ANNUAL REPORT 2007- 08



Regional Medical Research Centre for Tribals
(ICMR) Jabalpur

PREFACE

It gives me great pleasure to present the activity report of the year 2007-08. The year under report was eventful and saw significant achievements. The centre initiated few but promising research projects. Some of the projects are waiting for funding. During this period the centre also received quite a good number of extramural funds from agencies like NACO, WHO-SEARO, ICMR, etc.

Predominantly a research institute, its academic activities are well reflected as many budding scholars/students joined the centre to pursue their Ph.D/ post graduation dissertation work under the able guidance of the scientists of the centre.

The scientists and the research staff are quite enthusiastic and work in an environment conducive for research. The scientific publications in reputed national and international journals are a reflection of their hard work. The scientists and the staff also presented papers in international conferences/meetings held abroad such as in Royal Society of Tropical Medicine and Hygiene, UK, American Society of Tropical Medicine and Hygiene, USA, Boston University School of Public Health, USA. During the said period one of the scientist also left for pursuing higher education at Royal Tropical Institute, Amsterdam. In terms of human resource development both scientists and the research staff were trained to handle high technology based laboratory equipments such as DNA sequencer, flowcytometer and liquid nitrogen plant, etc. from reputed bio-medical institutes/laboratories of the country.

The centre also disseminated research output and transfer of technology by organizing series of workshops through out the year. Mention may be made of International workshop on molecular epidemiology and immunology of malaria and other vector borne diseases organized from 16th -19th October 2007 which amasses delegates, scientists, academicians, scholars, program personnel, etc from all over the country and abroad. They presented papers and shared their valuable experiences of successes and failures both are essential for effective planning and implementation of health programmes in future. Hands on training were the other attraction of the workshop. The workshop is mostly supported by WHO, US Embassy, New Delhi, Ministry of Science & Technology, NVBDCP, MP Council of Science & Technology and ICMR. During this period we have published the proceeding of the National symposium on tribal health organized in October 2006.

I am happy to inform that RMRCT will complete its 25 years since inception and we are going to celebrate the Silver Jubilee on 1st March 2009. There is a proposal to organize an international symposium on tribal health from 27th February to 1st March 2009 at the centre. We are preparing for the mega event and getting an overwhelming response from both national and international delegates and from funding agencies.

Needless to mention the constant support and guidance provided by Lt. Gen D. Raghunath, SAC Chairman is a source of inspiration for the scientists. I place on record and express my sincere thanks to Prof. N.K.Ganguly, Former Director General, ICMR for his interest, encouragement and is always a motivation for all of us.

Neeru Singh

Director

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1. COMMUNICABLE DISEASES

1.1. Prevalence of pulmonary tuberculosis and ARTI in tribal population of Madhya Pradesh

Tuberculosis is the largest single cause of adult illness and death from a communicable disease in the country. Every year, approximately 2 million persons in India develop tuberculosis (TB); accounting for one fourth of the world's new TB cases (Dye et al 1999). Over 2 million people die of tuberculosis worldwide each year, around 4,00,000 of them die in India alone. Epidemiological information on tuberculosis is vital for planning the control strategies, particularly in tribal areas. Barring few studies, the information on tuberculosis is lacking in tribal population. The baseline data on tuberculosis situation among them is essential to know the extent of the problem and also to know the impact of the control program, at a later stage by conducting re-survey. The present study has been undertaken to assess the prevalence of tuberculosis as well as tuberculosis infection in tribal population of M.P.

Objectives

1. To estimate the prevalence of tuberculosis infection and pulmonary tuberculosis in tribal population of Madhya Pradesh.
2. To study the drug susceptibility pattern of tubercle bacilli.

Methodology

The study was conducted in collaboration with Tuberculosis Research Centre, Chennai among the tribal population of randomly selected villages from selected districts of the state adopting multistage cluster sampling. It was a cross-sectional sample survey to estimate the prevalence of pulmonary tuberculosis among adults ≥ 15 years and prevalence of tuberculosis infection and thereby estimating annual risk of tuberculosis infection (ARTI) among children aged 1 - 9 years. Tuberculin survey was also conducted among Saharia-a primitive tribal community in the Sheopur district of the state. Disease

survey was undertaken among other two primitive tribal communities as well.

Tuberculin survey methodology involved enumeration of the study population, BCG scar reading and tuberculin testing with one tuberculin unit (TU) of purified protein derivative (PPD) RT 23 on mid-volar aspect of left forearm intra-dermally & reading after 72 hours. The survey methodology for disease survey included registration of all persons in the selected villages. All individuals aged 15 years and above were questioned for chest symptoms relating to TB; viz. Persistent cough for two week's or more/ chest pain for one month or more/ fever for one month or more / haemoptysis within 6 months. Persons with any of these symptoms (symptomatics) were considered eligible for sputum collection. Persons with a previous history of anti-TB treatment were also considered eligible for sputum collection. Two sputum samples (about 2ml each) - one spot and one overnight - were collected from all eligible individuals in sterilized McCartney's bottles. The samples were transported to the laboratory maintaining cold chain and examined for smear, culture and drug susceptibility testing using standard techniques. A case was defined as an individual whose sputum was positive for acid fast bacilli by ZN microscopy and/or growth of *M.tuberculosis* by culture. Drug susceptibility testing (DST) was done by conventional method on solid Lowensten Jensen (LJ) media for four first line drugs namely Isoniazide, Streptomycin, Rifampicin and Ethambutol.

Results

Tuberculin survey among tribal population

Of the 5333 children registered, 4802 (90%) were tuberculin tested and read for reaction size. Among the 4802 children test read, 3062 (63.8%) children had no BCG scar. The frequency distribution of children by reaction sizes indicated a fair mode at 18 mm in the right hand side of the distribution. By mirror- image technique, the prevalence of infection among BCG vaccinated children was estimated to be 7.6% (95% CI: 4.4-10.9%) and ARTI was computed to be 1.4% (0.8-2.0%). The corresponding figures for unvaccinated children were 6.8% (95% CI: 4.8-8.9%) and 1.3% (0.9-1.7%) respectively (Table 1.1.1). The difference in the proportion of vaccinated and unvaccinated children was not statistically significant. There was no difference in risk of infection between male and female children. The prevalence of infection and ARTI were significantly higher among

children aged 5-9 years compared to those aged 1-4 years (P<0.001).

Tuberculin survey among Saharia primitive tribe

Among 1443 children registered, 1341 (92.9%) were tuberculin tested and read for

Table 1.1.1. Estimated prevalence of infection and ARTI among children

Classification	No. tested	No. infected			ARTI (%)	P value
		No.	%	(95% CI)		
BCG Scar						
No	3062	209	6.8	(4.8 - 8.9)	1.3 (0.9-1.7)	NS
Yes	1550	118	7.6	(4.4-10.9)	1.4 (0.8-2.0)	
All*	4802	343	7.1	(5.5 -8.8)	1.3 (1.0-1.7)	
Sex						
Male	2359	158	6.7	(5.0 - 8.4)	1.3 (0.9-1.6)	NS
Female	2443	185	7.6	(5.6 - 9.6)	1.4 (1.0-1.8)	
Age (in years)						
1-4	2093	42	2.0	(1.3 - 2.8)	0.7 (0.4-0.9)	<0.001
5-9	2709	301	11.1	(8.6 -13.6)	1.6 (1.2-1.9)	

* Children with doubtful scar and no information on scar included

reaction size. The proportion of children with BCG scar was 35%. The prevalence of infection and ARTI was found to be very high i.e. 19.0% (95% CI: 15.4 - 22.5 %) and 4.0% among vaccinated children. The corresponding figures among unvaccinated children were 21.1% (95% CI: 18.3- 23.8%) and 3.9% (95% CI: 3.4 - 4.5%) respectively (Table 1.1.2). The prevalence of infection and ARTI were significantly higher among children aged 5-9 years compared to those aged 1-4 years (P<0.001).

Table 1.1.2. Estimated prevalence of infection and ARTI among children of Saharia primitive tribe

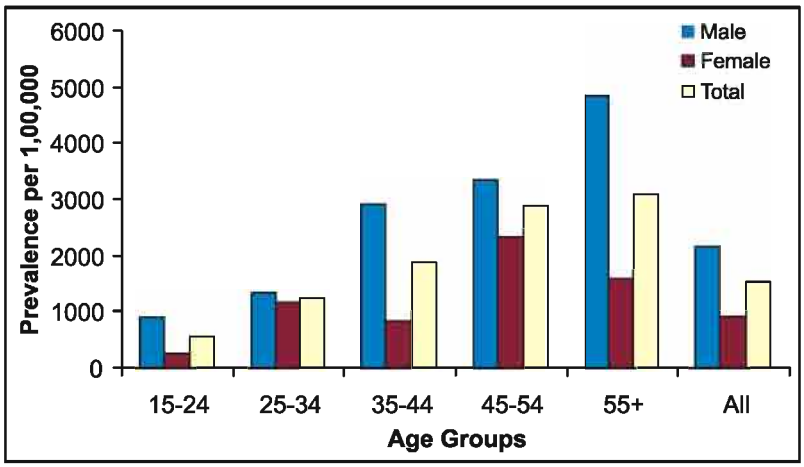
Classification	No. test/ read	No. infected			ARTI (%)	P value
		No	%	(95% CI)		
BCG Scar						
No	877	185	21.1	(18.3 –23.8)	3.9 (3.4-4.5)	NS
Yes	464	88	19.0	(15.4 –22.5)	4.0 (3.2-4.8)	
All*	1341	273	20.4	(18.2 -22.5)	3.9 (3.5-4.3)	
Sex						
Male	660	108	16.4	(13.5 – 19.2	3.1 (2.6-3.7)	<0.001
Female	681	165	24.3	(21.0 –27.4)	4.7 (4.0-5.4)	
Age (in yrs)						
1-4	538	40	7.4	(5.2 – 9.7)	2.5 (1.8-3.3)	<0.001
5-9	803	233	29.0	(25.9-32.2)	4.5 (3.9-5.0)	

Disease Survey

Tribal population of Madhya Pradesh

Of the 23,411 registered individuals from eleven districts, 22,270 (95.1%) were screened for symptoms and 1770 (7.9%) were found to be symptomatic. Sputum was collected from 1703 (96.2%) individuals and 83 were diagnosed to be sputum positive cases on smear and/or culture. The overall prevalence was found to be 390 per 100,000 population .The prevalence increased with age, being 170 in 15-24 year age group to 990 in 55+ year age group. The increase in trend with age was statistically significant ($p<0.001$). The prevalence of bacillary PTB was also significantly higher among males (550/100,000) as compared to females (230/100,000) ($p<0.001$) (Fig 1.1.1).

Fig 1.1.1: Age and sex wise prevalence of tuberculosis among tribal population



Saharia primitive tribe

Of the 11,468 individuals eligible for screening, 11,116 (96.8%) individuals were screened for symptoms. Of these, 1,269 (11.4%) individuals were found to be symptomatic. A total of 166 sputum positive cases were diagnosed from 1248 persons subjected to sputum examination. Overall prevalence was found to be 1,518 per 100,000 population. The prevalence of bacillary PTB was more than double ($p<0.001$) amongst males (2,156 /100,000) compared to females (933/100,000). The prevalence increased with age being 546 per 100,000 in 15-24 year age group to 3,086 in 55+ year age group (Fig 1.1.2). The increase in trend with age was statistically significant ($p<0.001$).

The prevalence among Bharia and Baiga primitive tribal communities has been provisionally estimated to be 4.3 and 1.5 per 1000 respectively (Table 1.1.3).

Fig 1.1.2: Age and sex wise prevalence of tuberculosis among Saharia

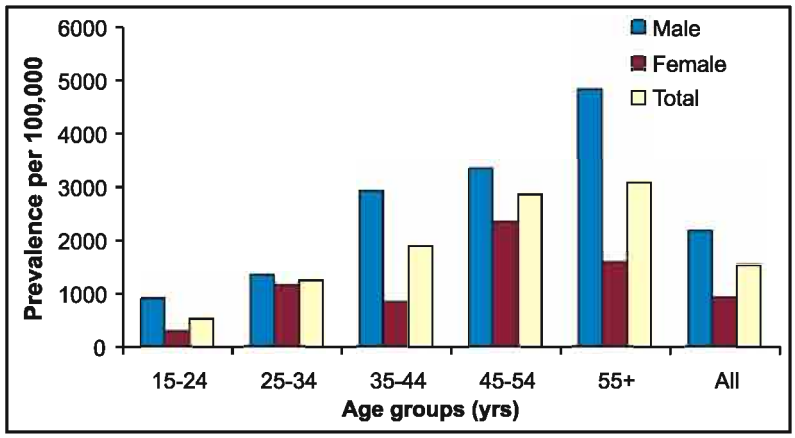


Table 1.1.3. Prevalence of tuberculosis among primitive tribal communities

Tribe	Population covered	Population screened (%)	Symptomatics (%)	Cases diagnosed (sputum +ve)	Prevalence of TB per 100,000 (Provisional)
Saharia	12928	96.6	10.8	166	1518
Bharia	2566	96.3	6.6	06	430
Baiga	2359	97.5	8.4	02	150

Drug susceptibility testing

Drug susceptibility testing is in progress. So far 73 isolates have been tested. One isolate has been found to be MDR (multi drug resistant). Twenty isolates were found resistant to single drug and 6 isolates to two drugs. Forty seven isolates were found sensitive to all the tested drugs (Table 1.1.4).

Table 1.1.4. Drug susceptibility testing of the isolates

Result	Drugs tested			
	Streptomycin	Isoniazide	Rifampicin	Ethambutol
Resistant	15	15	01	01
Sensitive	58	58	72	72

1.2. Prevalence of pulmonary tuberculosis in Jabalpur District of Madhya Pradesh

This is a multi-centric study of Central TB Division, Govt. of India and RMRCT is one of the five sentinel sites in the country. The study is being funded by WHO under Model DOTS project.

Objectives

1. To estimate the prevalence of bacillary tuberculosis in Jabalpur District of Madhya Pradesh among population aged ≥ 15 years.
2. To study the change in prevalence rates on follow-up surveys using same methodology in future at regular intervals of five years.

Methodology

This is a cross sectional study to be carried out in urban as well as rural population of Jabalpur district. Sample size has been estimated to be 90,000 adults aged ≥15 years. The survey methodology includes registration of all individuals and screening of those aged 15 years or more for identification of symptomatics. Two sputum samples, one spot and one over night, will be collected from all symptomatic individuals and those with a history of previous anti-TB treatment. These samples will be brought to the laboratory for smear and culture examination. All diagnosed cases will be referred to the nearest DOTS centre for anti-TB treatment as per the RNTCP guidelines.

Progress

The clusters from the study area have been selected. The laboratory expansion and installation of equipments is completed. The process of staff recruitment and their training / reorientation (both field and lab.) is initiated.

1.3. Molecular Epidemiology of community acquired *Staphylococcus aureus* strains from primitive tribes of Madhya Pradesh

MRSA is a widely prevalent problem in nosocomial infections. Recently it has been proved that community acquired methicillin resistant *S.aureus* (CA-MRSA) is also emerging as an infective agent. The present proposal would like to assess the extent of drug resistance in *S.aureus* especially methicillin among different primitive tribes of M.P. It is assumed that certain risk factors that are present in urban setup may not be present in primitive tribes. The proposal on completion would lead to defining the extent of drug resistance in the tribes.

Methodology

After obtaining the informed consent, nasal swabs are collected from healthy individuals. The samples are inoculated on a selective medium of brain heart infusion (BHI) Agar containing 10% NaCl and 0.01% bromocresol purple as an indicator. *S.aureus* is identified by standard methodology. Antimicrobial susceptibility testing is done by Kirby Baeur disc diffusion method as well as minimum inhibitory concentration (MIC) for oxacillin. Resistance to oxacillin by MIC method is considered as standard for identifying methicillin resistant *S.aureus*.

The multiplex PCR and PFGE are performed for genotyping. The presence of the mecA (gene coding for penicillin binding protein 2A) and femA (factor essential for methicillin resistance) genes are used as internal control for detection of MRSA.

Results

Out of 319 nasal swabs collected from Baiga tribe of Baigachak area, 64 (20%) isolates of *S.aureus* are detected. Of these 31 (48.4%) isolates are resistant to oxacillin by MIC method. This is a very high rate of colonization. Molecular analysis of the strains is in progress.

1.4. Epidemiology of viral hepatitis in tribal populations of Orissa, Madhya Pradesh/Chhatisgarh and Jharkhand

Viral hepatitis is caused by different viruses that belong to different taxonomical families and genera. HAV and HEV are transmitted by fecal-oral route. Mostly, drinking water or consumption of food contaminated with sewage water results in local outbreaks and epidemics. HBV and HCV are blood-borne viruses and the transmission occurs through contaminated blood, blood products and through improperly sterilized needles/syringes. HBV can also be transmitted through sexual routes. HDV is a defective virus needing active HBV replication for its multiplication. Thus, the spread of this virus is restricted to individuals with active HBV replication. HDV infection leads to a severe liver disease(s). The prevalence of these viruses in tribal areas of India mostly remains unknown. The present study would assess the prevalence of these viruses and the risk factors for transmission among primitive tribal communities of Madhya Pradesh and Chhattisgarh. The generated sero and molecular epidemiological data would help in designing appropriate control strategies.

Objectives

1. To determine the prevalence of antibodies to hepatitis A and hepatitis E viruses.
2. To determine the prevalence of hepatitis B, C and delta viruses.
3. To assess the risk factors for transmission of hepatitis viruses.
4. To determine the circulating genotypes of HBV & HCV and prevalence of pre-core and basal core promoter mutants of HBV.

Methodology

The study is an ICMR task force study being undertaken among primitive tribal communities in different parts of the country. The primitive tribal communities in Madhya Pradesh and Chhattisgarh are being covered by the centre. These are Baigas, Bharias, Saharias in Madhya Pradesh and Abujhmarias, Hill Korwas, Kamars and Birhors in Chhattisgarh.

The study methodology involves collection of demographic and socio-cultural information from the households and information on risk factors from the study individuals. The blood samples are collected from the study population; plasma/serum is separated on site, aliquoted and transported to the laboratory maintaining the cold chain. The samples are examined for hepatitis markers using different ELISAs for detecting Anti-HAV, HBsAg, Anti-HBc, HBeAg, Anti-HBe, HDV and Anti-HEV. All serum specimens are being screened for Anti-HCV using a third generation enzyme immunoassay. PCR will be employed to detect HBV DNA and for genotyping. HCV RNA detection and genotyping will be done using real time PCR method.

Results

A total of 1247 blood samples from different primitive tribes have been collected so far. Seroprevalence of hepatitis markers is shown in Table 1.4.1. Tribe-wise prevalence on the basis of samples tested so far is as under:

Abujhmaria: Out of 66 samples collected, 62 were found to be positive for anti HAV antibodies (94%). Three samples were found positive for anti-HCV antibodies (5%). Of the 4 HBsAg positive, real time PCR detected HBV DNA in all four samples.

Kamar: The prevalence of HAV antibodies was 96% in this tribe. The prevalence of anti-HEV was 36%. The prevalence of HBsAg and anti HBs was found to be 3% and 5% respectively. The prevalence of anti HCV was 7%. Out of 8 HBsAg positive samples 5 were studied by Real time PCR to determine HBV DNA and it was found in 3 samples.

Baiga: The prevalence of HBsAg and anti HBs was found to be 5% and 11% respectively. The prevalence of anti HCV was 7%. The Anti HAV positivity has been found to be 100%. Three HBsAg positive samples were studied by Real time PCR to determine HBV DNA and found HBV DNA in only one sample. The prevalence of anti-HEV was 59%.

Saharia: Of the 173 blood samples collected so far, the prevalence of HBsAg and anti HBs was found to be 5% and 33% respectively. The prevalence of anti HCV was 1%. Anti HAV antibodies were present in 165 samples (99%). The prevalence of anti HEV was found to be 40%. Four samples were positive by Real time PCR for HBV DNA.

Bharia: A total of 247 blood samples have been collected. Anti HAV antibodies were present in 223 samples (96%). Twelve samples were found positive for HBsAg (5%) and twenty for anti HBs (8%). Sixty five percent samples were found to be positive for anti HEV. A total of 235 samples were tested for anti HCV out of which 35 samples were positive (15%). The HBV DNA were found in 10 samples.

Birhor: A total of 247 blood samples have been collected. Ninty five percent samples were found positive for Anti-HAV. While the prevalence of HBsAg and anti-HBs was found to be 5% and 6% respectively. A total of 240 samples were tested for anti HEV out of which 141 samples were positive (59%). The prevalence of anti-HCV was 6%.

Hillkorwa: A total of 158 blood samples have been collected. 98% samples were found positive for Anti-HAV. The prevalence of HBsAg and anti-HBs was found to be 15% and 7% respectively. Out of 117 anti HEV antibodies were present in 45 samples (38%). The prevalence of anti-HCV was 6%.

The prevalence of hepatitis B (7%) and C (8%) was higher in 20-50yrs age group (Fig 1.4.1). Twenty four serum samples were studied by PCR to determine viral genotypes. Determination of HBV genotypes showed that in our study population genotype D was the most prevalent genotype.

