ANNUAL REPORT 2005-06

REGIONAL MEDICAL
RESEARCH CENTRE
(Indian Council of Medical Research)
Bhubaneswar

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BHUBANESWAR

Contents

Preface

During the year research activity was focussed on developing strategies of public health importance or product/tool that can help in diagnosis or immunoprophylaxis against filariasis. Besides, human resource development was strengthened by deployment of workforce like research fellows from various reputed organisations and by imparting training & guidance to M.Sc. students from various Universities for undertaking their dissertation work. Infrastructure was enhanced to facilitate research progress in terms of equipments, consumables and space.

Research was addressed in areas of Lymphatic Filariasis, Malaria, Nutrition and other diseases of regional importance like Hepatitis. Research issues were addressed in basic, applied as well as in operational areas to develop immunoprophylactic agents, diagnostic assay and tools that can help in national programme. Out of 21 projects undertaken this year, 4 are completed while 10 were extramural that helped resource generation with financial support from National/ International organisations.

Major focus of research in filariasis was to explore areas of host or parasite factors that can impart protection against filarial infection through innate or adaptive immunity and differences studied through polymorphism in host. Parasite secretions like glutathion-s-transferase (GST) that is known to help parasite survival and used as prophylactic in vaccine against other parasitic diseases was explored to find its ability to protect against filarial infection. TLR4 gene mutations like Asp 299Gly and Asp 399 lle that are associated with innate immunity in bacterial infection also found to show strong association with filarial infection in males. This can help to explain the observation that disease development in filariasis can occur without prepatent microfilarimia that may be associated with differential expression of host receptors on macrophase like TLR4 receptors, which show mutations.

To assist the current national programme, issues on mass drug administration against filariasis, innovative MDA strategy for urban area was developed, with partnership approach taking community specific socio-cultural practices, religion and attitude into consideration. The strategy was executed under the state programmer for 2 consecutive years to improve drug compliance level. Appropriate recommendations are made after testing the strategy in the field through operational research. Immunological assays like

IgG & IgM assays developed are being tested for efficacy that can detect filarial infection as early as 1½ year of children to assist efficacy monitoring of MDA programme. One of major issues of MDA programme is poor drug compliance that is largely ascribed to fear of side reaction by the community to Diethyl Carbamazine (DEC). The possible role of Wolbachia mediating such side reaction was studied. The results indicated strong association of Wolbachia density to post drug reaction and 2-3 weeks pre treatment with Doxycycline can reduce Wolbachia density. Besides, clinical trial with lower dosage of DEC are being conducted for its efficacy and tolerability that may significantly reduce side reactions.

Malaria is one of the major health problems in this region. Since Orissa reports high frequency of falciparum infection and severe malaria leading to high case fatality hence, molecular epidemiological studies undertaken indicated variation in distribution of parasite genotypes and drug resistance strains in Pf.. Data on vector transmission indicators are generated to assist national programme. The malaria programme, being continued in the state, was monitored in 2 districts i.e. Sambalpur and Sundargarh every month to improve the output. Malaria data of the state for last decade has been analysed and that has indicated higher morbidity and mortality rate in forested areas largely affecting children in KBK districts due to continued transmission. Drug resistance mapping for Chloroquine, S.P compounds and vector mapping have been initiated to denote insecticidal resistance in high-risk districts.

The state run programme on malaria chemoprophylaxis with Chloroquine is being evaluated for its efficacy, acceptability and community compliance. Clinical trials with newer antimalarials are under way. To help rapid screening of this incriminating vector A.annularis, efforts are taken to develop species-specific diagnostic markers. GIS mapping of Angul district was carried out to co-relate vector transmission indicators that can help developing tool for epidemic prediction. Since many currently used chemical insecticides have high toxicity with prohibitive cost for use in mass programmes, efforts have been made to develop bioperspective of botanicals as an effective insecticide in collaboration with CSIR laboratory at Regional Research Laboratory (RRL), Bhubaneswar.

Micronutrient deficiency disorder and undernutrition are widely prevalent in this region. Nutrition study of Dongria Kondh primitive tribe and Domb scheduled caste population at Rayagada district of

Orissa has indicated high frequency of Goitre and anaemia reflecting poor iodine and iron containing food nurture. The preliminary study on role of trace-metals in undernutrition has been initiated in collaboration with Institute of Physics at Bhubaneswar.

To generate information on prevalent bacterial enteropathogens in this region periodic rectal swab examination of paediatric age group of children admitted to diarrhoea ward of reputed referral hospitals and PHCs were undertaken through culture and molecular markers. This indicated high prevalence of E.coli (80%), besides Vibrio cholerae (16%) and Shegella (2%).

Human resource development was emphasized actively to assist in developing trained manpower in bio-medical research in this region. Around 20 meritorious students of CSIR, UGC and SRFs from ICMR sanctioned are undergoing PhD. Programme. Around 45 M.Sc. students from various universities have completed their dissertation work in medical biotechnology. Medical officers, Public Health personnel were imparted training on mass drug administration under filarial elimination programme, sponsored by state health department. Medical officers of three states of eastern region were imparted training under Professional Development Course (PDC) conducted by State Institute of Health & Family Welfare (SIHF&W). Training on verbal autopsy methodology to ascertain cause of death due to TB. or alcoholism was imparted by scientists to census staff of Orissa.

Several scientists were sent to reputed institutes in India and abroad to acquire new technique. Scientists participated and presented research papers in conferences & seminars.

The centre organised several scientific meetings, lectures and workshops during the period. Seminar, journal club and scientific lectures by invited eminent speakers were organised. The linkages with other upcoming institutions locally and at national or international level established. Six monthly news bulletin and library newsletter were published and distributed. Posters on centre's actively in research field and educative materials were prepared and demonstrated in 13th National Children Science Congress for public awareness in December 2005.

Human and animal ethical committee meetings were organised periodically. Animal house was maintained as per guidelines and periodically supervised by veterinary experts. Celebration like national science day and centre's foundation day were conducted

by staff by inviting eminent speakers. Research coordination meeting with state health officials and scientific experts under chairmanship of commissioner cum principal secretary health, Orissa was conducted to identify priority areas of researchable issues of this region on 29th may 2006. The ongoing projects of the centre were reviewed interimly twice this year by inviting experts.

Collaboration with state health authorities were strengthened by providing regular OPD services at Capital Hospital on filariasis, diagnostic services on haemoglobinopathy disorder, diarrhoeal surveillance and during outbreak of Jaundice & Chickenguniya infection. Besides frequent interaction with Medical Colleges, State Aids Cell and local health authorities made several laboratory equipments catering to modern technology were procured. Construction of guesthouse, auditorium, Ph.D. scholars hostel and animal house got completed through CPWD's internal renovation, and horticultural work at campus were executed. The renovation of Centre's buildings was carried out.

During the year, the centre generated Rs. 71.85 lacks through extramural projects, research fellowship & equipment grants. From outside sources other than the budget. The centre published sixteen research papers in 2005 of which 12 are SCI publications. Total Impact Factor (I.F) is 18.273 for the year 2005, besides, in 2006 till date 12 research papers have been published or in press of which 9 are covered in Science Citation Index (SCI). Our library organized JCCC@ICMR training programme for librarians of ICMR institutions of eastern region. Library subscribes 34 foreign and 37 Indian biomedical journals. Online accesses of full text journals are made accessible to all computers of the centre through LAN.

There are 97 staff in position including 16 scientists with various expertise who catered to accomplish the output

The scientists and staff of this Centre made continuous effort and contributed to significant output of the Centre. I sincerely thank scientists and staff for their endeavour and contributions. I am also thankful to the State health department and other agencies and collaborating institutes for their assistance and co-operation. I extend my deep gratitude to Council for its continuous support, guidance and encouragement. With all round support, the Centre can continue its endeavour to achieve its goal.

S.K.Kar

Research Highlights

The centre continued to focus its research activities on various issues pertaining to lymphatic filariasis, malaria and micronutrient deficiency disorder. In order to develop product for imparting protection against lymphatic filariasis infection studies were addressed on protective immunity of host. Studies on innate immunity in filariasis showed that a point mutation (Thr to Ile) in Toll like receptor-4 (TLR-4) at 399 amino acid positions could protect the human host from developing filarial disease in males. Glutathione-S-transferase (GST), isolated from the cattle filarial worm *Setaria digitata was* found to be highly immunogenic and appears to play a protective role against filarial infection .The IgG, IgM and IgE seropositivity to GST were significantly high in asymptomatc microfilaemia carriers and chronic patients compared to endemic normals. To address major issues on filarial elimination program studies were undertaken on side reaction of DEC and development of strategy for urban areas for better drug compliance. Investigation for any association of Wolbachia density to post–DEC reactions indiacated that a) Doxycycline treatment of Mf carriers for 21 and 10 days significantly decreased the Wolbachia load; b) decreased Wolbachia density resulted in significant decrease in post-DEC reaction in host but not in cytokine levels and c) Doxycycline treatment had no significant effect on adult worm viability (shown by circulating filarial antigen) or on Mf density. The frequency of reactions was also significantly less in subjects having TLR-4 mutations (Thr 399 Ile) in comparison to those with wild type sequence. The low coverage and compliance rate are the major cause of set back to MDA programme. The centre has developed an innovative strategy to increase the compliance/coverage rate in urban areas through a formative research programme.

Several epidemics reported in the region were investigated. Investigations on sprodic outbreak of Diarrhoeal diseases have identified V *cholerae* 01 serotype Inaba biotype El Tor for the first time in this region. Molecular typing of *P falciparum* isolates collected from clinical cases of malaria indicates the presence of different point mutations in DHFR and DHPS genes responsible for resistance to Sulphadoxine and Pyremethamine. A strong association was observed between the prevalence of CQ resistance markers (PfCRT 76T and PfMDR1 86Y) and severe malaria cases indicating strong possibility of treatment failure in development of severity in malaria. A multiplex PCR was developed

for simultaneous detection of *An.fluviatilis* species complex, human host preference and *Plasmodium falciparum* sporozoite presence using a unique mosquito processing methods.

Investigation on several epidemics of viral hepatitis in this region revealed causative organism as HEV in this region. An out break of fever reported from Panposh in Sundergarh district of Orissa affecting more than 4000 subjects was investigated. This sample got tested at NIV, Pune .The causative organism was found to be Chinkunguniya virur, the first reported in Orissa.

Wolbachia infection in *Aedes aegypti* (Liver pool strain) was found to cause cytoplasmic incompatibility, which reduces hatching rate. Our experiment design to eliminate Wolbachia infection from all developmental stages of mosquitoes has shown that tetracycline treatment at doses 0.2 mg/litre the infection was eliminated from vector. Vector mapping studies on malaria transmission in Angul districts of Orissa has shown B / C species compex of *Anopheles culicifacies* and S / T species complex of *Anopheles fluviatilis* are the predominant malaria transmitting vectors in the region and their insecticidal sensitivity determined.

A study conducted in three states like Orissa, Jharkhand and west Bengal has shown that the domestic violence in terms psychological, physical and sexual harassment against women is linked with increased risk of pre-term birth, stillbirths and spontaneous abortions/miscarriages.

1 On Going Studies

1	Immunochemical characterization of filarial glutathione S-transferase and its protective potential in experimental filariasis.
2	Human Bancroftian Filariasis: Identification of Immunological markers of morbidity in Hydrocele and Elephantiasis
3	Post–DEC reactions in Human Bancroftian filariasis: An Immunobiological study in Orissa, India
4	Genetic polymorphism of host molecules involved in immunity and immunoregulation in human filariasis.
5	Development and evaluation of community development and partnership strategies for drug delivery for the control of lymphatic filariasis in urban areas of Orissa, India
6	Efficacy and Tolerability of single dose DEC of 100mg, 200mg & 300mg strength in filariasis endemic community in Orissa.
7	Studies on prevalence of 76Tcrt / 86Ymdr1 Plasmodium falciparum isolates in severe malaria cases of Orissa and its biological advantage.
8	Development of potent mosquitocidal agents from natural sources
9	Molecular Characterization of *Anopheles annularis* Complex Development of Species Specific Diagnostic Markers and Micro satellite Markers
10	Malariogenic stratification of Anugul district of Orissa using sibling species prevalence of malaria vectors.
11	A study on immunoregulation and genotyping for cytokine polymorphism in human cerebral malaria.
12	The effect of Choloroquine Chemoprophylaxis during pregnancy among the compliant and non - compliant mothers of Orissa.
13	Molecular analysis of drug resistance genes and prediction of treatment outcome in P.falciparum infections in Orissa.
14	A randomised clinical trial with Chloroquine and alternate drug regimens to study the comparative efficacy, in treatment of uncomplicated P.falciparum malaria in two endemic districts of Orissa.
15	Epidemiological characterisation of bacterial enteropathogens among the children suffering from acute diarrhoea-A hospital based study.
16	A 6-year's Prospective study of the risks of death by cause from tobacco and alcohol use among 2million Indian men and women, A multicentric study.
17	Epidemiology of viral hepatitis in tribal populations of Orissa, Madhya Pradesh/ Chhatisgarh and Jharkhand, India –a multicentric study

On Going Studies

Principal Investigator:
Dr. M. K. Beuria
Co- Investigators:
Dr. M.K. Das and Dr. M.S. Bal
Funding : Extramural (DST)
Starting Date : March 2005
Closing Date : February 2008

1. Immunochemical characterization of filarial glutathione S-transferase and its protective potential in experimental filariasis.

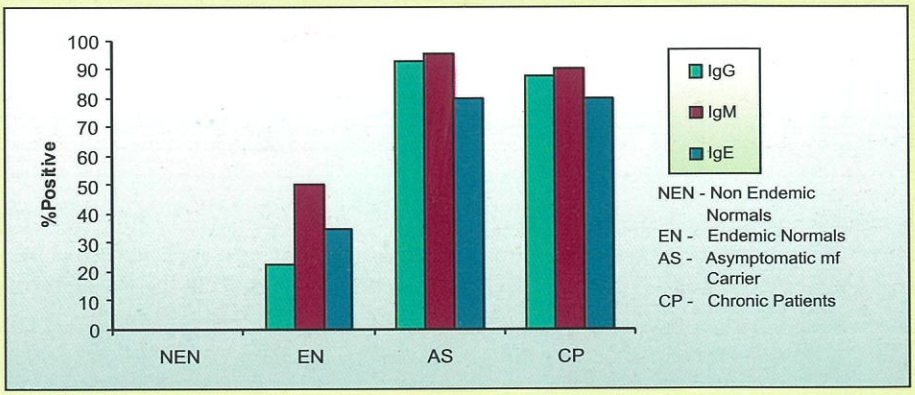
Objectives:

1. To determine recognition pattern of anti-Glutathione-S- transferase (GST) antibodies (SDS-PAGE and immunoblotting) in filarial sera.
2. To determine the cytokine responses specific to GST in filariasis.
3. To evaluate the protective potential of GST to clear microfilariae in experimental infected animal.

