



PREVALENCE OF SEXUALLY TRANSMITTED INFECTION IN TAMILNADU - 2004



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**AIDS Prevention and Control Project (APAC)
Voluntary Health Services (VHS)**

Chennai - 600 113.



**APAC-VHS
Chennai**

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**Prevalence of
Sexually Transmitted Infections
in General Population
in Tamil Nadu**

2003-04

**AIDS Prevention And Control Project (APAC)
Voluntary Health Services (VHS)
Chennai - 600 113**

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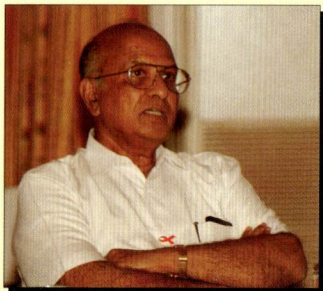
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Abbreviations

APAC	- AIDS Prevention and Control Project
CI	- Confidence Interval
CMC	- Christian Medical College
CT	- Chlamydia trachomatis
DPH	- Department of Public Health, Government of Tamilnadu
ELISA	- Enzyme Linked ImmunoSorbent Assay
GC	- Gonococci
HBV	- Hepatitis B Virus
HD	- Heamophilus Ducrei
HIV	- Human Immunodeficiency Virus
HSV	- Herpes Simplex Virus
IgA	- Immunoglobulin A
IgM	- Immunoglobulin M
IMR	- Infant Mortality Rate
LGV	- Lymphogranuloma Venerum
NG	- Neisseria Gonorrhoea
PID	- Pelvic Inflammatory Disease
RIMP	- Registered Indigenous Medical Practitioner
RPR	- Rapid Plasma Reagin
STI	- Sexually Transmitted Infection
TPHA	- Treponema pallidum haemagglutination assay
TPPA	- Passive Particle Agglutination Test
TV	- Trichomonas Vaginalis
USAID	- United States Agency for International Development
VHS	- Voluntary Health Services
WIP	- Women In Prostitution
YRG CARE	- Y R Gaitonde Centre for AIDS Research and Education

Foreword



Sexually Transmitted Infections (STIs) are important co-factors in the transmission of HIV. While there are experiments going on to explore a vaccine for HIV, it is known that STI is curable and controllable. AIDS Prevention And Control (APAC) project has developed strategies for the prevention and control of STI and thereby control the spread of HIV infection in the community.

APAC Project, administered by the Voluntary Health Services (VHS), Chennai, and funded by USAID, is one of the key players in implementing STI/HIV prevention and AIDS care programs in Tamil Nadu. APAC, since its inception in 1995, has been able to contribute significantly to the prevention and care and support of HIV/AIDS.

Many researches carried out by APAC have helped the program implementers to understand the high-risk sexual behaviour, STI health care facilities in the state, and availability and accessibility of condoms in the state. On similar lines, the reliable baseline data on the prevalence of STI was also generated by APAC, as it is important to measure the success of the intervention programs, which aim to prevent STI. APAC conducted the first round of Community Prevalence Study in 1998. During 2004, APAC conducted the study on 'Prevalence of STI in Tamil Nadu'.

I thank Dr. Bimal Charles, Dr. Lakshmi Bai and all the APAC team members for initiating the study.

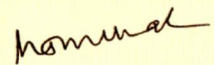
I thank the consortium of organizations - Directorate of Public Health, Government of Tamil Nadu, CMC, Vellore, Post Graduate Institute of Basic Medical Science, Chennai, YRG CARE-VHS, Chennai, Seva Nilayam, Theni, for the successful completion of the study.

I acknowledge the panel of experts for their technical expertise to the study - Dr. Dora Warren, CDC, Dr. S.P. Thyagarajan, Vice Chancellor, University of Madras, Dr. N. M. Samuel, T.N. M.G.R Medical University, Dr. Heiner Groskurth, STI Specialist, Dr. Sanjay Kapur, USAID, Dr. Kurien Thomas, CMC and Mr. S. Ramasundaram, I.A.S.

I am grateful to the Health Secretary, Government of Tamil Nadu and the Project Director, TNSACS for their active support to this study.

I appreciate the efforts taken by Dr. Praneeta Varma, Program Manager-Research and Dr. P. Krishnamurthy, Project Director, APAC in analyzing the data and completion of the report successfully.

The report contains the findings of the survey and, I hope it will be useful for program implementers.

A handwritten signature in dark ink, appearing to read 'N.S. Murali', with a stylized flourish at the end.

Dr. N.S.Murali
Hon.Secretary,
VHS.

Executive Summary

AIDS Prevention And Control (APAC) project assessed the prevalence of STIs and HIV in the general community in Tamil Nadu in 1998. This study was the first attempt to document the community prevalence in India and it helped to structure intervention programs by APAC and other organizations. APAC reassessed the point prevalence of STIs in the general population in Tamil Nadu during 2003-2004. In addition, two high-risk groups namely, Sex Workers and Truckers and Helpers were also studied.

Objectives of the Study

- 1) To obtain the community prevalence of Syphilis, Gonorrhea, Chlamydia, Chancroid, Trichomoniasis, Bacterial vaginosis, Candidiasis, Hepatitis B, Herpes simplex virus 2 and HIV.
- 2) To obtain the prevalence of the following STI syndromes in general population
 - Genital Ulcers (Male and Female)
 - Discharge (Male and Female)
 - Inguinal bubo (Male and Female)
 - Scrotal swelling (Male)
 - Pelvic inflammatory Infections (Female)

Methodology

Multi-stage sampling design was adopted to select a representative sample from the state of Tamil Nadu. Medical camp approach was adopted to collect the data from the general population.

For the general population, the districts selected for the study were Chennai, Tuticorin, Dharmapuri, Tanjore, Thirunelveli and Dindigul. Sample size was calculated based on the 10% prevalence of STI (excluding HIV and HBsAg) reported in the Community Prevalence Study of APAC in 1998. The final sample size was calculated to be 1350. Totally 90 medical camps were conducted (15 per district) and 11,556 people were screened at the medical camps conducted in the six Districts.

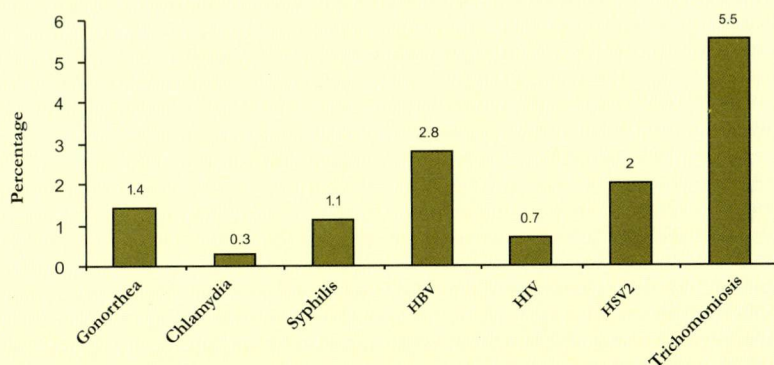
From the study participants, a sample of urine (first 10-20 ml), blood, urethral swabs (men), vaginal and endocervical swabs (women) were collected to test for the presence of infections using laboratory methods. Specimens were collected with strict adherence to standardized protocols by trained medical officers and lab technicians. Internal and external measures were adopted for quality assurance. Ethical clearance for conducting the study was taken from the Institutional Review Board of The TN Dr. MGR Medical University.

