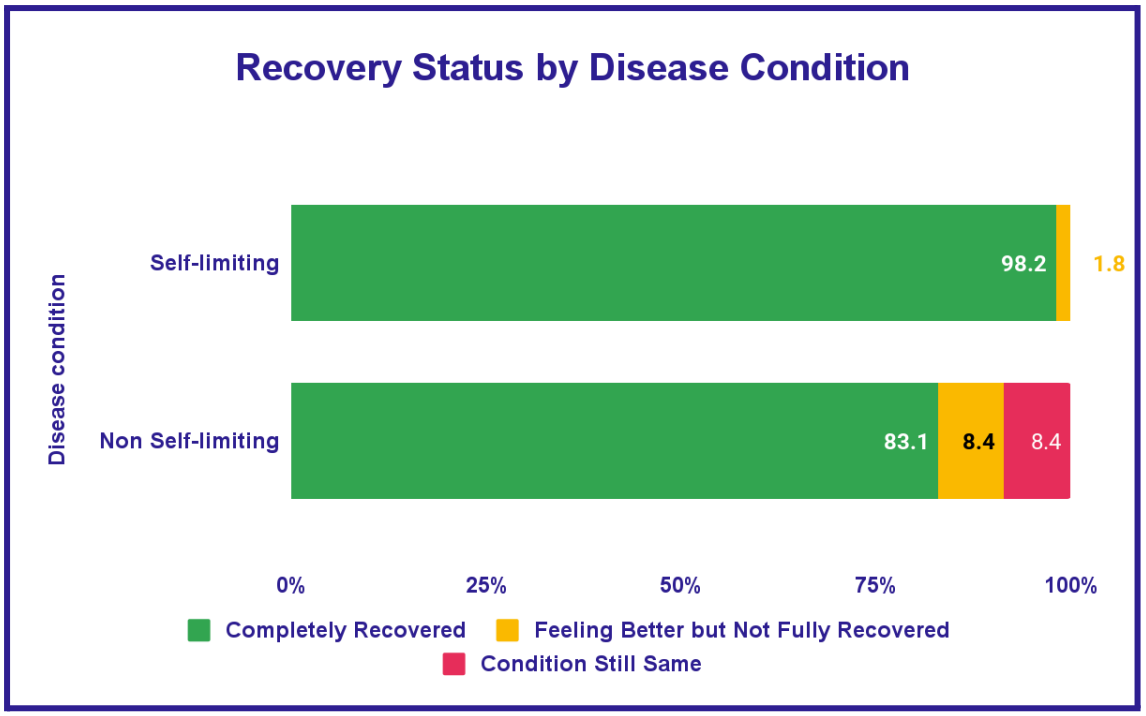
Nearly all clients, **99.4% (n=316), received the prescribed medication**, and an equal proportion, **99.4% (n=316), adhered to their treatment**, demonstrating a high level of compliance. Only **0.6% (n=2)** were not prescribed medication because they were referred to a higher facility for further consultation and management.

Doctor-Assessed Clients' Recovery Status (Across Episodes)

The recovery assessments (after follow-up) were conducted by an independent doctor to ensure impartiality. **Among 374 diagnosed episodes, 344 (92%) completely recovered, and 17 (4.6%)** felt better but not fully recovered.



We report recovery outcomes by disease condition and public health importance. From the lens of disease condition, we find **that for non-self-limiting conditions, 83.1% (n=128) of episodes fully recovered,** and 98.2% (n=216) of the episodes with **self-limiting conditions fully recovered**.