Work Progress:

Glutathione-s-transferases, which help in parasite survival against host-induced damages, are detoxification enzymes. These enzymes have been used as component of anti-parasitic vaccine in Schistosomiasis, Fascioliasis and in Chaga's disease. In this study we have purified Glutathione-s-transferase from cattle filarial parasite Setaria digitata to evaluate it's role in human filariasis. We have earlier determined the IgG and IgM antibodies to Glutathione-s- transferase in individuals living in areas endemic for Wuchereria bancrofti infection. Majority (90%) of infected individuals (asymptomatic microfilaraemic and chronic patients) were seropositive for both the antibodies compared to normal individuals (20%) of endemic regions. IgE antibodies were determined in different group of filarial sera. Seropositivity of 80%, 60%and 35% were observed in chronic patients, asymptomatic microfilaraemics and in endemic normal respectively. None of the sera collected from non-filarial endemic regions were found positive for any antibody isotype. The effect of filarial serum on enzymatic activity of GST was studied. Inhibition was noticed in all categories of filarial sera. Incubation of sera from non-filarial region could not inhibit the enzymatic activity.

Fig1: Prevalence of antibody isotype to GST in different group of filariasis



Principal Investigator:
Dr A.K.Satapathy,
Co-Investigators:
Dr A.S. Kerketta, Dr P.K. Sahoo, and Dr. B.Ravindran
Funding: Intramural
Starting Date : March 2006
Closing Date : February 2009

2. Human Bancroftian Filariasis: Identification of Immunological markers of morbidity in Hydrocele and Elephantiasis

Objectives:

1. To evaluate filarial specific as well as mitogen induced T-cell proliferative responses in hydrocele and lymhoedema patients
2. To quantify inflammatory cytokines and chemokine levels in patients with hydrocele and lymhoedema and correlating with severity of chronic manifestation.

On Going Studies

3. To type TNF receptors, Type I & Type-II genetic polymorphism in hydrocele and lymphedema patients.

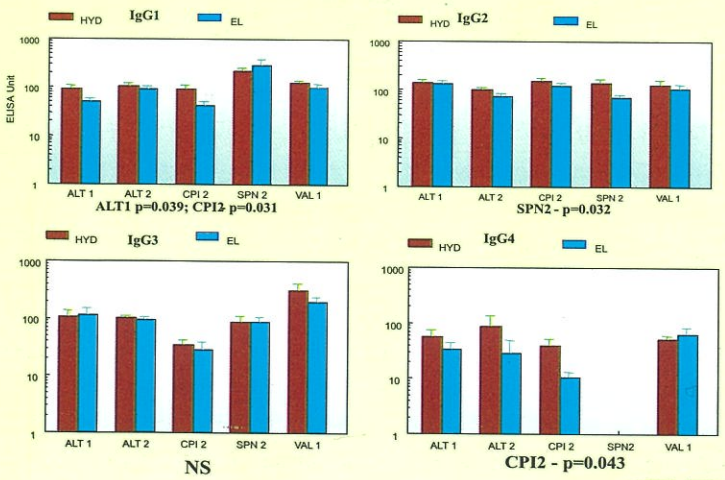
Background

Hydrocele and elephantiasis are two major clinical manifestations associated with chronic Bancroftian filariasis. Testicular hydrocele is a frequent clinical finding of lymphatic filariasis of men, yet genital involvement in women is rarely reported. In contrast elephantiasis occurs with equal frequency or more commonly in women than men. The more important question still remains as to why some individuals develop one form of pathology, where as others develop another form. Although hydrocele and lymphedema / elephantiasis are two diverse form of chronic manifestation, Separate immunological data distinguishing between patients with elephantiasis or hydrocele have not been readily available. The studies conducted so far on the immune response in chronic disease manifestation are taking both hydrocele and lymphedema as single group. Altered expression of cytokines as well as chemokine receptors is associated with the development of disease in some parasitic infections such as Schistosomiasis and Chaga's disease. In addition, chemokine receptors have been implicated in the pathogenesis of Rheumatoid arthritis, multiple sclerosis, atopic dermatitis and allergic asthma. However such immunological markers differentiating the two diverse forms of chronic disease manifestations for filariasis are not known. An attempt has been made to address these issues.

Work progress

Antibodies to the following recombinant proteins were quantified in hydrocele and lymphedema patients. Abundant Larval Transcript- 1) ALT-1; 2) ALT-2; 3) Serpin –2 (SPN-2); 4) Cystein Protease inhibitor –2 (CPI-2) and VAL. The first two molecules produced by infective larval stages while SPN-2 is synthesized only by microfilarial stages and CPI-2 is present on the surface of adult filarial worms. So far 22 cases of Hydrocele and 21 Lymphedema cases were studied with varing severity. The responses to ALT-1, ALT-2 and VAL were similar in both the groups. Isotype analysis (Fig-1) shows IgG1 antibody to ALT-1 and CPI-2, IgG2 antibody to SPN-2 and IgG4 antibody to CPI-2 were significantly high in hydrocele than lymphedema indicating that humoral response of the two diverse forms of chronic disease appear to be different from each other.

IgG Isotypes to 5 different recombinant filarial proteins in Hydrocele and Lymphoedema cases



On Going Studies

Principal Investigator :
Dr. B.Ravindran,
Co-Investigators :
Dr S.K.Kar, and Dr A. K. Satapathy
Collaborator :
Dr. Achim Hoerauf, Bernhard Nocht Institute of Tropical Medicine, Hamburg, Germany.
Funding : Extramural (Indo-German)
Starting Date : March 2003
Closing Date : December 2006

3. Post–DEC reactions in Human Bancroftian filariasis: An Immunobiological study in Orissa, India

Objectives:

1. To study the role of endosymbionts Wolbachia in mediating reactions after administration of DEC in infected human subjects.
2. To study the role of endosymbionts Wolbachia in mediation of inflammatory responses in human filariasis during acute disease episodes

Background

The project addressed the issue of side reactions observed in population after administration of single dose of Diethylcarbamazine citrate, the anti-filarial drug being currently used as MDA for control of lymphatic filariasis. It is generally believed to be associated with microfilarial density in the subject although empirical data for this is not available. Since post-DEC reactions often appear similar to LPS mediated inflammation and an endobacteria such as Wolbachia are known to reside in Mf, the current study was undertaken to investigate the association between Wolbachia density and post-DEC reactions. The underlying principle is that Wolbachia are susceptible to tetracyclines / doxycyclines and DEC mediated reactions should be preventable in Mf carriers by pre-treatment with the above antibiotics.

Work Progress

Two strategies were followed; first, to treat Mf carriers with doxycycline for different duration and then administer DEC to monitor reactions by both clinical observation as well as by observing indicators of host inflammatory response through measurement of inflammatory molecules viz. TNF-α, IL-6 and RANTES as well as Wolbachia density to analyze association between them; second, to treat cohorts of subjects, (with and without patent infection) with DEC and analyze the association as described above. The first approach is being pursued independent of the second approach; it is being done in three phases- in each phase 4 groups of Mf carriers are being used, one placebo and three treated with doxycycline for different durations (5, 10 and 21 days) and subsequently treated with DEC to monitor reactions. The following is the summary of results for the second approach: 1) Pre-treatment TNF-α levels were significantly more in Mf carriers (AS) and patients with chronic filarial disease (CH) (free of detectable infection) in comparison to subjects with cryptic infection (CR) (amicrofilaraemic with filarial antigenemia only), 2) Post–DEC reactions were significantly more in AS and CH cases as compared to CR cases and prevalence was comparable in the two (AS and CH) groups, 3) post DEC reactions were associated with significant elevation of TNF-α only in AS cases and not in CH cases, 4) conversely, significantly elevated levels of RANTES was observed only in CH cases and not in AS cases after administration of DEC, 5) plasma IL-6 levels were found to be significantly elevated in AS cases in comparison to CR and CH categories (pre drug administration) and after DEC administration, the levels of IL-6 decreased significantly in CR and CH cases and not in Mf carriers, and 6) plasma Wolbachia levels (as shown by real-time PCR) significantly decreased within 24 hrs after DEC consumption in CR and CH groups and not in the AS group.

On Going Studies

Cumulative clinical scoring of post –DEC reactions in each case was monitored as shown in Table 1. Subjective reactions such as headache, body ache and nausea were not taken into account since they could be results of re-call bias.

Table 1

Clinical Scoring Criteria:	Scoring	24 hrs	48 hrs	72 hrs	Total
Fever — <102	1+				
Fever — >102	2+				
Vomitting	1+				
Lymphangitis	2+				
Orchitis- Tender/nontender	2+				
Adenitis- Tender	2+				
Adenitis- NonTender	1+				
* Scoring rate : 2 + and above is taken as Reactor					

Three cohorts of subjects' viz., a) Mf carriers b) people with cryptic infection and c) patients with chronic filarial disease were treated with 6 mg/Kg of DEC and post-DEC reactions were monitored as mentioned above. The results shown in Table 2 indicate that presence of Mf is needed to mediate reactions. There were no significant reactions encountered in CR and CH cases while 45% of Mf carriers clinically reacted on administration of DEC. More significantly, the reactions are dependent on density of circulating Mf as shown in Fig 1. Mean higher density of Wolbachia resulted in greater frequency of development of reactions following DEC administration.

Table 2: Post DEC Reaction

AS (Mf+), n=18		CR (CFA+), n= 18		CH (CFA-), n= 15	
Reactors No (%)	Non-Reactors No (%)	Reactors No (%)	Non-Reactors No (%)	Reactors No (%)	Non-Reactors No (%)
8(44.44)	10(55.56)	1(5.550	17(94.45)	2(13.33)	13(86.67)
Stat: *AS Vs. CR: p= 0.00178, AS Vs. CR/CH pool: p = 0.0096					

Fig 1

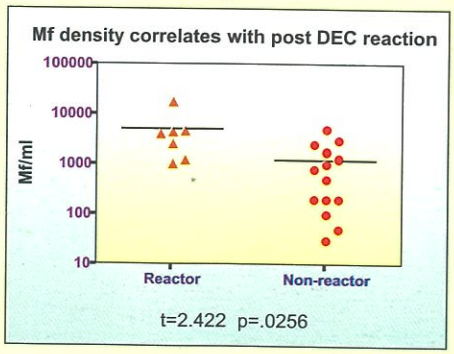
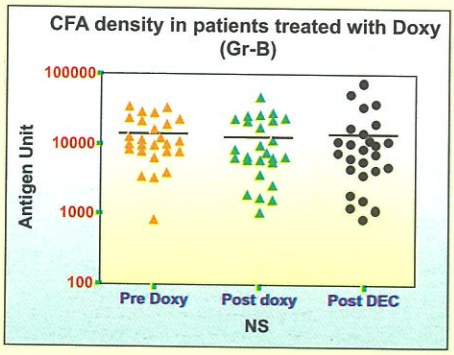


Fig 2



On Going Studies

Fig 3

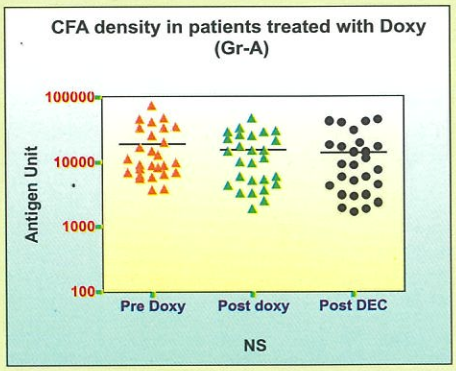


Fig 4

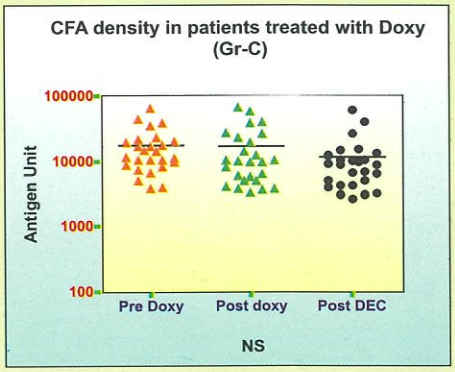


Fig 5

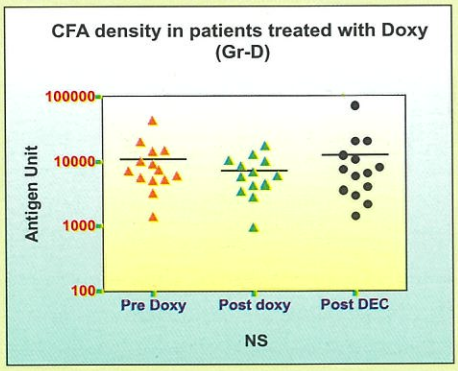
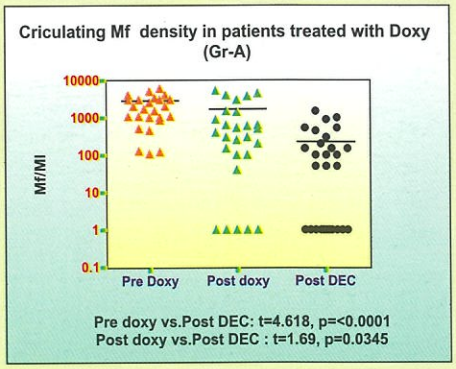


Fig 6



As mentioned earlier that 4 groups of Mf carriers were treated with Doxycycline for varying periods of duration – there was no significant change in circulating filarial antigen levels was observed among different groups as shown in Figs 2-5. The Mf density decreased significantly (Figs. 6-9) following Doxycycline treatment for 21 and 10 days. There was a significant decrease in Wolbachia levels in Mf as shown by real-time PCR (Figs 10-13). Treatment for 21 days and 10 days were effective while 5 days treatment did not significantly eliminate intra-cellular Wolbachia in Mf. The post-DEC reaction was associated with Wolbachia density (Fig 14) further emphasizing the importance of Wolbachia endosymbionts in mediating reactions.