Findings:

The community prevalence of any STI is 10.63%. Proportionate prevalence of viral STIs is 47%.

Genital symptoms were reported by 47% - 18.3% male and 81.7% female. Among women, 53% complained of vaginal discharge, 40.5% of pelvic pain and 28.8% of pruritis. Among men, the commonest complaint was pruritis at 25.2%.

Figure 1: Individual STI Prevalence (General Population)



Clinical examination noted genital discharge in 51% of the female study participants and Pelvic Inflammatory Disease (PID) in 27.5%. Among males, inguinal bubo was noted in 1.7%, genital discharge in 0.3% and scrotal swelling in 1.2%.

Introduction

The serious health, economic and social consequences of Sexually Transmitted Infections (STIs) is well recognized in the field of public health. The actual prevalence of STIs and related suffering is underestimated because of the silence that surrounds STIs. The stigma associated with the disease effectively screens out public visibility to the issue in contrast to other diseases like diabetes or hypertension. STIs can cause a wide spectrum of effects on an individual-ranging from complete absence of symptoms to life-threatening complications. Although many STIs are curable, some are not, and all can lead to serious and enduring health consequences.

Multiple studies have suggested that STIs are important cofactors in the transmission and acquisition of HIV infection. An “epidemiological synergy” exists between STIs and HIV, and thus interventions in STI/HIV work on the basic premise that the control of one, may have beneficial effects on control of the other. In recent years, epidemiological studies have shown that persons with ulcerative and non-ulcerative STI are more susceptible to HIV.

Effective STI control requires both targeted and more generalized strategies. Targeted interventions that reduce transmission in core groups (such as sex workers) with a high rate of partner exchange, and bridging groups (such as migrant workers, truck drivers etc), who seek new sexual networks, have led to rapid STI control in several areas (Thailand, South African mining areas & Nairobi). Treatment of STI and health education, including correct condom use, are efficient and cost-effective ways to prevent HIV epidemic.

An estimate of the prevalence of STI within the local community helps in designing and delivering effective STI/HIV programs. With this intent, **AIDS Prevention And Control (APAC) project** had assessed point-prevalence of STI in the community twice: 1997-98 and 2003-04.

The first assessment of prevalence of STIs and HIV in the general community in Tamil Nadu [*Community Prevalence of STI in Tamil Nadu*] was commissioned by APAC in 1998. This study was the first attempt to document the community prevalence in India. National AIDS

Control Organization (NACO) and the World Bank have referred to it in their planning document for the Phase II of National AIDS Control Program. State level HIV/AIDS intervention programs in Tamil Nadu by APAC and TANSACS have also taken cognisance of the study findings in planning appropriate strategies for prevention and control of STI/HIV.

APAC reassessed the point prevalence of STI in the general population in Tamil Nadu in 2003-04. This time around, a baseline assessment for two groups considered being at higher-risk for STI/HIV - Women in Prostitution [WIP] and Truckers and Helpers was also done.

Drawing the strengths from the earlier experience of conducting the 'Community Prevalence of STI in Tamil Nadu', APAC once again brought together a consortium of institutions to pool in the expertise of various organizations. *Seva Nilayam*, a community based organization was responsible for organizing camp logistics and ensuring community participation; *Christian Medical College* (CMC), Vellore designed the methodology for study and analysed the data; *Y R Gaitonde Center for AIDS Research and Education* (YRG CARE) VHS lab, Chennai, conducted the microbiological investigations; *Dr A.L. Mudaliar, Post Graduate Institute of Basic Medical Sciences* (PGIBMS), *University of Madras*, Chennai, performed external quality control on microbiological investigations and *Department of Public Health* (DPH), Government of Tamil Nadu, organized and trained the medical and para-medical staff for the camps. The collective of these groups provided essential inputs at various phases of the study to make it complete and holistic.

Selection of Clusters:

30 clusters (15 per district) from each stratum were selected based on the Probability Proportionate to Size (PPS) method. Each ward (urban) and village (rural) was considered as a cluster. An exhaustive list of wards and villages was put together based on the Census Report 2001 and data sourced from the district headquarters. The clusters (village or ward) were allocated proportionately to each stratum based on the total number of village and wards (PPS) in that stratum.

Selection of Households (HH):

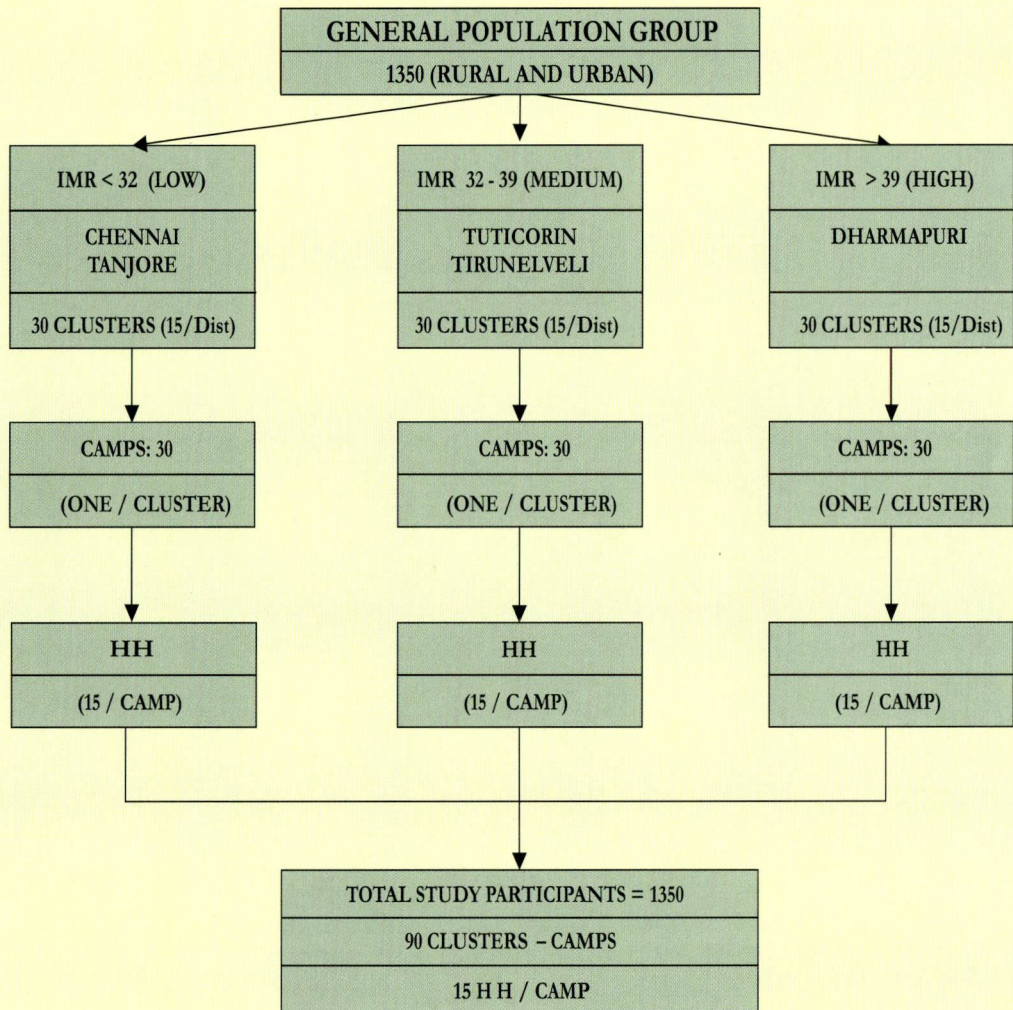
The list of all households and the map of the village/ward were obtained and from the list of households, 15 households were randomly selected.