The study is in progress

Fig 1.4.1. Age-wise distribution of hepatitis markers

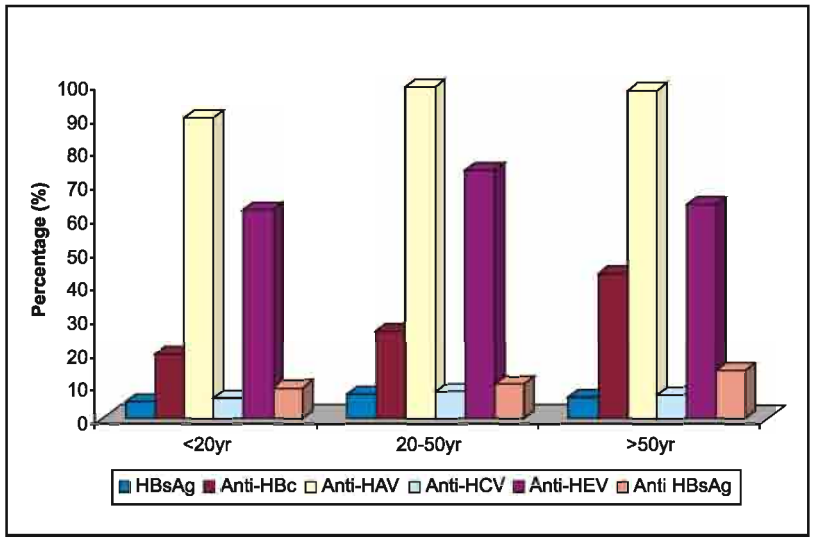


Table 1.4.1: Seroprevalence of viral hepatitis

	Percent positive & (n=tested)							
Name of the tribe	HBsAg	Anti HBs	Anti HBc	HBeAg	Anti HAV	Anti HCV	HBV DNA	Anti HEV
Abujhmaria (66)	10% (61)	16% (61)	25% (64)	NT	94% (66)	5% (66)	100% (4)	NT
Baiga (105)	5% (81)	11% (74)	47% (74)	NT	100% (74)	7% (76)	33% (3)	59% (69)
Sahariya (173)	5% (167)	33% (155)	59% (169)	9% (11)	99% (167)	1% (167)	50% (8)	40% (168)
Kamar (251)	3% (250)	5% (244)	13% (210)	0% (6)	96% (246)	7% (236)	60% (5)	36% (241)
Bharia (247)	5% (242)	8% (239)	29% (231)	25% (12)	96% (233)	15% (235)	91% (11)	65% (228)
Birhor (247)	5% (244)	6% (244)	19% (238)	NT	95% (240)	6%* (240)	NT	59% (240)
Hillkorwa (158)	15%* (158)	7% (154)	17% (156)	NT	98% (157)	6%* (121)	NT	38% (117)

* Initially reactive

2. VECTOR BORNE DISEASES

2.1. Preparation of field site for malaria vaccine trial in and around Jabalpur

The study has four major arms and progress of work done under immunoepidemiology and molecular biology component of the study are as under.

A. Immunoepidemiology study

Objectives

The objectives of immunoepidemiologic arm of the study are

1. To characterize immune response to specific *P. vivax* and *P falciparum* antigens/epitopes in children and adults naturally exposed to malaria.
2. Study the development and maintenance of immune responses in different age groups with emphasis on infants, their older siblings and their mothers, including identification of epitopes that correlate with protection.
3. Determine the role of stage specific antigens in the development and maintenance of natural immunity to malaria.
4. Evaluate the immune mechanisms that are involved in pathogenesis of malaria, especially anemia, cerebral malaria and placental malaria.

Under immunologic component thirteen synthetic peptides represented B and/or T cell epitopes from conserved and semi-conserved regions of *P. falciparum* and *P. vivax* asexual/sexual blood stages were obtained from Malaria Vaccine Section, CDC, Atlanta, GA. ELISA protocols for the antibody determination have been optimized. The optimum concentration of peptides for solid phase absorption at a final concentration of 10 µg/ml was determined for screening sera. Sixteen known positive and 10 negative sera (NE-HC) were tested for antimalarial IgG antibody against seven *P. falciparum* and six *P. vivax* stage-specific peptides to obtain titration profile.

We have tested 113 siblings, 198 adults and 600 pregnant women for antibodies. Age-wise increase in IgG level has been observed (Fig 2.1.1 & 2.1.2). Seropositivity rate was significantly higher in older children (5 -<15 year) and adult subjects than younger children (1 - <5 yr).

Fig 2.1.1. Responder frequency to *P.falciparum* Antigens

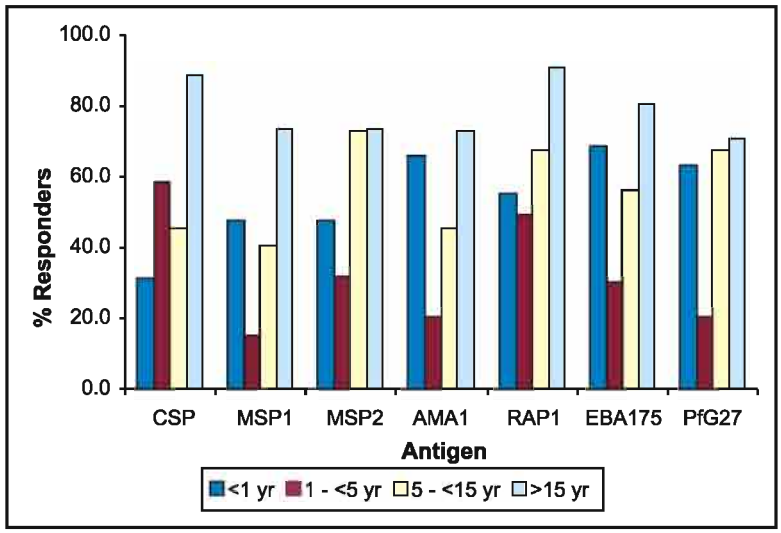
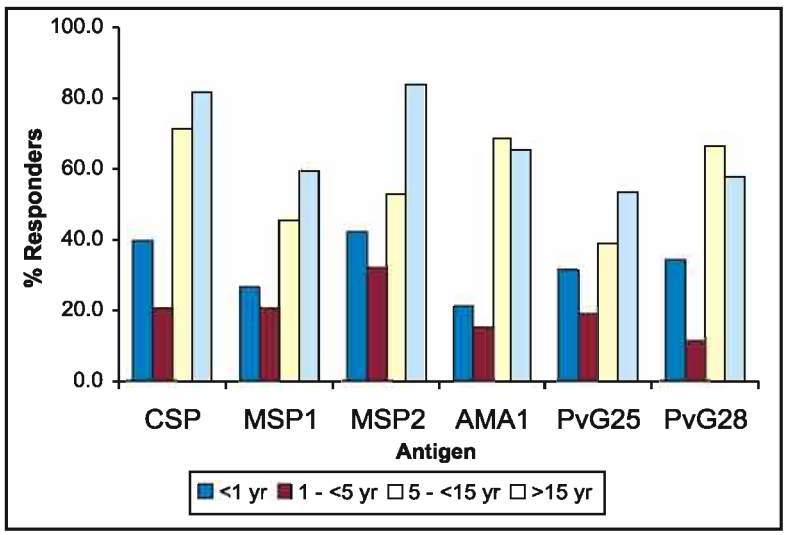


Fig 2.1.2. Responder frequency to *P. vivax* Antigens



The enrolled pregnant women were divided gravida-wise into three categories: primigravida (n=180), secundigravida (n=186) and multigravida (n=234). Results of the antibody responses of three groups against individual peptides were compared. No significant differences have been observed between pregnant women of different gravida.

Blood samples collected from a group of 149 malaria parasites positive (79 *P. falciparum* and 70 *P. vivax*) patients in hospital based study were tested for determination of antibodies to species and stage-specific peptides. Proportionate sizes of malaria negative subjects (n=50) were also taken for comparison. Seroprevalence was more in parasite positive cases (Fig 2.1.3 & 2.1.4).

Fig 2.1.3. Seroprevalence with *P.falciparum* Antigens

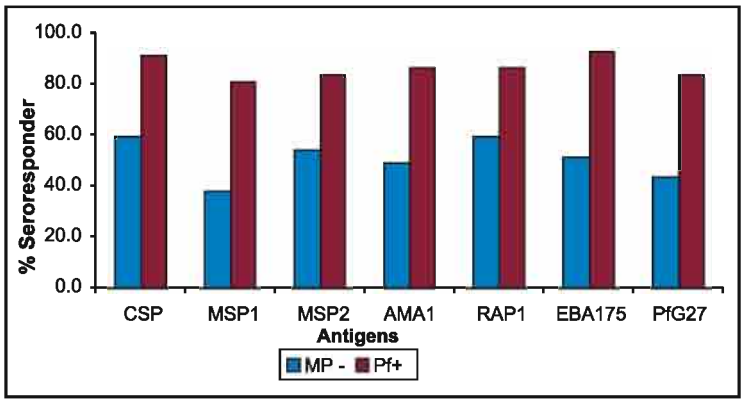
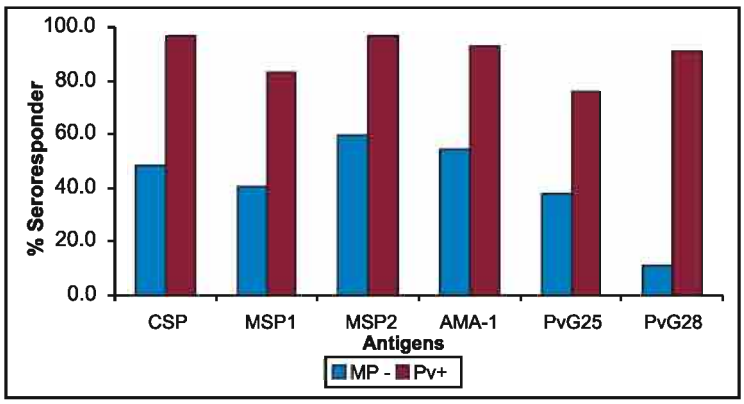


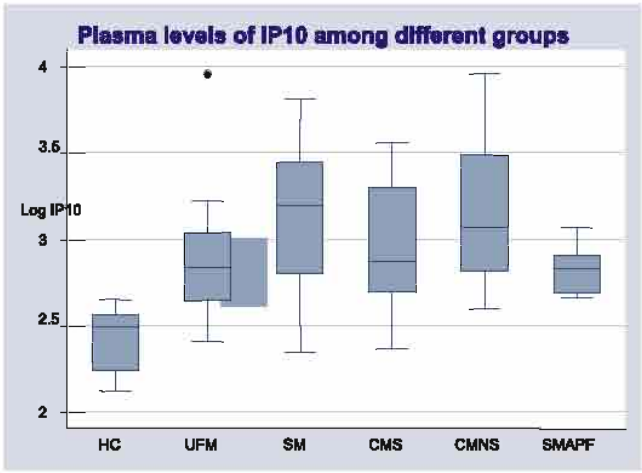
Fig 2.1.4. Seroprevalence with *P.vivax* Antigens

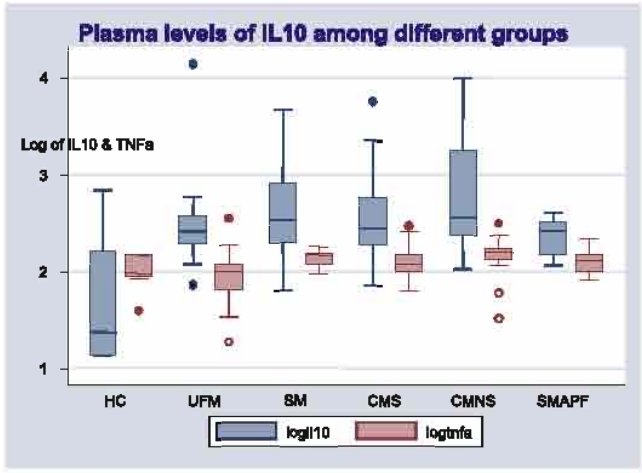


Cytokines estimation: Four categories of patients were identified: uncomplicated *falciparum* malaria, cerebral malaria, cerebral malaria non survivors, severe malaria and severe malaria anaemia. For this study, we used plasma of 35 healthy controls (HC), 53 uncomplicated *P falciparum* malaria (UFM), 52 cerebral malaria (CM), cerebral malaria non survivors 16, severe malaria anemia (SMA) 24 and 26 severe malaria (SM) cases with other complications. Cytokines like IL-10, IP-10, and TNF-α level were estimated in plasma

using commercially developed two-site ELISA assay kits (R and D system). Our results revealed that IP-10, which is a proinflammatory chemokine, progressively increased with the disease severity. Its plasma levels were found to be significantly elevated during malaria illness compared to HC; with highest levels found among CM cases followed by SM, SMA and UFM and lowest levels among HC subjects (Fig 2.1.5). The levels of TNF-α were also increased with the severity of disease. In comparison to HC both were elevated among the severe cases of malaria. In our study IL-10 was low among the HC subjects but in patients it got up-regulated during the disease severity; in the SMA.

Fig 2.1.5. Plasma levels of IP10 and IL10 among different groups

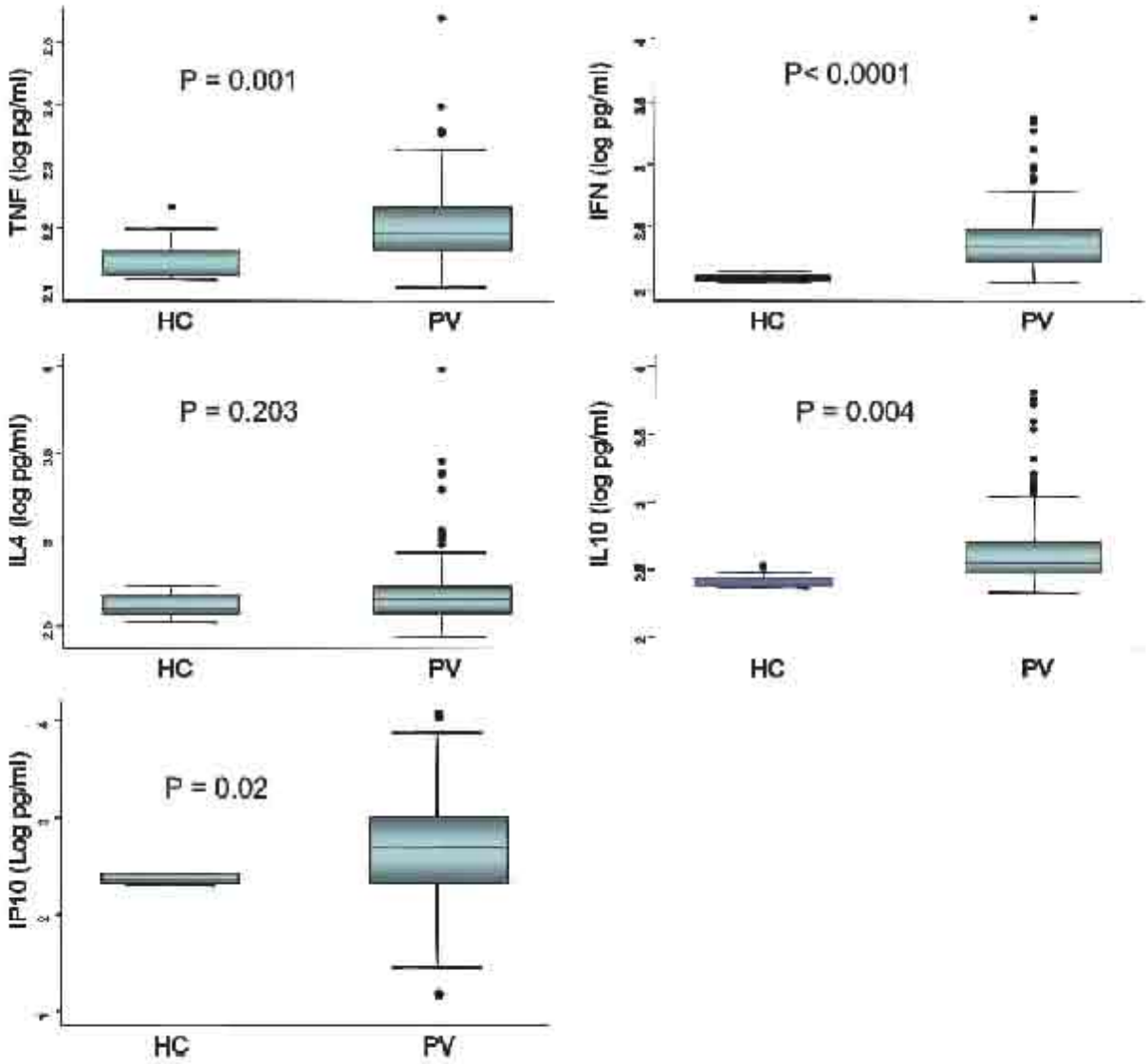




Cytokine in *P.vivax* infection

In this study we have evaluated plasma levels of IP-10, TNF-α, IFN-g, IL-10 and IL-4 among 173 *P vivax* cases and 34 HC (20 for IP10 and rest for others). Overall except IL-4 all other cytokines were found significantly raised among diseased groups compared to HC (Fig 2.1.6).

Fig 2.1.6. Cytokine in *P.vivax* infection



B. Molecular Biology

Objectives

The objectives of molecular biology arm of the study are

1. To determine the nature and extent of polymorphisms in *Plasmodium vivax* CSP (vaccine candidate antigen) gene.
2. To determine the prevalence of *Plasmodium falciparum* chloroquine resistant (pfcrt) mutant among the population.
3. To determine the nature and degree of polymorphism in merozoite surface proteins of *Plasmodium falciparum*.

DNA Sequencing of *P.vivax* CSP gene

Sequences of 40 samples were analyzed and compared to a reference sequence obtained from GenBank **(M11926 & J04090)**. All the sequences were found to be of VK210 type. This was confirmed by the presence of the nonapeptide repeat sequence GDRA (A/D)GQPA in the aminoacid sequences. Detailed analysis of the sequences suggests that the presence of 5 different variants of the VK 210 at the amino acid level. Variant type I is prevalent (64.5%) among the all 5 variant followed by type II (27.5%) and rest three were in minority (Fig 2.1.7 & 2.1.8).

DNA Sequencing of *P.falciparum Pfcrt* gene

The *Pfcrt* gene of *P.falciparum* isolates were partially sequenced to study the rate of mutation at various codons that have previously been shown to be associated with chloroquinine resistance , that is codon 72,73,74,75,76 & 220 of *Pfcrt.* The overall double mutant at position 72 C S & 76 K T (SVMNT) were found dominant (60%) followed by wild type mutant CVMNK (38%). We also found triple mutation in the position 74 M-I, 75 N-E & 76 K-T (CVIET) 2% (Fig 2.1.9 & Fig 2.1.10).