Fig 7

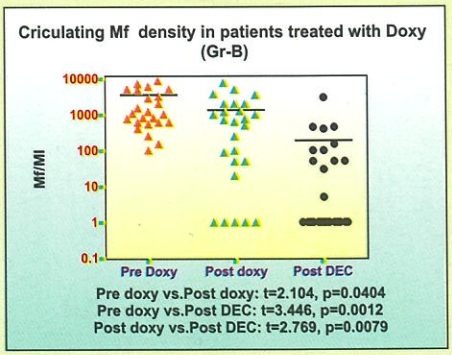
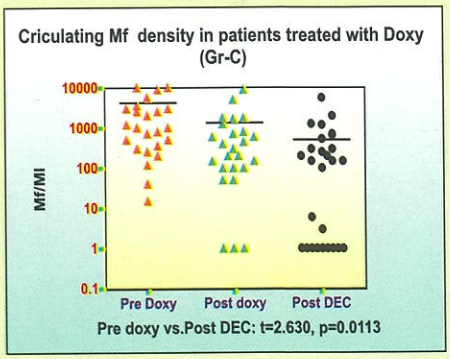


Fig 8



On Going Studies

Fig 9

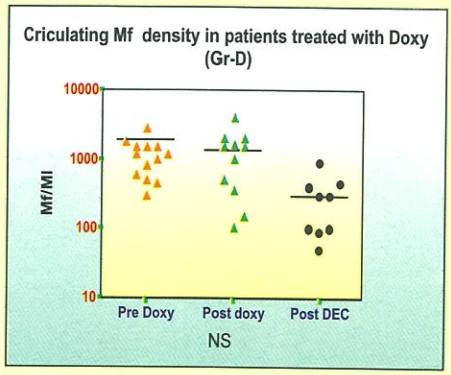


Fig 10

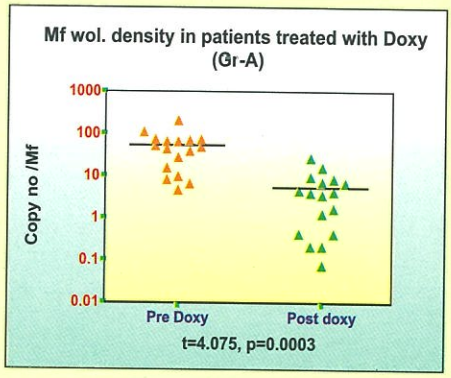


Fig 11

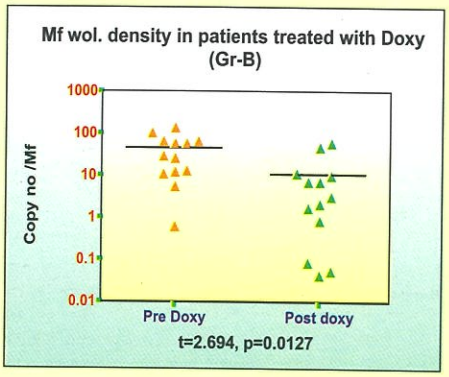


Fig 12

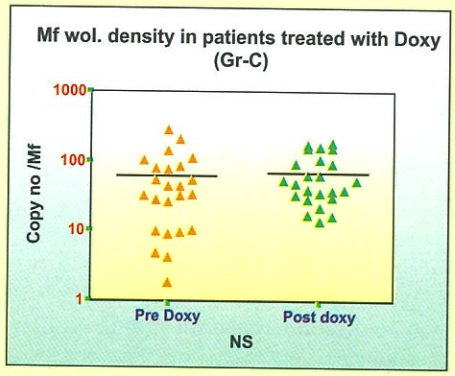


Fig 13

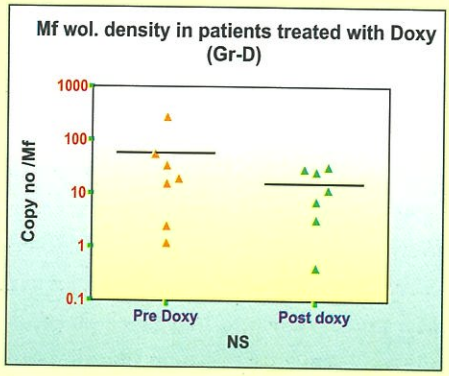
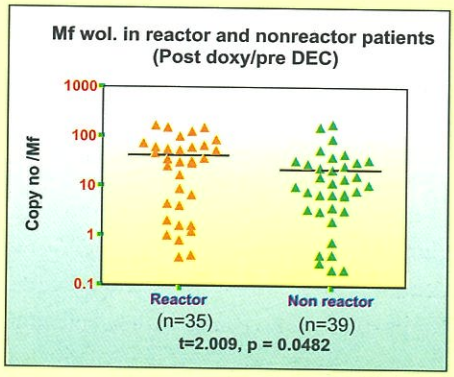


Fig 14



On Going Studies

The Toll Like Receptor (TLR) family is a group of pattern recognition receptors. TLR-4 is found on surface of mammalian monocytes, macrophages and neutrophils. It recognizes endotoxin (lipopolysaccharide present in cell wall of gram negative bacteria) as its ligand and results in induction of inflammatory molecules. Two known mutations in TLR4 gene (Asp299Gly, Thr399Ile) have been known. Filarial parasites contain an endosymbiont Wolbachia with LPS like molecules. Since post DEC reaction exhibited significant association with higher levels of wolbachia in mf, we assumed that TLR-4 mutation could potentially influence the post DEC reaction in human filariasis. To check this possibility of host genetic factors playing a role in post DEC reaction, the prevalence of TLR 4 genotypes were assessed in all the Doxy/DEC treated cases to correlate with side reactions (Table -3). TLR 4 mutation frequency was significantly more in non-reactors (37.70%) in comparison to reactors (17,07%). This indicates that TLR4 mutation could protect human hosts from side reactions associated with DEC treatment.

Table-3: Frequency of TLR4 mutation in Reactor and Non-reactor (21 days Doxy + single dose DEC)

	Reactor (n=41)	Non reactor (n=61)
TLR4 (299)	4 (9.75%)	15 (24.59%)
TLR4 (399)	6 (14.63%)	14 (22.95%)
TLR4	7 (17.07%) *	23 (37.70%) *

* Reactor Vs Non-Reactor P = 0.0283

Principal Investigator:
Dr B.Ravindran
Co-Investigator:
Dr A.K.Satapathy
Collaborator:
Dr S. Sharma, TIFR, Mumbai
Funding: Extramural (ICMR)
Starting date: March 2005
Closing date: August 2006

4. Genetic polymorphism of host molecules involved in immunity and immunoregulation in human filariasis

Objectives:

1. To type polymorphism of human genes that play a role in innate and/or adaptive immunity in human filariasis
2. To correlate genetic polymorphism with clinical and parasitological status in human filariasis

Work progress:

A spectrum of clinical manifestations can be observed in human communities with in lymphatic filariasis endemic areas. A large proportion of infected subjects are free of overt disease manifestations and most of the patients with chronic disease are free of current patent infection. Unlike several other infectious diseases, there is no clear consensus that patent infection would necessarily lead to development of chronic disease in human lymphatic filariasis. Longitudinal epidemiological studies indicated that development of chronic disease need not necessarily be a definitive consequence of patent infection in a given host conversely evidence exists for development of chronic disease with out prior

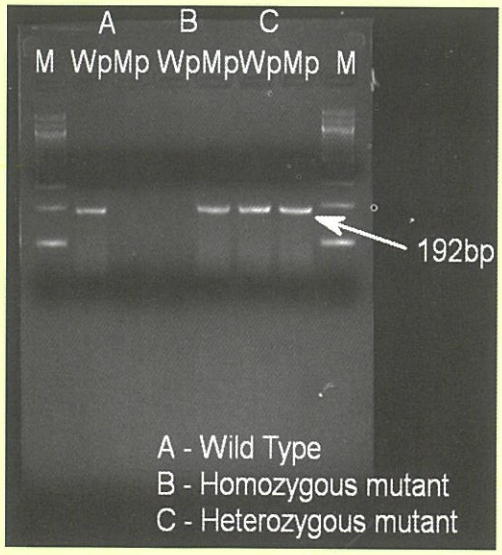
On Going Studies

experience of patent filarial infection. These observations point towards the possibility of host genetic factors playing a significant role in the clinical as well as parasitological outcome in the exposed population. Experimental studies conducted in genetically well-defined strains of mice have clearly indicated a role for genetic factors both against infective larvae and microfilarial stages of filarial parasites.

The Toll Like Receptor: The TLR family is a group of pattern recognition receptors. TLR-4 is found on surface of mammalian monocytes, macrophages and neutrophils. It recognizes endotoxin (lipopolysaccharide present in cell wall of gram negative bacteria) as its ligand and results in induction of inflammatory molecules, which play a critical role in innate immunity against such bacterial infections. Two known mutations in TLR4 gene (Asp299Gly, Thr399Ile) have been known. Mutations of TLR-4 gene in human population results in quantitatively decreased LPS mediated signaling leading to enhance susceptibility to some of bacterial infections. Increased LPS mediated signaling could also be a contributing factor in some of the inflammatory conditions. Since development of overt chronic manifestation in filariasis has been associated with involvement of inflammatory reaction, and filarial parasites contain an endosymbiont Wolbachia with LPS like molecules, we assumed that TLR-4 mutation could potentially influence clinical as well as parasitological status in human filariasis and studied TLR-4 polymorphism in different clinical groups of human Bancroftian filariasis.

The TLR4 Asp299Gly mutation is caused by substitution of A to G in the coding region at position 896. We typed the mutation by PCR assays using the (wild type) Forward primer-5'-CTTAGACTACTACCTCGATGA-3', and (mutant) Forward primer 5'-CTTAGACTACTACCTCGATGG-3', (allele specific interaction at the 3' end) with a common anti-sense Reverse Primer- 5'-TAAGCCTTTTGAGAGATTTGA-3'. PCR assay was performed as follows: 12 cycles of 10 seconds at 950 C followed by 60 seconds at 65 0C, followed by 17 cycle of 10 seconds at 95 0C, 50 seconds at 60 0C and 30 seconds at 720 C. The final extension was 7 min at 720C. The final amplicon of PCR product is 192 bp. The amplified products were analyzed by electrophoresis on 2.5% low melting agarose gels stained with ethidium bromide. DNA from normal subjects will get amplified with 'wild type' primers - heterozygous mutations will be characterized by amplification with both 'wild type' as well as 'mutation' dependent primers. DNA from individuals homozygous for TLR4 mutations will get amplified only with 'mutation' dependent primers as shown in Fig 1.

Fig 1.



To check the possibility of host genetic factors playing a role in the clinical as well as parasitological outcome in the exposed population, the prevalence of

On Going Studies

TLR-4 Asp299Gly genotypes was assessed in about 450 subjects of filariasis with different clinical manifestations. The frequency of Asp299Gly TLR4 mutation did not significantly differ in individuals with various categories in comparison to endemic controls. Mutation frequency in male and females were analyzed separately. Patients with hydrocele were found to display lower frequencies than endemic controls; however the percentage of mutation was not statistically significant between different categories (Fig-2 and 3). These

Fig 2.

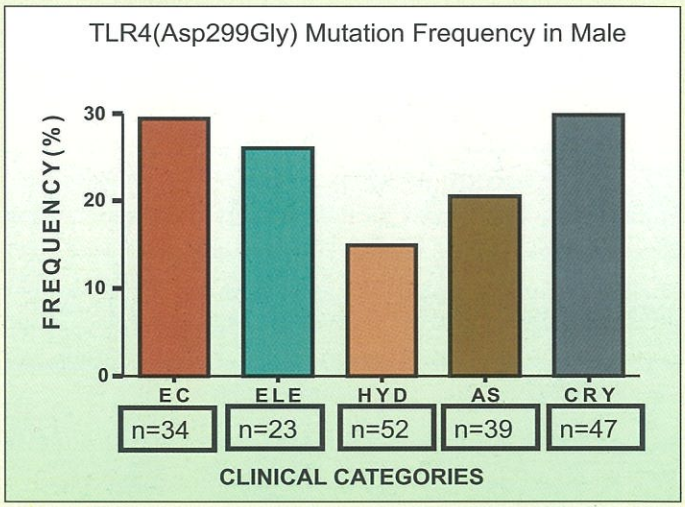
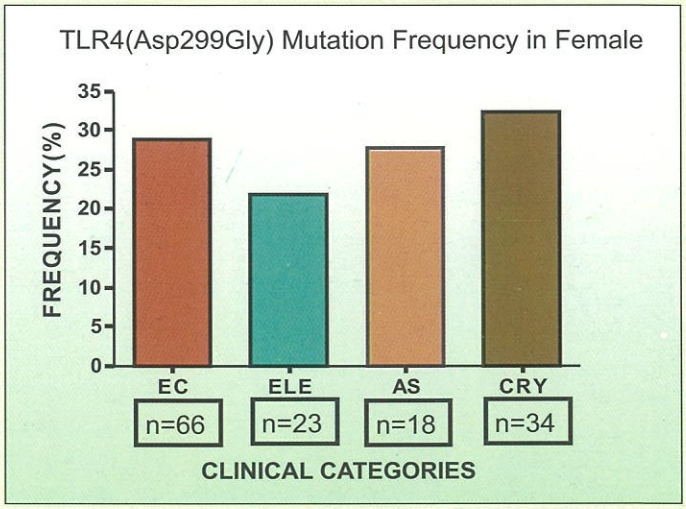


Fig 3.

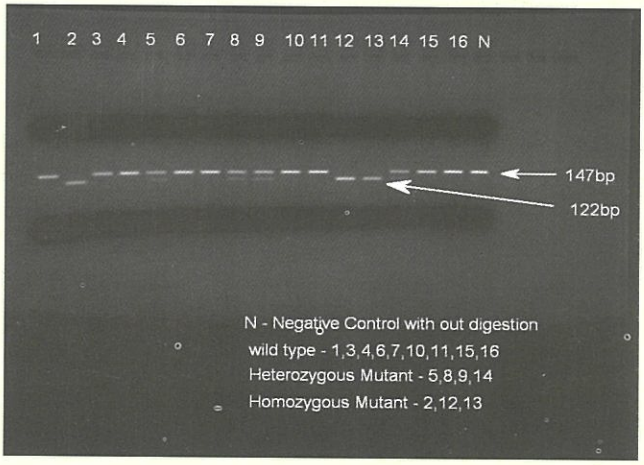


finding suggest that TLR4 mutation Asp299Gly in endemic population does not play a major role in determining the clinical or parasitological outcome in human lymphatic filariasis.

The second major TLR4 (Thr399Ile) mutation is caused by a C to T substitution at position 1196 in the coding region. This mutation was detected by PCR amplification of involved region with sense primer 5'-GCTGTTTTCAAAGTGATTTTGGGAGAA-3'

that contains a mismatch at position –3 from the 3' end of the primer (G instead of C) to create a Hinf I cleavage site when the mutant 1196T allele is amplified. Antisense primer was 5'-CACTCATTTGTTTCAAATTGGAATG-3'. Isolated DNA was amplified with these primers using a thermal cycler. The parameters were an initial denaturation at 95°C for 7 min, followed by 35 cycles: denaturation at 95°C for 30 s, annealing at 62°C for 30 s, and elongation at 72°C for 32 s. The final elongation was at 72°C for 5 min followed for a cooling to 4°C. The elongation product 147-bp fragments were digested at 37°C with Hinf I for 4 hrs resulting in fragments that either were cut into two fragments of 122-bp and 25-bp (allele T) or were not restricted (C allele) (Fig-4). These fragments were analyzed by electrophoresis on 2.5% agarose gels stained with ethidium bromide.

Fig 4.



We assessed the association between TLR4 (Thr399Ile) polymorphism and parasitological outcome/ chronic manifestations of filariasis in a large population base from filarial endemic areas. Fig-5 shows the frequency of TLR 4 (399) mutation in different clinical categories of filariasis in males. TLR-4 (399) mutation frequency was significantly more in endemic controls (28%) in comparison to patients with chronic disease (7.1%) in males. Similarly, the frequency mutation of TLR 4(399) in patients with active infection was significantly high in comparison to patients with chronic manifestations. This indicates that TLR-4 mutation (Thr399Ile) could protect human hosts from developing chronic filarial disease in males. Such an association of TLR-4 (399) mutation was not observed in females (Fig-6). Hydrocele, the most common chronic manifestation in filariasis is restricted to only males and the

Fig 5.