Selection of Individuals:

All aged between 15-49 years were eligible to participate in the study. The social workers did a house-to-house survey and collected details from each household. All the eligible adults in the selected households were given a card with a distinctive code number. This helped in identification of the individual at the campsite and facilitated their movement into the study.

Sample size was calculated based on the 10% prevalence of STI (excluding HIV and HbsAg) reported in the Community Prevalence Study of APAC in 1998. A sample size of 450 per stratum was calculated keeping precision at 3.5%, 95% CI, and allowing for a 5% drop out. The final sample size was calculated at 1350 adjusting for the design effect of 1.5 for cluster sampling design technique.

Figure 3 : Sample Distribution



Medical camp approach: In India, Health Camps for medical check-up is an accepted mode to take health care to populations whose access to health care is limited due to social, economic or geographical reasons. Thus for the purpose of this study, general health camp approach was adopted to collect data from the community. Contact was established with Panchayat and local community leaders and they remained involved in the entire process of the study. Information about the Health camp was given well in advance to the community and camps were organised with a lot of enthusiasm and support from the community. Camp approach helped to avoid the labelling effect for the study population.

Study subjects in rural areas were identified with the help of family registers and in the urban setting, households were numbered. Social workers identified the houses prior to the camps, established a rapport with the study subjects and motivated them to participate in the camps. Adequate care was taken to ensure equal participation of both the genders in the camp.

A total of 90 medical camps were conducted, 15 in each district over a period of 34 days. 11,556 people were screened at the medical camps conducted in the six districts. On each day, three medical camps were conducted simultaneously in three sites covered by three camp teams. Each team consisted of medical doctors (2), nurses (2), lab technicians (2), social workers (2), and camp organizers/helpers (2). These camps were conducted in the evening also to enable participation of both men and women.

The camps were set up in a manner that ensured a smooth flow for the general population into the section of the camp where a team of care providers from the Department of Public Health attended to them. Camp attendees were given medicines such as iron tablets, anti-helminthic tablets and other essential drugs from the pharmacy counter and if required, lab tests (blood and urine sugar or HB) and ECG were done.

The population eligible for the study had been provided a distinct identification (asterixed ID card) by the social workers on their visit to the households earlier. On approaching the camp, the cardholder was unobtrusively guided to the study section. The study participant was then taken to a separate private room where confidentiality could be assured, and where the social worker conducted an interview and risk assessment. The following were performed:

1. ***Interview and risk assessment:*** Social workers sought informed consent and using a standard interview schedule, interviewed the study participant. Questions included information regarding demographic characteristics, social and sexual behavior, past and present medical history, risk behavior and treatment seeking behavior.
2. ***Physical examination and specimen collection:*** Physical examination was done by a trained physician of the same sex to minimize anxiety. Separate examination rooms were made available for men and women in each camp to address the concern for privacy. Standard clinical practice and use of sterile medical supplies and equipment were ensured. The lab team collected lab specimens and study participants were then directed back to the male/female doctor to complete the survey.
3. ***Diagnosis and Treatment:*** A diagnosis was made, taking into account the results of the interview, risk assessment, physical examination, microscopy results (Gram stain and direct wet mount examination). Any STI syndrome identified during examination was treated according to NACO guidelines and follow-up, if required, was done by one of the participating hospitals. All investigations and treatment drugs were provided free of charge.

Microbiological Tests

From the study participants, a sample of urine (first 10-20 ml), blood (serum), urethral swabs (2) from men and vaginal (3) and endocervical (3) swabs from women were collected to test for the presence of infections using laboratory methods. (Ref. Table:1).

Table 1: Microbiological Tests

DISEASE	TEST	TESTED FOR	SPECIMEN COLLECTED
SYPHILIS	TPHA	<i>T. pallidum</i> antibody	Blood (serum)
	RPR	Reaginic Antibody	Blood (serum)
GONORRHEA	Culture	<i>N. gonorrhoeae</i>	Endocervical or urethral swab
CHLAMYDIA	PCR	<i>C.trachomatis</i> DNA	Urine or Endocervical swab
CHANCROID	Culture	<i>Heamophilus ducreyi</i>	Endocervical or urethral swab
HIV	ELISA	HIV 1/2 Antibodies	Blood (serum)
HBV	ELISA	HBsAg	Blood (serum)
HSV 2	ELISA	IgM Antibodies	Blood (serum)
TRICHOMONIOSIS	Wet Mount	<i>Trichomonas vaginalis</i>	Vaginal swab
BACTERIAL VAGINOSIS	Gram Smear	<i>Nugent's Criteria</i>	Vaginal swab
CANDIDIASIS	Wet Mount	<i>Candida sp.</i>	Vaginal swab

Biospecimen Collection, Storage and Shipping

Specimen Collection

Specimens were collected with strict adherence to the standardised protocols by trained medical officers and lab technicians (*details vide Annexure 2*).

Transportation of Specimens

All serum/urine samples were stored in cryoboxes (thermocool box containing dry ice). All the swabs for bacteriological studies were stored in AMIES medium and transported after checking for proper labelling and packing in zip-log plastic bags. These tightly packed plastic bags were placed in an ice bath prepared in a thermocol box and properly sealed. Within twenty four hours, samples were shipped by rail or road to reach the reference laboratory at Chennai.

On receipt at the laboratory, they were checked for breakages and leakages and then subjected for the bacteriological and molecular biological procedures.

At the end of each camp, all biohazards were burnt with petrol/kerosene at the site itself. Swab containers were wiped with an alcohol wipe. This increased safety and reduced cross contamination.

Microbiological Methods

a) Bacteriological Methods: Smears from endocervical swabs were used to identify *organisms morphologically resembling* Neisseria gonorrhea and Heamophilus ducreyi. Vaginal swabs were used to identify Trichomonas vaginalis and Gardenerella vaginalis. Isolation of Neisseria gonorrhea from urethral /endocervical swabs were attempted using Oxoid chocolate agar, fermentation of sugars, and oxidase test. Identification and test for Beta lactamase production were conducted as per standard procedures. *H. ducreyi* was isolated from the above-mentioned swabs on oxoid chocolate agar.

b) Serological Studies: Serology for Syphilis, HBsAg, HIV, HSV2 IgM, and Chlamydia IgM was conducted on the serum samples using standard commercial kits. The following table shows the the test done and type of kit used to identify the STIs.