Fig 2.1.7. Alignment of amino acid sequences of the repeat region of Pvcsp (5 different isolates)

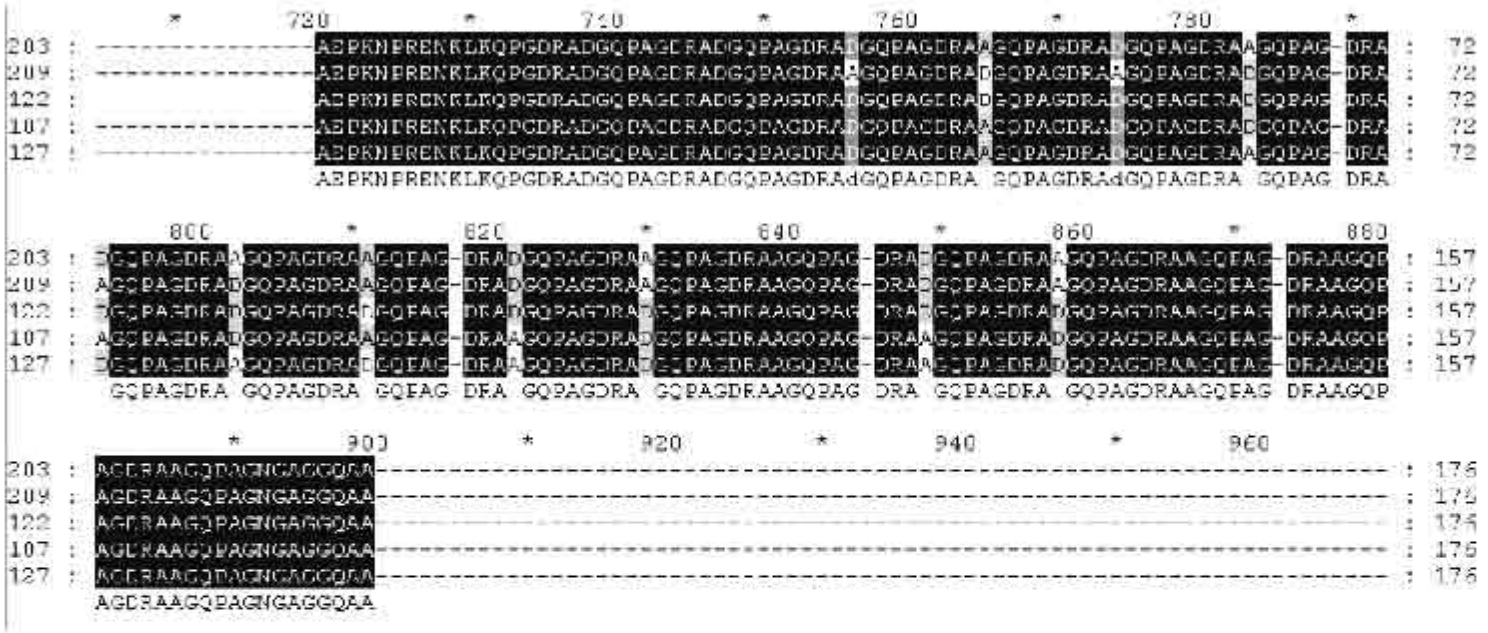


Fig 2.1.8. Electrophorogram of VK 210 showing the nucleotide sequence

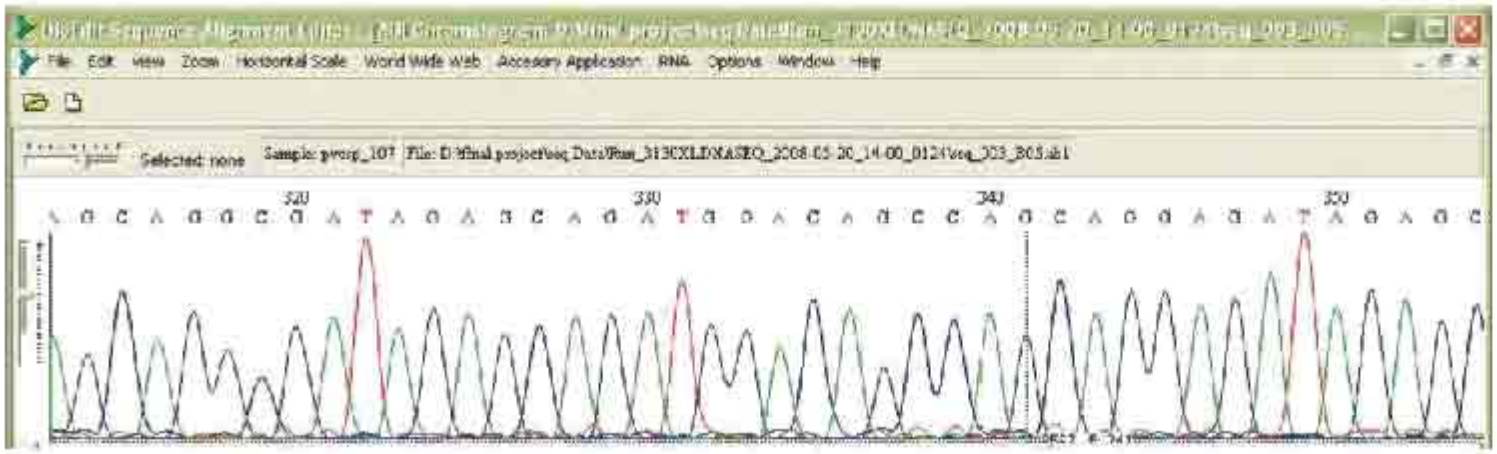


Fig. 2.1.9. Prevalence of *Pfcrt* haplotypes

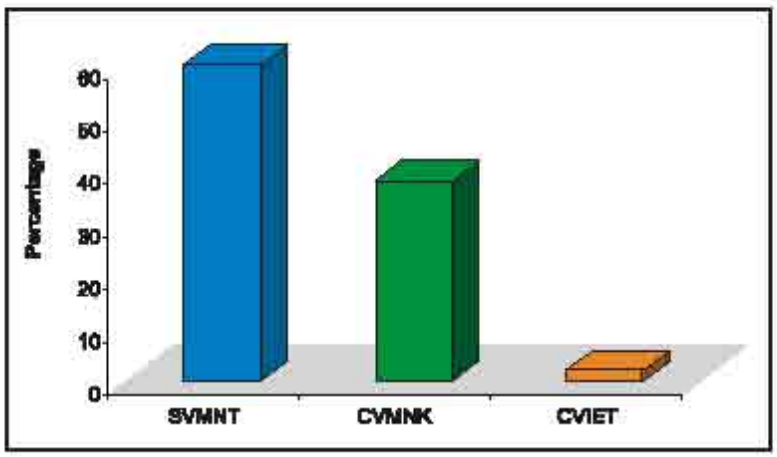
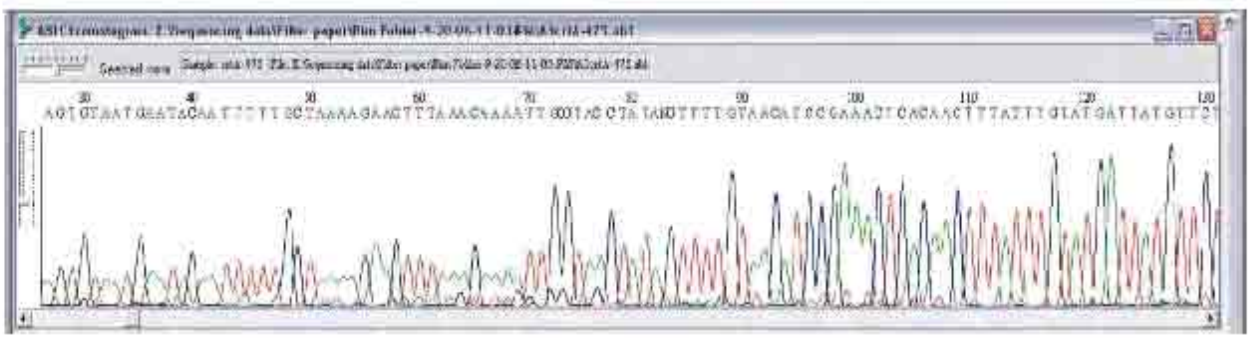


Fig. 2.1.10. Electrophogram of *Plasmodium falciparum* chloroquine resistance transporter gene. Decoding SVMNT heplotype in *crt* gene of *Plasmodium falciparum* isolates



DNA Sequencing of *P.falciparum* Merozoite surface proteins1

555 bp polymorphic region of block 2, merozoite surface protein 1 gene was amplified. A total of 322 *P. falciparum* infected blood samples were used for the amplification and sequencing of merozoite surface protein 1, block 2. The overall allelic prevalence was observed higher in K1 (43 %) followed by MAD20 (35%) and RO33 (22%) (Fig 2.1.11). In the block 2 of MSP1, the nucleotide and the deduced amino acid sequence were found to be highly polymorphic among the isolates (Fig 2.1.13).

DNA Sequencing of *P.falciparum* Merozoite surface proteins2

634 bp, polymorphic central repeat region of merozoite surface protein 2 gene was amplified. A total of 322 *P. falciparum* infected blood samples were used for the sequencing of central repeat region, merozoite surface protein 2. The overall allelic prevalence was observed higher in FC27 (72 %) as compared to 3D7 (28%) (Fig 2.1.12). In the central repeat region of MSP2, the nucleotide and the deduced amino acid sequence were found to be highly polymorphic among the isolates (Fig 2.1.14).

Fig. 2.1.11. Allelic prevalence of MSP 1

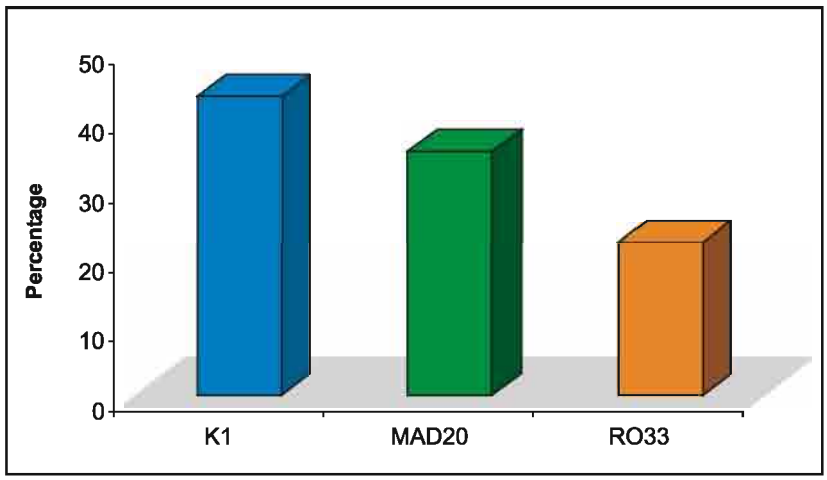


Fig. 2.1.12 Allelic prevalence of MSP 2

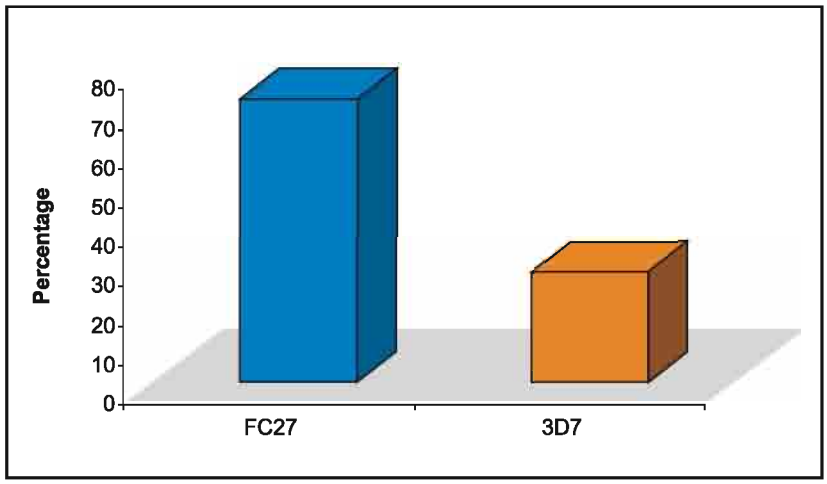


Fig. 2.1.13. Amino acid alignment of K1 like Allele Family (MSP1)

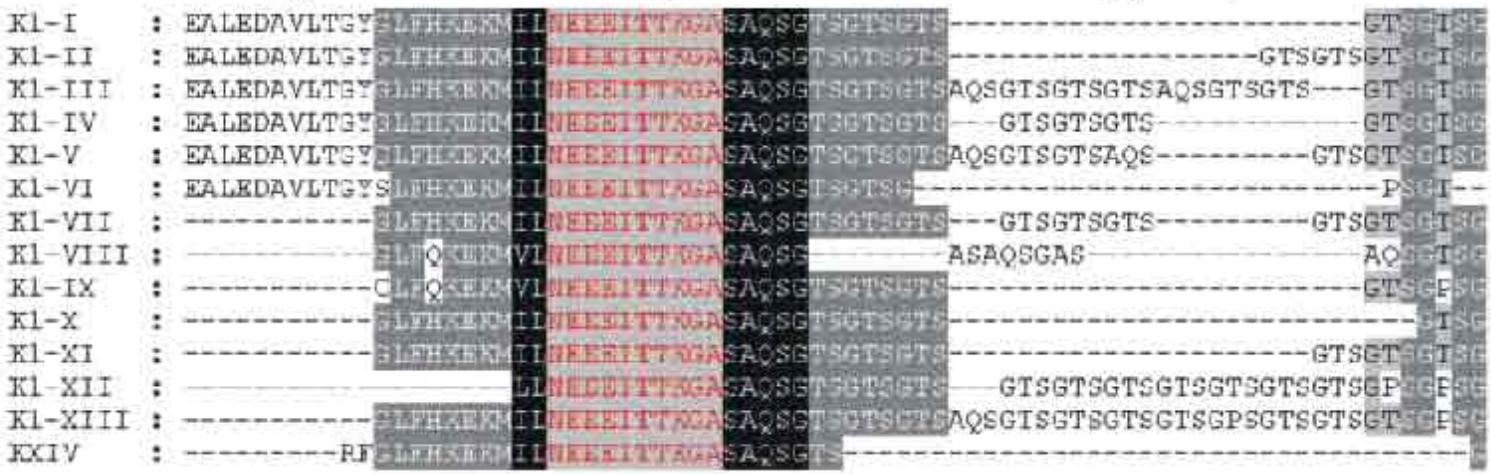
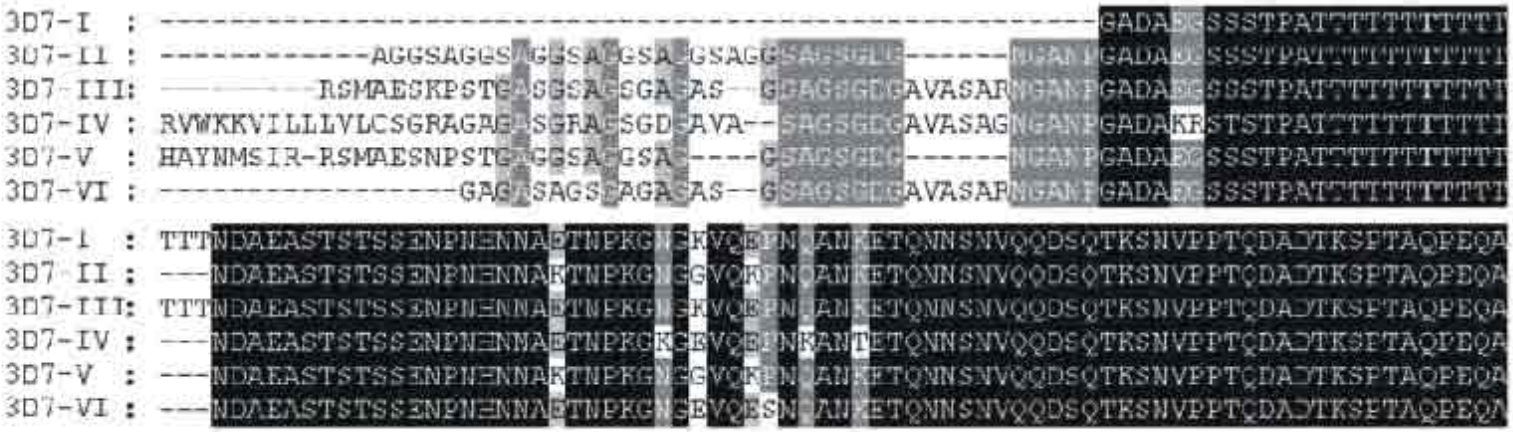


Fig 2.1.14. Amino acid alignment of 3D7 ALLELIC FAMILY OF MSP2



Socio-economic and household risk factors of malaria in tribal areas of Madhya Pradesh

This study is a part of ongoing research project on 'Preparation of a field site for malaria vaccine trial in and around Jabalpur'.

Objective

The main objective of this study was to assess the association of socio-demographic, socio-economic and household behavioural factors with malaria in tribal dominated rural areas in Madhya Pradesh.

Methodology

The study site is Bargi block of Jabalpur district. The baseline household census was carried out during May 2005 to December 2005 to establish study cohort - by collecting socio-economic and demographic information of all individuals in the study area. The study has two major components, viz. cohort study and community based fever surveys. Cohort study include all pregnant women, their husband, infant and siblings and these are followed for three years or till woman become pregnant for next time or withdraw from the study. A routine fortnightly fever survey is conducted in all villages to access the prevalence of malaria infections in the community. For this study the cut off date for fever survey was 30th June 2008, i.e. it extract information from all fever surveys conducted upto 30th June 2008 and similarly all pregnant women enrolled upto this date. All 62 villages of Bargi block were covered in the study and these villages comprised 7117 households with an average family size of 4.97 members. The ethnic tribe 'Gond' is living with other socio-economically backward castes in this area. Main source of livelihood of these poor peoples is agriculture related activities, animal husbandry and manual labour. Illiteracy is vastly prevalent with poor health infrastructure.

Data and its Analysis

Locally designed software in ADO.NET is used for data entry. The system is developed based on the MS-SQL 2000. Later, the data was transferred to SPSS-12.0

statistical software package (SPSS, Chicago, USA). Unadjusted (univariate) and adjusted with their 95% confidence intervals (CI) were calculated to access the relationship of socio-demographic and socio-economic variables with the malaria prevalence. The logistic regression technique was used and a P value of ≤0.05 was considered for statistical significance.

The socio-demographic, socio-economic and behavioural risk factors of malaria were divided in three broad groups, viz. characteristics of head of household, housing characteristics and behavioural factors.

Principal Component Analysis (PCA) technique was used to compute assets based index to discriminate households in assets ownership. The component coefficient score (weight) were obtained using the unrotated principal components. Then households were ranked according to the asset index scores, and divided in five quintiles of equal size (approximately 20 percent each).

Asset index and quintiles

Overall 30 variables were used in PCA analysis and the details of these variables are given in Table 2.1.1. Analyses of the asset index revealed that overall out of 7117 households in study, 1430 household were categorized as most poor, 1441 as more poor, 1389 as poor, 1434 as less poor and 1423 as least poor. The value of index varies from -1.02 to 7.47 with mean value as 0 and standard deviation as 1. Most of the asset items are positively associated with PCA score and only six out of total thirty variables were negatively associated. However, the magnitude of PCA score for many of these assets was very small.

Table 2.1.1. Proportion of households owned different asset items, their weight and impact on PCA score

Asset Items	Proportion of household owing asset						PCA scores
	Most Poor	More Poor	Poor	Less Poor	Least Poor	Total	
Bicycle	0.11	0.28	0.46	0.63	0.72	0.44	0.09
Moped /Scooter	0.00	0.00	0.01	0.01	0.08	0.02	0.06
Motorcycle	0.00	0.00	0.00	0.00	0.13	0.03	0.13
Room Cooler	0.00	0.00	0.00	0.00	0.06	0.01	0.10
Radio	0.00	0.02	0.07	0.11	0.26	0.09	0.08
Colour TV	0.00	0.00	0.00	0.02	0.13	0.03	0.10
BW TV	0.00	0.02	0.05	0.13	0.37	0.11	0.12
Fan	0.00	0.00	0.01	0.07	0.49	0.11	0.17
Bullock Cart	0.00	0.00	0.00	0.01	0.03	0.01	0.04
Cow	0.15	0.44	0.56	0.66	0.69	0.50	0.07
Buffalo	0.00	0.04	0.08	0.17	0.31	0.12	0.08
Bullock	0.04	0.29	0.44	0.56	0.55	0.38	0.07
Goat	0.09	0.10	0.10	0.10	0.07	0.09	-0.01
Type of Roof							
Cemented / Concrete	0.00	0.00	0.00	0.00	0.16	0.03	0.15
Others (mud/sheets/thatch)	0.00	0.00	0.00	0.01	0.03	0.01	0.04
Tiles	1.00	1.00	1.00	0.99	0.81	0.96	-0.15
Type of Walls							
Brick cemented	0.00	0.00	0.00	0.03	0.23	0.05	0.15
Dung & Earth	0.99	0.65	0.52	0.36	0.22	0.55	-0.12
Mud Bricks	0.00	0.34	0.48	0.60	0.54	0.39	0.05
Other (Thatch/sheet/wood)	0.01	0.01	0.01	0.01	0.01	0.01	-0.01
Source of Water							
Hand pump in house	0.00	0.00	0.01	0.01	0.08	0.02	0.06
Well in house	0.00	0.00	0.01	0.02	0.07	0.02	0.04
Public hand pump	0.89	0.83	0.67	0.59	0.50	0.70	-0.08
Public well	0.08	0.12	0.27	0.30	0.25	0.20	0.03
River/Canal/Spring	0.02	0.03	0.02	0.02	0.01	0.02	-0.01
Tap water supply	0.00	0.02	0.03	0.05	0.10	0.04	0.06
LPG, Biogas, Kerosene	0.00	0.00	0.00	0.00	0.04	0.01	0.09
Agricultural Land	0.10	0.29	0.57	0.77	0.83	0.51	0.11
Owing Irrigated Land	0.00	0.00	0.00	0.05	0.35	0.08	0.14
Growing Cash Crop	0.00	0.02	0.09	0.26	0.50	0.17	0.12
N	1430	1441	1389	1434	1423	7117	

Note: $ Impact of change from 0 to 1 for each item (weight/standard deviation)

Only very few households from most poor, more poor and poor quintiles owned items like moped/scooter, motorcycle, room cooler, radio, color TV, black & white TV, fan, bullock cart, cow, buffalo, agricultural land, irrigated land, cultivation of cash crop. Most of the houses in study area have mud brick or mud/dung walls, and tiles made roof. Public hand pump is the main source of drinking water for these households and woods as the main source for cooking fuel (Table 2.1.1).

Association of household head's characteristics with malaria

Head's age demonstrated a negative effect, indicating that younger heads had more chances of finding a patient in the household. A household with 30 years old or younger head had about 1.9 times more chances to have a malaria patient at household as compared to a household with 60 year or older heads. Illitearte head of household were more to have a malaria case in household. Similarly, occupation of household head had significant impact of malaria occurrence. Households with labourer head had significantly more chances of having malaria cases as compared to households with salaried/business man as head. The scheduled tribes (ST) households had significantly more malaria cases, a scheduled tribe household, if other things remains unchanged, was about 1.7 times more to have a malaria case as compared to other castes (mainly other backward classes) households. Crowding at household (family size) was also significantly associated with malaria, even when controlled for other characteristics of head (Table 2.1.2).

Association of housing characteristics with malaria

A source of drinking water within household also lowers the risk of malaria. Households using woods and dung cakes as cooking fuel were significantly more to have malaria cases. Mere having agricultural land doesn't make any difference between household having malaria and not having malaria. Cash crop cultivators significantly had more chances of having a malaria patient in households. The households from poorest quintile of asset index had lesser chances as compared to richest households to have malaria, whereas households from more poor, poor, less poor groups had relatively more chances of malaria (Table 2.1.3).