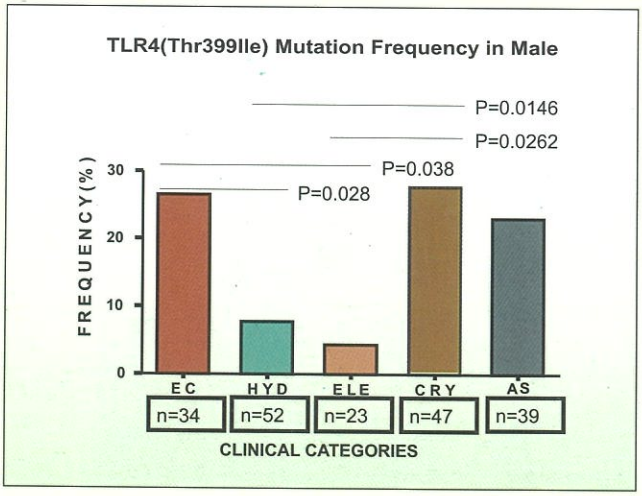
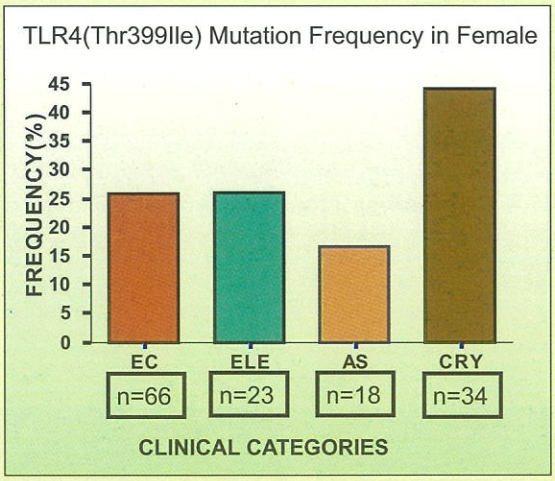


Fig 6.

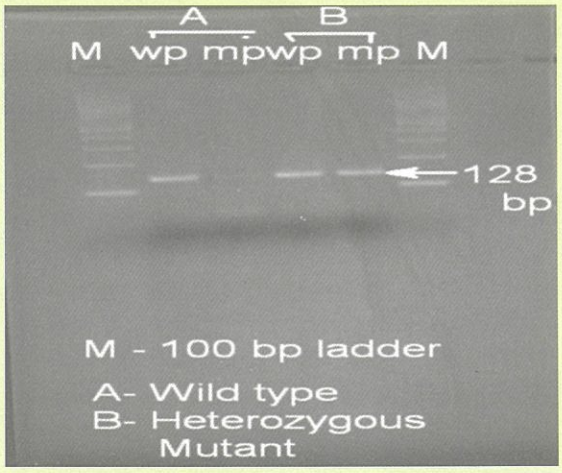


observed difference in elephantiasis (observed in both males and females) does suggest that this mutation plays a role only in males and not in females.

The Mannose-binding lectin: MBL is a C type collectin that participates in pathogen recognition, opsonization, phagocytosis and complement activation. A common set of structural polymorphism, known as the B, C and D alleles (together known as the O alleles) within a 15-bp span in exon 1 disrupt the function of MBL. The structural change in exon 1 results in a disruption of the binding domain. Structural variants have been associated with a wide range of infectious and autoimmune disorders. Low MBL levels are associated with susceptibility to certain infection in contrast high MBL levels might exacerbate the renal complications of diabetes. Since the development of chronic manifestation in filariasis has been associated with involvement of inflammatory reaction, we assumed that MBL mutation might have an association in the clinical as well as parasitological status in human filariasis.

Allelic specific PCR was performed to genotype codon 52(D) of MBL2 gene. Two sense primers, one for mutant 5'- TCTCCCTTGGTGCCCATGACG-3' and another for wild 5'- TCTCCCTTGGTGCCCATGACG-3' was chosen. To maintain specificity one non-complimentary nucleotide was placed at forth position from 3' end. The common antisense primer was 5'-GCAGCGTCTTACTCAGAAACTGTG-3'. The PCR was initiated by 12 cycle of 950C for 10 seconds and 620C for 10 second, followed by 27 cycle of 950 C for 30 seconds, 620 C for 30 second, 720C for 30 seconds and the final extension was at 720 C for 7 minutes. PCR products were resolved by electrophoresis in 3% agarose with ethidium bromide and visualized under UV light. The final elongation product is 128 bp (Fig-7).

Fig 7.

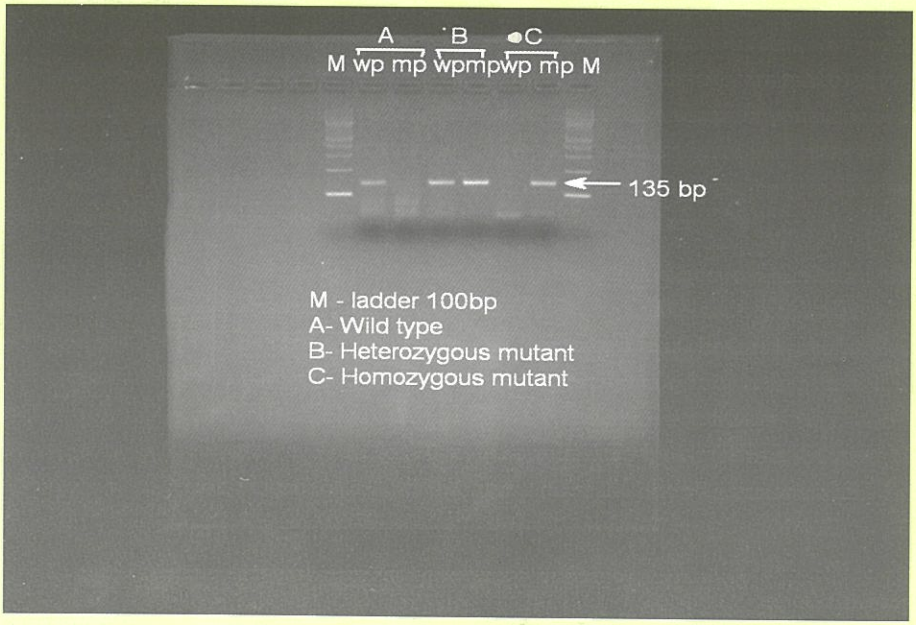


We analyzed the distribution of genetic polymorphism of MBL 52 D gene against parasitological and clinical outcomes following exposure to filarial parasites in a W. bancrofti area. About 400 individuals with different clinical

manifestations and endemic normal were typed for MBL 52 D mutation. The frequency of MBL 52(D) codon was found to be very rare in this population. The distribution of structural variants known as alleles D of exon 1 in chronic vs. uninfected subjects did not differ significantly by stat. analysis (data not shown).

The **MBL codon 54 B** of exon1 was typed by Allelic Specific PCR method. The first exon of MBL gene of sense primer 5'- CCCCTTTTCTCCCTTGTTGC-3' (wild type) and 5'- CCCCTTTTCTCCCTTGTTGT-3' (mutant type) were amplified with a common antisense primer of 5'- GCAGCGTCTTACTCAGAAACTGTG-3'. An uncomplimentary base was inserting at forth position from 3'end at both sense primers. The PCR condition for amplification was initial 12 cycle of denaturation at 950 C for 10 s and anneling at 620C for 10 seconds, followed by 26 cycle of denaturation at 950C for 30 s, anneling at 620C for 30 seconds, extension at 720C for 30 seconds and finally 720C for 7 minutes. PCR product was analyzed by 3 % agarose gel with ethidium bromide and visualized under UV light. The PCR product size was 135 bp.(Fig-8)

Fig-8



We analyzed the mutation frequency of MBL codon 54 B among patients with filariasis. And the results summarized in Fig-9. The frequency was not found to be significantly different between control subjects and patients with acute diseases. (We had demonstrated a difference in plasma MBL levels between these two groups earlier) However there was a significant difference in mutation frequency between acute disease cases and asymptomatic Mf carriers. MBL 54 B mutation frequency was significantly low in asymptomatic parasite carriers (14.08%) in comparison to acute cases (30.0%). This correlates with plasma MBL levels that we had observed earlier- Mf carriers were found to contain four times more MBL than patients with acute disease. More significantly this difference in mutation frequency was prominent only in males (Fig-10) and not in females (Fig-11).

Fig 9.

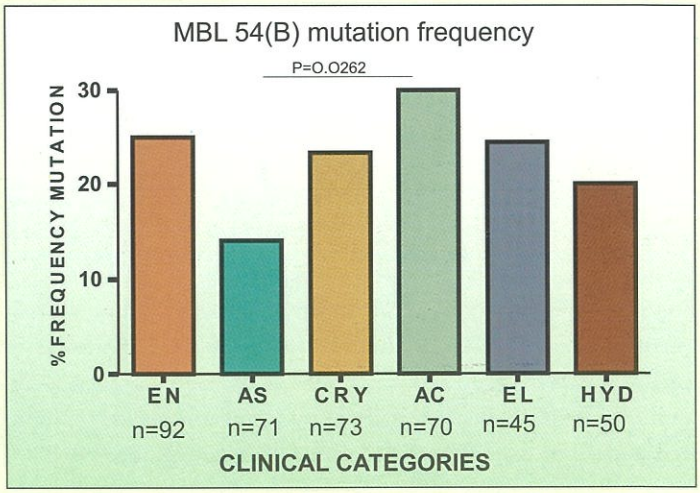


Fig 10.

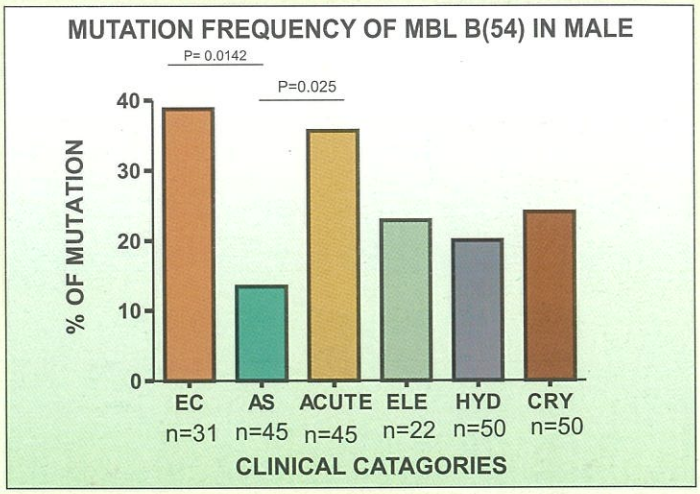
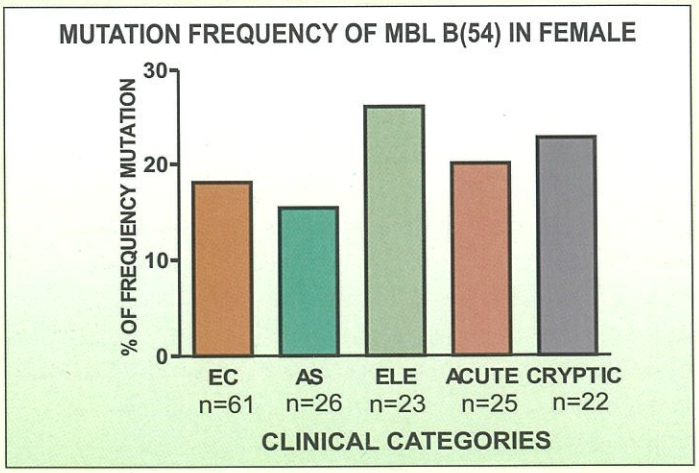


Fig 11



On Going Studies

Genetic polymorphism of IL-10 gene: Filarial infection in humans is characterized by polarized T-cell responsiveness. In general a Th1 type of immune response has been observed in absence of active filarial infection. A Th1 type of immune response is associated with increased T –cell proliferative response and a high IFN g production. IL-10 production has been found to be low. While a Th2 type of immune response has been observed in presence of active filarial infection. A Th2 type of immune response is associated with decreased T –cell proliferative response and high IL-10 and low IFN g production. Further PBMC of Mf carriers has been shown to release higher levels of IL-10 than in patients with chronic lymphatic pathology, thus attributing a role for this cytokine in down regulating effectors immune responses in Mf carriers. Therefore we assumed that there might be some association between these polymorphism and clinical/ parasitological status in filariasis.

Gene encoding for IL-10 is located on chromosome 1 (1q31-1q32). Three SNPs in IL-10 promoter a) IL-10 (-1082) G>A b) IL-10 (-819) C>T and c) IL-10(-592)C>A have been shown to influence IL-10 production. About 120 DNA sample was genotyped for all three mutation at promoter region by nested PCR. Initially a long DNA fragment which contain all these regions were amplified and subsequently the PCR products were used as a template to genotype three SNP by allelic specific primers.

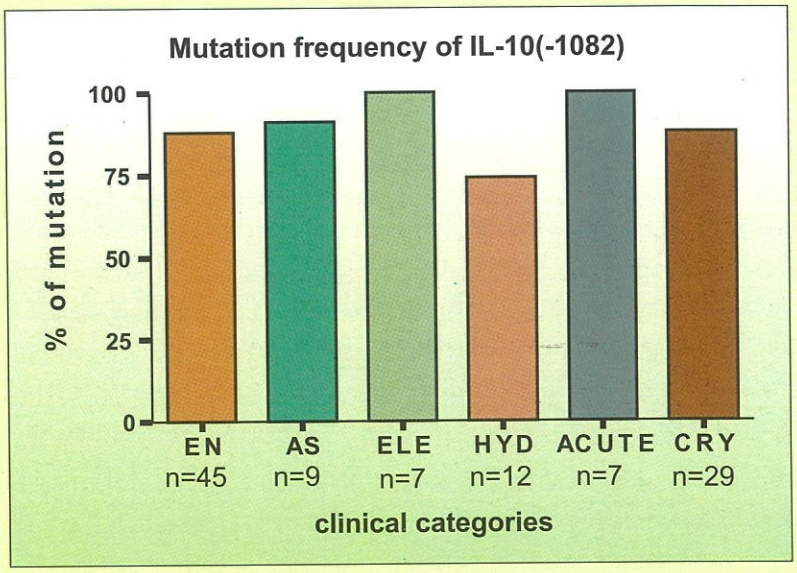
We analyzed the mutation frequency of IL-10 (-1082) among patients with filariasis and the results are summarized in Table-1. The distribution of G and A allele were 48% and 52% respectively. The frequency of heterozygous genotype (GA) was found to be more frequent as compared to wild genotype (GG). However, the total mutation frequency was 82% in this population.