Table 2: Lab Kits

STI	Tests done	Kit used
Syphilis	RPR TPHA	Span Diagnostics kit, India Sero Dia, Japan
HBsAg	ELISA	Stimulus, Span Diag., India
HIV 1/2	ELISA	Biorad (France) and Vironostika (Netherlands)
Chlamydia IgM	ELISA	Euro immun, Germany
HSV2 IgM	ELISA	Euro immun, Germany

Statistical methods

SPSS Ver. 6 for Windows and SUDAAN were used in the analysis of data. Probability of selection for age and sex distribution was from 2001 census data. Since a household in a cluster with larger number of households had a smaller chance of selection compared with a household in a cluster with smaller number of households, inverse of cluster size was considered as the probability of selection. The probabilities of age and sex distribution and cluster were multiplied and inverse of the product was taken as the weight. The weight was scaled to average unity. Cluster adjustments at three levels, viz. district, cluster and households were performed. Prevalence at 95% confidence was computed.

Training, Pilot Study & Quality Control

A Pilot camp was conducted to identify the potential bottlenecks in executing the study. During this camp, data forms, database structure and methods involved in screening the subjects were pre-tested and finalized. A three-day workshop was conducted to standardize the methodology of clinical examination, specimen collection, data entry and transportation of specimens. The camp doctors were trained for recognition of STI syndromes by direct tutorials and video demonstration. Lady doctors who were responsible for managing the female subjects were given special training on examination of genitalia and speculum

examination for one week. To standardize the procedure a detailed study manual containing design of the study, operational guidelines on conducting medical camps, methodology of identification of cluster, households and individuals, details of clinical examination and specimen collection, data entry and transportation of specimen to laboratory, ethical issues related to the study, was made available at the campsites.

Internal and external quality control techniques were employed to facilitate high quality data. External quality control was done on the specimens tested.

The internal quality check included the following:

- ▶ Careful scrutiny of each data-form for completeness of information before sending them to the study center by camp supervisors.
- ▶ Double entry of the data obtained in the database
- ▶ Standardization of the clinical and laboratory procedures before the conduct of the study.

Quality Assurance of Lab Testing

10 percent of the serum, plasma swab and urine samples were sent to the Department of Microbiology, Dr. ALM-PGIBMS for external quality assurance.

Ethical Issues

Ethical clearance for conducting the study was taken from the Institutional Review Board of The TN Dr. MGR Medical University. Confidentiality of the subjects was ensured in the study. The medical camp approach adopted for collecting data protected the study participants from labelling effect. The participants for the study were informed about the objectives of the study and a written consent was obtained from the study participants for the administration of the questionnaire, clinical examination and collection of specimens. Informed consent for the study participants below the age group of 18 years was taken from the parents. The study participants were informed that biospecimens collected were meant for studying the STI conditions and HIV. The specimens collected have been banked for three years for future studies.

Individuals detected to have STIs (syndromic and etiological) were informed of their disease status and treated appropriately.

Universal precautionary measures were adopted at the camps and post exposure prophylaxis was kept accessible for the doctors, nurses and lab technicians in case of needle-prick injury.

Findings

I. PROFILE OF STUDY PARTICIPANTS

Household Profile:

There were 90 clusters studied, of which 49 were rural and 41 urban¹. Out of a total of 4662 individuals enumerated from the selected households, 2893 were from the eligible age group of 15-49 years. In the eligible population, 53 percent (1531) were males and 47 percent (1362) were females. The mean family size was 3.82.

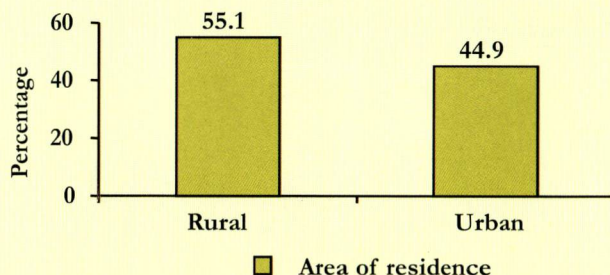
Table 3: Household Profile - Age by sex distribution

Age (in years)	Male			Female			Total		
	n	Per cent	Percent Out of Adults	n	Per cent	Percent Out of Adults	n	Per cent	Percent Out of Adults
< 5	244	9.8	-	229	10.5	-	473	10.1	-
5 – 9	283	11.4	-	282	12.9	-	565	12.1	-
10 – 14	270	10.9	-	262	12.0	-	532	11.4	-
15 – 19	247	10.0	16.1	173	7.9	12.7	420	9.0	14.5
20 – 29	449	18.1	29.3	518	23.7	38.0	967	20.7	33.4
30 – 39	452	18.2	29.5	470	21.5	34.5	922	17.8	31.9
40 – 49	383	15.5	25.0	201	9.2	14.8	584	12.5	20.2
≥ 50	150	6.1	-	49	2.2	-	199	4.3	-
Total	2478	53.1	52.9	2184	46.8	47.1	4662		

Socio Demographic Profile of Study Participants:

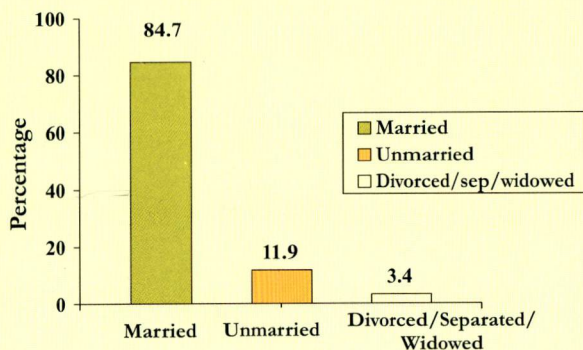
There were 584 men and 758 women who participated in the study (n=1342). The majority i.e., 740 (55.1 percent) were from rural areas. Maximum representation (76.8 percent) was from 20-39 year age group. 43.5 percent had education above high-school level and 22.4 percent were illiterate.

Figure 4: Distribution by area



¹ Urban/Rural defined as per Census of India.

Figure 5: Marital Status

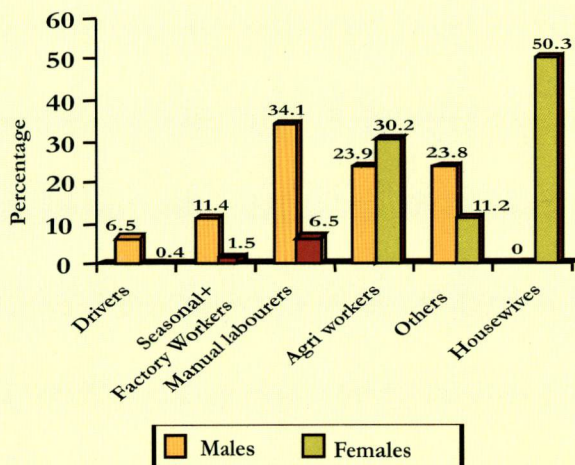


There were 1137 (84.7 percent) participants who were currently married. The rest 11.9 percent were unmarried and 3.4 percent were divorced/ separated or widowed. (*Ref. Annexure 3*)

Occupation

Occupation was stated to be housewives by 381 (28.6 percent) study participants while 368 (27.5 percent) were agricultural workers and 247 (18.4 percent) were labourers or vendors. There were 223 (16.6 percent) participants who were professionals, unemployed or others. Factory workers and drivers constituted 77 (5.8 percent) and 41 (3.1 percent) respectively.