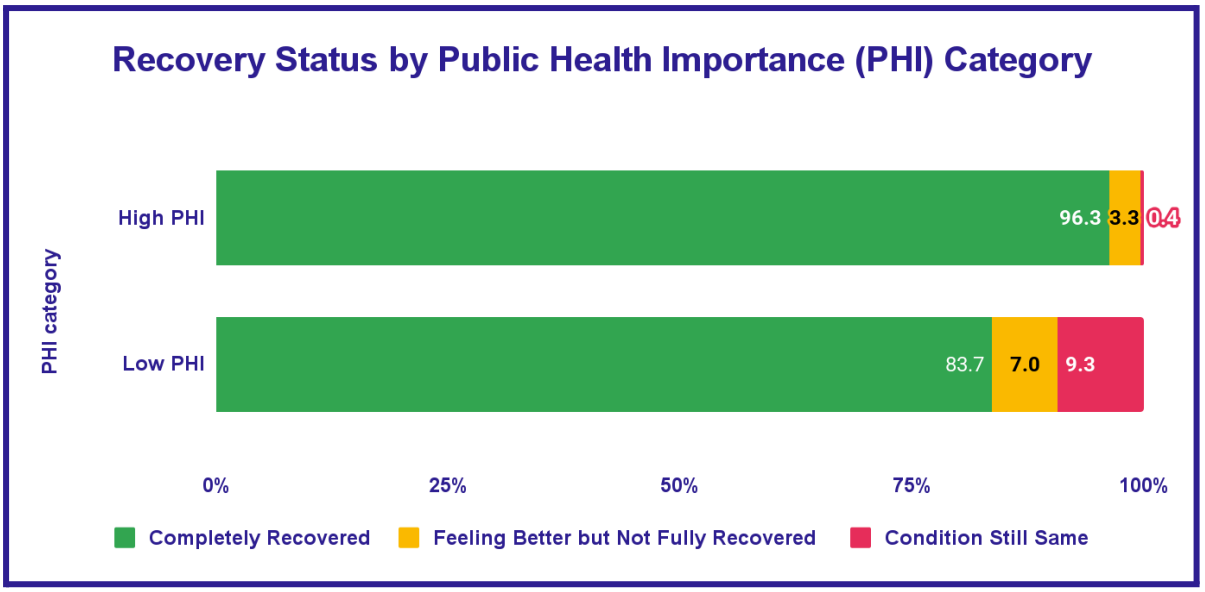
Regarding public health importance, **96.3% (n=236) of high-PHI episodes fully recovered,** whereas **83.7% (n=108) of low-PHI episodes fully recovered.**

Recovery Outcomes for Disease Conditions by PHI Category

The findings indicate that among high-PHI cases, a greater proportion of self-limiting conditions (78%) achieved full recovery compared to non-self-limiting conditions (22%). This suggests that while some clients with self-limiting conditions may have recovered on their own, telemedicine played a crucial role in managing non-self-limiting cases, ensuring timely medical advice, and supporting recovery where intervention was necessary.

Distribution of Fully Recovered Episodes by Disease Condition and PHI Category

	Condition of Disease		
PHI category	Self-limiting	Non Self-limiting	Total
High PHI	78.0	22.0	100
Low PHI	29.6	70.4	100
Total	62.8	37.2	100



Recovery Status by CPHC Service Category

Recovery outcomes varied across 374 recorded episodes within Comprehensive Primary Health Care (CPHC) services. Full recovery 100% was observed in neonatal and infant care (n=12), family planning (n=3), and emergency medical services (n=1). Childhood and adolescent health services had a high recovery rate of 98% (n=144 episodes).

For common communicable diseases (n=82 episodes), 90.2% (n=74) fully recovered. Elderly and palliative care (n=67 episodes) had the lowest recovery rates, with 77.6% (n=52) fully recovered and 11.9% (n=8) showing no improvement. Non-communicable diseases had the poorest outcome, with 100% (n=1) of cases remaining unchanged.