Table 2.1.2. Some characteristics of head of household and their association with malaria

Variables	N	% of sample	Odd Ratio (95% CI) Unadjusted
Age (in years)			
≤ 30yrs	1430	20.1	1.9 (1.5-2.5)*
31-40	2240	31.5	2.3 (1.8-2.9)*
41-50	4696	23.8	1.8 (1.4-2.3)*
51-60	994	14.0	1.6 (1.2-2.2)*
60+ R	757	10.6	1
Education (completed grade)			
No Schooling	3543	49.8	1.3 (1.1-1.5)*
Primary	2301	32.3	1.1 (0.9-1.3)
Secondary+ R	1273	17.9	1
Occupation			
No work	518	7.3	1.1 (0.7-1.5)
Cultivator	2177	30.6	1.7 (1.3-2.2)*
Labourer	3853	54.1	2.0 (1.5-2.6)*
Business/Salaried R	569	8.0	1
Caste			
Others R	2803	42.2	1
SC	653	9.2	1.0 (0.8-1.3)
ST	3458	48.6	1.7 (1.5-1.9)*
Family Size (no. of members)			
≤ 3 R	1584	22.3	1
4 – 5	3028	42.5	2.6 (2.2-3.2)*
≥ 6	2505	35.2	4.6 (3.7-5.6)*
Total	7117	100.0	

Note: R = Reference categories. * =Statistical significant (p ≤ 0.05).

Association of household behavioural factors with malaria

Household behavioural variables such as mixed dwelling, place of sleeping of household members and use of mosquito nets or other preventive means for malaria also have significant impact on malaria. However, the mixed dwelling loosed its significance in presence of other behavioural variables. Sleeping outside house and no use of bed nets or

any other preventive means, substantially increase the risk of malaria at household level (Table 2.1.4).

Table 2.1.3. Housing characteristics and their association with malaria

Variables	N	% of sample	Odd Ratio (95% CI) Unadjusted
Type of Roof			
Others [R]	282	4.0	1
Tiles	6835	96.0	1.7 (1.2-2.4)*
Type of Walls			
Mud Bricks [R]	3157	44.4	1
Dung & Earthen	3960	55.6	1.3 (1.2-1.5)*
Water sources			
Outside house	6548	92.0	2.6 (1.3-9.9)*
Within house [R]	569	8.0	1
Type of fuel use for cooking			
Wood/Dung	7055	99.1	3.6 (1.3-9.9)*
LPG/B-gas/Ker/Char) [R]	62	0.9	1
Have Ag. Land			
No	3483	48.9	1.0 (0.9-3.1)
Yes [R]	3634	51.1	1
Have Irrigated land			
No	6547	92.0	2.4 (1.8-3.1)*
Yes [R]	570	8.0	1
Cash Crop			
No [R]	5891	82.8	1
Yes	1226	17.2	1.0 (0.9-1.2)
Wealth Index			
Most poor	1430	20.1	1.4 (1.1-1.7)*
More poor	1441	20.2	1.7 (1.4-2.1)*
Poor	1389	19.5	1.9 (1.5-2.3)*
Less poor	1434	20.1	1.6 (1.3-2.0)*
Least poor [R]	1423	20.0	1
Total	7117	100.0	

Note: R = Reference categories. *= Statistical significant ($p \leq 0.05$)

Table 2.1.4. Household behavioural indicators and their association with malaria

Variable	N	% of sample	Odd Ratio (95% CI)
			Univariate
Animals co-reside inside house			
No [R]	4516	63.5	1
Yes	2601	36.5	1.0 (0.9-1.2)
Place of night sleeping$			
Outside room	4195	58.9	1.7 (1.5-1.9)*
Inside room [R]	2861	40.2	1
Use any mean to prevent mosquito bite			
None	336	4.7	1.6 (1.1-2.3)*
Leaf/Smoke	6161	86.6	1.6 (1.3-2.0)*
Bed Net/Mosquito Coil [R]	620	8.7	1
Total	7117	100.0	

2.2. *Aedes aegypti* pupal demographic survey and dengue virus activity in Barela Town of Jabalpur

Dengue is one of the crucial vector borne infection. There is no treatment available for the dengue. Reducing vector population in household water containers remains an important strategy for reducing the transmission of disease. One of the major risk factor for dengue infection is the ratio of *Aedes aegypti* female adult to human population in a given area. Accurate assessment of abundance of adult vector population to human population is not possible in the field condition. Abundance of adult vector population is directly correlated to pupal population as they are feasible to locate and count. Further only certain type of containers support pupal growth which differs from area to area. Hence pupal demographic survey is important to assess risk factors. During 2007 there has been an outbreak of dengue in Jabalpur city and adjoining semi urban town of Barela. Therefore entomological surveillance has been carried out to find out stegomyia indices and the key containers that support pupation and to estimate the ratio of *Aedes aegypti* pupa to human population in semi urban town of Barela.

Objectives

1. To identify the most productive containers which support population of *Aedes aegypti* in semi-urban and urban settings.
2. To estimate *Aedes aegypti* pupa per person in semi-urban.
3. To study dengue virus activity in the semi-urban and urban settings.

Methodology

Barela is a small town under the Jabalpur tehsil located 20 Km. from Jabalpur city. The population of the town is about 11000 living in 15 administratively divided wards. More than 90% of water supply is from municipality water works. Entomological survey was carried out in wet season i.e. during August and September. Households in the town were surveyed for the presence of water filled containers and the presence of *Aedes aegypti* immature with the help of Torch. The pupa was collected by straining the container with

sieve and resuspending the sieve in white enamel bowl with little water and pupae were accurately counted.

Blood samples were collected by door to door survey in Barela town and from OPD of medicine department of Medical College Hospital, Jabalpur during September to October 2008. Samples were tested using First response test (Dengue IgG /IgM antibody test).

Results

Overall 362 households with a population of 1954 were surveyed. In these houses 1467 water filled containers were examined. Sixty seven houses with 78 containers were recorded infested with *Aedes aegypti* in immature stages. House, Breteau and Container index (HI, BI &CI) of 18.5, 21.5 and 5.3 were computed. These indices were much higher than same indices recorded in Jabalpur city in the preceding years

Breeding Habitats: Examined water filled containers were classified in 13 categories. Among these 12 were found to support vector breeding. Cement tanks followed by cement cisterns and mud pots were the most preferred breeding habitats with 12.4, 9.0 and 6.4% containers recorded positive for *Aedes aegypti* breeding respectively (Fig 2.2.1).

Pupal population: Among the infested containers 36% were having standing crop of pupa. In all 2265 pupa were collected from 25 infested containers. Over 51% of standing pupal crop was recorded from Cement tanks, followed by 30% in mud pots. Overall pupal index (PI) was 623.

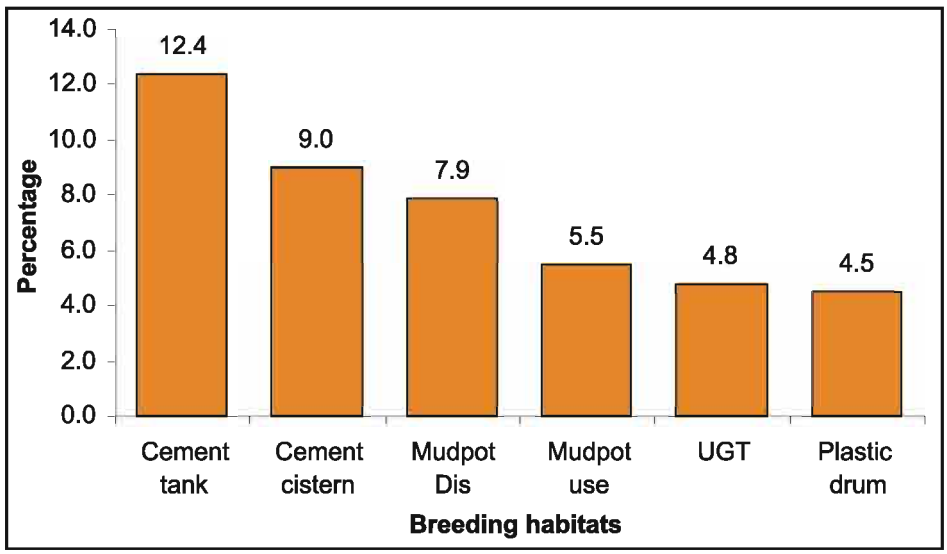
Per Man-Pupal ratio: Overall population of surveyed houses was 1954. Average household size was 5.39 ± 2.0. Ratio of per man/*Aedes aegypti* pupa was 1:1.15. The ratio varies with the household size (Table 2.2.1).

Virus activity: Intravenous blood samples of sixteen OPD patient referred by Medical specialist of Medical College hospital and four samples collected from Barela by door to door survey were tested. All were negative for Dengue IgG /IgM antibody.

Table 2.2.1. Household size wise per man pupal count and entomological indices in Barela town

Household size	No. exam	Population	No. pupa collected	Per man pupal count	HI	BI	CI	PI
1-3	57	145	690	4.75	22.8	28.1	7.2	1210
4-7	258	1371	1510	1.1	19.1	22.3	5.6	585
8 &above	47	438	65	0.14	14.1	14.1	3.3	138
Total	362	1954	2265	1.15	18.5	21.5	5.3	623

Fig 2.2.1. Major breeding habitats in Barela

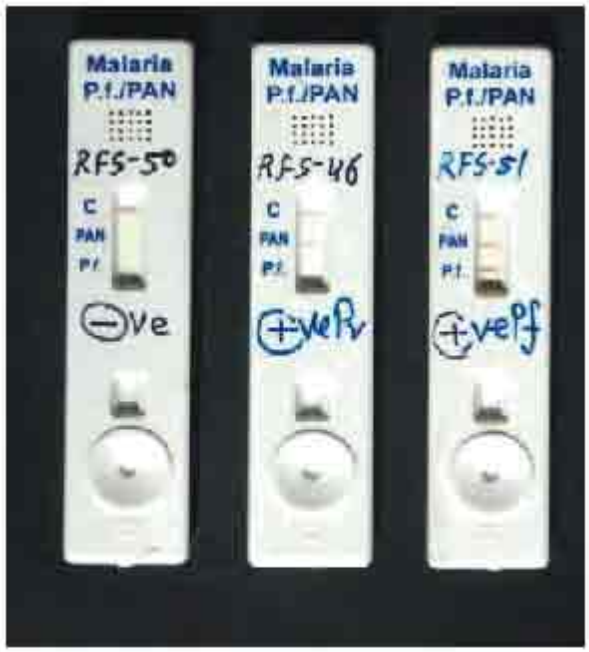


2.3. Evaluation of rapid diagnostic test vs. traditional and molecular techniques for malaria

This project was undertaken on the request of WHO Country office. Thailand has developed a new rapid diagnostic test (RDT) kit for differential diagnosis of *Plasmodium* species. WR India wants us to evaluate the kit for its usefulness in the field and hospital. The Study has been initiated for the sensitivity and specificity of RDT kits in comparison with microscopy as Gold standard for diagnosis of *Plasmodium falciparum* and non *falciparum* malaria as per WHO standard protocol. A total of 389 patients having fever were tested with RDT in parallel with microscopy in field of which 174 were found malaria positive (36Pv and 138 Pf) while microscopy detected 146 positive (32 Pv and 114 Pf). A questionnaire concerning age, sex, medication and malaria associated symptoms were filled at the time of survey. Three or four drops of blood were also collected in heparinized microfuse tubes for PCR to be conducted in laboratory.

In hospital, a total of 58 cases were screened with RDTs Vs microscopy, out of which 54 were malaria positive (3 Pv and 51 Pf) by RDT while microscopy revealed a total of 31 positive only (2 Pv and 29 Pf).

The study is ongoing.



2.4. Evaluation of the introduction of insecticide treated mosquito bed nets (ITMN) for malaria control in tribal population of Central India

Study on Evaluation of the introduction of Insecticide Treated Mosquito Bed nets (ITMN) has just been initiated for the assessment of the feasibility of the introduction, treatment and effectiveness of these nets in tribal areas of Madhya Pradesh, India. The process for recruitment of staff and procurement of supplies initiated.

3. GENETIC DISORDERS

3.1. Prevalence of haemoglobinopathies and G6PD deficiency in Scheduled Tribes and Scheduled Castes of district Damoh, M.P.

Haemoglobinopathies in the form of sickle cell disease and β-thalassaemia are common in tribal predominant belt of central India but with a varied prevalence rate. Status of α-thalassaemia is not known from tribal populations of India.α-thalassaemia type II play a protective role in clinical presentation of sickle cell disease and β-thalassaemia. Beside it gives protection from severe form of malaria but causes mild anaemia. Present study is an attempt to map the sickle cell gene and other haemoglobinopathies at micro level in the scheduled tribes and scheduled castes of Damoh district of Madhya Pradesh.

Objectives

1. To study the prevalence of common haemoglobinopathies of scheduled tribes and scheduled castes of Damoh district of Madhya Pradesh.
2. To study the prevalence of G6PD deficiency of scheduled tribes and scheduled castes of Damoh district of Madhya Pradesh.

Population

Damoh district lie in the centre of Madhya Pradesh and the total population of the district (Census 2001) was over 1 million. The proportion of scheduled tribes and scheduled castes was 12.5% and 19.5% respectively. The main tribe of the district is Raj Gond and the main scheduled caste is Chaudhary. Two tehsils i.e. Tendukhera and Jabera has the highest concentration of tribal population. Twenty villages, 10 from each tehsil having high concentration of tribal and scheduled caste population were selected from the district and family was taken as sampling unit. Only apparently healthy volunteers were included as subject after taking written consent. In total, 321 Raj Gond and 339 scheduled caste populations were studied.

Methodology

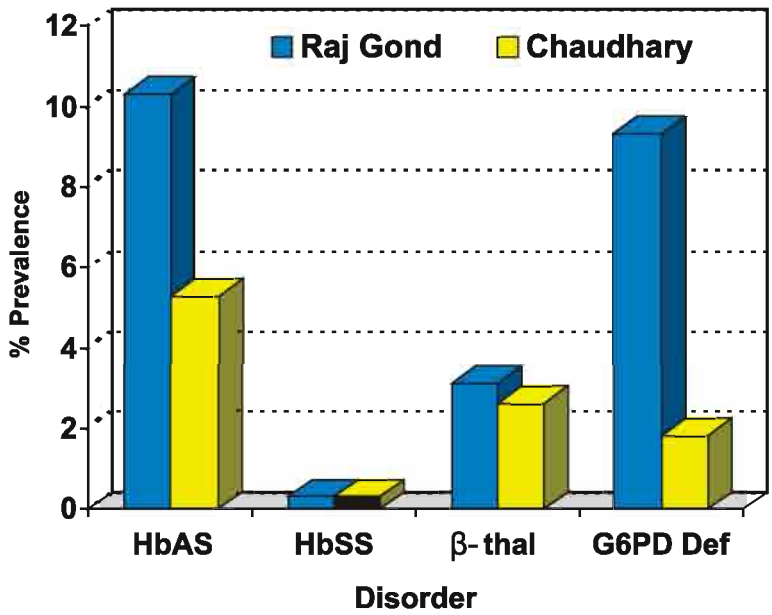
Intravenous blood samples were analysed for CBC using automatic blood cell

counter. Identification of abnormal haemoglobin, unstable haemoglobin, G6PD deficiency, haemoglobin A_2 (Hb A_2) and foetal haemoglobin (HbF) was done following standard techniques. DNA was extracted from buffy coat by phenol-chloroform methods. Identification of α -thalassaemia type II was done by allele specific amplification.

Results

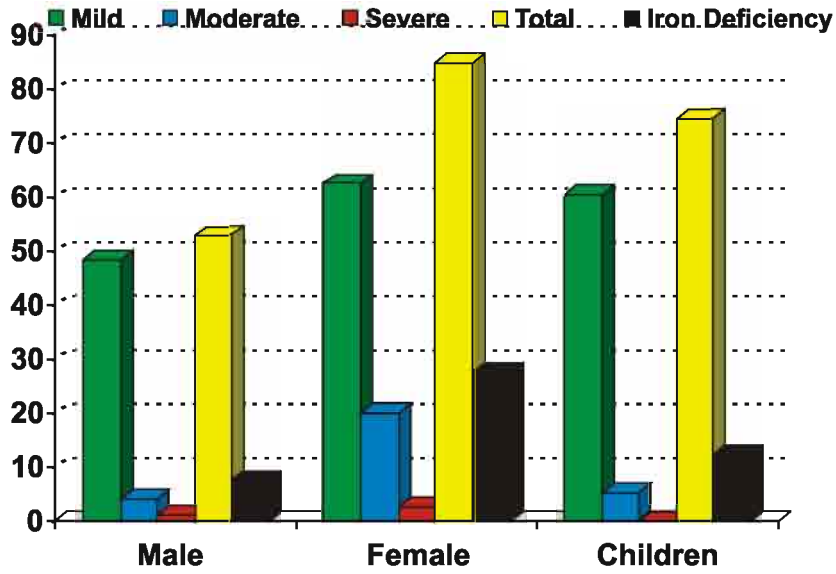
The prevalence of haemoglobinopathies and G6PD deficiency in studied population is given in Table 3.1.1. Sickle haemoglobin is the only form of abnormal haemoglobin in the study area with a prevalence rate of 10.3% and 5.3% as heterozygotes in Raj Gond and Chaudhary respectively. G6PD deficiency was very high in Raj Gond (9.3%). β-thalassaemia trait was 3.1% and 2.6% respectively for Raj Gond and Chaudhary (Fig 3.1.1). There were two girls of age 10 years with sickle cell homozygous in apparently healthy condition. These girls were moderately anaemic with moderately elevated (6.5% and 9%) of HbF.

Fig 3.1.1. Prevalence of haemoglobinopathies among scheduled tribes and scheduled caste populations of Damoh district



Anaemia was more common in Raj Gond tribe (71.9%, Fig 3.1.2) as compared to Chaudhary (31.8%, Fig 3.1.3) group. In most of the cases anaemia was of mild category. Female and children (<12 years) were more prone to anemia as compared to males in both the population groups. Prevalence of iron deficiency, as judged by estimation of free erythrocyte protoprophyrin level, was less in comparison to prevalence of anemia. All persons having severe form of anaemia and about 50% of moderate level of anaemia were having iron deficiency. Anaemia in the study area is caused by many other factors like common infections, worm infestation and α^{+}-thalassaemia type II etc. The analysis of samples for sickle haemoglobin, and β-thalassaemia is in progress.

Fig 3.1.2. Prevalence of anaemia and iron deficiency in Raj Gond tribe of district Damoh, M.P.



Alpha thalassaemia type II is very common among Raj Gond (- α gene frequency-0.5899) and given in Fig 3.1.4. Such high frequency of α-thalassaemia are reported from few population of the world. Only deletional form of α-thalassaemia is investigated, $-\alpha^{3.7}$ allele predominate (82.5%) over $-\alpha^{4.2}$ allele. In Chaudhary population the prevalence of α-thalassaemia type II is very low (α- gene frequency -0.0391). The homozygousity of α-thalassaemia type II (-α/-α) reduced the haemoglobin and MCV and MCH values (Table 3.1.1).

Fig 3.1.3. Prevalence of anaemia and iron deficiency in Chaudhary Scheduled caste of district Damoh, M.P.

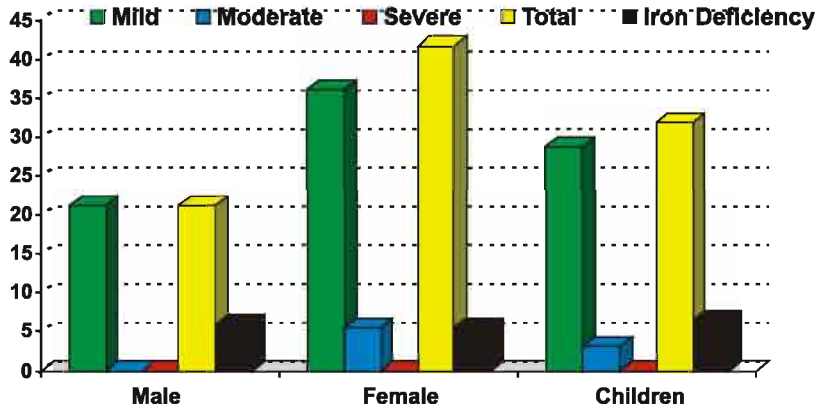


Fig 3.1.4. Prevalence of alpha thalassaemia type II among different populations of Damoh district

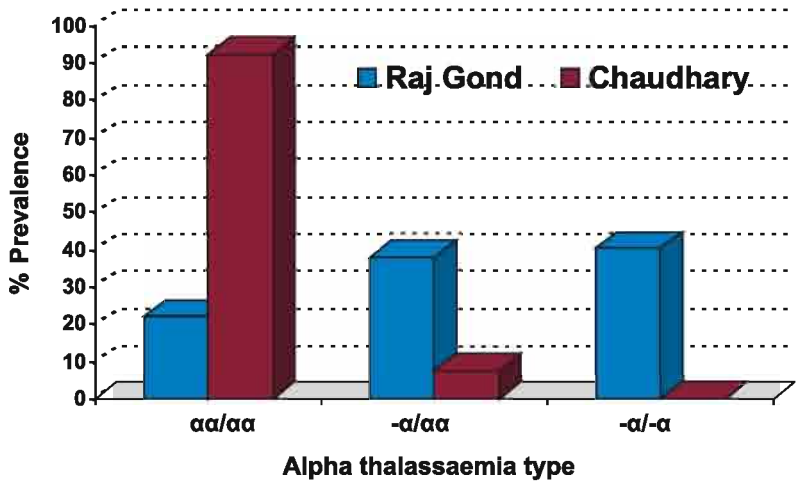


Table 3.1.1. Alpha thalassaemia type and CBC profile in Raj Gond of district Damoh of M.P.