Table-1 Allele and genotype frequency of -1082 mutations in IL10 gene

IL10	-1082	n	n/N (%)
Allele	G	106	106/218 (48)
	A	112	112/218(52)
Genotype	GG	20	20/109 (18)
	GA	66	66/109 (61)
	AA	23	23/109 (21)

The genotype frequencies for IL-10 (-1082) mutation did not differ significantly between clinical and parasitological categories (Fig-12). These finding suggest that IL-10 (-1082) mutation may not have significant role in determining the clinical or parasitological outcome in human lymphatic filariasis.

Fig 12.

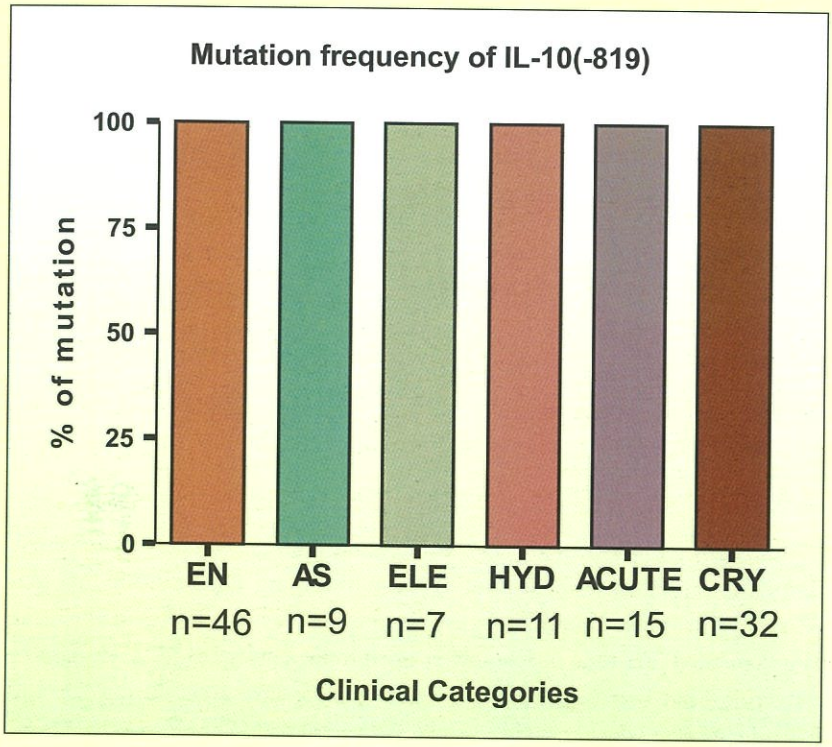


The second major IL-10 (-819) mutation is caused by C to T substitution at promoter region. IL-10 (-819) C>T mutation was typed by nested PCR. The allele frequency for C and T was found to be 49% and 51% respectively (Table-II). About 98% of the population was found to be Heterozygous while none of the individual was found to be wild type. We also analyzed the distribution of genetic polymorphism of **IL-10 (-819)** gene against parasitological and clinical outcomes following exposure to filarial parasites in a W. bancrofti area. About 120 individuals with different clinical manifestations and endemic normal were typed for IL-10 (-819) mutation and the results are shown in Fig-13. The percentage mutation was not significantly different between categories. These finding suggest that IL-10 (-819) mutation has no role in determining the clinical or parasitological outcome in human lymphatic filariasis.

Table 2 Allele and genotype frequency of -819 mutation in IL10 gene

IL10	-819	n	n/N (%)
Allele	C	117	117/238 (49)
	T	121	121/238(51)
Genotype	CC	0	0
	CT	117	117/119 (98)
	TT	2	2/119 (2)

Fig 13.



5. Development and evaluation of community development and partnership strategies for drug delivery for the control of lymphatic filariasis in urban areas of Orissa, India

Objectives

(1) To test an intervention strategy that addresses the challenges for MDA in urban areas, building on an inclusive partnership framework developed on the basis of the research findings on the above objective, and involving in particular the private practitioners and active CBOs.

(2) To evaluate the impact of this intervention strategy on perceived need of, and in enhancing support for, MDA amongst all stakeholders including the community, health workers and municipal officials.

(3) To describe the preparatory and mobilization process as developed by the stakeholders, and to assess its strengths and weaknesses.

(4) To describe the drug distribution process as developed by the government in consultation with the stakeholders, and to assess its strengths and weaknesses.

(5) To evaluate the treatment coverage (consumption rate) achieved with the new strategy, and to assess whether after three years of intervention it reaches the desired level of treatment coverage that is required for elimination of LF.

Principal Investigator:
Dr. B.V. Babu,
Co-Investigators:
Dr. A.S. Kerketta, Dr. S.K. Kar,
Prof. D.K. Behera,
Sambalpur University
Funding:
UNICEF/UNDP/World Bank/
WHO's Special Programme on
Research and Training in
Tropical Diseases (TDR), World Health
Organisation (WHO),
Geneva, Switzerland
Starting date: July 2003
Closing date: 31st August 2006

(6) To determine the feasibility of implementation of the new strategy using existing human resources (health and other sectors) at the municipal and community level.

Purpose of the study

To develop and test alternative strategies for mass drug administration, which would achieve the desired high treatment coverage in urban populations necessary for elimination of lymphatic filariasis (LF).

Phases of the study

It is planned to undertake this study in two phases. The phase-1 is formative phase and the phase-2 includes intervention, mass drug administration (MDA) and evaluation. The formative stage, with the objective to explore and identify opportunities within urban communities, helped to design innovative urban-specific intervention strategy for MDA for elimination of LF has been undertaken.

Study site

The study is implemented in two municipality areas i.e. Choudwar and Dhenkanal. The formative research was carried out in Choudwar municipality before first round of intervention. The intervention developed based on the results of formative research has been implemented first time in Choudwar town during 2004 MDA. The second phase of intervention has been undertaken in two municipality areas during 2005 MDA. During intervention, the researchers acted as facilitators. The existing health system along with municipality and other partners have implemented the intervention. The researchers have carried out the evaluation. The coverage survey has been carried out in two non-intervention rural areas along with the intervention urban areas.

Brief description of Intervention

The results of formative research suggested us to go for an intervention strategy with community participation and partnership. A health services driven MDA strategy with community participation and partnership approach was developed and experimented. The following components of intervention are tried out in study areas.

Stakeholders' active involvement in planning and decision-making:

In this programme, municipality and local health institutions played key roles. The municipality consisted of elected representatives of wards (geographical and political units in urban area) called councillors and a chairperson. This body succeeded to form coordination committee by including many stakeholders like bureaucrats of municipality, private practitioners, practitioners from other governmental and non-governmental hospitals, community based organizations (CBOs) like youth clubs, women clubs and residence associations, non-governmental organizations (NGOs), journalists, representatives of industries, prison and schools, and representatives of religious and ethnic groups in the program. This committee met periodically. The research team initially advocated for the program to different stakeholders and shared the results of formative research. The coordination committee took all decisions on planning including social

mobilization and drug distribution. However, the committee received some directions and suggestions from the local health institution, which was responsible for providing drugs and other resources.

Advocacy:

Advocacy was done both among the populations and key partners. This task was performed by the research team for the coordination committee and the latter did the advocacy among the local groups and the community.

Initiating the intervention:

Having designed the plan for the entire urban area, the coordination committee identified ward level partners, who are suitable to undertake activities related to community mobilization and drug distribution. The strengths and weaknesses of these groups were assessed by the coordination committee and necessary inputs were given. In most of the wards the concerned councillors led the ward level activities.

Partnership:

Thus the partners were involved in various stages of intervention. Also some of the stakeholders got involved in resource mobilization. The micro-level planning at the municipality and ward level were made by the coordination committee and the ward level committee, respectively. A few medical practitioners from the coordination committee were grouped into four teams for adverse side reactions surveillance and management as an integral part of the distribution process. In addition, different sub-groups were identified for the separate differential treatment:

Special strategies

- Sub-group approach: Special strategies were developed for better coverage and compliance among the sub-groups like religious and linguistic minorities, inmates of jail and school children.
- Use of local practitioners: The services of local practitioners including private practitioners and physicians from government sector were utilized during management of adverse side reactions, and ward level community mobilization activities.
- Sensitization of media personnel: Through a process of mobilization, media personnel were requested to highlight the positive aspects of the program ignoring the bare instances of some adverse reactions at the time of reporting. For achieving their support, some of them were made members of the coordination committee.
- Communication and community mobilization activities: Intensive community mobilization activities (e.g., rallies by school children and house-to-house visits) were organized by involving different partners during the period of environment building. Various IEC materials also were used.

MDA:

The strategy ultimately resulted in local decision-making in consultation with health institution with regard to execution of drug distribution. The following were the major components in MDA.

- **Selection and training of community drug distributors (CDDs):** The ward level committee identified some local volunteers, designated as CDDs, to distribute the drugs. Some para-medical staff of the local health institutions were included as supervisors to monitor the MDA process. The CDDs and supervisors underwent one-day training, organized by local health institution with the help of the coordination committee.

- **Drug distribution:** The distribution process initiated as planned jointly by the coordination committee and ward level committee. The distribution was carried out by the CDDs either individually or in groups. In some wards, the members of coordination committee, particularly the councillors and members of ward level committees, monitored the activities. The supervisors monitored the activity of the drug distribution and assisted the adverse reactions management team by identifying cases along with CDDs. The distribution process continued subsequently for three more days, but adverse reactions management teams did not conduct mobile operation during those days due to practical exigencies. However, the CDDs, supervisors and ward level committees were directed to bring such cases to respective hospitals of these physicians.

The details of evaluation of intervention including sampling, data collection methods and processing and analysis of data were presented in previous annual report.

Evaluation of first round of intervention

The intervention was evaluated by using several qualitative and quantitative methods. Major findings of this round of intervention are presented in the previous report, and summary of those findings are given hereunder. Household coverage survey was undertaken in intervened urban area, and other urban and rural areas, where MDA was undertaken without such intervention. Three indicators namely coverage (percentage of eligible people who received tablets), compliance (percentage of eligible people who swallowed tablets) and household coverage (percentage of households visited by CDD or health worker during MDA) were used to evaluate the intervention. The intervened urban area recorded significantly higher coverage ($P<0.001$), compliance ($P<0.001$) and household coverage ($P<0.01$) than that of the non-intervened urban area, but nearer to that of the non-intervened rural area.

Evaluation of second round of intervention

The above table - 1 depicts that the coverage in the intervened urban areas is 79.9% and 82.1%; and the compliance is 42.2% and 47.6%. In rural areas, where there is no specific intervention, the coverage and compliance are better than the intervened urban areas.

It is clear from Table 2 that in the intervened urban areas majority of the respondents could not receive the drug, as the drug distributors did not visit their houses. Among the people whose houses were visited by the drug distributors 14.6% refuse to receive the drug due of side reactions and 9.9% felt it unnecessary to accept the drug in the first intervened urban area. Similarly, in the second intervened urban area 8.9% of people did not receive the drug as they felt afraid of adverse reactions. Around 7% of people did not feel the necessity of receiving the drug. Around 13% of people and 12% of people were absent at the time of drug distribution in the first and second urban areas respectively.

A few respondents i.e. 2.5% in the first urban area and 1.8% in the second urban area did not receive the drug for their children as they perceived them to be underage. Sickness was a factor for not receiving the drug for 2.6% of people in the first urban area and 1.5% of people in the second urban area. Very few people (0.6%) in the second urban area did not receive the drug, as they did not like the drug distributor.

In case of the first non-intervened rural area, maximum people (36.3%) failed to receive the drug as they were not informed or their houses were not visited by the drug distributors. Around 17% of the respondents did not receive the drug due to fear of adverse reactions. About 15.3% of people felt it unnecessary to receive the drug. A similar percent of people were absent during MDA. Among all the respondents 6.8% did not receive the drug due to sickness and 3.7% did not receive the drug for their children as they felt them to be underage. About 1.4% women did not receive the drug due to pregnancy. In the second non-intervened rural area, 50% of the respondents were absent at the time of drug distribution. Around 27% of households were not visited by the drug distributors. About 5.8% of women did not receive the drug due to pregnancy and a similar number of people did not receive the drug due to sickness. About 7.7% of the respondents did not receive the drug for their children as they thought that they are still underage to swallow the drug.

It is clear from the Table 3 that fear of adverse reactions was the major cause of non-compliance both in the intervened urban areas and the non-intervened rural areas. The reason was cited by 66.3% of respondents and 65% of respondents in the first and second intervened urban areas, respectively and by 66% of people and 61.8% of people in the first and second non-intervened rural areas, respectively. Around 11% of people felt it unnecessary to consume the drug even though they received it and another 11.4% of people could not consume the drug as they were sick during MDA in the first intervened urban area. In that area 4.3% of people were absent during MDA and so could not consume the drug even though their family members had received the drug for them and another 4.5% of respondents forgot to consume the drug. In the second intervened urban area, 20.1% of people did not feel the necessity of consuming the drug. Reasons like "Sickness" and "Forgot" were cited by 6.7% and 5.1% of the respondents respectively for non-compliance. About 2.4% of people could not consume the drug due to absence.

In the first non-intervened rural area, about 15.4% and 12.7% of respondents cited "Felt unnecessary" and "Sickness" as the reasons for not consuming the drug respectively. About 9.4% of people were absent at that time and 4.5% of people forgot to consume the drug. Similarly, in the second non-intervened rural area, around 20% of the respondents did not feel it necessary to consume the drug and another 7.9% could not consume the drug as they were not present during MDA. About 4.4% of people were sick at that time and another 3.4% forgot to consume the drug. Very few respondents in all the four areas felt that their children are underage to consume the drug.

In the second round of intervention, the coverage and compliance rates in intervention urban areas are below those achieved in previous intervention (2004 MDA). The reasons for the lowering down of compliance are being analysed. The qualitative data collection is in progress and will be analysed to unveil the reasons for lower coverage, in addition to difference in the implementation of intervention.

On Going Studies

Table 1:

Coverage and compliance in intervened and non-intervened areas

Areas	Sample size	Coverage (%)	Compliance (%)
Urban area 1	4416	79.9	42.2
Urban area 2	5929	82.1	47.6
Rural area 1	1789	83.5	60.9
Rural area 2	1714	93.9	63.1

● Where strategy has been implemented along with MDA, ● No intervention is made except MDA.