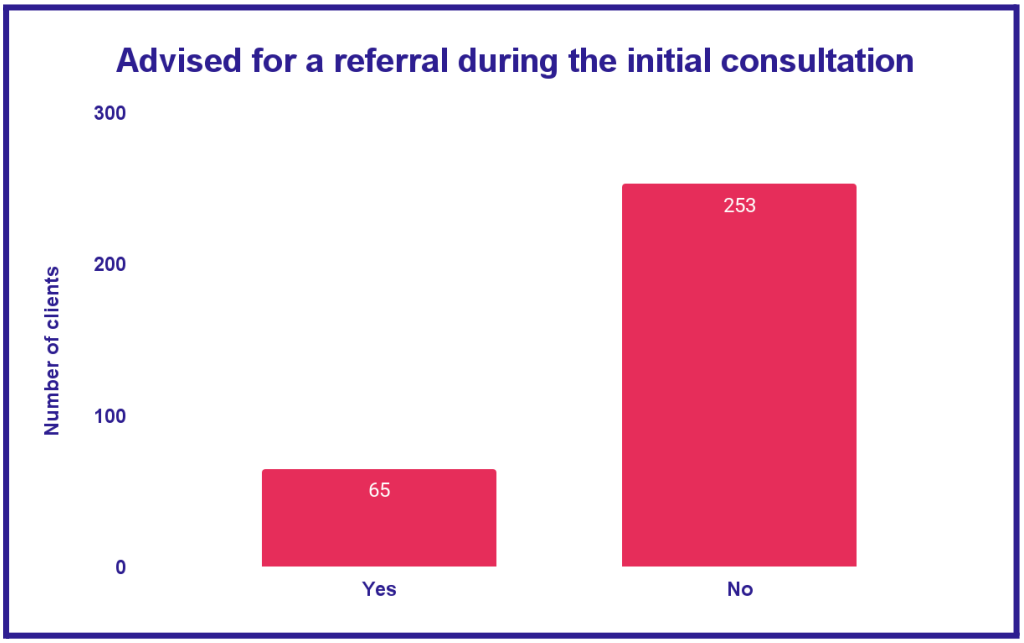
CPHC Category Services	Recovery Status (n)			
	Completely Recovered	Feeling Better but Not Fully Recovered	Condition Still Same	Total
Neonatal and infant health care services	12	0	0	12
Childhood and adolescent health care services	144	3	0	147
Family planning, contraceptive services, and other reproductive health care services	3	0	0	3
Management of common communicable diseases and outpatient care for acute simple illnesses and minor ailments	74	5	3	82

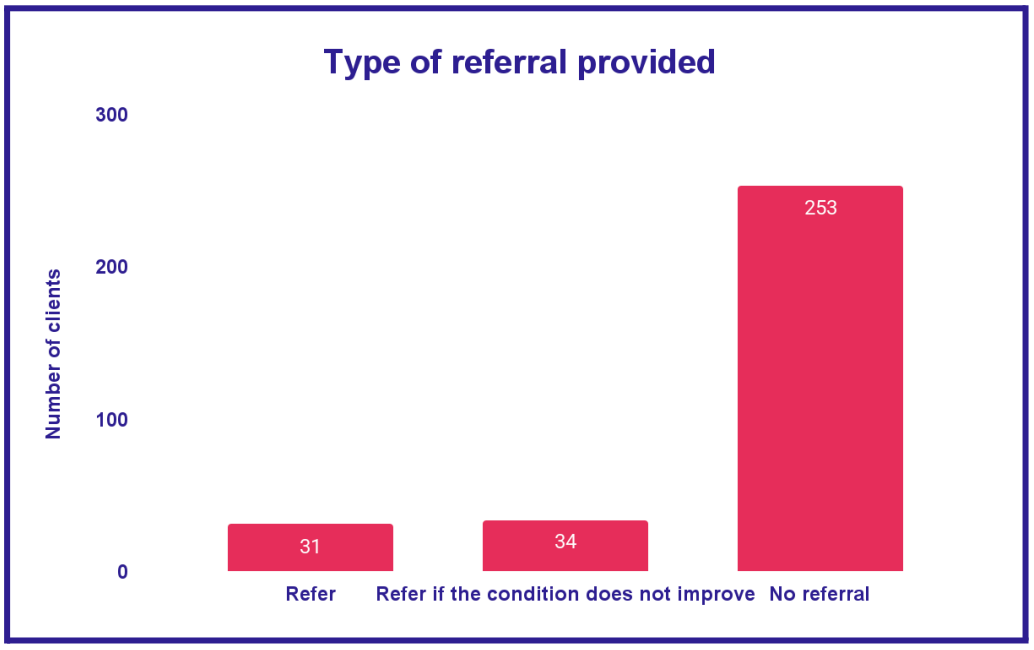
CPHC Category Services	Recovery Status (n)			
	Completely Recovered	Feeling Better but Not Fully Recovered	Condition Still Same	Total
Screening, prevention, control, and management of non-communicable diseases	0	0	1	1
Care for common ophthalmic and ENT problems	54	2	0	56
Basic oral health care	4	0	1	5
Elderly and palliative health care services	52	7	8	67
Emergency medical services	1	0	0	1
Total	**344**	**17**	**13**	**374**