Type.	N	Hb (g/dl)	PCV (%)	TRBC ($10X^{12}$/l)	MCV (fl)	MCH (pg)	MCHC g/dl	HbF (%)	HbA_2 (%)
αα/αα	12	11.4 ±2.1	37.7 ±5.3	4.7 ±0.5	81.1 ±12.2	24.5 ±4.9	30.0 ±1.9	0.9 ±0.5	2.2 ±0.9
-α/αα	35	11.7 ±1.5	389 ±4.4	4.9 ±0.7	77.6 ±7.3	24.0 ±3.3	30.8 ±1.6	0.8 ±0.3	2.7 ±1.1
-α/-α	32	11.3 ±1.6	37.8 ±4.9	5.1 ±0.7	74.9 ±4.7	22.4 ±1.7	29.9 ±1.1	0.9 ±0.4	2.3 ±1.0

3.2. Alpha thalassaemia in relation to common haemoglobinopathies in some tribes of Madhya Pradesh

Sickle haemoglobin of Central and Southern India belongs to same haplotype (Kulozik et.al.1986; Gupta et.al. 1991) and suggest a common origin. In some tribal groups the differences in prevalence of sickle haemoglobin is too large and suggests their different origin. Along with sickle haemoglobin, these tribal populations also have β-thalassaemia,α -thalassaemia type II (α^+-thalassaemia) and G6PD deficiency. All these single genetic disorders are stated to have evolved due to selection pressure of malaria and have attained different prevalence rates. These small endogamous populations give a unique opportunity to study the human genetic diversity and micro-evolution in terms of gene-environmental interaction.

The co-existence of α -thalassaemia type II in sickle cell disease and β-thalassaemia is stated to reduce the disease severity. α-thalassaemia is also stated to provide protection against severe form of malaria. The status of α-thalassaemia is not known for most of tribal population of MP.

Objective

1. To correlate the variation in sickle haemoglobin to the other haemoglobinopathies like β-thalassaemia, α-thalassaemia and G6PD deficiency in Kol, Gond. Pradhan, Bharia and Baiga populations of Madhya Pradesh.

Population

The study was carried out amongst Baiga, Kol, Bharia, Gond of Patalkot Valley and Pradhan of M.P. Only apparently healthy volunteers were included as subject after taking written consent. Family was taken as sampling unit.

Methodology

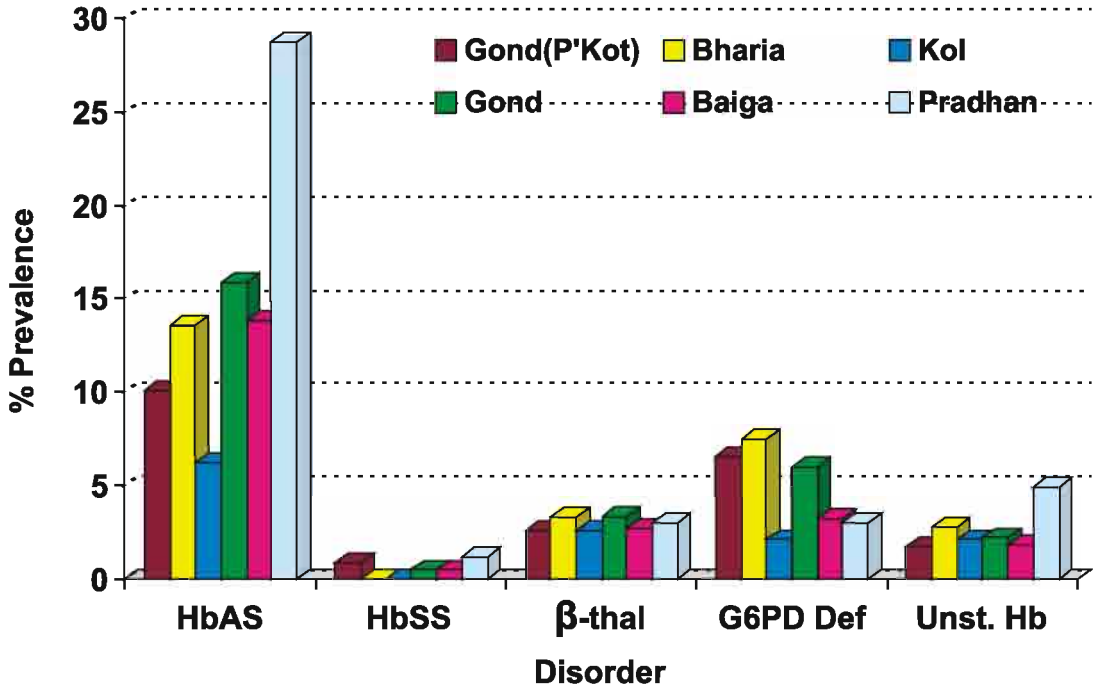
The blood samples were processed for various haematological and genetic parameters. Intravenous blood samples were analysed for CBC using automatic blood cell counter. Identification of abnormal haemoglobin, unstable haemoglobin, G6PD deficiency,

haemoglobin A_2 (Hb A_2) and foetal haemoglobin (HbF) was done following standard techniques. DNA was extracted from buffy coat by phenol-chloroform methods. Identification of α-thalassaemia type II was done by allele specific amplification.

Results

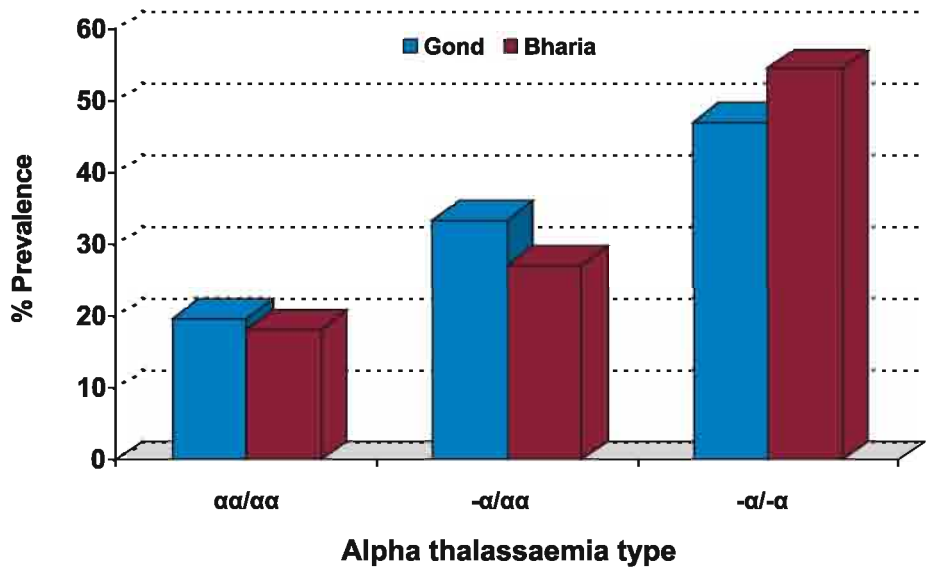
Prevalence of haemoglobinopathies and G6PD deficiency in tribes of Patalkot area of district Chhindwara, Kol of district Satna, Gonds of district Shahdol and Pradhan and Baiga of district Dindori are given in Fig 3.2.1. G6PD deficiency is very high (6 - 7%) among Gond and Bharia tribes of Patalkot and Gonds of Shahdol. Sickle haemoglobin is very high (29%) among Pradhans of Dindori and it was moderate (about 15%) in Baigas and Gonds. Prevalence of heat unstable haemoglobin was about 2% in all the tribes except Pradhan in which it was 5%(Fig 3.2.1).

Fig 3.2.1. Prevalence of haemoglobinopathies among different tribes



α-thalassaemia type II was done only for tribes of Patalkot area of Chhindwara district. Work for the other tribes is under progress. Deletional form of α-thalassaemia type is very high in both the tribes of Patalkot valley i.e. Gond and primitive tribe - Bharia (Fig. 3.2.2). Only 19% of the studied population was having all the four α-genes. The gene frequency of α- gene was high i.e. 0.6373 for Gonds and 0.6818 for Bharias. Such high frequency of α-thalassaemia type II are rarely reported from any population of the world.

Fig 3.2.2. Prevalence of alpha thalassaemia type II among tribes of Patalkot area of Chhindwara district, M.P.



3.3.Morbidity profile of sickle cell disease in central India

Sickle cell disease is the first molecular disease studied in details that express the complexity of interaction of various genetic factors (located in cis and trans position of the locus) and environmental factors in phenotypic expression of disease. In India the disease is mainly reported from the tribal predominant belt of central and southern India. The origin of sickle cell gene of India is different from the rest of the country and need independent evaluation. The clinical profile of the disease and the various compounding factors influencing the disease profile are not known.

In sickle cell clinic, a total of 439 patients were registered till the end of March, 2008 i.e. 44 new patients were registered. About three fourth patients are of less than 15 years of age. Among the main clinical complications for which patients sought medical intervention at the time of presentation were painful crises of bones and joints/bony pain (68%), recurrent fever (55%), abdominal/splenic pain (30%) and generalized or extreme weakness (35%). Splenomegaly was the most common clinical sign recorded in 70% of the patients. Massive splenomegaly (>9cm) was seen in 2 patients.

The distribution of age of 439 patients is highly skewed on left side with a median age of 10.35 years. The distribution suggests that the rate of mortality increases after the age of 15 years. Female has little higher median age than male (Fig 3.3.1). There was increase in non-palpable spleen (auto-splenectomy) from age of 10 years (21.4%) to 25 years (46.9%) suggesting that patients were more prone to repeated sickling or parasitic infections or both. Pallor and icterus were the most common (75% - 92%) signs and joint / bony pain with or without fever were most common symptoms (60% - 68%) among sickle cell disease patients. About 14% of patients were not having any major health complaint but were picked up either during family screening or volunteer screening or were having persistent pallor / icterus. More than one fourth (27.8%) patients were from OBCs communities.

Table 3.3.1 depicts the CBC profile of sickle cell disease patients in steady state. Average haemoglobin level was low as expected with large variations in MCV and MCH values. The mean foetal haemoglobin level was high ranging from 13 to 13.5%. There was no difference in mean HbF in adult female, children and adult male.

Deletional form of α-thalassaemia type II was studied in 71 SCD patients. Nine SCD persons were homozygous for α-thalassaemia type II and 17 were heterozygotes. The main form of deletion was $-\alpha^{3.7}$kb deletion. Homozygousity of deletional form of α-thalassaemia type II ($-\alpha^{3.7}/-\alpha^{3.7}$) showed slight reduction in haemoglobin level and values of MCV and MCH. The hematological and clinical profile of these patients will be correlated with the number of functional α-globin genes (Table 3.3.2).

Fig 3.3.1. Age and sex distribution of sickle cell disease patients

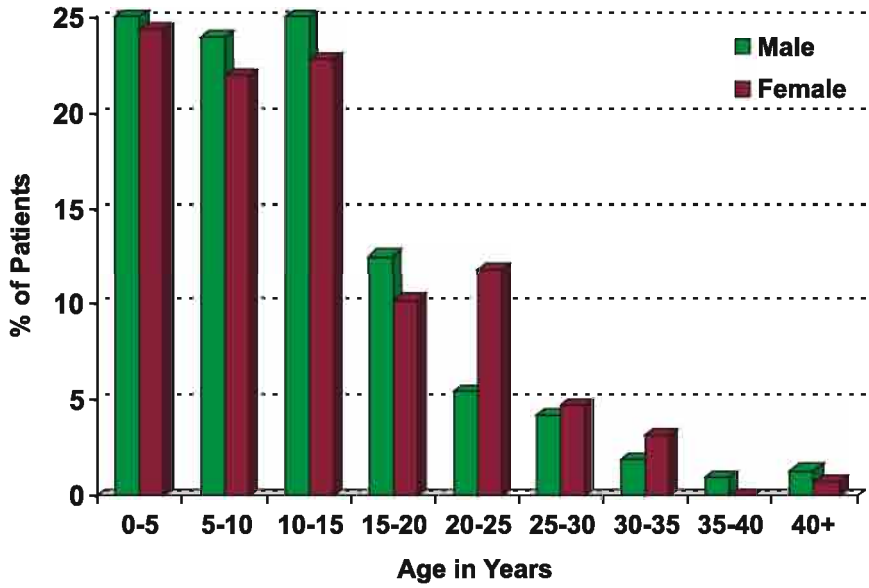


Table 3.3.1. CBC profile of sickle cell disease patients

Age Group	N	Hb (g/dl)	PCV (%)	TRBC ($x10^{12}$/l)	MCV (fl)	MCH (pg)	MCHC (g/dl)	HbF (%)	HbA_2 (%)
Male	103	8.2 ±2.5	24.6 ±7.1	3.2 ±1.0	78.8 ±12.3	26.5 ±5.2	33.6 ±3.4	13.3 ±6.1	2.9 ±1.4
Female	46	7.9 ±2.2	23.5 ±6.3	3.0 ±0.8	79.6 ±10.7	26.7 ±4.9	33.4 ±3.5	13.5 ±5.5	2.7 ±1.4
Children	242	7.2 ±1.9	21.8 ±5.8	2.9 ±0.9	78.6 ±13.2	26.2 ±5.0	33.2 ±4.6	12.9 (5.5	2.6 (1.0

Table 3.3.2. CBC profile of sickle cell disease patients in relation to functional α-globin genes

No. α-gene	N	Hb (g/dl)	PCV (%)	TRBC (X1012/l)	MCV (fl)	MCH (pg)	MCHC	HbF (%)	HbA_2 (%)	Retic (%)
αα/αα	**46**	7.9 ±2.0	24.2 ±6.5	3.0 ±0.9	80.6 ±13.6	27.5 ±5.6	32.9 ±3.9	12.5 ±4.5	2.9 ±1.7	7.4 ±4.8
-α/αα	**27**	8.4 ±2.3	25.7 ±6.5	3.4 ±0.9	77.9 ±15.2	25.4 ±5.5	34.9 ±3.8	16.9 ±5.8	2.2 ±1.1	13.0 ±8.5
-α/-α	**10**	9.8 ±2.5	29.1 ±6.6	4.1 ±1.1	72.5 ±10.2	24.5 ±3.7	33.8 ±2.0	11.4 ±3.9	2.5 ±0.4	8.0 ±5.0

Patients who lost to follow-ups

Out of 439, only 243 patients attended the clinic regularly. We tried to find out reasons leading to loss to follow-up. We approached 42 patients / families who were lost in the follow-up and were residing in and around Jabalpur. Out of these 20 (47%) died during the course. We noted down the signs and symptoms of these patients during their last illness and tried to ascertain the possible cause of death of these patients. The remaining 22 patients who did not attend sickle cell clinic narrated following reasons for not attending the follow-up clinic. Some patients reported multiples difficulties in attending the clinic.

- Fifteen patients said that sickle cell clinic was not easily accessible and they have to spend lot of money and time to attend the clinic.
- Three patients said that sickle cell clinic is running only two days in a week and no emergency facilities are available.
- Four patients (school age children) said that they have to attend the school on these days.
- Five patients said that they were attending other Govt. hospitals for day to day management of the illness/crisis. The hospitals were near by their residence.
- 2 patients shifted to other places.

Most of these patients (17 out of 22) preferred to seek medical advice from private practitioners of their area as they are more satisfied with them.

Out of the twenty patients who died during the course of follow up, six died due to splenic sequestration crisis and four died due to hepatic failure and high grade fever. One patient died due to internal bleeding and another due to post operative complications. We did not get any information regarding the cause of the death for eight patients as their parents were not available at the time of visit.

4. COMMUNITY HEALTH

4.1. Integrated Disease Surveillance Project NCD Risk Factor Survey (Phase-I) Madhya Pradesh and Maharashtra

Non communicable diseases (NCD) are responsible for a high proportion of deaths and disabilities. WHO estimated that in year 2000 NCDs were responsible for 59% of deaths and 46% of the global disease burden. Based on available trends, by 2020 NCDs are predicted to account for 73% of deaths and 60% of disease burden. Much of the projected rise in NCDs is preventable, particularly those related to smoking, poor diet, physical inactivity and obesity.

The Government of India with the assistance of the World Bank has implemented the Integrated Diseases Surveillance Project (IDSP). The main activity of the project is to develop a system of decentralized state based surveillance of selected risk factors of non communicable diseases throughout the country. Surveillance of risk factors of non-communicable diseases is an important component of the project. For this purpose, periodic community based surveys will be undertaken through identified organizations within the country. The RMRCT Jabalpur is identified as one of the Regional Resource Centre (RRC).

Objectives

The main objectives of the study are to-

1. Estimate the prevalence and distribution of risk factors in different strata in various states/regions of India.
2. Establish a data base of NCD risk factors and monitor trends of important risk factors over a period of time.
3. Support evolving strategies and intervention of identified risk factors to reduce the burden of diseases due to non-communicable diseases.

Methodology

As Regional Centre we were involved mainly in the training and quality control of the

state survey agencies. Thus we supervised the training programme of the grass root level/ field workers and supervisors of both the states. Supervision was done even in the field training. Time to time supervision was also done during the data collection of Madhya Pradesh. State survey agency has covered 100 primary sampling units (village/ward) from each state. From each sampling unit 50 randomly selected households were covered. As a quality control we surveyed 10% primary sampling units (5% urban and 5% rural) and 50% of the selected households from each primary sampling unit covered by the state survey agency.

This survey was done from January to March 2008 and included 560 men/women aged 15 64 years living in Urban/Rural areas of these states. All the households in the selected PSU were visited and men and women were interviewed. The survey instrument was based on the STEPS approach of WHO and it included questions related to tobacco use, alcohol intake, physical activity and history of treatment for hypertension and diabetes mellitus. Height, weight, waist circumference and blood pressure were also measured.

Results

Demographic particulars of study population show that about 38% of the households in Madhya Pradesh were living in pucca houses, whereas in Maharashtra this figure was 50%. The main source of lighting was electricity in both the states. The mean size of landholding in both the areas was about 8 acres, and out of that about 50% was irrigated (Table 4.1.1).

Results from the study shows that smoking was more prevalent in Madhya Pradesh (7%) as compared to Maharashtra (5.6%). The use of smokeless tobacco was 39.9% in Madhya Pradesh and 31.7% in Maharashtra. The predominant form of smokeless tobacco used in study areas was '*Khaini*' followed by '*Gutkha*'. About 18.4% respondents reported that they consumed alcohol in the past one year and all of them were men. The prevalence of alcohol consumption in Madhya Pradesh was 22.8% as compared to 14.2% in Maharashtra (Table 4.1.2). In Madhya Pradesh 3.2% of them consumed more than three standard drinks per day. Whereas in Maharashtra 7.5% consumed more than three standard drinks.

Table 4.1.1. Some demographic information of study area

Variables	Madhya Pradesh	Maharashtra
Age Group (in yrs.) (Nos.)		
15-54	218	203
54-64	58	81
Type of Houses		
Pucca	38.8	52.6
Semi-pucca	27.2	40.2
Pucca	42.0	7.2
Separate Kitchen	--	90.3
Own House	94.8	83.9
Agriculture Land	32.8	44.8
Land holding (in acre)		
<2.5	57.3	40.5
2.5-5	19.5	18.9
5-10	13.4	23.4
10-15	6.1	11.7
15-20	--	0.9
20-25	1.2	3.6
<25	2.4	0.9
Main source of lighting		
Electricity	95.2	96.8
Kerosene	4.8	3.2
Livestock	38.4	25.3

In Maharashtra overall only 20% and 33.7% individuals were normal based on the systolic and diastolic blood pressure respectively. Majority of the individuals were found to be in pre-hypertensive stage. Stage II hypertension which is usually manifested in the disease form was seen in 7% individuals (Table 4.1.3). In Madhya Pradesh overall only 35% and 48.7% individuals were normal based on the systolic and diastolic blood pressure respectively. Stage II hypertension was seen in 8% individuals. Stage II hypertension was also observed in individual less than 30 years in both the states (Table 4.1.4).