Figure 6. Occupation by gender



Fertility and Contraceptive Practices

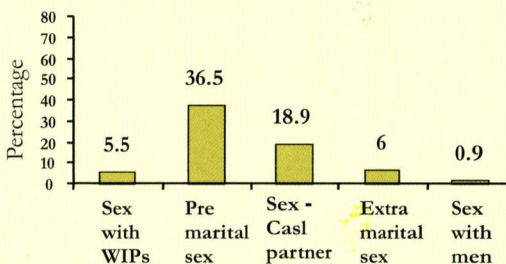
55 percent of the study participants had 1-2 children while 39.2 percent had more than three children. Among females, the most common form of contraception reported was tubectomy (72.5 percent) while 17.9 percent of the males reported using condom as a contraceptive.

General Health Profile

Most of the female participants reported lower abdominal pain (68 percent) while medical problems such as hypertension (BP), TB, heart-related ailments were reported by 6 percent of study participants.

Risk Behavior : 2.7 percent of the study participants gave history of receiving blood transfusion. 29 percent of the study participants reported taking more than 5 injections in a year and 13 percent had never used disposable needles for injections. Other behavior noted were: smoking (22.2 percent), tattoos (22.4 percent) and alcohol use (22 percent). Among 584 males, 26 percent had more than one sexual partner, while 51 percent had a single partner and 22 percent had no sexual partner. More than a third of the male study participants (36.5 percent) had pre-marital sexual experience. While 5.5 percent of the males reported having a paid sex partner, 18.9 percent had a casual partner (non-paid). Among those who had sex with a paid partner, 52 percent also had casual partners. Frequent travel (37.4 percent), lack of privacy (37 percent), festivals (36.2 percent) and pregnancy (34.5 percent) were the reasons most cited for times when sex was not possible with spouse. 56.3 percent of the males who had sex with women in prostitution used condoms, while only 12 percent of those who had sex with a casual partner reported condom usage.

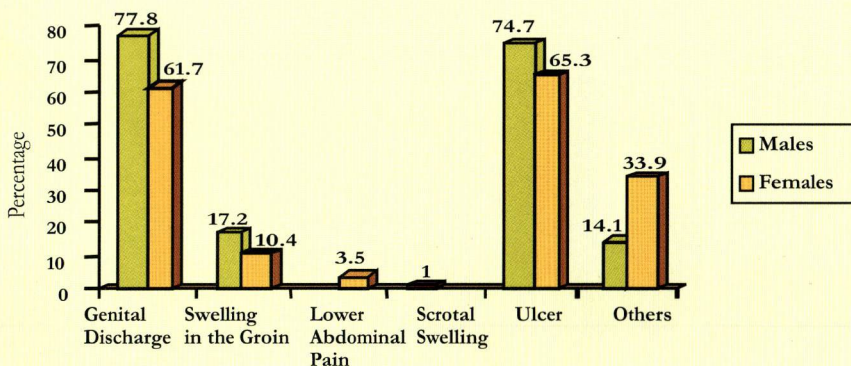
Figure 7 : Sexual Behavior



STI: Awareness and Experience

a) **Awareness :** Only 47 percent of participants were aware of Sexually Transmitted Infections, of which 67 percent were aware that it is preventable and 69 percent identified genital discharge and ulcer as important symptoms of the disease. Figure 5 gives the distribution of the symptoms identified as STIs by the study participants.

Figure 8 : STI Symptoms awareness



b) History of STI

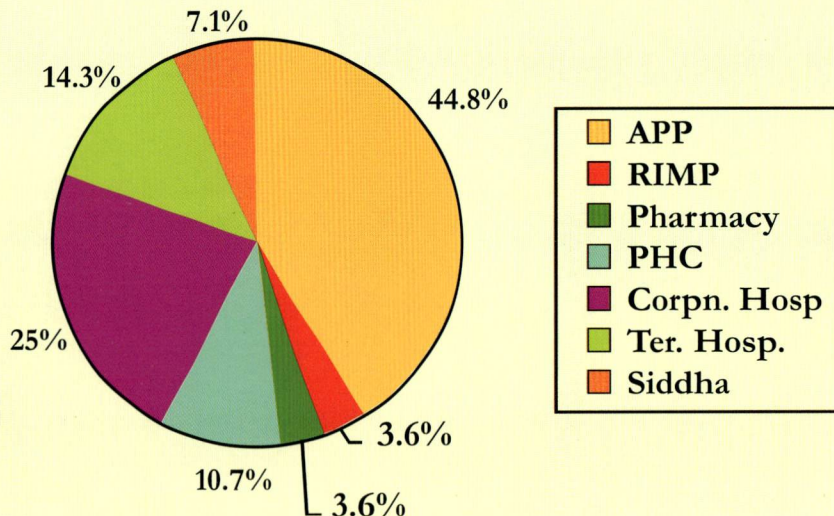
Past history of STI was noted in 3.1 percent (n=1164) of the participants, while 0.3 percent had a current complaint of STI. 65.8 percent of the subjects who had a past experience of STI always completed treatment, while 16 percent completed sometimes and 5 percent never completed the prescribed treatment. Among those who had a past history of STI, only 1.5 percent reported that their spouses too had STI, and 0.6 percent of the spouses had a current STI infection.

Treatment Accessed

General Health Problems : Nearly 67 percent of the subjects sought treatment for their common ailments from private allopathic facilities while 39 percent accessed care from PHC and 18 percent directly approached pharmacies. Overall, 77 percent of the study participants stated that they had got medicine from pharmacies without prescription.

STI Treatment : Of the study participants who had heard of STIs, 45 percent mentioned Private Allopathic clinics as the nearest facility for STI treatment, while 36 percent mentioned Government health care facilities, 11 percent mentioned indigenous medical facility, 14.3 percent tertiary hospitals and 4 percent pharmacy.