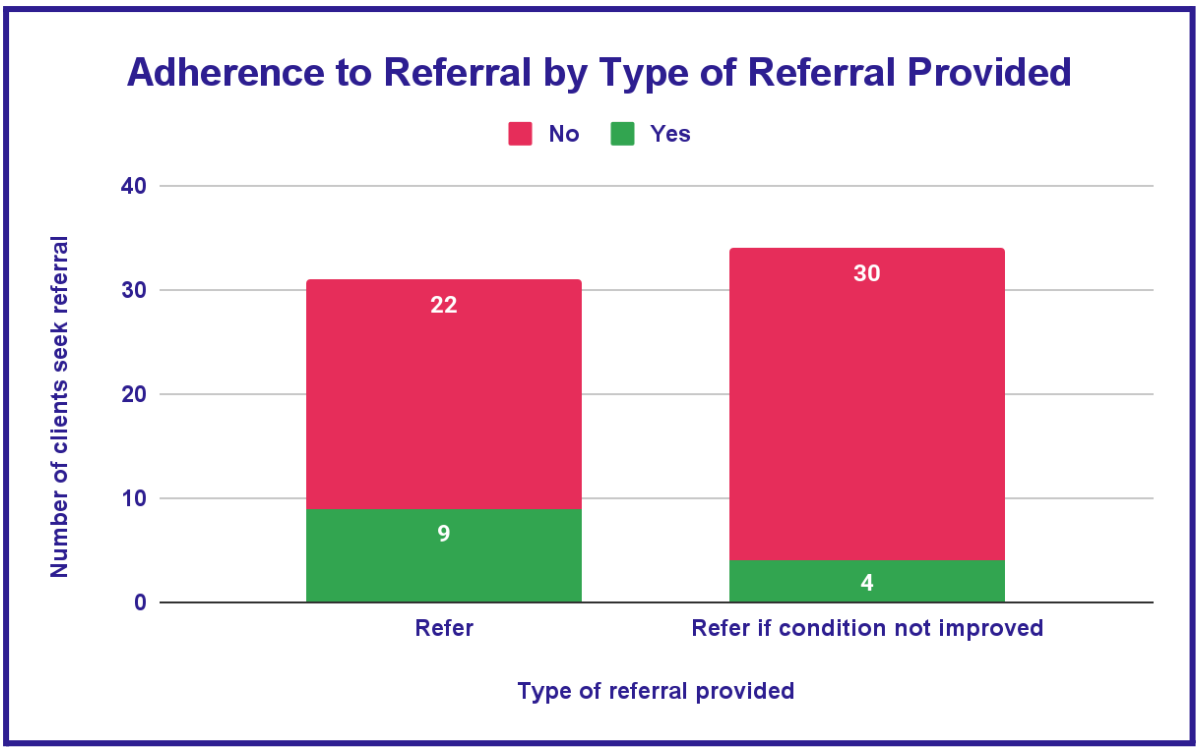
Client Adherence to Referral

The referrals were categorized as unconditional referrals, where the treating doctor directly advised a referral during the initial consultation, and conditional referrals, where a referral was recommended only if the client's symptoms did not improve.

During initial teleconsultations, **65 of the 318 clients were referred for in-person consultation**. Of those advised, **34 cases (10.7%) were advised to seek a referral only if their condition did not improve**. Among the 65 clients advised for referral, 13 cases adhered to the referral and sought further care.