Table 4.1.2. Prevalence of Smoked tobacco use, Smokeless tobacco use and Alcohol consumption

Area	Tobacco use		Alcohol consumption
	Smoked	Smokeless	
Madhya Pradesh n=276	47 (7%)	110 (39.9%)	63 (22.8%)
Maharashtra n=284	16 (5.6%)	90 (31.7)	40 (14.1%)

Table 4.1.3. Distribution (%) of adults by type of Hypertension (WHO criteria) and Age group in Maharashtra

Category	BP cut of levels (mm Hg)	Age Group (in Years)			
		<30	30-40	40-54	55-64
Normal	SBP<120	34.9 (n=30)	22.2 (n=14)	14.8 (n=8)	5.0 (n=4)
	DBP<80	41.9 (n=36)	31.7 (n=20)	33.3 (n=18)	26.3 (n=21)
Pre Hypertension	SBP 120-139	54.7 (n=47)	54.0 (n=34)	50.0 (n=27)	36.3 (n=29)
	DBP 80-89	40.7 (n=35)	44.4 (n=28)	38.9 (n=21)	37.5 (n=30)
Stage I Hypertension	SBP 140-159	9.3 (n=8)	15.9 (n=10)	25.9 (n=14)	27.5 (n=22)
	DBP 90-99	16.3 (n=14)	17.5 (n=11)	20.4 (n=11)	22.5 (n=18)
Stage II Hypertension	SBP ≥160	1.2 (n=1)	7.9 (n=4)	9.3 (n=4)	31.3 (n=11)
	DBP ≥ 100	1.2 (n=1)	6.3 (n=4)	7.4 (n=4)	13.8 (n=11)

Table 4.1.4. Distribution (%) of adults by type of Hypertension (WHO criteria) and Age group in Madhya Pradesh

Category	BP cut of levels (mm Hg)	Age Group (in Years)			
		<30	30-40	40-54	55-64
Normal	SBP<120	41.0 (n=48)	28.5 (n=15)	38.0 (n=19)	26.3 (n=15)
	DBP<80	59.5 (n=69)	30.8 (n=16)	48.0 (n=24)	43.9 (n=25)
Pre Hypertension	SBP 120-139	44.0 (n=51)	50.0 (n=26)	38.0 (n=19)	35.1 (n=20)
	DBP 80-89	25.0 (n=29)	55.8 (n=29)	38.0 (n=19)	38.6 (n=22)
Stage I Hypertension	SBP 140-159	11.2 (n=13)	13.5 (n=7)	18.0 (n=9)	19.3 (n=11)
	DBP 90-99	15.5 (n=18)	13.5 (n=7)	14.0 (n=7)	17.5 (n=10)
Stage II Hypertension	SBP ≥160	3.4 (n=4)	7.7 (n=4)	6.0 (n=3)	19.3 (n=11)
	DBP ≥ 100	0.0	0.0	0.0	0.0

4.2. Tobacco related disease in the tribal population of Kundam block, Jabalpur district

The dried leaf of the plant *Nicotiana tobaccum* is used for smoking, chewing or snuff. Globally tobacco use accounts for a considerable proportion of mortality. Tobacco contains more than 4,000 chemicals and most of them are carcinogenic. Chewing or snuffing tobacco can lead to inflammation of oral cavity and oral cancer. Incidence of smoking related disease and concomitant rise in death rates have increased rapidly in many developing countries. Tobacco is responsible for significant amount of morbidity and mortality among middle age adults. As per WHO, tobacco kills more people annually than AIDS, alcoholics, drug abuse and accidents.

Methodology

The study is being carried out in Kundam block of district Jabalpur. It is a Gond tribe predominated block. The total population of the block was 92,260 as per 1991 census, and Gond tribe comprises about 71.2% of its total population.

The estimated sample size for the study is 1000 households. For the sampling purpose block is divided into four clusters viz. eastern, western, northern and southern cluster. It is proposed to have sample of 250 Gond households from selected villages in each cluster.

Head of the household or senior person was interviewed through structured schedule to collect general household information, about household members. Information about tobacco use was collected from all 6 years and/or older individuals available at the time of survey. Detailed history on habit and different type of tobacco use were collected from all active and passive tobacco users. Interview schedule also included information on knowledge, attitude toward tobacco use, addiction and dependence, quitting behaviors, etc. Clinical examinations of oral cavity are done for all active users by medical doctor.

Formation of village level committee for prevention of tobacco use

A committee comprising of village Pradhan, school teachers, village health workers, ANM, representative of any NGO operating in the area and one or two educated

young persons were formed. The detrimental effects of tobacco use on human health were discussed with committee members and they were trained on the preventive aspects for its communication to villagers.

Results

A total of 1342 population were interviewed from 262 households using pre designed schedule. About 58% of the sample population is the user of tobacco products. The tobacco products as smokeless form are predominant among women (53%) and men (31%). However '*Beedis*' are the predominant form of tobacco use among men (Table 4.2.1).

A total of 819 individuals were clinically examined. The proportion of disease was 11% of leukoplakia, 13% of submucosis fibrosis, 3% of COPD and 9% of ulceration in mouth. Clinically examined cases have been referred to Medical College Jabalpur for their histopathological confirmation.

Tobacco use in the form of '*Beedis*', '*Chillum*', '*Gutaka*', '*Nasmanjan*' are highly prevalent in the community. Most of them start smoking for pleasure and/or due to some socio cultural norms prevalent in the tribe. They also use tobacco to get relief from toothache. There is lack of awareness about harmful effect of tobacco.

Table 4.2.1. Tobacco user status in tribal population of Kundam block, Distt Jabalpur

Sex	Smoker (%)	Smokeless (%)	Mixed user (%)	Non user (%)
Male (n=670)	25.67	30.59	7.91	35.82
Female (n=672)	-	52.67	-	47.32
Total (n=1342)	12.81	41.65	3.94	41.53

5. SOCIAL AND BEHAVIOURAL STUDIES

5.1. Newborn care among tribes of Madhya Pradesh: A case study of Bhils of Dhar district

About 1.2 million neonates die annually in India, amounting to almost one-fourth of all global newborn deaths. Demographic studies carried out among the tribes of Madhya Pradesh reported a very high infant and child mortality. However, very few attempts have been made to study the newborn care practices among the tribes of Madhya Pradesh, especially among Bhil Tribe - the most populous tribe of the state.

Objectives

The main objective of this study is to understand different practices followed by Bhils related to the newborn care.

Methodology

The study is being carried out among Bhils of Dhar district in Madhya Pradesh state. The target population is currently married women aged 15-49 years and who delivered a live birth during two years preceding the date of survey (recently delivered woman). It is proposed to interview about 1000 recently delivered women (RDWs) from 60 selected Primary Sampling Units (PSU). The primary sampling units are selected through probability proportion to population size (PPS) sampling technique. Here the population considered is of tribal.

Results

The field work is completed in three tehsil, viz. Sardarpur, Dhar and Badnawar. The preliminary findings collected from 130 RDWs from 10 villages of Sardarpur tehsil shows that about two-third women were registered with ANM during pregnancy and 63% received at least one antenatal care (ANC). However, only 27% women received recommended three ANC. Home visits of health workers is very poor and only 16% and 22% women respectively visited by ANM and *Aganwadi worker* (AWW). It is important to learn that even

after initiation of *Jannani Suraksha Yojana* in 2005, more than 50% deliveries occurred at home (Table 5.1.1). The study is ongoing.

Table 5.1.1: Antenatal and delivery care among Bhils of Dhar district

Items	Percent
Registered with ANM	65.0
Antenatal Care	
Received 1+ ANC	63.0
3+ ANC	27.1
Home visit during pregnancy by	
ANM	16.0
AWW	22.0
Place of Delivery	
Home (own/parent's)	49.0
Govt. Institutes	43.0
Pvt. Institutes	3.0
Others	5.0

5.2.Prevalence of Infertility in India

According to the estimates of World Health Organization, there are about 8% of couples at global level experience some form of infertility problems during their reproductive lives. The consequences of infertility for women particularly in pronatalist culture can be devastating. A large number of such couples suffer from infertility largely from preventable conditions such as STI, parasitic infestations, unhygienic obstetric practices, unsafe abortions, exposure to potently toxic substances in the diet or environment and different socio-cultural practices. Community based data on prevalence of infertility has seen scarce in India and most of such data is hospital based. This is a multicentric ICMR Task Force study and aims to generate a baseline data on the problem from 12 states of the country. RMRCT, Jabalpur is entrusted to carry out the survey at Madhya Pradesh.

Objective

The objective of the study is to understand the prevalence, social risk factors, treatment seeking behaviour and psycho-social consequences pertaining to infertility.

Methodology

The estimated sample size for the study is 2700 ever married women aged 15-49 years in rural and urban areas. The study is being carried out in two randomly selected districts. Two PHCs in rural areas and five urban centres (city/towns) are selected in each district.

Progress

Selection of 24 villages from 4 PHCs and 20 urban wards from 10 urban centres in Jabalpur and Mandla districts has been done by adopting PPS sampling strategy. Finalization of interview schedule is just completed and process of recruitment of staff has been initiated.

5.3.A study to explore HIV positive individuals to understand their actions taken for the Non-progression of HIV infection to live longer and healthy

In an effort to control this rapid spread of HIV infection, certain preventive measures have been developed including the awareness campaign and targeted interventions specific to each high risk group knowing fully well that HIV/AIDS is first social disease and later on the medical disease. The available literature reveals that several studies have been delved to understand and assess the knowledge, attitude and practices of several groups viz. community, teachers, students, nurses, doctors and other professionals. However, hardly any information is available about the knowledge, attitude, practices (KAP) about HIV/AIDS including their perception on management of life with people living with HIV/AIDS (PLHA) and how do they prevent others from their infection.

Objectives

The present study endeavors to understand -

1. The knowledge, attitude, practice (KAP) of PLHA about the mode of spread of HIV infection, transmission and its prevention.
2. How PLHA manage their life with HIV infection and measures adopted to prevent transmission.

Methodology

The information was collected from HIV/AIDS patients visiting Integrated Counselling and Testing Centres (ICTCs) of Netaji Subhash Chandra Bose Medical College, Jabalpur and Regional Medical Research Centre for Tribals (RMRCT), Jabalpur. Overall, 40 people living with HIV/AIDS were identified but four PLHAs refused to participate in the study. Only 36 PLHAs (27 males and 9 females) aged 18 to 52 years were interviewed. The interview schedule contained questions mainly on mode of spread and transmission, parent to unborn child transmission, knowledge about risky behavior and

their HIV status and how they manage their life as a PLHA and so on. All PLHAs were asked to visit for follow-up counseling to bridge-up the gaps and lacunas.

Results

The findings show that all PLHA had heard about HIV/AIDS, barring one male and one female PLHA. Higher preponderance of studied male PLHAs divulged that HIV infection probably spread either through sex (84%) or using infected syringes (80%) or through infected blood (60%). However, female PLHAs had poorer knowledge on modes of spread of HIV infection as compared to male PLHAs. Knowledge about parents to unborn child transmission (PUCT) of these PLHAs was also assessed through series of questions. Only 68% male and 87% female PLHAs knew that HIV infected parents are likely to transmit HIV infection to their unborn child. About 52% males told that contraction of HIV infection may be prevented either through use of condom while practicing multi-sexual relationship or by using disposable syringes or through HIV tested blood for transfusion respectively. Like other parameters, knowledge on prevention from HIV among females was extremely poor (Table 5.3.1).

The probe was made to assess whether any measures were taken by PLHA to prevent their spouse and children. Table 5.4.1 gives the detailed information on this account revealing that study subjects irrespective of sex had little knowledge. Seven out of 27 males told that their families members were also tested for HIV on the advice of doctor/counselor. However, 68% males and 37% females PLHAs adopted one or other preventive measures like isolation from the spouse & family; stopped sharing food or bed, stopped donating blood and started using disposable syringes (Table 5.3.2).

Endeavour was also made to ascertain the life history of PLHAs by asking several questions. Seventeen male PLHAs admitted for practicing multisexual relations without use of condom. Eight out of these seventeen males also admitted that they had continued relations even after knowing that their partner is HIV infected. All female PLHAs told that they contracted HIV infection from their husband only, as they came to know about their infection either during pregnancy or at the time of husband's death (Table 5.3.3).

Thereafter, all PLHAs were inquired about their present status of sickness or otherwise. Sixteen males and three females reported that they remain sick most of the time. Out of these sixteen males, four were also suffering with Tuberculosis and seven were having multiple sickness. Two females reported that they were suffering from complicated STDs.

Table 5.3.1. Knowledge/awareness about HIV/AIDS among PLHAs

Knowledge	Males (N=27)	Females (N=9)
Heard about HIV/AIDS	25	8
Mode of transmission		
Sex	21	5
Infected syringes	20	3
Infected blood	15	0
Sleeping/eating together	1	3
Mosquito bite	1	0
Knowledge about parents to child transmission		
HIV positive parents transmit infection to unborn child	17	7
Each unborn child be infected	13	2
HIV transmit through breast feeding	10	3
Mode of prevention		
Use of condom	19	4
Disposable / sterilized syringes	18	2
Tested blood for transfusion	13	0
No sharing of razor/blade	1	0
Indirect contact to sanitary napkin/blood etc	2	1

Table 5.3.2. Preventive measures to stop transmission to family & others

Preventive measures	Males (N=27)	Females (N=9)
Got HIV tested of family members	7	0
Started own treatment	4	5
Any other precautions adopted?	17	3
If yes, what precautions adopted?		
Isolated from spouse	2	0
Isolated from family	15	0
Stopped sharing food	7	0
Stopped Sleeping together	5	0
Stopped donating blood	7	0
No contact with blood	7	3
Used disposable syringes	9	0
Used condom	3	0
No sex without condom	1	0

Table 5.3.3. Life history and behaviour of PLHA

Behavior indicators	Males (27)	Females (9)
Ever practiced multi-sexual relations	17	0
Used condom at each act	3	0
Continued relation after knowing that your partner is HIV+	8	0
Got HIV tested on Med. advise	24	8
Aware about the source of their HIV infection	15	8
Visit to CSW	4	0
Got blood transfusion	2	0
Went at wrong place	11	0
From Husband	--	8
Maintaining relations with spouse as before	13	4*
Getting ART	15	3

* only from married females

6. REGULAR ACTIVITIES

6.1. Integrated Counseling and Training Centre (ICTC) and State Referral Laboratory (SRL) for HIV

This is an ongoing activity pertaining to HIV testing and counseling. Clients numbering to 1057 were tested this year for HIV, of which 121 turned out to be reactive. The centre also worked as a testing centre for the sentinel surveillance program during October 2007 to January 2008. A total of 7000 specimens were tested from 19 sentinel sites for ANC, STD and FSW.



Blood collection for HIV testing

6.2. National Nutrition Monitoring Bureau, MP Unit

National nutritional monitoring bureau (NNMB) Madhya Pradesh unit is functioning from this institute since 1987 covering both Madhya Pradesh and Chhattisgarh. In the year 2007-08 "Assessment of Diet & nutritional Status of the Tribal Population Second Repeat Survey" has been planned by the central team at NIN, Hyderabad. Apart from collection of current dietary information, anthropometric assessment of the tribal population, it has also been planned to assess the prevalence of different morbidity, obesity and hypertension among adult male and females above 20 years. A total of 4269 households from 108 villages were

covered from Madhya Pradesh and Chhattisgarh for anthropometry and clinical signs. A total of 1080 households were covered for the diet survey. The survey is completed and data has been sent to NIN, Hyderabad for analysis.

6.3. Sickle Cell Clinic

Centre runs a sickle cell clinic at N.S.C.B. Medical College, Jabalpur and offers the facilities for diagnosis of haemoglobinopathies to the patients of the areas. During the period of April 2007 to March 2008, a total of 824 persons suspected to be suffering from hemolytic anaemia and referred by various public sector hospitals were analysed for haemoglobinopathies. During the period 116 persons were identified as sickle cell disease, 92 as sickle cell trait, 46 as α-thalassaemia trait, and 8 as α-thalassaemia major. These patients and their parents were briefed about presentation and possible prognosis of the disorders and the preventive measures. The sickle cell disease patients were requested to get them registered in the Sickle Cell Clinic.



Sickle cell clinic at NSCB Medical College, Jabalpur

6.4. Library

The library of the centre continues to cater the documentation and information needs of the scientists, other research staff of RMRCT as well as other local institutes like NSCB Medical College, Veterinary College, Home Science College, Rani Durgawati Vishwavidyalaya, etc. It also extent services to research personnel from other universities /institutes of national and international standard.

Library is now providing the LAN facilities to scientists and other research staff of the centre through broadband connection for literature search for their research work.

Now library has acquired modern furniture, air-conditioners and compactors for its reading rooms. The library is also a member of recently launched consortium of Ministry of Health and Family Welfare (MoHFW) and National Medical Library (NML), New Delhi which facilitates accessing to 1500 journal including 850 e-journals. It also provides photocopying facility at a nominal rate.

Library has following resources:

New Additions	
Books/Journals	341
Total subscription	54
Total Library collection	
Books	1143
WHO publications	568
Bound Foreign Journals	1114
Bound Indian Journals	740
MEDLINE CDs	21
Others CDs	22
Census Floppies	60



6.6. Human Resource Development

The centre provides technical guidance and infrastructure facilities to PhD/ MD/ MSc students for conducting their research work for dissertation. Six PhD students are enrolled at the centre. Twelve students from different universities/institutions of the country had also carried out their Post-graduation dissertation work under the supervision of centre's scientists.



Students working in laboratory

6.7. RMRCT Publication

(a) Tribal Health Bulletin

Centre published a biannual and bi-lingual 'Tribal Health Bulletin', which published peer-reviewed papers related to various health aspects. This year Vol. 11, No.1 & 2 is published.



(b) RMRCT Update

Centre also published biannual RMRCT Update, which highlights the regular activities of the Centre. This year Vol. 4, No.2, 2007 & Vol.5, No.1, 2008 are published.



(c) Proceedings of National Symposium

Centre published proceedings of National Symposium on Tribal Health held on Oct. 2006.



6.8. Establishment of New Laboratory/facilities

DNA sequencing facility	
DNA sequencing of *Plasmodium falciparum* gene (MSP-1, MSP-2, MSP-3 and Pfrct)	

Lymphocyte proliferation assay against different malarial antigen radioactivity (^{3}H)



Sporozoite ELISA for determination of sporozoite in *Plasmodium falciparum* & *Plasmodium vivax*



Sibling speciation of *An.fluviatilis* by PCR



A liquid nitrogen plant of capacity 200 liters was recently installed at the centre to provide uninterrupted supply of liquid nitrogen for cryopreservation of biological specimens for longer duration



7. PUBLICATIONS

7.1. Research Papers published/in press/accepted

1. Alam MT, Bora H, Mittra P, **Singh N**, Sharma YD. Cellular immune responses to recombinant Plasmodium vivax tryptophan-rich antigen (PvTRAg) among individual exposed to vivax malaria. Parasite Immunology.2008. 30: 379-383.
2. Alam MT, Bora H, **Singh N**, Sharma YD. High immunogenecity and erythrocyte binding activity in the tryptophan-rich domain (TRD) of the 74-kDa Plasmodium vivax alanine-tryptophan-rich antigen (PvATRAg74). 2008. Vaccine. 26: 3787-3794.
3. Anvikar AR, **Dolla CK**, Dutta S, Rao VG, Gadge V, Shukla GP, Rao S, Karforma C. Role of Diarrheagenic Escherichia Coli in Acute Diarrhoea of Tribal Preschool Children of Central India. Paediatr Perinat Epidemiol. 2008 Jan; 22(1):40-6.
4. Anvikar AR, **Rao VG**, Savargaonkar DD, Rajiv Y., Bhondeley MK, Tiwari B, Karkare A, Luke C, Gadge V, Ukey M, Patel P. Seroprevalence of sexually transmitted viruses among tribal population of central India. Int J Infect Dis. 2008 (In Press).
5. Bharti PK, Silawat N, Singh PP, Singh MP, Shukla MM, Gyanchand, Dash AP and **Singh N**. The Usefulness of a new rapid diagnostic test, First Response® Combo Malaria Ag (pLDH/HRP2) card test for malaria diagnosis in forested belt of Central India. Malar J.2008. 7:126.
6. Bhat J, Rao VG, Yadav R, Gadge V, Shukla GP, Tiwari BK, Ukey M, Rao S, Karforma C, Bhondeley MK. Pulmonary Tuberculosis among tribal population of Jhabua, Madhya Pradesh, India. Int J Infect Dis. 2008; 12, supli.1.
7. Das D, Kumar S. Filarial hydrocele management in global programme on elimination of Lymphatic filariasis Current science. 2007, Vol, 93 (9&10): 1200 November.
8. Garg S, Chauhan SS, **Singh N**, Sharma YD. Immunological responses to a 39.8 kDa Plasmodium vivax tryptophan-rich antigen (PvTRAg39.8) among humans. Microbes and Infection. 2008. 10(10-11):1097-105.

9. Jain V, Armah HB, Eric J Tongren, Wilson N, Ned R, Crawford S, Nagpal AC, Joel PK, Singh MP, Dash AP, Udhayakumar V, **Singh N**, Jonathan K Stiles. Plasma IP-10, apoptotic and angiogenic factors associated with fatal cerebral malaria in India. Malar J. 2008. doi: 10.1186/1475-2875-7-83.

10. Jain V, Nagpal AC, Joel PK, Shukla MM, Singh MP, Gupta RB, Dash AP, Mishra SK, Udhayakumar V, Stiles JK, **Singh N** . Burden of cerebral malaria in central India (2004-2007). Am J Trop Med Hyg. 2008. 79(4): 636-642.

11. Kumar D, Verma A, Sehgal VK. Neonatal mortality in India. International Electronic Journal of Rural and Remote Health Australia. 2007, Vol.7 (4).