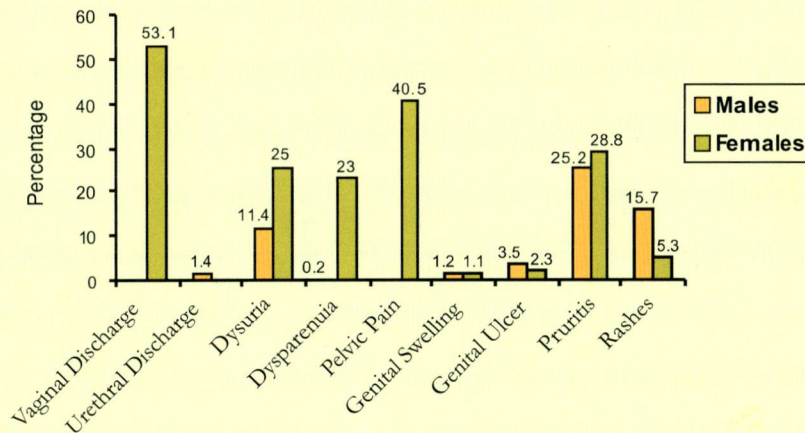
Figure 9 : STI Treatment



II. CLINICAL FINDINGS

Self-reported Genital Symptoms: Genital symptoms were reported by 628 (47 percent) of the study participants. Among them, 115 (18.3 percent) were males and 513 (81.7 percent) were females. The distribution of these symptoms by gender is given in Figure 10. The prevalence of vaginal discharge (53 percent) was the commonest complaint among women followed by pelvic pain (40.5 percent) and pruritis (28.8 percent). Among men, the most common complaint was pruritis (25.2 percent). Infertility was reported by 7.8 percent of men and 5.7 percent of women

Figure 10 : Reported genital symptoms by Gender



Clinical Examination

Genital Examination was performed in 575 males and 719 females. Of these 695 women consented or underwent bimanual palpation and examination. The following clinical problems were identified. Syndromes were noted in 33 percent. Multiple syndromes were noted in 13.7 percent (Males-5.3%, Females-54.5%) of the study participants.

Pubic Hair: On examination it was found that 14 females (1.9 percent) had lice or nits but none were found in males.

Genital Discharge: Genital discharge was noted in 367 (51 percent) female study participants and 2 (0.3 percent) male study participants.

Genital Ulcer: Among the study participants, genital ulcers were noted in 10 (1.7 percent) males and 56 (7.8 percent) females.

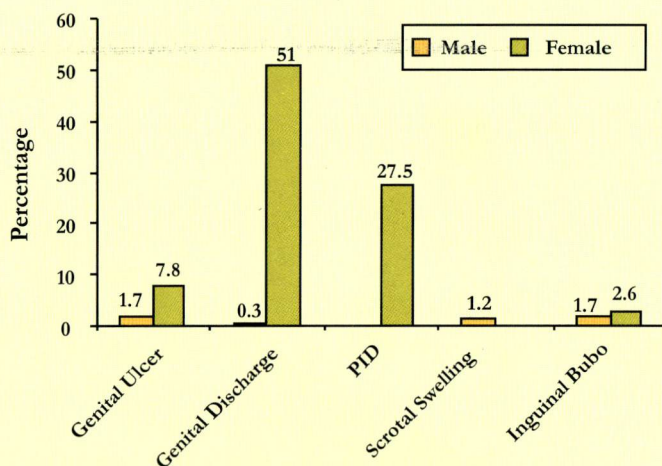
Inguinal Bubo: Inguinal Bubo was noted in 19 (2.6 percent) females and 10 (1.7 percent) males.

Scrotal swelling: Painful scrotal swelling was noted in 7 (1.2 percent) male study participants.

Pelvic Inflammatory Disease [PID]: PID was noted in 198 (27.5 percent) female study participants.

Bimanual Examination: Uterine mass was noted in 59/695 (8.5 percent) and 13/695 (1.9 percent) had adnexal mass. Tenderness on bimanual examination in women was noted in 83/695 (11.9 percent) and 56/695 (8 percent) of the female participants had tenderness of the labia/vagina/cervix.

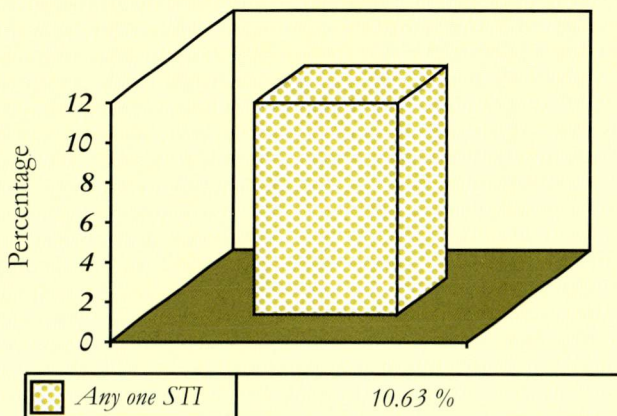
Figure 11 : Clinical STI



III. LAB FINDINGS : PREVALENCE OF STI

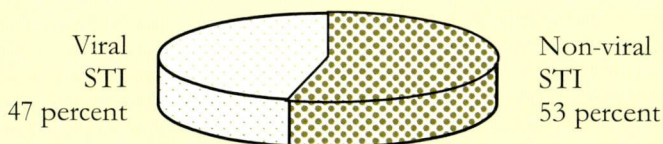
The prevalence of individual STI conditions as diagnosed by microbiological tests and its distribution by age, sex and residence and associated risk factors are reported in this section.

Figure 12 : Prevalence of STI



The prevalence of any of the STIs- Gonorrhea, Syphilis, Trichomoniasis, Chlamydia, Chancroid, HSV2, HIV, and HBV is 10.63 percent.

Figure 13 : Prevalence of Viral / Non-Viral STI



The prevalence of individual STI conditions and its distribution by age, sex and residence are given in Table-4. Among those who had an STI, 53.5 percent had non-viral STI (Gonorrhea, Syphilis, Chlamydia and Chancroid).

Multiple STI were noted in 0.3 percent [$n=1$ (female)] of study participants.

All the strains of isolated *N.gonorrhea* were found to be negative for Beta lactamase production.

Table 4 : Prevalence of STI

Type of STI	Total No. Tested	No. +ve	Prevalence	Location %		Sex in %		Age group (in years) %			
				Rural	Urban	M	F	15-19*	20-29	30-39	40-49
<i>Syphilis</i> [TPHA &RPR]	1342	15	1.1	1.4	0.8	1.0	1.2	-	1.0	1.0	2.0*
<i>Gonorrhea</i> [Culture]	1254	18	1.4	0.7	2.3	2.3	0.7	6.0	1.0	1.0	3.0
<i>Chlamydia</i> [PCR]	366	1	0.3	-	0.6	-	0.3	-	-	1.0	-
<i>Trichomoniosis</i> [Wet Mount]	705	39	5.5	6.0	5.1	-	5.5	8.0	4.0	6.0	7.0
<i>HIV</i> [Elisa]	1318	10	0.7	0.6	1.0	1.4*	0.3	-	1.2*	0.8	-
<i>HBV</i> [Elisa HBsAG]	1340	37	2.8	2.2	3.5	3.9	1.9	2.0	3.0	2.0	5.0
<i>HSV2</i> [Elisa IgM]	1326	27	2.0	2.3	1.7	1.0	2.8*	-	2.0	2.0	2.0

*p value < 0.05

Individual STI Conditions:

Risk factors were assessed with data obtained from a questionnaire. Analysis was carried out for individual STI conditions and for any STI/HIV with key demographic variables (area, sex, age, education, occupation) and sexual/behavioral variables (Blood transfusion, number of injections, disposable needles, condom use, number of sexual partners, sex with WIPs).