Of those who sought care **(n=13), n=5 reported symptom improvement**, and **n=3** felt better after following the referral. Other reasons for referral outcome are illustrated in the table below:

Clients' Reported Outcome After Seeking Referral	Freq.	Percent
Symptoms improved with treatment	5	38.5
Client took the referral and is now feeling better	3	23.1
Client went to the PHC and started treatment	1	7.7
Still Experiencing Symptoms	1	7.7
Client is visiting PHC for ANC care	1	7.7
Client is going to the Anganwadi for nutrition	1	7.7
Client took TT injections	1	7.7
Total	**13**	**100**

The reasons for not seeking referral are illustrated in the table below:

Clients' Reported Reasons for Not Seeking Referral (Unconditional Referral)	Freq.	Percent
Financial constraints	2	9.1
Transport issues	2	9.1
Lack of companion (client stays alone)	3	13.6
Family issues	1	4.6
Symptoms improved with treatment	13	59.1
Reson not specified	1	4.6
Total	**22**	**100**

Clients' Reported Reasons for Not Seeking Referral (Conditional Referral).	Freq.	Percent
Transport issues	1	3.3
Family issues	1	3.3
Symptoms improved with treatment	24	80.0
Pain subsided, so referral was not sought	2	6.7
Reason not specified	2	6.7
Total	**30**	**100**

Discussion

This study offers early evidence on health outcomes following teleconsultations provided through the Arogya Sampada (AS) telemedicine initiative, implemented in two tribal blocks of the Nashik district, Maharashtra. While limited in geographic and sample scope, the findings add to a growing body of evidence on the role of telemedicine in primary care delivery in low-resource settings, particularly in rural India.

The study was designed to assess client recovery after receiving teleconsultations, an area that remains under-researched despite the rapid scale-up of telemedicine services nationally. Most existing evaluations focus on utilization or satisfaction metrics; fewer studies examine clinical outcomes. By using independent medical coding and outcome assessments, this study attempts to bridge that gap, offering a structured approach to validating recovery in real-world settings.

Findings from this study point to the potential utility of teleconsultations in supporting recovery from common conditions, particularly for self-limiting and high public health importance (PHI) illnesses. High rates of reported recovery, coupled with near-universal medication adherence, suggest that in certain clinical scenarios—such as uncomplicated respiratory or gastrointestinal infections—teleconsultations may serve as an effective and acceptable mode of care. However, effectiveness was more limited for non-communicable diseases and geriatric care, where in-person follow-up, longitudinal care plans, and diagnostic capacity are often essential.

While promising, these results must be interpreted cautiously. The study is based on a small selected sample of clients, where disease burden may be limited by the geography of operation, and does not include a control or comparison group. Recovery was assessed retrospectively at a single follow-up point, and client reported responses may be subject to bias. The findings therefore reflect observed associations, not causal impacts. Moreover, the study excluded cases likely to be self-limiting and of low public health importance in the screening stage, limiting generalizability.

Nonetheless, the study offers several important implications for policy and program design. First, teleconsultations may be integrated more systematically as part of India's primary healthcare strategy, especially for conditions where in-person care is not essential. Second, ensuring medication access and follow-up through frontline health workers appears to be a critical success factor and should be prioritized in scaling such models. Third, referral adherence remains a challenge—future iterations of telemedicine programs should explore referral tracking systems, transport support, and community-level education to close this gap.

From a research perspective, this study highlights the feasibility of conducting structured outcome validation in rural telemedicine programs and calls for larger, prospective evaluations that include control groups, track long-term outcomes, and assess cost-effectiveness. Future research should also examine whether improvements observed in

recovery translate into broader gains in service equity, financial protection, and system efficiency.

In summary, while limited in scope, this study underscores that teleconsultations—when accompanied by appropriate follow-up mechanisms—can contribute meaningfully to care delivery in underserved settings. However, realizing their full potential will require further evidence, systems-level integration, and intentional program design to ensure they are responsive to the needs of diverse populations.

Conclusion

This study aimed to assess the impact of teleconsultations under the Arogya Sampada (AS) program on client health outcomes, specifically recovery following remote consultations. Among the 318 clients and 374 diagnostic episodes analyzed, the majority reported full recovery, particularly for self-limiting and high public health importance (PHI) conditions. These results suggest that teleconsultations—when accompanied by medicine delivery and follow-up mechanisms—may support clinical recovery for select conditions in rural tribal settings.