Table 2:

Reasons for not receiving tablets

Reasons	Intervened urban area 1	Intervened urban area 2	Non-intervened rural area 1	Non-intervened rural area 2
Underage	22 (2.5%)	19 (1.8%)	11 (3.7%)	8 (7.7%)
Pregnant	10 (1.1%	4 (0.4%)	4 (1.4%)	6 (5.8%)
Sick	23 (2.6%)	16 (1.5%)	20 (6.8%)	6 (5.8%)
Fear of side effects	129 (14.6%)	95 (8.9%)	50 (16.9%)	-
Felt unnecessary	88 (9.9%)	74 (6.9%)	45 (15.3%)	-
Did not like distributor	-	6 (0.6%)	-	-
Absent	119 (13.4%)	125 (11.8%)	45 (15.3%)	52 (50.0%)
Not informed/ not visited	436 (49.3%)	676 (63.8%)	107 (36.3%)	28 (26.9%)
Others	40 (4.5%)	30 (2.8%)	13 (4.4%)	1 (0.9%)
No response/ do not know	18 (2.0%)	16 (1.5%)	-	4 (3.9%)

Table 3:

Reasons for not swallowing tablets

Reasons	Intervened urban area 1	Intervened urban area 2	Non-intervened rural area 1	Non-intervened rural area 2
Underage	9 (0.5%)	6 (0.3%)	1 (0.3%)	2(0.4%)
Pregnant	10 (0.6%)	9 (0.4%)	-	1(0.2%)
Sick	190 (11.4%)	136 (6.7%)	51 (12.7%)	23(4.4%)
Fear of side effects	1105 (66.3%)	1330 (65.0%)	266 (66.0%)	327(61.8%)
Felt unnecessary	189 (11.3%)	412 (20.1%)	62 (15.4%)	109(20.6%)
Absent	72 (4.3%)	50 (2.4%)	38(9.4%)	42(7.9%)
Forgot	75 (4.5%)	105 (5.1%)	18(4.5%)	18(3.4%)
Others	67 (4.0%)	40 (1.9%)	4(0.9%)	31(5.8%)
No response/ do not know	4 (0.2%)	19 (0.9%)	2(0.5%)	1(0.2%)

On Going Studies

6. Efficacy and Tolerability of single dose DEC of 100mg, 200mg & 300mg strength in filariasis endemic community in Orissa.

Principal Investigator:
Dr. B. Dwibedi
Co- Principal Investigators:
Dr. S.K.Kar
Funding: Intramural
Starting date: Mar 2006
Closing date: Feb 2007

Rationale:

The present mass drug administration programme to eliminate lymphatic filariasis is facing major challenge to achieve the targeted drug compliance rate of 80-85% in the country including Orissa. This is largely because of fear of side reaction. Besides confusion in the drug dosage in different age groups has also been noted during the MDA programme. Hence uniform dosage to all ages and reduction of side reaction is thought to increase drug compliance in the community. Some of the clinical trials with lower dose (2ml/kg) DEC has also shown effectiveness in clearing microfilaria from circulation. DEC fortified salt with still minimal dose of DEC is also effective in decreasing community load of Mf. An attempt has been taken through the study to observe whether side reaction is reduced by low dose DEC administration and efficacy of this drug in low dose is maintained or not when instituted in a community setup in MDA mode.

Objectives:

1. To compare efficacy of single dose mass administration of DEC in 100mg, 200mg & 300mg strength in three defined filarial endemic population.
2. To observe the side reactions in three dosage levels as above.

Work progress:

The study needs selection of three endemic villages basing on filarial disease and microfliarimia prevalence for DEC intervention to be given so different villages in endemic parts of Cuttack, Khurda & Puri district were visited. Clinical & MF survey was done in those areas. And three villages were selected for imparting three regimens of MDA. The village mapping, population enumeration was done and MF status of the population in the villages during pilot survey is presented in the table. Children below 2years, pregnant women & those who are critically ill were excluded from the study

Population of the selected villages:

Parameters	Bhatimunda (Cuttack)	Saranga (Cuttack)	Retanga (Khurda)
Total Population	2250	2090	2005
Population Excluded	60 (2.7%)	50 (2.4%)	40 (1.9%)
Study Population eligible for trail	2190	2040	1965
2-5 yrs	300 (13.7%)	302(14.8%)	260(13.2%)
6-14 yrs	422 (19.3%)	412(20.2%)	370(18.8%)
>14 yrs	1468 (67%)	1326(65%)	1335(67.9%)
MF Rate (Pilot Survey)	9%	8.2 %	5.6 %

On Going Studies

Clinical Assessment & MF Screening:

Initial clinical examination & Haematological survey are undertaken before institution of DEC in one study site i.e. Bhatimunda, Cuttack district. The Clinical Parameters used for survey were body weight, clinical assessment for acute & chronic filariasis, history of Acid Peptic Disease /Blood Pressure disorder/ Diabetes/ Asthma/ head reeling & history of drug intake. The Laboratory Parameters include MF Density, ICT Test and HB % estimation. The activities are on the way.

After completion of initial clinical and laboratory examination each site will be allocated to one of the three DEC regimens Then DEC will be administered in supervised mode in these study sites and the population will be monitored for side reaction for a week after DEC institution and followed up for filariamia status at intervals of 3,6,9 & 12 months to observe the efficacy of the drug in clearing microfilaria & antigenimia.

Principal Investigator:
Dr M R Ranjit
Co-Investigator:
Dr G P Chhotray
Funding: Intramural
Starting Date: April 2005
Closing Date: January 2006

7. Studies on prevalence of 76Tcrt / 86Ymdr1 Plasmodium falciparum isolates in severe malaria cases of Orissa and its biological advantage.

Objective

1. To investigate the prevalence of 76Tcrt / 86Ymdr1 Plasmodium falciparum isolates in severe malaria cases of different geographical regions of Orissa.
2. To test the drug sensitivity pattern of these isolates by in-vitro assay.
3. To study the multiplication pattern of these isolates in different blood groups

Work Progress:

During this period about 70 blood samples from severe falciparum malaria cases admitted in S C B Medical College Hospital, Cuttack and IGH, Rourkela and about 47 blood samples from uncomplicated cases belonging to Athagarh, Jajpur and Khurda area has been collected for analysis. The genomic DNA of P falciparum was isolated by phenol extraction and EtOH precipitation. The PfCRT(K76T) and PfMDR1(N86Y) point mutation was analysed by PCR-RFLP method. Of the total severe cases 9(12.8%) cases were found to harbour PfCRT(K76T) point mutation ,4(5.7%) PfMDR1 (N86Y) point mutation and 18(25.7%) both PfCRT(K76T) and PfMDR1(N86Y); while amongst the uncomplicated cases 3(6.3%) cases were having PfCRT 76T point mutation ,1(2.1%) with PfMDR1 86Y and 2(4.2%) having both PfCRT 76T and PfMDR1 86Y point mutations (Table1). Efforts are made to collect more specimens for other geographical areas to facilitate geography wise analysis.

Table: 1

Clinical Cases	PfCRT			PfMDR1			PfCRT+ PfMDR1 Mutant
	Wild	Mutant	Mixed	Wild	Mutant	Mixed	
Uncomplicated	44/47 (93.6%)	2/47 (4.3%)	1/47 (2.1%)	46/47 (97.8%)	1/47 (2.1%)	0/47 (0.0%)	2/47 (4.2%)
Severe	61/70 (87.1%)	7/70 (10.0%)	2/70 (2.9%)	66/70 (94.2%)	3/70 (4.3%)	1/70 (1.4%)	18/70 (25.7%)

Attempt has been made to collect samples from other regions of Orissa. The in-vitro susceptibility & growth potential of parasites will be done. Hence the study needs extension of one year to complete all the three objectives.

8. Development of potent mosquitocidal agents from natural sources

Principal Investigator :
Dr.U.V.Mallavadhani,
RRL (CSIR), Bhubaneswar
Co-Investigators :
Dr.N.Mahapatra, Dr.R.K.Hazra,
Dr.S.K.Parida Mr.N.S.Marai,
Mr.H.K.Tripathy
Funding :
Extramural (ICMR Task force)
Stating date: July 2005
Closing date: July 2007

Objectives:

1. Mosquitocidal screening of the natural sources and natural products/analogues against mosquito vectors, An. Stephensi (malaria), Cx.quinquefasciatus (filariasis), Ae.aegypti (dengue).

Work Progress:

Most of the third world countries are affected by tropical diseases and majority of population lives in areas, where the prevalence if illness is high. Mosquitoes of several genera transmit a wide range of tropical diseases. Particularly, the mosquitoes belonging to Anopheles, Culex and Aedes are important vectors of tropical diseases and cause malaria, filaria, dengue hemorrhagic fever and yellow fever respectively.

Vector control is an important strategy for preventing disease transmission. Chemical insecticides were the main weapons of controlling mosquito vectors. But the chemical insecticides have certain drawbacks like rising cases of refractory behavior of mosquitoes' vectors, their prohibitive cost, high toxicity and concern about the environmental hazards. These problems have initiated research for development of an environment friendly biodegradable, target specific agent for development of a sustainable and cost-effective control structure, which may prove safer and more efficient. Hence there is an urgency to develop safer and more potent insecticides

The larvicidal activity of the plant extracts were assessed in the laboratory condition against the 3 species of mosquitoes viz., An. stephensi (vector of malaria), Ae.aegypti (vector of Dengue) and Cx.quinquefasciatus (vector of filariasis) following standard WHO procedure (WHO 1981).

Out of 17 plant extract sample received from RRL. We have screened nine samples against Aedes, Anopheles and Culex. The test concentrations were increased sequentially (0.1 to 1 ppm). The results depicted in table 1. The mortality with different concentrations and different hours of exposure were shown in the table-2.

On Going Studies

Table1. EFFECT OF PLANT EXTRACTS ON MOSQUITOES.

(Percentage of mortality)

Code	Conc.	No. of Mos.	An .stephensi (In percentage)			Cx.quinquefasciatus (In percentage)			A.aegypti (In percentage)		
			24 hr.	48 hr.	72 hr.	24 hr.	48 hr.	72 hr.	24 hr.	48 hr.	72 hr.
		20	0	0	0	0	1	0	-	-	-
010	1ppm	20	0	0	0	0	0	2	-	-	-
		40	0	0	0	7.5	7.5	10	-	-	-
		25	0	2	0	0	0	0			
001	1ppm	25	0	0	0	0	0	0	-	-	-
		50	0	6	8	0	0	0	-	-	-
		10	0	0	0	-	-	-	-	-	-
002	1ppm	10	0	0	0	-	-	-	-	-	—
		10	0	0	0	-	-	-	-	-	-
		25	0	0	0	0	0	0	-	-	-
003	1ppm	25	0	0	0	0	0	0	-	-	-
		50	0	6	10	4	14	0	-	-	-
		25	0	0	0	0	0	0	-	-	-
022	1ppm	25	0	4	0	0	0	4	-	-	-
		125	0	1.6	4.8	0	1.6	11.2	-	-	-
		25	0	2	0	0	0	1	-	-	-
023	1ppm	25	0	0	4	0	0	0	-	-	-
		125	0	2	5	12.8	16	24	-	-	-
		25	0	0	0	-	-	-	-	-	-
024	1ppm	25	0	0	0	-	-	-	-	-	-
		125	0	2	0	-	-	-	-	-	-
		25	0	0	1	-	-	-	-	-	-
025	1ppm	25	0	0	0	-	-	-	-	-	-
		125	0	0	9.6	-	-	-	-	-	-

Table2. Highest effect on mosquito species and percentage of mortality

Plant extract code	Highest effect on mosquito species	Concentration	Exposure Time in hours	Percentage of mortality
001	Culex quinquefasciatus	10ppm	120	86.66
002	Culex quinquefasciatus	5ppm	24	40.00
010	Anopheles stephensi	25ppm	48	100
012	Culex quinquefasciatus	4ppm	24	25
003	Culex quinquefasciatus	10ppm	96	56.25
022	Anopheles stephensi	1ppm	120	41.81
023	Anopheles stephensi	1ppm	120	52.88

Principal Investigator:
Dr R.K. Hazra
Co-Investigators:
Dr. Namita Mahapatra,
Dr. S.K. Parida,
Mr. N.S. Marai, Mr. H.K. Tripathy
Funding: Intramural (DST)
Starting Date: February 2006
Closing Date: January 2007

9. Molecular Characterization of Anopheles annularis Complex Development of Species Specific Diagnostic Markers and Microsatellite Markers

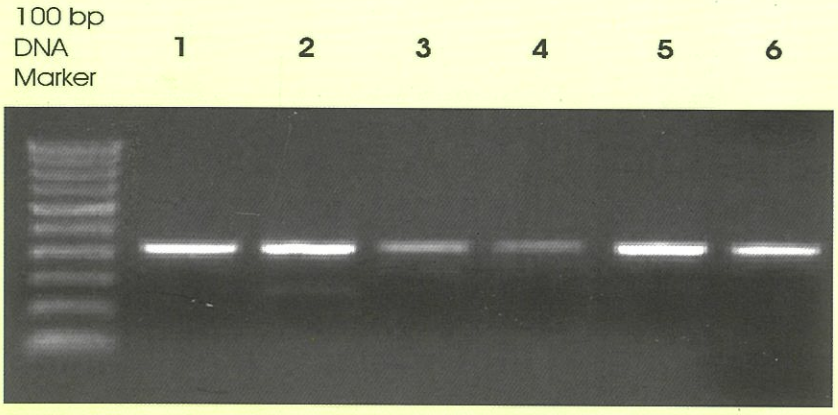
Objective:

1. To develop species-diagnostic molecular assay for distinguishing members of the Anopheles annularis complex, species A & B.

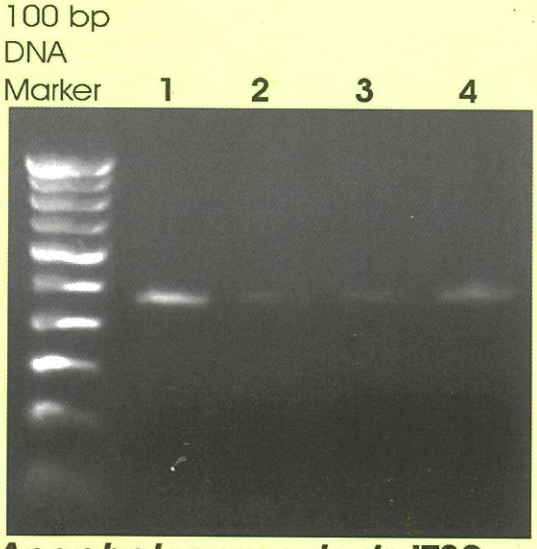
On Going Studies

Work progress:

As a base line study the mosquito samples of anopheles annularis were collected from Ghatagaon & Banspal PHC (Keonjhar), Anugul, Kendrapara, Gania area of Orissa. The number of Anopheles annularis collected from different localities of Orissa was 95, 436, 13 and 9 from Keonjhar, Anugul, Kendrapara and Gania respectively. Out of the total samples ovaries from 70 mosquitoes were processed for polytene chromosome study, while genomic DNA was extracted from rest of the mosquitoes for the molecular analysis of sibling species. The target region for PCR, ITS2 region and D3 domain of 28S rDNA was already standardized by PCR using universal primers. The PCR amplified products were around 400bp for D3 domain and 500bp for ITS2 region. The PCR products were kept for further sequencing.