STI Cases : 10.63 percent of the study participants had at least one of the STIs like Gonorrhea, Syphilis, Trichomoniosis, Chlamydia, Chancroid, HSV2, HIV, and HBV.

- The overall prevalence was almost similar in urban (10.65 percent) and rural areas (9.6 percent).
- The overall prevalence was higher among 20-29 (11 percent) and 40-49 (11.6 percent) years of age group as compared to other age groups. The differences observed between the age groups were statistically significant (p=0.03).

Syphilis: Fifteen study participants tested positive for Syphilis out of the total 1342 tested. The overall prevalence of Syphilis was 1.1 percent (0.6, 1.7).

- The higher the level of education of study participants, the lower the prevalence of syphilis ($p=0.01$).
- The prevalence of Syphilis was significantly higher among the study participants of higher age-group ($p=0.02$).

Gonorrhea: Of the 1254 study participants screened for Gonorrhea, 18 were tested positive. The overall prevalence of Gonorrhea was 1.4 percent (0.6-2.3). The prevalence was lower in rural (0.7 percent) as compared to urban (2.3 percent) areas. However, the difference was not statistically significant.

Chlamydia: Of the 366 study participants screened for Chlamydia, only 1 was found positive. The overall prevalence of Chlamydia was 0.3 percent (0-0.8).

Trichomoniasis vaginalis: Among the 705 female study participants screened for Trichomoniasis vaginalis, 39 tested positive. The overall prevalence was 5.5 percent (3.4-7.6)

- The prevalence was significantly higher among seasonal and factory workers (27.3 percent) as compared to other occupation categories ($p=.001$).

Hepatitis B: Of the 1340 study participants screened for Hepatitis B, 37 were tested positive. The overall prevalence was 2.8 percent (1.8 - 3.7).

- The prevalence was higher in males (3.9 percent) as compared to female study participants (1.8 percent) ($p=.07$).

Human Immuno Deficiency Virus (HIV): 1318 study participants were screened for HIV, of which ten tested positive for HIV-1. None were positive for HIV-2. The overall prevalence was 0.7 percent (0.3-1.2). Co-infection with Candidiasis was noted in only one study participant. Prevalence of HIV was more among those who had two or more than two partners (2.7 percent) as compared to those who had a single partner (1.3 percent) and those with no partners.

- The prevalence was significantly higher in males (1.4 percent) as compared to females (0.3 percent) ($p=.05$)
- The prevalence (1.2 percent) was significantly higher in 20-29 years age group as compared to 0.8 percent in 30-39 years age group. None tested positive in the age group 15-19 and 40-49.

Herpes Simplex Virus (HSV2): There were 1326 study participants who were screened for HSV2 and 27 were tested positive. The over all prevalence was 2.0 percent (1.1-2.9).

- The prevalence was significantly higher in females (2.8 percent) as compared to males (1.0 percent) ($p=0.02$).

Bacterial Vaginosis (BV): There were 180 female study participants who tested positive for Bacterial vaginosis out of the 572 screened. The overall prevalence was 31.5 percent (27.1-35.8).

- The prevalence (70 percent) of bacterial vaginosis was significantly higher in 15-19 years age group as compared to other age - groups ($p=0.02$).
- Seasonal and factory workers had a significant higher prevalence (50 percent) as compared to other occupation categories ($p=0.06$).

Candidiasis: Among the 704 female study participants screened for Candidiasis, 51 were tested positive. The overall prevalence was 7.2 percent.

Association between Syndromes and Lab Findings

The study attempted to explore the association of STI syndromes and lab findings and the following has emerged :

Genital Ulcer: No genital ulcers were noted among the 15 participants who tested positive for syphilis or the 27 who were positive for HSV2 by lab findings.

Genital Discharge:

Vaginal discharge: Vaginal discharge was a very common finding in the clinical examination. Among the 5 women who had a laboratory confirmed Gonococcal infection, 2 had vaginal discharge. Of the 179 study participants who had Bacterial Vaginosis confirmed by lab test, only 96 (53.6 percent) were noted to have vaginal discharge during clinical examination. Vaginal discharge was noted in 24 (61.5 percent) of the 39 females who had lab confirmed Trichomoniosis.

Urethral Discharge: Lab findings confirmed gonorrhea in 13 male study participants. However, clinically, the syndrome of urethral discharge was noted only in 1 of them.

Inguinal Bubo: Though inguinal bubo was noted among 10 males and 19 female study participants during clinical examination, lab findings did not confirm for any STI.

Scrotal Swelling: No scrotal swelling was noticed during clinical examination among the 12 study participants who were found positive for Gonorrhea by lab findings.

PID: There was no clinical evidence of PID among the 5 females who had lab confirmed gonorrhea. Clinical diagnosis of PID was noted in 191 (25.9 percent) of the female participants, but only one from the group had any laboratory confirmed chlamydia.

Limitations

- **Less participation of males in the study.** There was a larger participation of women (56 percent) in the study as compared to men, which is a limitation of the health camp approach. Future studies need to address the gap in male-female participation.
- **Participation of adolescents was low.** Only 3.7 percent (50) of the study participants were from the 15-19 years age group of which 74 percent were males. Information on prevalence of STI among adolescents needs to be studied further.
- **Cost constraints in laboratory procedures.** Selection of tests e.g. PCR for studying the prevalence of chlamydia could not be done for all study participants due to the cost involved.

Summary

- Overall, 47 percent of the study participants reported genital symptoms.
- The prevalence of Laboratory confirmed STI in the general community is 10.6 percent. Among those who had an STI, 53.5 percent had treatable bacterial STIs (Gonorrhea, Syphilis, Trichomoniasis, Chlamydia, Chancroid).
- HIV prevalence is noted at 0.7 percent- 1.4 percent in males and 0.3 percent in females. The findings from the study are similar to the 0.75 percent prevalence reported from ANC sero-sentinel surveillance (TANSACS, 2003 report).
- The prevalence of overall STI was not very different between males (9 percent) and females (10.3 percent) while individual differences were noted for infections under study like HSV2, which was significantly higher amongst the females.
- The prevalence of any STI was similar in the rural areas (9.6 percent) and urban areas (9.9 percent).
- Hepatitis B prevalence is 2.8 percent(1.8-3.7). The prevalence of Hepatitis B was 5.1 percent (CI) as reported by APAC in 1998. This could reflect the variation in HBV prevalence in different geographic regions of Tamil Nadu.

Recommendation

➤ **Promote early detection and treatment of STIs through demand generation and provide accessible STI services**

STI/HIV intervention programs and other RCH/ public health programs need to strengthen services and promote early health seeking behavior through education, self-risk assessment and recognition of symptoms indicative of STI. Awareness of STI symptoms and information about availability of accessible treatment and care services should be generated in the community through effective outreach and multi-communication channels. Community Health care workers in rural and urban health settings, during their routine contact with the community, can also assess for indications of STI and refer appropriately. The importance of partner(s) notification, and the need to bring them in for counseling and treatment needs to be emphasized.