In relation to the secondary objectives, the study documented a diverse distribution of health conditions. Respiratory infections and minor communicable diseases were most common, with over two-thirds of all diagnoses falling under high PHI categories. Furthermore, 41.2% of all conditions were non-self-limiting, of which 83.1% resulted in full recovery—indicating a positive trend but also signaling areas where follow-up care and continuity may be crucial. Recovery outcomes, when categorized by ICD-11 codes, revealed that certain service areas—such as childhood care—achieved higher recovery, while elderly care and NCDs had relatively low recovery, albeit assessed with small sample sizes.

While these findings are promising, they are context-specific and must be interpreted within the study's limitations—most notably the absence of a control group, non-random sampling, and reliance on client reported data. Despite these constraints, the study demonstrates the feasibility of outcome-focused evaluations in telemedicine settings and contributes initial evidence on how remote care may influence recovery in underserved geographies.

In sum, this study answers its central research question by providing early, context-bound evidence that teleconsultations have the potential to support client recovery, particularly for common and acute conditions, in low-access settings. However, broader conclusions about program effectiveness or scalability require further research through more robust, comparative designs.

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Annexure

List of all Diagnoses

Sr.N.	Diagnosis	ICD11 code	Episodes of Diagnosis
1	Upper Respiratory Tract Infection (URTI)	CA07.0	77
2	Acute Pharyngitis	CA02.Z	64
3	Acute Rhinitis	CA00	39
4	Scabies	1G04.Z	27
5	Lower Respiratory Tract Infection (LRTI)	CA4Y	19
6	Osteoarthritis	FA0Z	17
7	Gastritis	DA42.Z	13
8	Tinea Corporis	1F28.Y	13
9	Viral Fever	1D86	11
10	Gastroenteritis	1A40	10
11	Acute Diarrhea	1A40	9
12	Muscle sprain	FB32.5	7
13	Acute Gastroenteritis	1A40.0	5
14	Dental caries	DA08.0	5
15	Amoebiasis	1A36.Z	4
16	Dermatitis	EA8Z	4
17	Fatigue	MG22	4
18	Otitis media	AB00	4
19	Pustule	ME66.Y	3
20	Acute Arthritis	FA2Z	2
21	Cough	MD12	2
22	Dysmenorrhea	GA34.3	2
23	Essential hypertension	BA00.Z	2
24	Headache	MB4D	2
25	Impetigo	1B72.Z	2
26	Migraine	8A80.Z	2
27	Sinusitis	CA0A	2

Sr.N.	Diagnosis	ICD11 code	Episodes of Diagnosis
28	Tinea Cruris	1F28.3	2
29	Abdominal or pelvic pain	MD81	1
30	Angular cheilitis	DA00.0	1
31	Burns	ND95.Z	1
32	Chronic Arthritis	FA2Z	1
33	Colitis	1A40.0	1
34	Diarrhea	ME05.1	1
35	Dysuria	MF50.7	1
36	Functional Constipation	DD91.1	1
37	Glossitis	DA03.0	1
38	Infection of the Skin	1B7Y	1
39	Mastitis	GB21	1
40	Otitis external	AA3Z	1
41	Paronychia	EE12.0	1
42	Physical trauma	ND56	1
43	Stress Headache	8A81.Z	1
44	Superficial injury of the abdomen, lower back or pelvis	NB50	1
45	Superficial injury of the forearm	NC30.Z	1
46	Superficial injury of lower limb, level unspecified	ND30	1
47	Tinea Unguium	1F28.1	1
48	Urinary tract infection	GC08	1
49	Vertigo	MB48.0Z	1
Grand Total			**374**

Non-self-limiting diagnoses are conditions that do not resolve on their own without medical intervention. These typically require treatment, management, or ongoing care.