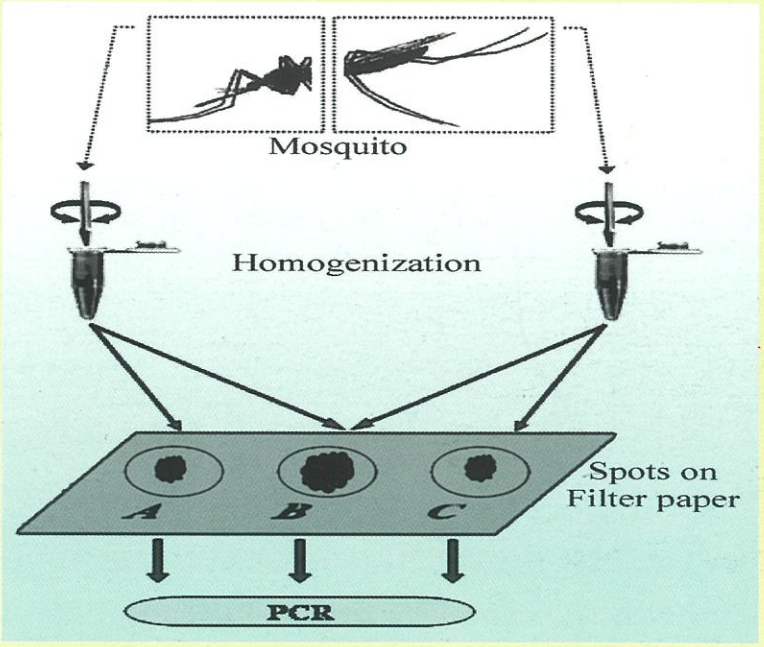
***Anopheles annularis* D3 region PCR showing ~400 bp amplicon**



***Anopheles annularis* ITS2 region PCR showing ~500 bp amplicon**

Proposed Work for Future:

The study is planned to establish correlation between cytotaxonomic techniques and a new techniques developed to establish the specificity of these tools in the accurate identification of the sibling species. This would be the first attempt to develop genetic markers, which could be used in mapping genes of interest, to study the population structure, gene flow etc.



Legend:

Mosquito processing method. The head-thoracic portion and rest abdominal part of each mosquito were homogenized separately. Half of the homogenate from the head-thoracic region was dispensed to spot A and another half to spot B. Similarly, half of the homogenate from the abdominal part was dispensed to spot C and another half to spot B. Punched discs from these spots were then subjected to DNA isolation and PCR.

10. Malariogenic stratification of Anugul district of Orissa using sibling species prevalence of malaria vectors

Principal Investigator:
Dr. N. Mahapatra,
Co-Investigators:
Dr. R.K. Hazra, Dr.S.K.Parida,
Mr. N.S.Marai, and
Mr. H.K. Triparthy.
Funding: Intramural
Starting date: October 2003
Closing date: September 2006.

Objectives:

1. To study the prevalence of different sibling species complex of malaria vectors and their susceptibility status to insecticides in Anugul district of Orissa.
2. To study the bionomics of the complex like resting, feeding and biting behaviour, anthropophilic indices, gonotrophic cycle, and preferential breeding habit.
3. Malariogenic stratification of the district basing on the above parameters

On Going Studies

Background:

Vectors are the most important determinants of malaria. The distribution of vectors, their species complex and its biological adaptation and residence in particular environment is the determining factor in establishing malaria endemicity. Anugul district has eight PHCs having a total population of 11,39,341(census 2001) . It has forest, riverine and plain ecotype and it has also developmental dam project areas as well as mining areas.

Work Progress

The study sites were selected from two different ecotype i.e. hilly forest areas and plain area of Angul district. From these two ecotypes villages were selected randomly from where mosquitoes were collected. Mosquitoe collection was done from 10% of the households (HD) and 10% of the cattle sheds (CS) from each village. The sampling for all the entomological studies was done as per the WHO procedure (WHO, 1975). After collection, the mosquitoes were identified, blood meals collected on Whatmans filter paper for processing by gel diffusion technique. The ovaries were dissected from semigravid females and were placed in modified Cornoy's fixative. Ovaries were processed in 50% propionic acid and stained in 2% lacto- aceto-orcein according to the method of Green and Hunt (1980) for making polytene chromosome preparation. The chromosomal preparation was studied under phase contrast microscope.

The presence of 13 species of mosquitoes belonging to four genera i.e. Anopheles, Culex, Aedes and Armigeres. Anopheles species collected were An.aconitus, An.annularis,, An.culicifacies ,An.fluviatilis ,An.hyrcanus, An. maculatus, An. pallidus, An. pseudojamsei, An. subpictus ,An.splendidus, An. tessellatus, An. vagus and An. varuna in the district as identified and classified by taxonomy by uses of identification keys of Christopher. The detailed PMHD and number is given in Table –1

The density of An culicifacies was highest during rainy season & lowest in summer in plain areas while An. fluviatilis was collected more in foothill areas during winter. An. annularis was also found with highest PMHD in winter in plain areas (Fig-1).

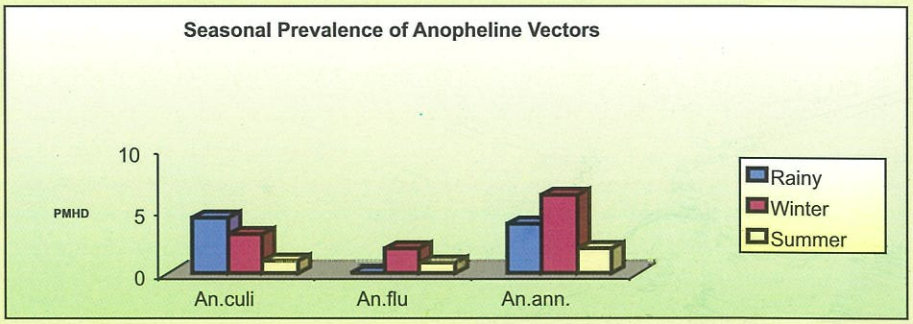
Table - 1

Number of mosquitoes collected from Angul(Oct. 2005- july.2005)

Species	Total No	PMHD	%
An.aconitus.	18	0.05	0.12
An.annularis.	436	1.24	2.91
An.culicifacies.	1150	3.28	7.67
An.fluviatilis.	216	0.62	1.44
An.jeyporensis.	16	0.04	0.11
An.hyrcanus.	108	0.31	0.72
An.pseudojamsi	8	0.02	0.05
An.subpictus.	6854	19.58	45.71
An.vagus.	6128	17.51	40.87
An.varuna.	26	0.07	0.17
An.splendidus.	22	0.06	0.14
An.palidus	4	0.01	0.03
An.maculatus	6	0.02	0.04
Total	14992		

Fig. 1

Seasonal Prevalence of Anopheline Vectors 2005-06



An. culicifacies, An.fluviatilis and An. annualris are found to be the main vectors in Anugul district. Out of five sibling species of An.culicifacies (A, B, C, D, & E), species B and C are found in plain area (Fig – 2) out of three sibling species of An. fluviatilis(S,T &U) only S and T were collected from the foothill areas with sibling 'S' predominance. These sibling species were identified by polytene chromosome preparation. Out of sibling species of An. culicifacies sibling species 'C' was 78 % and rest were 'B' (Fig – 3).

Fig. 2

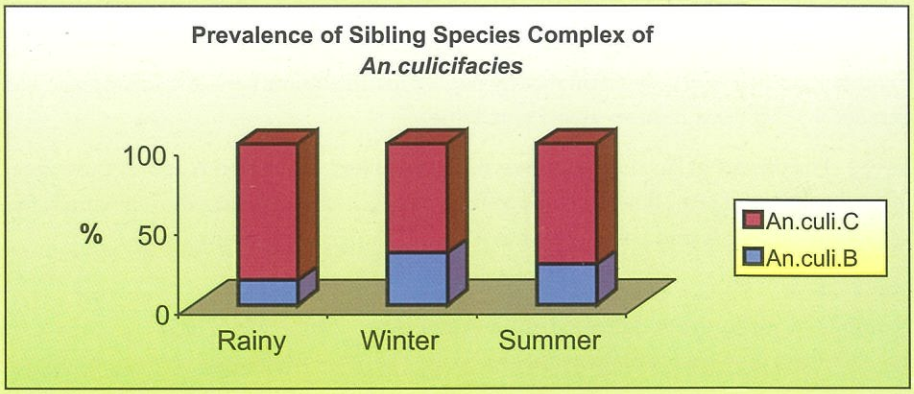
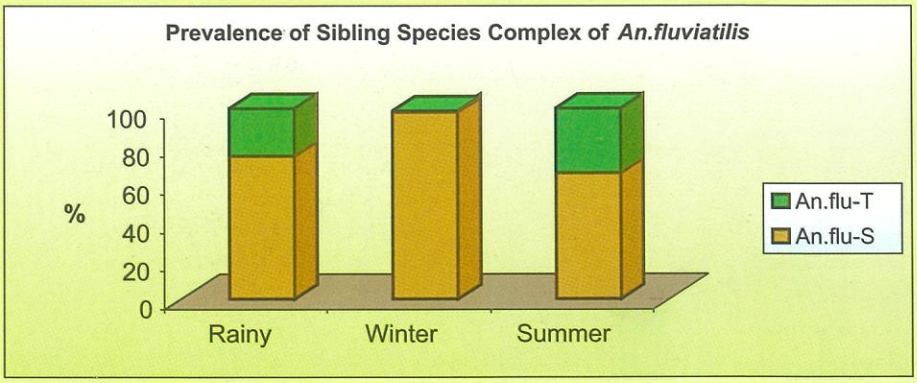


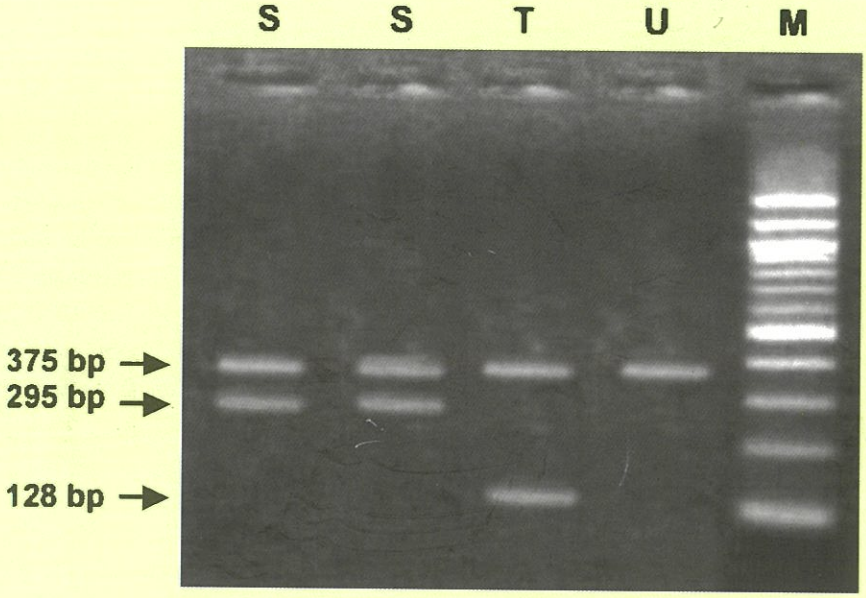
Fig. 3



On Going Studies

Besides polytene chromosome detection of sibling species, molecular identification of An.fluviatilis was also done, in D3 region of the ribosomal DNA using primers developed by MRC (Singh et al 2004). The result revealed the composition of An. fluviatilis 'S' to be 89% and T 11% (Fig- 4). One specimen of An. fluviatilis 'U' was also collected.

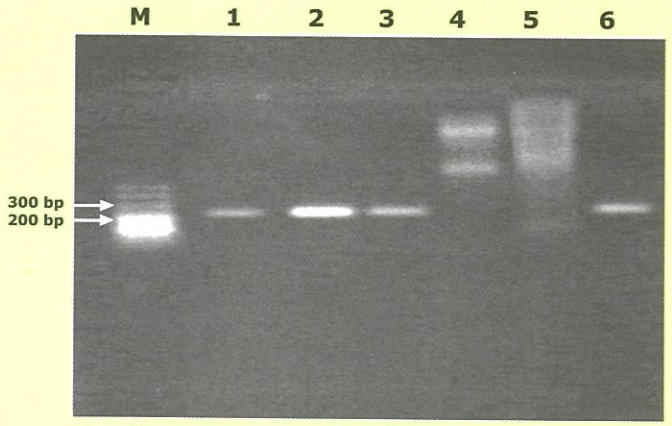
Fig. 4 Molecular analysis of *An.fluviatilis*



Detection of sporozoite

Detection of sporozoite was done in 875 anophelines using PCR technique (Snounou et al 1993) besides dissection method. Seven specimen of An culicifacies and Five of An.annularis were found positive for P.falciparum sporozoite by PCR method (Fig-5). The sporozoite rate by PCR method was found to be 1.48% and the sporozoite rate by both the methods is 1.09% (Table-2).

Fig. 5 Detection of sporozoite by PCR method



Lane M: 100 bp ladder, Lane 1&2 test samples *An. culicifacies* and 3 to 5 test samples of *An.annularis* Lane 6 : Positive Pf sample

Table-2 - Sporozoites Detection.

SL. No.	Anopheline Species	PCR detection		Dissection Method	
		No Tested	No. Positive	No Tested	No. Positive
1	An.culicifacies	469	7	205	0
2	An.annularis	281	5	51	0
3	An.fluviatilis	125	1	57	0

Precipitin test

Precipitin test was conducted using 926 mosquitoes (An. culicifacies 643, An. annularis 140, An. fluviatilis 93) for the identification of source of blood meals of anopheline vectors by using gel-diffusion technique. An. fluviatilis was found to be highly anthropophilic (>75%) where as both An. Culicifacies & An. Annularis were found to have low anthropophilic index (>3% & >2%) respectively. An. culicifacies(>97%) and An. annularis(>96%) were highly zoophilic.(Fig 6,7 & 8). Comparing the mosquito feeding habit yearly in 3 consecutive years no significant variation in the feeding pattern was observed.