12. Lucchi WN, Tongren JE, Jain V, Nagpal AC, Kauth CW, Woehlbier U, Bujard H, Dash AP, **Singh N**, Stiles JK, Udhayakumar V. Antibody responses to the merozoite surface protein-1 complex in cerebral malaria patients in India. Malar J. 2008 (7):121.

13. Mohamad I. Brooks, **Singh N**, Davidson HH. Control measures for malaria in pregnancy in India. Ind J Med Res, 2008. 128 (3): 221-330.

14. Rao VG, Anvikar AR, Savargaonkar D, Tiwary BK, Abbad A. Sexually transmitted diseases in tribal population of central India. Int J Infect Dis. 2008; 12, supli.1.

15. Rao VG, Gopi PG, Yadav R, Sadacharam K, Bhat J, Subramani R, Anvikar AR, Tiwari BK, Vasantha M, Bhondeley MK, Gadge V, Eusuff SI, Shukla GP. Tuberculosis infection in Saharia, a primitive tribal community of Central India. Trans R Soc Trop Med Hyg. 2008 (in press).

16. Rao VG. Tuberculosis Control: Current Status and Challenges. RMRCT Update 2007; 4(2): 1-4.

17. Sharma RK, Rani M, Pandey A. Women status and fertility behaviour in an agricultural society in Uttar Pradesh. Man in India. 2008, Vol. 88 (1&2).

18. Sharma RK. Kumar A. District level analysis of reproductive health status in Madhya Pradesh. In A. Ranjan (eds.), Population Issues. 2008. Bhopal: Shyam Institute.

19. Siddiqui AA, Bora H, **Singh N**, Dash AP and Sharma YD. Expression, Purification and Characterization of the Immunological Response to a 40- Kilodalton

Plasmodium vivax Tryptophan- Rich Antigen. Infection and Immunity. 2008. 76(6): 2576-2586.

20. Siddiqui AA, **Singh N**, Sharma YD. Expression and purification of a Plasmodium vivax antigen- PvTARAg55 tryptophan- and alanine- rich antigen and its immunological responses in human subjects. Vaccine. 2007. 26: 96-107.

21. Tiwari BK, Rao VG, Mishra DK, Thakur C. Infant-feeding practices among Kol tribal community of Madhya Pradesh. Indian J Community Med. 2007;32:228-8.

22. Vinayak S, Alam MT, Upadhyay M, Das MK, Dev V, **Singh N**, Dash AP, Sharma YD. Extensive Genetic Diversity in the Plasmodium falciparum Na+/H+ Exchanger-1 Transporter Protein Implicated in Quinine Resistance. Antimicrobagents Chemother, 2007, 51: 4508-4511.

23. Williams EK, Hossain MB, **Sharma RK**, Kumar V, Pandey CM, Baqui AH. Birth interval and risk of stillbirth or neonatal death: findings from rural north India. Journal of Tropical Pediatrics, 2007 (in press).

7.2. Books / Monograph

24. Devotta S, Rayalu S, Wate SR, Labhasetwar N, Biniwale RB, Godfrey S, Labhasetwar P, **Chakma T**, Swami A, Dwivedi HB, Parihar G, Saxena A. Integrated fluorosis mitigation: A guidance manual. Nagpur: 2007. NEERI.

8. CONFERENCES/ SYMPOSIA /WORKSHOPS /TRAININGS ATTENDED

All Scientists of the centre participated in "International workshop on molecular epidemiology and immunology of malaria and other vector borne diseases" held during 16th - 19th October 2007 at RMRCT, Jabalpur.

Dr. Neeru Singh

- Attended malaria workshop on 15th -17th May 2007 and delivered a lecture on "Rapid diagnostic test in malaria" at Visakhapattanam.
- Attended meeting on Chikungunya on 29th May 2007 at Delhi .
- Attended meeting regarding "Vaccine project" on 11th & 12th June 2007 at ICMR Delhi.
- Attended the meeting on Chikungunya with district health officials on 30th August 2007 at Katni.
- Attended expert group meeting on the project "Preparation of a field site for malaria vaccine trial in and around Jabalpur" on 8th & 9th September 2007 at Pachmarhi.
- Attended meeting regarding "NICHD/India collaborations: accomplishments and future opportunities" on 19th September 2007 at New Delhi.
- Attended 9th Indo-US joint working group (JWG) meeting on contraceptive and reproductive health research (CRHR) on 20th & 21st September 2007 at New Delhi.
- Presented papers at 56th Annual meeting of American Society of Tropical Medicine and Hygiene during 4th - 8th November 2007 at Philadelphia, USA.
- Presented a paper at 34th Annual Conference of Clinical Biochemistry of India (ACBICON 2007) during 17th - 20th December 2007 at New Delhi.
- Chaired a session at National Seminar on Teratology and Genetic Disorders, organized by Centre of Experimental Medicine and Surgery, Institute of Medical Sciences on 7th & 8th February 2008 at Banaras Hindu University, Varanasi.
- Delivered a lecture at IX International Symposium on Vectors and Vector Borne Disease organized by NIMR and NVBDCP, Delhi during 14th -17th February 2008 at Puri.
- Attended meeting on MIP project review and data analysis workshop during 4th - 8th March 2008 at Boston University School of Public Health, Boston, USA.

Dr. V. G. Rao

- Presented a paper at 62nd National Conference on Tuberculosis & Chest Diseases (NATCON 2007) during 14th -16th December 2007 at New Delhi.

Dr. T. Chakma

- Attended Integrated Disease Surveillance Programme on non communicable disease trainers training programme at ICMR HQ, New Delhi during 18th - 20th July 2007.
- Attended as resource person the workshop on "Fluorosis mitigation strategy" on 26th & 27th July 2007, organized by National Environmental Engineering Research Institute (NEERI), Nagpur.
- Attended as resource person the training programme for grass root level workers of Maharashtra for Integrated Disease Surveillance Programme, Cardiovascular risk assessment survey during 11th 13th September 2007 at Pune.
- Attended as resource person "2nd International learning exchange programme" during 19th - 21st September, 2007, at Dhar and Jhabua, organized by UNICEF, Bhopal.
- Attended as resource person the workshop "Prevention and management of Dengue and Chikungunya" for medical officers of Katni district on 25th September 2007 at Katni.
- Delivered lectures in a workshop organized by BAIF Institute of Rural Development, Karnataka for the coordinators and workers of Sachetna Drinking water Project on 6th & 7th October 2007 at Tumkur, Karnataka.
- Attended International Workshop on Leadership Skills in Nutritional Sciences, organized by Nutrition Society of India on 13th & 14th November 2007 at NIN, Hyderabad.
- Delivered a lecture in workshop organized by UNICEF, Bhopal on 'Wise Water Management and Fluorosis Mitigation for West Bengal' on 28th November 2007 at Indore.
- Attended as resource person/observer at the training programme for field investigators and supervisors of Madhya Pradesh for Integrated Disease Surveillance Programme, Cardiovascular Risk Assessment Survey, during 8th - 10th December 2007 at Nagpur.
- Delivered lectures at workshop on Integrated Fluorosis Mitigation organized by Ministry of Water Resources, Govt. of Ethiopia, during 2nd - 6th March 2008 at Addis Ababa, Ethiopia.

Dr. R. B. Gupta

- Attended expert group meeting on the project "Preparation of a field site for malaria

vaccine trial in and around Jabalpur" on 8th & 9th September 2007 at Pachmarhi.

- Presented a paper at National Seminar- cum-Workshop during 3rd- 5th February 2008, organised by Tribal Research and Training Institute, Raipur, Chhattisgarh.
- Presented a paper at National Seminar on Teratology and Genetic disorders on 8th & 9th February 2008 at CEMS, IMS, Banaras Hindu University, Varanasi.
- Presented a paper at 3rd Indian Anthropological Inter-congress of Indian National Confederation & Academy of Anthropologists on Man and Environment - the South Asian Perspectives during 21st - 23rd February 2008 at Punjab University, Chandigarh.

Dr. S. Qamra

- Presented a paper at National Seminar on Contribution of Anthropology to Contemporary Society and participate in Golden Jubilee Celebration on 15th & 16th July 2007 organised by Dr. H. S. Gaur Viswavidyalaya, Sagar.
- Attended training on Design, Monitoring and Evaluation of HIV/AIDS Projects held at New Delhi during 19th to 21st September 2007.
- Presented a paper at National Seminar on Tribal Health in India - Problems and Future Perspectives at Pondicherry on 4th & 5th February 2008, organised by Department of Anthropology, University of Pondicherry.
- Presented a paper at 3rd Indian Anthropological Inter-Congress of Indian National Confederation & of Anthropologists on Man and Environment- the South Asian Perspectives during 21st - 23rd February 2008 at Panjab University Chandigarh.

Mr. Gyanchand

- Presented a paper at IX International Symposium on Vectors and Vector Borne Disease organized by NIMR and NVBDCP, Delhi during 14th -17th February 2008 at Puri.

Dr. K. B. Saha

- Attended the expert and investigators meeting on the ICMR Task Force project on Prevalence of Infertility in India on 20th August 2007 at NIN, Hyderabad.
- Attended expert group meeting on the project "Preparation of a field site for malaria vaccine trial in and around Jabalpur" on 8th & 9th September 2007 at Pachmarhi.
- Presented a paper at Bhopal Seminar on Contemporary Issues in Population and Health organized by Shayam Institute during 23rd -25th January 2008 at Bhopal.
- Presented a paper at National Seminar on Tribal Health in India - Problems and Future Perspectives on 4th & 5th February 2008 organized by the Department of Anthropology, University of Pondicherry.

Dr .D. Das

- Attended expert group meeting on the project "Preparation of a field site for malaria vaccine trial in and around Jabalpur" on 8th & 9th September 2007 at Pachmarhi.
- Attended a meeting on the task force project Epidemiology of Viral Hepatitis in M.P. & Chhatisgarh on 14th &15th February 2008 at ICMR Headquarter, New Delhi.
- Attended a meeting on the task force project on Epidemiology of viral hepatitis in M.P. & Chhattisgarh on 18th March 2008 at NIV, Pune.

Dr. Surendra Kumar

- Attended workshop on biostatistics basic principles and regulatory requirements of statistics in clinical research on 16th & 17th June 2007 at Hydrabad.
- Attended Integrated Disease Surveillance Programme on non communicable disease trainers training programme at ICMR HQ, New Delhi from 18th to 20th July 2007.
- Presented a paper at IX International Symposium on Vectors and Vector Borne Disease organized by NIMR and NVBDCP, Delhi during 14th -17th February 2008 at Puri.

Mr. Dinesh Kumar

- Attended the expert and investigators meeting on the ICMR Task Force project on Prevalence of Infertility in India on 20th August 2007 at NIN, Hyderabad.
- Presented a paper at the conference on "Royal Society of Tropical Medicine and Hygiene a centenary celebration meeting the Millennium Development Goals" during 13th - 15th September 2007 at Queen Elizabeth II Conference Center, London, UK

Dr. Rajiv Yadav

- Presented a paper at 62nd National Conference on Tuberculosis & Chest Diseases (NATCON 2007) during 14th -16th December 2007 at New Delhi.

Dr. Jyothi Bhat

- Attended a consulate meeting on MDR/ XDR TB on 14th & 15th September 2007 at Tuberculosis Research Centre, Chennai.
- Presented a paper at XXXI National Congress of Indian Association of Medical Microbiologists (IAMM) during 16th - 18th November 2007 at Mangalore.
- Presented a paper at 62nd National Conference on Tuberculosis & Chest Diseases (NATCON 2007) during 14th-16th December 2007 at New Delhi.

- Presented a paper at Medbio 2008 An Industry Academia Meet during 14th - 16th February 2008 at BMHRC, Bhopal.
- Attended 9th Sir Dorabji Tata Symposium on Antimicrobial Resistance on 10th & 11th March 2008 at SDTC, Bangalore.

Dr. R. K. Sharma

- Attended short term training course on economic basic of health care intervention during 16th to 18th August 2007 at WHO collaborative training centre, Community Health Department, Christian Medical College, Vellore.
- Attended expert group meeting on the project "Preparation of a field site for malaria vaccine trial in and around Jabalpur" on 8th and 9th September 2007 at Pachmarhi.
- Presented a paper at XIX Annual Conference of Indian Association for the Study of Population (IASP) during 26th - 28th October 2007 at BHU, Varanasi.
- Presented a paper at National Seminar on Population, Environment and Development organized by IIPS, Mumbai during 17th -19th March 2008 at Dehradun.

Jyotirmoy Roy

- Presented a paper at National Seminar on Tribal Health in India - Problems and Future Perspectives, organized by the Department of Anthropology, University of Pondicherry on 4th & 5th February 2008 at Pondicherry.

Dr. Arvind Verma

- Presented a paper at the conference on "Royal Society of Tropical Medicine and Hygiene a centenary celebration meeting the Millennium Development Goals" during 13th - 15th September 2007 at Queen Elizabeth II Conference Center, London, UK.

Mr. K.V.K. Rao

- Attended training on OvidSP of NMLERMED Consortium organized by National Medical Library, Delhi on 5th & 6th February 2008 at New Delhi.

Mr. S.N. Singh

- Presented a paper at 3rd All India Conference of CGLA, during 25th - 27th February 2008 at Nagpur.

9. EVENTS

9.1. Hindi-Day / Fortnight (1st to 15th September 2007)

During this period the Director of the centre promoted the use of *Hindi* among the scientists, other officers and staff of the centre in their day to day official work. Various competitions with Hindi as a medium of communication were organized at the centre for the employees and the winners were presented with cash prizes and certificates by the Director.



Prize distribution ceremony on occasion of *Hindi* day

9.2. Scientific Advisory Committee Meeting

Twentieth Scientific Advisory Committee Meeting was held on 29th December 2007 at the RMRCT under the chairmanship of Lt. Gen. Raghunath, Principal Executive, Sir Doraji Tata Centre for Research in Tropical Disease, Bangalore. Ongoing, completed and proposed new projects were discussed.



SAC meeting in progress

9.3. Vigilance Week (1st to 7th November 2007)

National vigilance week was observed during 1st - 7th November 2007. An oath was taken by all employees of the centre not to indulge in corrupt practices.



Employees taking oath

9.4. World AIDS Day (1st December 2007)

On World AIDS Day a team of RMRCT researchers visited the Schools at Bargi block of Jabalpur district to create awareness among the students about HIV/AIDS. The research team also participated in various activities carried out by other government departments in nearby villages for educating people, especially youths about HIV/AIDS.

9.5. National Science Day Celebration

National Science Day was celebrated on 28th February 2008. On this occasion scientific posters depicting the centre's research output were exhibited. Centre's scientists and technical staff delivered lectures on emerging health problems at various schools of Jabalpur city. Students from different schools also visited the laboratories and interacted with scientists and other researchers of the centre.



Scientific Exhibition during National Science Week



Students visiting laboratories

9.6. Foundation Day

The centre celebrated its 24th foundation day on 1st March 2007. On this occasion Dr. Altaf Lal, Health Attache, US Embassy delivered foundation day lecture and Sri M. Rajamani, IAS, Sr. Dy. Director General (Admn.) and Sri Sanjiv Datta, Financial Advisor, ICMR, New Delhi also graced the occasion. Prizes were distributed to the best workers from technical and administrative categories.



Guests on the dais on Foundation Day

10. Appendices

10.1. Joining & Farewell

Dr. Neeru Singh, DD(SG) took over the charge of the centre as Director on 1st October 2007.



Dr. Anup R. Anvikar, Assistant Director at the centre joined National Institute of Malaria Research, New Delhi as Assistant Director in June 2007.



10.2. Felicitation/Awards/Scholarship

Dr. C. K. Dolla, SRO

Netherlands Fellowship Programme of Government of Netherlands for pursing MPH course at VIT, Amsterdam.

Mr. Dinesh Kumar, SRO

Awarded RSTMH Centenary Scholarship by Royal Society of Tropical Medicine and Hygiene to attend the Conference at London, United Kingdom during 13th - 15th September 2007

Dr. Arvind Verma, RA

Awarded RSTMH Centenary Scholarship by Royal Society of Tropical Medicine and Hygiene to attend the Conference at London, United Kingdom during13th - 15th September 2007

10.3. Foreign Visits of Scientists & Research Staffs

Dr. Neeru Singhl

- Philadelphia, USA during 4th - 8th November 2007.
- Boston University School of Public Health, Boston, USA during 4th - 8th March 2008.

Dr. T. Chakma

- Addis Ababa, Ethiopia during 2nd - 6th March 2008.

Dr. C.K.Dolla

- Pursuing MPH course at V.U. University, Amsterdam (September 2007-08).

Mr. Dinesh Kumar

- Royal Society of Tropical Medicine and Hygiene, London, UK during 13th - 15th September 2007.

Dr. A. Verma

- Royal Society of Tropical Medicine and Hygiene, London, UK during 13th -15th September 2007.

10.4. Visitors

Prof. N.K.Ganguly, Director General, ICMR visited the centre on 11th August 2007 and Inaugurated International Hostel and DNA sequencing laboratory.



Mr. Jaldeep Govind, IAS, Tribal Commissioner of Madhya Pradesh visited the centre on 18th September 2007 for meeting with scientists of the centre.



Dr. Altaf Lal, Health Attache, US Embassy graced the foundation day celebration and delivered a lecture.



Sri M. Rajamani, IAS, Sr. Dy. Director General (Admn.), ICMR, New Delhi, addressed the scientists & staff of the centre on foundation day.



Sri Sanjiv Datta, Financial Advisor, ICMR, New Delhi, addressed the scientists & staff of the centre on foundation day.



10.5. Workshop/Training Organized

A workshop was organized by ICMR for administrative staff of RMRCT on 22nd May 2007. Mr. H.L. Arora, Sr. Administrative Officer and Mr. G.D. Sharma, Sr. Accounts Officer from ICMR H.Q., were the resource persons.



National Institute of Malaria Research Field Station Jabalpur and RMRCT jointly organized a meeting to review the progress of the project entitled, "Preparation of field site for Malaria vaccine trial in and around Jabalpur" on 8th & 9th September 2007 at Panchmarhi, Madhya Pradesh. Dr. N.K. Ganguly, Director General, ICMR presided the meeting as special invitee.



Five training-cum-workshops on HIV/AIDS were jointly organized by RMRCT and MPSACS, Bhopal for laboratory technicians and staff nurses during 11th June to 13th July 2007. Forty five laboratory technicians and fifty four staff nurses were trained.



Centre organized International Services Association (INSA) 41st Community health trainer's training program during 9th - 16th September 2007.



Training imparted to the Medical Officers of District Katni on Dengue and Chickungunya on 25th September 2007.



An International Scientific Workshop on Molecular Epidemiology and Immunology of Malaria and Other Vector Borne Diseases was organized at Regional Medical Research Centre for Tribals jointly with National Institute of Malaria Research, Field Station, Jabalpur during 16th - 19th October 2007. Various health needs and problems of host parasite interactions, genetic diversity, pathogenesis, epidemiology and control were discussed. Hands on training sessions were arranged for participants on PCR and Sequencing.





Two Malariology training workshop for Medical Officers of districts of Madhya Pradesh were organized during 28th - 30th January 2008 and 25th -27th February 2008. The workshops were organized jointly with NIMR-FS Jabalpur and Directorate of Health Services, Bhopal under Enhanced Vector Borne Disease Control Programme (EVBDCP).