List of Non-Self-Limiting with Diagnoses

Sr.N.	Diagnosis	Freq.	Percent
1	Abdominal or pelvic pain	1	0.7
2	Acute Arthritis	1	0.7
3	Acute Diarrhea	8	5.2
4	Acute Gastroenteritis	5	3.3
5	Acute Pharyngitis	1	0.7
6	Amoebiasis	4	2.6
7	Angular cheilitis	1	0.7
8	Burns	1	0.7
9	Chronic Arthritis	1	0.7
10	Colitis	1	0.7
11	Dental caries	5	3.3
12	Dermatitis	2	1.3
13	Diarrhea	1	0.7
14	Dysuria	1	0.7
15	Essential hypertension	2	1.3
16	Fatigue	4	2.6
17	Functional Constipation	1	0.7
18	Gastritis	12	7.8
19	Gastroenteritis	9	5.8
20	Glossitis	1	0.7
21	Impetigo	2	1.3
22	Infection of Skin	1	0.7
23	Lower Respiratory Tract Infection (LRTI)	16	10.4
24	Mastitis	1	0.7
25	Migraine	2	1.3
26	Muscle sprain	1	0.7

Sr.N.	Diagnosis	Freq.	Percent
27	Osteoarthritis	10	6.5
28	Otitis media	4	2.6
29	Paronychia	1	0.7
30	Pustule	3	2.0
31	Scabies	27	17.5
32	Superficial injury of abdomen, lower back or pelvis	1	0.7
33	Superficial injury of forearm	1	0.7
34	Superficial injury of lower limb, level unspecified	1	0.7
35	Tinea Corporis	13	8.4
36	Tinea Cruris	2	1.3
37	Tinea Unguium	1	0.7
38	Upper Respiratory Tract Infection (URTI)	4	2.6
39	Urinary tract infection	1	0.7
Grand Total		**154**	**100**

List of High-PHI with Diagnoses

Sr.N.	Diagnosis	Freq.	Percent
1	Acute Diarrhea	9	3.7
2	Acute Gastroenteritis	5	2.0
3	Acute Pharyngitis	64	26.1
4	Acute Rhinitis	39	15.9
5	Amoebiasis	4	1.6
6	Burns	1	0.4
7	Colitis	1	0.4
8	Cough	2	0.8
9	Diarrhea	1	0.4
10	Dysmenorrhea	1	0.4
11	Essential hypertension	2	0.8
12	Gastroenteritis	10	4.1

Sr.N.	Diagnosis	Freq.	Percent
13	Impetigo	1	0.4
14	Lower Respiratory Tract Infection (LRTI)	19	7.8
15	Mastitis	1	0.4
16	Otitis external	1	0.4
17	Otitis media	4	1.6
18	Sinusitis	2	0.8
19	Upper Respiratory Tract Infection (URTI)	77	31.4
20	Viral Fever	1	0.4
Grand Total		**245**	**100**

List of Medication Prescribed

Sr.N.	Medicine Prescribed	Freq.
1	Paracetamol	219
2	Levocetirizine Tablet	140
3	Dextromethorphan	78
4	Ambroxol	57
5	Levosalbutamol	57
6	Guaifensin	57
7	Omeprazole	33
8	Oral Rehydration Salts (ORS)	29
9	Permethrin Cream	28
10	Ibuprofen	23
11	Levocetirizine Oral Liquid	21
12	B-Complex (Multivitamin)	16
13	Clotrimazole (Lotion & Cream)	16
14	Zinc Sulphate Dispersible	15
15	Cefixime Oral Liquid	14
16	Amoxicillin	13

Sr.N.	Medicine Prescribed	Freq.
17	Cefixime Tablet	12
18	Clavulanic Acid Tablet	12
19	Dicyclomine	9
20	Saline Nasal Drops	9
21	Mupirocin Ointment	8
22	Metronidazole	7
23	IFA (Ferrous Salt + Folic Acid)	5
24	Calcium Carbonate Tablet	4
25	Doxycycline	3
26	Ciprofloxacin	2
27	Chlorpheniramine Maleate	1
28	Phenylephrine	1
29	Milk of Magnesia	1
Grand Total		**890**

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