➤ **Refocus the efforts of STI prevention in rural areas**

The foregoing findings revealed that the prevalence of STI is similar in urban and rural areas. This is indicative of the need to intensify the coverage of STI care services in rural areas as well. Public health response to STI needs to be strengthened through strategic planning and networking at the central and peripheral levels. For a sustained and comprehensive program, consensus and active support for STI control needs to be developed involving decision makers from government, universities, professional associations, communities and NGO/CBOs. Strategic planning to identify and prioritize the most effective approaches based on STI prevalence and transmission dynamics, contextual factors, cost effectiveness, feasibility and sustainability must be done at the rural outreach health program level.

➤ **Adopt methods for better detection of asymptomatic and viral STIs**

The study draws attention to the fact that majority of the STI cases are asymptomatic. Quality laboratory facilities still remain concentrated in urban areas while the infection spread is noted to be similar in rural and urban areas. Cost of tests is also prohibitive. Till such time that low cost, quality assured lab tests become available, there is a need to develop a strategy to reach and treat asymptomatic STI cases. The present strategies of syndromic management of STIs should be strengthened. Developing a protocol, which considers risk factor and clinical assessment tool for asymptomatic STI, may be considered.

Annexure 1: Selected Districts

Selected Districts:

< 32 IMR	32-39 IMR	>39 IMR
1. Chennai	1. Ariyalur	1. Dharmapuri
2. Coimbatore	2. Cuddalore	2. Madurai
3. Kanchipuram	3. Erode	3. Dindigal
4. Kanyakumari	4. Namakal	4. Perambalur
5. Karur	5. Pudukottai	5. Salem
6. Nagapatinam	6. Ramanathapuram	6. Theni
7. Sivaganga	7. Trichy	7. Villupuram
8. Thanjavur	8. Tirunelveli	8. Virudhunagar
9. Thanjavur	9. Thiruvarur	
10. The Nilgiris	10. Tuticorin	
11. Thiruvallur	11. Vellore	
12. Tiruvannamalai		

Source : Family Welfare Program in Tamil Nadu: Year Book 1999-2000.

Two districts selected from each region:

Chennai

Tuticorin

Dharmapuri

Tanjore

Tirunelveli

Dindigul

Annexure 2: Overview of Biospecimen Collection

From male participants : Urine, serum, urethral swabs were collected from the male participants. An external inspection of the genital area, noting the characteristics such as abrasions, ulceration, warts and urethral discharge was also done.

Urethral Swab : In the absence of visible urethral discharge, the patient was asked to milk the urethra. The characteristics of any discharge were noted. With a cotton wool swab, a specimen of discharge was obtained for Gram staining.

In case genital ulceration was found, the number and characteristics of the lesions were noted. A swab was obtained from the ulcer and inoculated in a transport medium, and stored at ice cold temperature for *H. ducreyi* culture.

Urine specimen: Urine specimen was collected for PCR to test for the presence of NG/CT. The first catch of urine (10-20 ml) was collected in a sterile prelabelled polypropylene container without any preservative. Centrifugation of the whole sample at 8000 rpm for 15 - 20 mins was done. One ml of the pellet was taken after discarding the supernatant and transferred into a 2 specimen cryovial, labelled and sealed. Urine specimen thus collected was stored temporarily at refrigerated temperature. Specimens were transported to the lab and stored at -80°C before performing the test.

Serum specimen: Five ml of blood was drawn for diagnosis of Syphilis, HIV and Hepatitis B. Vacutainer tube was inserted into a specific needle device to collect the requisite sample of serum, and the tubes were placed undisturbed for atleast 30 minutes on a slant rack. Tubes were balanced (visually) and centrifuged at 5000 RPM at room temperature for five minutes or at 3000 RPM for ten minutes. Serum was collected with the help of sterile dropper and transferred into a prelabelled storage cryovial.

From female participants: An external inspection of the genital area was made, and the characteristics of any local changes such as abrasions, ulceration, and vaginal discharge were noted. If there was no obvious discharge, for collection of vaginal smear the bevalve speculum

was moistened with few drops of saline added by sterile pipette and gently inserted into the vagina. The speculum was removed carefully and using a coverslip the secretions on the posterior valve of the speculum were transferred to a glass slide, and observed under microscope for *Trichomonas* and *Candida*. Urine and serum specimens were also collected from the female participants.

From female participant 3 vaginal swabs and 2 endo cervical swab were collected. One of the vaginal swab was smeared for identification of bacterial vaginosis. The second vaginal swab was processed for saline wet mount, to identify the presence of *Trichomonas vaginalis* (motile trophozoites). The third smear was prepared with 10 percent KOH wet mount for the identification of *Candida*.

For collection of Endo-cervical specimen: Using a large cotton swab, the exocervix was cleaned of all vaginal secretions and an endocervical sample was obtained onto the special swab by slowly rotating for 10 - 20 seconds, and withdrawing the swab avoiding contact with the vaginal surfaces. Swabs were transferred into the tube containing the transport medium. The endocervical swab was processed and aliquoted and transferred to YRG Lab for CT/NG PCR. For microscopy, fresh smears from the endocervix were collected by a sterile swab and examined under microscope immediately after processing for Gram and Giemsa staining.

Annexure 3

Table 3.1 : Distribution of Socio-demographic characteristics

Variables	Total	
	n	%
Residence		
Rural	740	55.1
Urban	602	44.9
Gender		
Male	584	43.5
Female	758	56.5
Marital Status		
Currently Married	1137	84.7
Divorced/Separated/Widowed	45	3.4
Unmarried	160	11.9
Age in Years		
15 – 19	50	3.7
20 – 29	508	37.9
30 – 39	525	39.1
40 – 49	259	19.3
Education		
Illiterate	303	22.6
Primary	455	33.9
High School	416	31.0
Graduates	168	12.5
No. of Children		
0	114	9.8
1 & 2	635	54.6
≥ 3	414	39.2
No. of pregnancies		
0	55	7.3
1 & 2	304	40.2
≥ 3	398	52.6

* Percentages were calculated excluding not known and blank information

Table 3.2 : Sexual Behavior

No.of Sexual Partners	Total	
0	119	20.4
1	299	51.2
2	58	9.9
≥ 3	108	18.5
Had sex with women in prostitution in the last one year(n= 573)	32	5.6
Sex before marriage(n= 419)	153	36.5

Table 3.3 : Distribution of knowledge on STI and its Medication

Variables	Total	
	N	%
Heard about the disease which are sexually transmitted (n = 1324)	628	47.4
STIs can be prevented (n= 618)	415	67.2
Symptoms of STIs		
Genital Discharge	148	69.2
Ulcer	147	68.7
Swelling in the groins	29	13.6
Lower abdominal pain- Female	8	3.7
Scrotal Swelling	1	0.5
Others	53	24.8
Spouse ever had an STI (n = 1161)		
Never	941	81.1
Past	17	1.5
Current	7	0.6
Respondent ever suffered from STIs (n = 1164)		
Never	1124	96.6
Past	36	3.1
Current	4	0.3
If yes, taken treatment (n= 41)		
Complete the treatment (n= 38)		
Always	25	65.8
Sometimes	6	15.8
Never	2	5.3

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