10.6. Committees

Scientific Advisory Committee

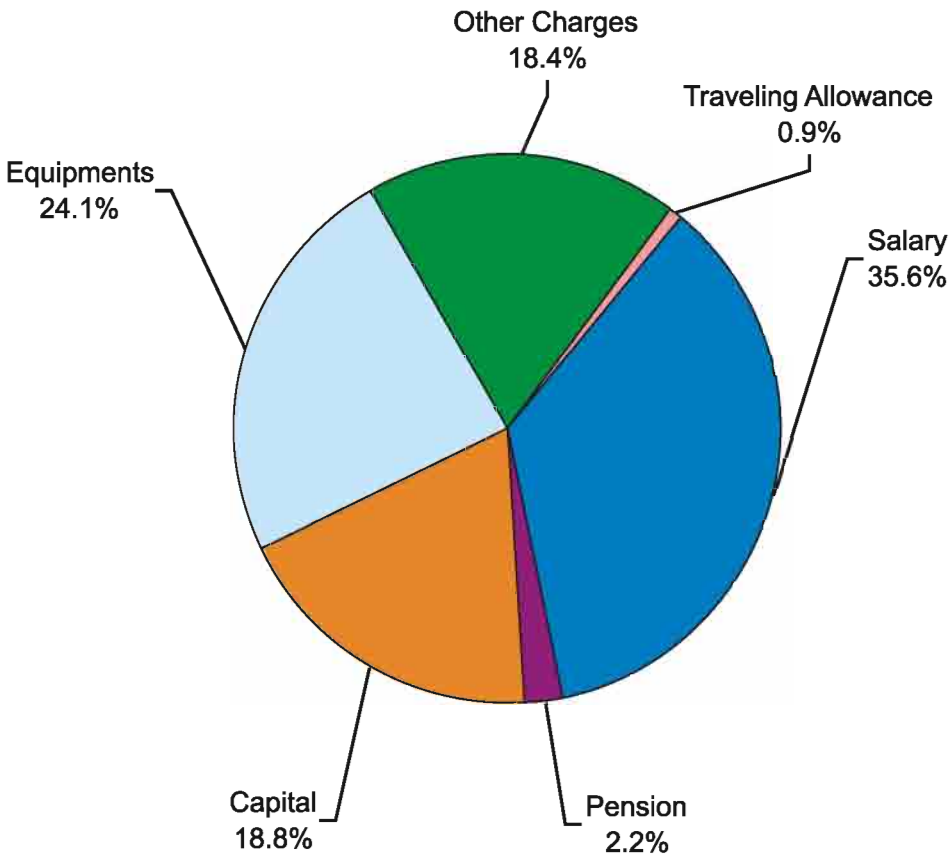
1	Lt. Gen. Raghunath Principal Executive Sir Dorabji Tata Centre for Research in Tropical Diseases, IISC Campus, Bangalore	Chairman
2	Prof. R.C. Mahajan S.N. Bose INSA Research Professor & Emeritus Professor Department of Parasitology PGI, Chandigarh	Member
3	Dr. P.R. Narayanan Director Tuberculosis Research Centre Chetput, Spur Tank Road, Chennai	Member
4	Dr. D.S. Agrawal B-24, Swasthya Vihar New Delhi	Member
5	Dr. S. Pattanayak B-91, Swasthya Vihar, Vikas Marg New Delhi	Member
6	Prof. A.P. Dash Director National Institute of Malaria Research Shamnath Marg, Delhi	Member
7	Dr. Rashmi Arora Scientist F Division of ECD Indian Council of Medical Research Ansari Nagar, New Delhi	Member
8	Dr. S. K. Subbarao Emeritus Medical Scientist Dept. of ECD Indian Council of Medical Research Ansari Nagar, New Delhi	Member
9	Prof. R. K. Mutatkar President The Maharashtra Association of Antrhopological Sciences (MAAS) 64, Anand Park, Aundh, Pune	Member
10	Dr. Neeru Singh Director Regional Medical Research Centre for Tribals Nagpur Road, Jabalpur	Member Secretary

Ethics Committee

1	Dr. Arun Sharma Professor & Head Department of Radiology NSCB Medical College, Jabalpur	Chairman
2	Dr. Pushpa Kirar Professor & Head Department of Radiotherapy NSCB Medical College, Jabalpur	Member
3	Dr. S. P. Pandey Professor & Head Department of Pharmacology NSCB Medical College, Jabalpur	Member
4	Dr. S. S. Sandhu Associate Professor Department of Biological Sciences Rani Durgavati University, Jabalpur	Member
5	Dr. B. K. Sahu Professor & Head Department of Rural Development Rani Durgavati University, Jabalpur	Member
6	Sh. Jamal Akhtar Baig Director ENFORCE (NGO Representative) M.P. Nagar, Bhopal	Member
7	Dr. V. G. Rao Scientist E RMRCT, Jabalpur	Member Secretary

10.7. Budget

Budget 2007-08
(Total Budget Rs. 823.46 Lakhs)



10.8. Staff List

Director
Dr. Neeru Singh, MSc, PhD

Community Medicine Department

Dr. V. G. Rao, MBBS, MD	Scientist E
Dr. Chandra K. Dolla, MBBS	Scientist C
Dr. Surender Kumar, MBBS	Scientist C
Dr. Bal Krishna Tiwari, MA, PhD	Research Assistant
Dr. Manoj K. Bhondeley, MSc, MPhil, PhD	Research Assistant
Shri Ajay K. Goyal, MA	Research Assistant
Shri Mahendra K. Ukey, Hr.Sec, DMLT	Lab Technician
Shri Ajesh Kumar Dubey, Hr. Sec	Insect Collector
Shri M. P. Tiwary, MA	Insect Collector
Shri Rakesh K. Jaiswal, Hr. Sec	Insect Collector
Shri Rajendra P. Gond, VIII	Lab. Servant
Shri Sukhlal Vishwakarma, Hr. Sec	Lab. Servant

Epidemiology Department

Dr. Tapas Chakma, MBBS, MAE	Scientist E
Shri P. Vinay Rao, MSc	Research Assistant
Shri Samar Bahadur Singh, MA, LLB	Research Assistant
Shri Pradeep K. Meshram, MA, MPhil	Research Assistant

Genetics Department

Dr. R. B. Gupta, MSc, PhD	Scientist E
Dr. Rajiv Yadav, MBBS, MD	Scientist B
Shri M.P.S.S. Singh, MSc	Research Assistant
Smt. Ujjwala Das, MSc	Research Assistant
Shri Subhash Godbole, MSc	Lab Technician
Shri Ashok K. Gupta, BA, CMLT	Lab Technician
Shri C. P. Vishwakarma, BA	Lab Technician
Shri Anil Gwal, BSc, CMLT	Lab Technician
Shri D. K. Mishra, BA	Insect Collector
Shri Jagdish P. Thakur, VIII	Lab. Servant

Vector Control Department

Shri Gyan chand, MSc	Scientist C
Shri V. Soan, MSc	Technical Officer
Dr. N. K. Choudhary, MA, PhD	Health Educator
Shri Mohan Lal Patel, Hr. Sec	Lab Technician
Shri S. R. Mishra, Hr. Sec	Insect Collector
Shri B. S. Patel, Hr. Sec	Insect Collector
Shri Ghanshyam Ahirwar, Hr. Sec	Insect Collector
Shri Dhan Singh Thakur, VIII	Lab. Assistant

Microbiology Department

Dr. Jyothi Bhat, MBBS, MD	Scientist B
Shri Vijay S. Gadge, MSc, DMLT	Research Assistant
Shri G. P. Shukla, BSc	Tech. Assistant
Smt. Savinder Rao, BSc, CMLT	Tech. Assistant
Shri Chandan Karforma, BSc, DMLT	Tech. Assistant
Smt. Canina Luke, Hr. Sec	Lab Technician
Shri Purshottam Patel, Hr. Sec, CMLT	Lab Technician
Shri Suresh K. Burman, VIII	Lab. Servant
Shri Jagdish Singh, IX	Lab Assistant

Immunology Department

Dr. Dasarathi Das, MSc, PhD	Scientist C
Shri L. S. Kaushal, BSc, CMLT	Lab Technician
Shri Lalit K. Sahare, Hr. Sec, DMLT	Lab. Technician
Shri Sheikh Salim, IV	Lab. Attendant
Shri Rajju Lal Neelkar, Hr. Sec	Lab. Assistant
Shri Vijay K. Kachhi, MA	Lab Assistant

Demography Department

Dr. Kalyan B. Saha, MSc, MPS, PhD	Scientist C
Dr. D. C. Jain, MSc, PhD	Research Assistant
Dr. Alpana Abbad, MA, PhD	Research Assistant
Smt. Maya Pandey, MA	Research Assistant
Shri Shiv Kumar Singh, MA	Lab Technician

Statistics Department

Shri Dinesh Kumar, MSc	Scientist C
Dr. Arvind Verma, MSc, PhD	Research Assistant
Shri D. C. Khatarkar, Hr. Sec	Insect Collector

Health Economics

Dr. Ravendra K. Sharma, MPS, MPhil, PhD	Scientist B
Dr. Joytrimoy Roy, MA, PhD	Research Assistant

Medico Social Department

Dr. S. R. Qamra, MSc, PhD	Scientist D
Shri Arvind Kavishwar, MSc, PGDCA	Research Assistant
Shri Praval Srivastava, MA	Research Assistant
Shri Prakash Srivastava, BA	Data Entry Operator Gr. B
Smt. Pushpa Umate, MA	Upper Division Clerk

Library

Shri K.V.K. Rao, MCom, BLib	Asst. Lib. & Inf. Officer
Shri S.N. Singh, MA, BLib	Library Information Asst.
Shri Ganga Bahadur, VIII	Jr. Library Attendant

Art and Photography Section

Dr. R.C. Mishra, MA, PhD	Sr. Artist cum Photographer

Establishment Section

Shri Ravi K. Gupta, BA	Section Officer*
Shri Sudesh K. Yadav, MA, LLB	Personal Assistant
Shri Subhash C. Muduali, MA, BLib	Stenographer
Shri Rajendra K. Thakur, BSc	Assistant
Shri Hakim Singh Thakur, MA	Jr. Hindi Translator
Shri Rajendra K. Minocha, Hr. Sec, DMLT	Tech. Assistant
Shri Jagdish P. Mishra, MA	Field Assistant
Shri Bhagwani Prasad, Hr. Sec	Upper Division Clerk
Shri Raj Kumar Handa, BCom-I	Upper Division Clerk
Shri Raghubir Prasad, Hr. Sec	Upper Division Clerk
Shri Subash S. Kumbhare, BSc, Com. Opt.	Data Entry Operator Gr. B

* On deputation to IGNCA, New Delhi

Shri Promod Kumar Garg, Hr. Sec	Daftari
Shri Laxman Prasad, VIII	Daftari
Shri Madan Singh Maravi, HSC	Peon
Shri Preetam Lal Gond, VIII	Peon
Shri Baidraj Kachhi, VII	Mali
Shri Ramesh Kumar Ahirwar, VII	Head Watchman
Shri Suresh Jaiswal, Hr. Sec	Watchman cum Cook
Shri Umesh Gautam, BCom	Watchman cum Cook
Shri Anil Vinodia, HSC	Watchman cum Cook
Shri Doman Ram	Watchman
Shri Malikhan Singh, HSC	Watchman
Shri Santosh Sonkar, IV	Watchman
Shri Ajay K. Soni, Hr. Sec	Watchman
Shri Santosh K. Kol, VIII	Watchman
Shri Prem Singh Gond, VIII	Watchman
Shri Bhagwan Singh, HSC	Watchman
Shri Ram K. Mehra, VIII	Watchman
Shri Summat Singh, VIII	Watchman
Shri Munna Lal Choudhary, V	Watchman
Shri Shesh Narayan, HSC	Sweeper
Shri Arakh C. Malik, VIII	Sweeper
Shri Vishnu Prasad, VIII	Sweeper
Shri Sone Lal Dumar, VI	Sweeper
Shri Papu Lal Dumar, VIII	Sweeper

Accounts Section

Shri B. K. Majumdar, BCom	Accounts Officer *
Shri Mohan Lal Kori, MA	Research Assistant
Shri P. K. Argal, MA	Assistant
Shri P. K. Bhale Rao, MCom	Assistant
Shri D. P. Lodhi, MA, LLB	Assistant
Shri P. K. Srivastava, MA, LLB	Upper Division Clerk
Shri Baisakhu Lal, Hr. Sec	Lower Division Clerk
Shri Suresh K. Pareha, IV	Peon

* Additional charge of Administrative Officer

Stores Section

Shri Gyan Chand Jain, BA	Section Officer*
Shri S. K. Vinodia, BCom	Assistant
Smt. Filomina Lakra, BA	Upper Division Clerk
Shri Sailesh K. Sahai, Hr. Sec	Upper Division Clerk
Smt. Reena Shome, BSc	Lab Recorder
Shri Ram K. Verma, Hr. Sec	Wireman
Shri Ram N. Dubey, Hr. Sec	Lower Division Clerk
Shri Tulsi Ram Kurmi, HSC	Driver
Shri Ram Narayan, IX	Driver
Shri Ashok Kumar Saini, VI	Driver
Shri Paramjeet Singh, IX	Driver
Shri Ramesh Kumar Gond, Hr. Sec	Driver
Shri Genda Lal, VIII	Driver
Shri Ravindra Kumar Katrah, VIII	Driver
Shri P. K. Namdev, MA	Motor Mechanic
Shri K. Venugopal Rao, Hr. Sec	Store Attendant
Shri Promod Choubey, MA, Dip. T	Lab Attendant
Shri Rameshwar Prasad, HSC	Workshop Helper cum Driver
Shri Prakash Sangle	Lab. Servant
Smt. Shashi Prabha Mishra	Lab. Servant
Shri Shamshad Ali Ansari	Lab. Servant

National Nutrition Monitoring Bureau (M.P. Unit)

Dr. Rakesh Babu, MBBS	ARS
Mrs. S. J. Khan, MHSc	ARS
Shri Gajanan Dhore, MSW	Social Worker
Shri Santosh Maravi, Hr.Sec	Field Attendent

Integrated Counseling & Testing Centre

Shri Atul Karkare, MA	Counselor**
Ms. Sharddha Shrivastava, MA	Counselor
Shri K. K. Verma, BSc, PGDCP&DT	Lab. Technician

* Additional charge of Section Offier (Estt.) **transferred to NSCB Medical College, Jabalpur in Dec. 2007

10.9. राजभाषा नीति के कार्यान्वयन एवं अनुपालन से संबंधित प्रगति रिपोर्ट

क्षेत्रीय जनजाति आयुर्विज्ञान अनुसंधान केन्द्र (भा0आ0अ0प0), जबलपुर में भारत सरकार, गृह मंत्रामलय, राजभाषा विभाग की राजभाषा नीति के समुचित कार्यान्वयन एवं अनुपालन के लिए सतत् प्रयास किए जा रहे हैं।

1. राजभाषा नीति कार्यान्वयन समिति

राजभाषा विभाग के आदेशानुसार इस अनुसंधान केन्द्र में 'राजभाषा कार्यान्वयन समिति' गठित है :–

1. डॉ. नीरू सिंह, निदेशक – अध्यक्ष
2. डॉ. व्ही0जी0राव, वैज्ञानिक 'ई' – सदस्य
3. श्री बरुण कुमार मजूमदार, लेखा अधिकारी – सदस्य
4. श्री रविकांत गुप्ता, प्रशासनिक अधिकारी – सदस्य
5. श्री ज्ञानचंद जैन, अनुभाग अधिकारी – सदस्य
6. श्री हाकिम सिंह ठाकुर, कनिष्ठ हिंदी अनुवादक – सदस्य

प्रत्येक तीन माह में इस समिति की बैठक होती है, जिसमें इस अनुसंधान केन्द्र में राजभाषा कार्यान्वयन एवं अनुपालन की स्थिति की समीक्षा की जाती है तथा सरकार द्वारा निर्धारित लक्ष्यों को प्राप्त करने हेतु आवश्यक उपायों की संस्तुति की जाती है। अभी तक इस समिति की कुल 61 तिमाही बैठकें आयोजित की जा चुकी हैं।

2. हिंदी पत्राचार

इस केन्द्र द्वारा प्रतिवेदनाधीन वर्ष 2007–08 के दौरान सरकार द्वारा निर्धारित लक्ष्य के अनुरूप हिंदी पत्राचार में अधिक से अधिक पत्राचार करने का प्रयास किया जा रहा है। और 'क' क्षेत्र के साथ–साथ 'ख' एवं 'ग' क्षेत्रों में मूल हिंदी पत्राचार बढ़ाने के लिए प्रयास किए जा रहे हैं।

3. धारा 3(3) एवं राजभाषा नियम–5 का अनुपालन

राजभाषा अधिनियम, 1963 (यथासंशोधित 1967) की धारा 3(3) के अनुपालन में सामान्य–आदेश, परिपत्र, निविदा सूचना एवं निविदा प्रपत्र आदि निर्दिष्ट दस्तावेजों के अतिरिक्त रिक्त पदों के विज्ञापन आदि भी हिंदी व अँग्रेजी में द्विभाषी रूप में जारी किए जाते हैं।

4. प्रशिक्षण

इस केन्द्र के अधिकांश अधिकारियों एवं कर्मचारियों को हिंदी का कार्यसाधक ज्ञान/प्रवीणता प्राप्त है और यह केन्द्र राजभाषा नियम 10.4 के अंतर्गत अधिसूचित है।

राजभाषा विभाग के निर्देशों के अनुसार जिन कर्मचारियों को हिंदी टंकण एवं हिंदी आशुलिपि के सेवाकालीन प्रशिक्षण की आवश्यकता थी, उन सभी को हिंदी शिक्षण योजना, राजभाषा विभाग, जबलपुर कार्यालय से हिंदी टंकण/हिंदी आशुलिपि का प्रशिक्षण दिलाया गया है और इस मद में भी शत–प्रतिशत लक्ष्य प्राप्त कर लिया गया है।

5. हिंदी–दिवस / हिंदी–पखवाड़ा

राजभाषा विभाग के निर्देशों के अनुसार केन्द्र में प्रति वर्ष हिंदी–दिवस एवं हिंदी पखवाड़ा मनाया जाता है। इस दौरान निदेशक महोदया द्वारा केन्द्र के सभी अधिकारियों एवं कर्मचारियों से सरकारी कामकाज अधिकाधिक हिंदी में करने की अपील की जाती है, कर्मचारियों के लिए हिंदी प्रतियोगिताएँ आयोजित की जाती हैं।

प्रतिवेदनाधीन वर्ष के दौरान इस केन्द्र में 1–15 सितम्बर, 2007 को "हिंदी–पखवाड़ा" मनाया गया। इस दौरान केन्द्र में क्षेत्रीय जनजाति आयुर्विज्ञान अनुसंधान केन्द्र एवं राष्ट्रीय मलेरिया अनुसंधान संस्थान के जबलपुर स्थित फील्ड स्टेशन के अधिकारियों एवं कर्मचारियों के लिए संयुक्त रूप से हिंदी टंकण, हिंदी टिप्पण एवं प्रारूपण, तात्कालिक हिंदी निबंध लेखन एवं हिंदी तात्कालिक भाषण प्रतियोगिताएँ आयोजित की गईं। 26 सितम्बर, 2007 को केन्द्र की निदेशक डॉ. नीरू सिंह ने इन हिंदी प्रतियोगिताओं तथा 'मूल रूप से हिंदी में सरकारी कामकाज (टिप्पण / आलेखन) करने के लिए प्रोत्साहन योजना के विजेता कम्रचारियों को नकद पुरस्कार एवं प्रमाण–पत्र वितरित किए, जिनका विवरण निम्नानुसार है :–

1. हिंदी टिप्पण एवं आलेखन प्रतियोगिता

प्रथम पुरस्कार रु. 1500 / –	श्री सुबाष चंद्र मुदुलि, आशुलिपिक
द्वितीय पुरस्कार रु. 1200 / –	श्री के0वेनुगोपाल राव, भंडार परिचारक
तृतीय पुरस्कार रु. 800 / –	श्री एस0के0उपाध्याय (एन.आई.एम.आर.)
सात्वना पुरस्कार रु 600 / –	श्री अजय अरोड़ा (एन.आई.एम.आर.)

2. हिंदी टंकण प्रतियोगिता

प्रथम पुरस्कार रु. 1500 / –	श्री डी0एन0विश्वकर्मा (एन.आई.एम.आर.)
द्वितीय पुरस्कार रु. 1200 / –	श्री एस0के0सहाय, उच्च श्रेणी लिपिक
तृतीय पुरस्कार रु. 800 / –	श्री सुबाष चंद्र मुदुलि, आशुलिपिक
सात्वना पुरस्कार रु 600 / –	श्रीमती फिलोमिना लकड़ा, उच्च श्रेणी लिपिक

3. तात्कालिक हिंदी निबंध प्रतियोगिता
(विषय : 'वर्तमान संदर्भ में न्यायपालिका बनाम कार्यपालिका')

प्रथम पुरस्कार रु. 1500 / –	श्री विश्वनाथ सिंह यादव (एन.आई.एम.आर.)
द्वितीय पुरस्कार रु. 1200 / –	श्री प्रदीप मेश्राम, अनुसंधान सहायक
तृतीय पुरस्कार रु. 800 / –	श्री पुष्पेन्द्र तिवारी (एन.आई.एम.आर.)
सात्वना पुरस्कार रु 600 / –	श्री एस0के0उपाध्याय (एन.आई.एम.आर.)
सात्वना पुरस्कार रु 600 / –	श्री जगदीश प्रसाद मिश्रा, क्षेत्र सहायक
सात्वना पुरस्कार रु 600 / –	श्री प्रवीण कुंड (एन.आई.एम.आर.)

4. हिंदी तात्कालिक–भाषण प्रतियोगिता

प्रथम पुरस्कार रु. 1500 / –	श्री एस0के0उपाध्याय (एन.आई.एम.आर.)
द्वितीय पुरस्कार रु. 1200 / –	डॉ0एन0के0चौधरी, चिकित्सा स्वास्थ्य कार्यकर्ता
तृतीय पुरस्कार रु. 800 / –	श्री प्रदीप मेश्राम, अनुसंधान सहायक

सात्वना पुरस्कार रु 600/–	डॉ. डी. दास, वरिष्ठ अनुसंधान अधिकारी
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इस केन्द्र के निम्नलिखित कर्मचारियों को इस प्रोत्साहन योजना के अंतर्गत नकद पुरस्कार प्रदान किए गए :–

श्री भगवानी प्रसाद, उच्च श्रेणी लिपिक
श्री राजकुमार हांडा, उच्च श्रेणी लिपिक
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श्री प्रमोद कुमार चौबे, प्रयोगशाला परिचारक
श्री जगदीश प्रसाद मिश्रा, क्षेत्र सहायक

5. प्रकाशन

इस अनुसंधान केन्द्र से जनजातियों की विशिष्ट स्वास्थ्य समस्याओं के अध्ययन एवं अनुसंधान के बारे में प्रकाशित 'ट्राइबल हैल्थ बुलेटिन' (अँग्रेजी में) तथा हिंदी में '' आदिवासी स्वास्थ्य पत्रिका '' के नाम से प्रकाशित की जाती है। अभी इस पत्रिका का खण्ड–11, अंक 1 एवं 2 (जनवरी एवं जुलाई, 2005) का प्रकाशन किया गया है।



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