Fig. 6

Anthropophilic Indices of Anophelines of Angul district

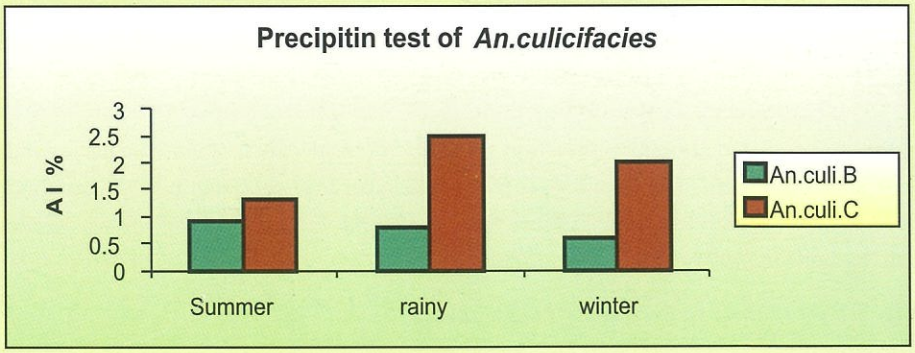


Fig. 7

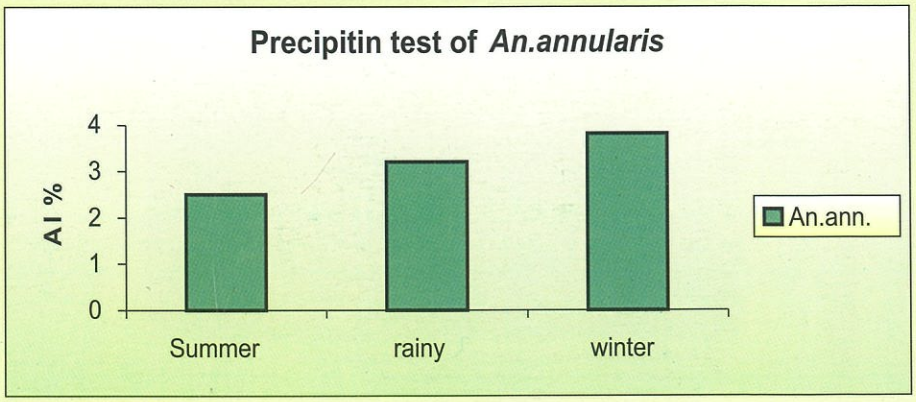
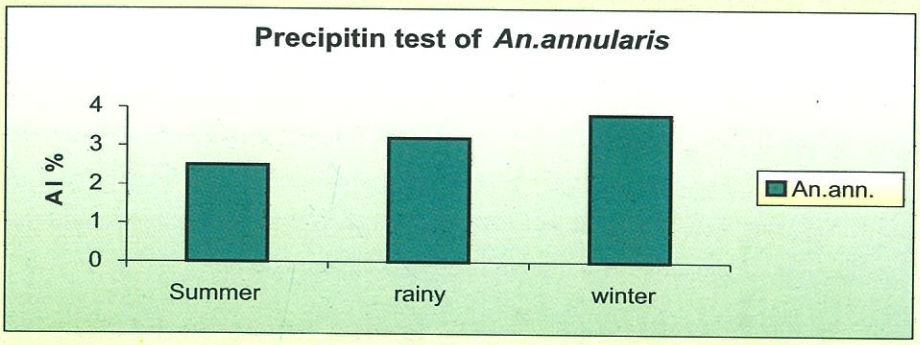


Fig. 8



Susceptibility Test

The susceptibility status of An.culicifacies B and C was done and it was observed that B and C both are resistant to DDT but they are susceptible to Deltamethrine 0.5%.

Though two sibling species reported in Anopheles annualris, the presence of species complex in Orissa is unknown. We have started the detection and identification of sibling species of An. annualris, which also plays an important role in malaria transmission. Molecular methods for identification of sibling species work initiated with standardization of D3 and ITS2 region

The data from two geographical areas have been generated and comared with the two ecotypes with regards to transmission and occurrence of malaria

11. A study on immunoregulation and genotyping for cytokine polymorphism in human cerebral malaria

Principal Investigator:
Dr.B.Ravindran
Co-Investigator: Dr A. K. Satapathy
Collaborators: Dr.Shobona Sharma, TIFR, Mumbai
Dr B.K.Das, SCB Medical College, Cuttack Starting date: January 2006
Closing date: December 2008
Funding: Extramural (ICMR PRC)

Objectives:

(1) To study B-cells responses (IgG and IgE) to malarial phospoproteins, Viz. PfPO, Pf2, Pf9 and MSP1, MSP3, AMA 1 and GPI in cerebral and/or in multiorgan dysfunction in human P.falciparum malaria.

(2) To quantify T-regulatory cells a) CD4+ CD25+ b) CD4+ CTLA 4+ in circulation in human cerebral malaria.

(3) 3) To type the following host gene polymorphism and to correlate predisposition to develop cerebral and/ or Multi-organ dysfunction in P.falciparum malaria: a) IL-10; b) TGF- β; c) TNF- α and d) IFN- γ

Work Progress:

One of the severe pathological manifestations of P.falciparum infection is the cerebral malaria and more crucially patients developing multiorgan dysfunction involving renal and hepatic dysfunction along with cerebral symptoms. However, only a subset of P.falciparum infected patients suffer from such clinical symptoms. The factors responsible for the precipitation of cerebral malaria amongst P.falciparum patients are not yet clearly identified. Several immune responses and host genetic polymorphism have been implicated in naturally acquired immunity and in cerebral malaria.

On Going Studies

Work Progress: Efforts are being made to collect samples from the following categories of malaria patients. (1) Clinically non-complicated P.falciparum cerebral malaria (NCM) (2) Cerebral malaria with renal or hepatic involvement-multiorgan dysfunction and (3) Endemic controls. About 130 blood samples of category (1) and (2) were collected at SCB Medical College, Cuttack. DNA were purified from the leukocytes and preserved. Isolated DNA will be used for typing genetic polymorphism of IL-10, TGF-β, TNF-α and IFN-γ. Sera were separated and preserved which will be used subsequently for quantification of antibodies responses to malarial phosphoproteins.

Principal Investigator:
Dr. Amarendra Mahapatra
Co- Investigators:
Dr. M.R. Ranjit, Mr. D.P. Hansda, Mr. H.S. Naik, Mr. B. Purohit & P.K. Jangid
Funding:
Extramural funding, NVBDCP (Initiated with Intramural grant)
Starting Date: March 2006
Closing date: February 2008

12. The effect of Choloroquine Chemo prophylaxis during pregnancy among the compliant and non - compliant mothers of Orissa.

Objectives:

1. To assess the frequency of malaria among the pregnant women and infants.
2. To assess the drug compliance pattern and impact of malarial chemoprophylaxis on pregnant mothers
3. To study the reasons of non-compliance and other best practices followed if any.

Work Progress:

The proposed study aims at to evaluate the efficacy of Choloroquine chemoprophylaxis in preventing or reducing malaria attack and consequently anaemia among the pregnant mothers. Besides this, the study will help us to calculate / quantify the malaria burden among the pregnant mothers and Infants at the community level, along with the community behaviour towards the disease-malaria. This can help us to plan better strategies for pregnant and infant care, and in turn to reduce the MMR, IMR, along with the proportion of Low Birth Weight Babies (LBW) in future.

Community Survey

Under the IMR mission Government of Orissa is supplying weekly 600mg of Choloroquine chemoprophylaxis, to all the pregnant mothers in the State, under the National Malaria Control Programme. The programme envisages covering all the pregnant women who are to be registered for immunization and ANC attendance at the Angan Wadi Center in the village. After first trimester of the pregnancy the AWC worker gives the chemoprophylaxis to all the pregnant women: since evidences reveal that chronic malaria infection is associated with anaemia in pregnancy, especially in primagravidae and indicate to take effective measures for prevention of malaria

and anaemia in pregnancy, especially in primagravidae. This in turn would significantly reduce anaemia and its deleterious effects on both the mother and the baby. This programme initiated in all districts since 2003 is yet to be evaluated. The study attempts to assess the compliance rate and thus compare the pregnancy outcomes of the compliant and non compliant mothers.

Table –1 Distribution Hb% among the pregnant women

Anemia level	>11	Mild 9-11g/dl	Moderate 7-9g/dl	Sever < 7	Total No
No.	10	18	32	18	78

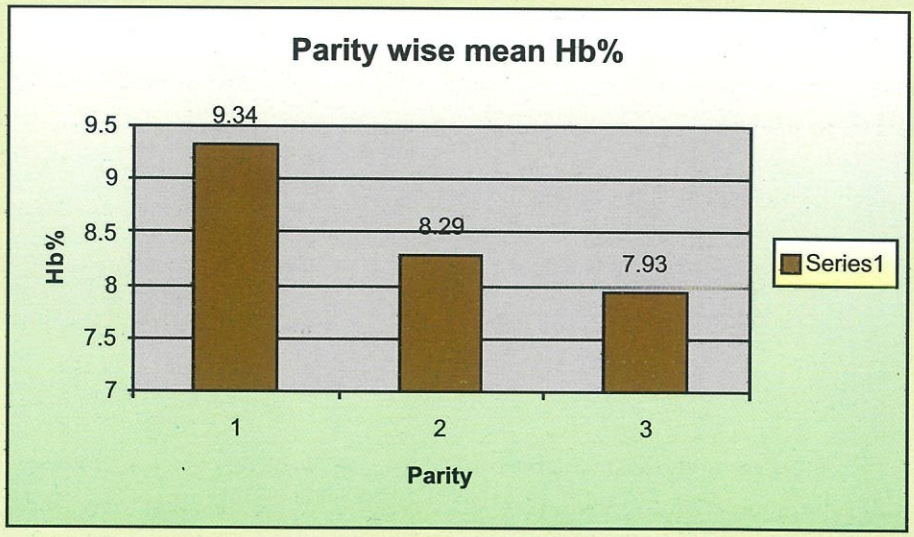
As per the study design a cohort of 500 pregnant women in their first trimester, will be prospectively followed up every three months, for their (i) Drug compliance, (ii) Fever History, (iii) parasite detection by both slide and from peripheral blood as well as cord & placental blood at time of delivery and ICT (iv) Hb status. The pregnancy out comes and fever history will be compared, with the cord & placental blood samples. The postpartum follow up of the study is extended to infants for 6 week to ascertain the transmission of infection. From mother by parasite detection from infant the Angan Wadi Worker's help is taken in this study.During this period a total 78 pregnant women were registered from 35 villages of Gania Block, in Nayagarh district. The preliminary results reveal association between parity and haemoglobin (Hb%) level. The mean Hb% among these subjects was 8.52% (Table-2) ; 10 of them were normal, 18 had severe anaemic and rest 50 had mild or moderate anaemic (Table-1). Out of 78 pregnant women 18 (23%) reported history of malaria. In the second follow-up 1 case out of 5 followed up reported malaria fever. Out of 78 pregnancies, 31 were in their 1st Parity. The rest 47 Pregnancies have reported a bad obstetrics history (BOH-10=21%) of last pregnancies; they are as follows: Still birth-2, Abortion- 4 and Infant died due to Malaria with in One year- 2 cases. In another 2 cases death occurred in the 4th and 7th day but the reasons of cause of death could not be ascertained.

Table-2 Epidemiological Detaild of all subjects:

Parity / Number	1st	2nd	3rd +	TOTAL
No.of Preg. Women	31	31	16	78
Malaria History	4	6	8	18 (23%)
Hb%	9.34%	8.29%	7.93%	8.52%

Focus Group Discussion in Community in progress

Fig. 1 Parity wise distribution of Haemoglobin level



Principal Investigator :
Dr. M.R. Ranjit
Co-Investigator :
Dr G.P.Chhotray, Dr. A.S.Acharya
Starting date : August 2006
Closing date : August 2009
Funding :
Extramural (Applied to NVBDCP)

13. Molecular analysis of drug resistance genes and prediction of treatment outcome in P falciparum infections in Orissa.

Objectives:

(i) To observe the frequency of the genotypes of PfCRT / PfMDR1 and DHFR-DHPS associated with Chloroquine and Pyremethamine-Sulphadoxine resistance in natural P.falciparum parasite populations of Orissa.

(ii) To study the origin and spread of resistant alleles through the parasite population in this region.

Background:

The EDPT chemotherapy is the most practical approach for control of this disease. According to the National Drug Policy, adopted in the state for control of malaria, Chloroquine is the first line and S-P is the second line of treatment of preference. But widespread development of resistance to the first line of drug (CQ) might be the cause of high incidence of malaria attributed deaths in the state, which needs continuous monitoring / surveillance to assess it's efficacy and develop a strategy to prevent it's spread. The WHO has outlined three ways of measuring drug efficacy; (i) The clinical responses of patients to drug treatment; (ii) the sensitivity of parasites to drugs in-vitro or (iii) accepted molecular markers as complementary tools for monitoring drug resistance. Though the first two methods are specific and quite sensitive, yet these are time consuming and sometimes raise ethical issues for its application. However, correlation of specific mutations in the genes that encode targets of the antifolate drugs and drug resistance, such as DHPS (targeted by Sulpha drugs) and DHFR (targeted by

DHFR inhibitors), are well established; and certain mutations in the P.falciparum Chloroquine transporter gene (PfCRT) and the P.falciparum multi-drug resistance gene analog (PfMDR1) has been observed to be associated with the development of resistance to Chloroquine in different studies including our own study conducted during 2002 – 03. However the frequency and distribution of CQ and S-P drug resistance markers has not been known. The proposed study aims at (i) generating a base line data on the frequency and distribution of CQ and S-P resistance markers in different physiographical regions of the state and (ii) predicting the origin and spread of these genotypes through P.falciparum populations in this particular region of the country. This information will serve as a public health tool to develop a rational drug policy and combat spread of drug resistance.

Work Progress

The project proposal has been prepared and submitted to NVBDCP for funding. However the work has been initiated with intramural funds. A total 131 blood samples positive for P.falciparum have been analysed. The genomic DNA of P.falciparum was isolated by standard protocol and point mutations in DHFR & DHPS genes responsible for SP drug resistance were analysed by PCR-RFLP technique. Of the total samples 32 were found to harbour single mutations (either N 51I, C 59R or S108N/T) in DHFR, 38 were having double mutations (51+59: 11, 59+108:17 and 108+51: 10) and 19 had triple mutations (51+59+108). In case of DHPS 16 samples were found to have single mutation (either A437G or K/L540E) none of the samples have double mutations. The study indicates that P.falciparum isolates harbouring SP drug resistant gene are prevalent in the state. However, the study is in progress to analyse other codons of DHFR (A50V, I164L) and DHPS (S/A436F, A581G, A613S/T) to know the level of resistance, its distribution & evolution.

14. A randomised clinical trial with Chloroquine and alternate drug regimens to study the comparative efficacy, in treatment of uncomplicated P.falciparum malaria in two endemic districts of Orissa

Principal Investigator:
Anna S Kerketta
Co-I nvestigators:
M R Ranjit, P K Jangid
Collaborators- 1.
Trupti Rekha Swain,
Pharmacology Department
SCB Medical College, Cuttack.
2. Dr S K Mishra- -IGH, Rourkela.
Starting period: March 2006
Closing period: February 2008
Duration: 2 years
Funding: Extramural

Objectives:

1. To study the comparative efficacy of four antimalarial drug regimens in treatment of uncomplicated P. falciparum malaria.
2. To differentiate the recrudescence and re-infection by using molecular marker.
3. To relate CQ failure with its plasma concentration.

Work progress

The study has been applied for extramural funding and initiated intramurally. The site selection work has been initiated in 8 villages of three high malaria endemic blocks. Daspalla of district Nayagarh, Kamakshya Nagar of district Dhenkanal &

On Going Studies

Narsinghpur of district Cuttack were visited with the aim to assess the incidence of fever cases in a defined territory during this season examined. This aims to assess the treatment seeking behaviour of the fever cases and to assess the prevalence of P.falciparum mono infection since it is the pre-requisite for the study. The door to door household survey was made to collect information on fever cases daily for consequevtive 5 days in the same popyulation group to record the incidence. Blood slide was collected from each of the fever cases examined under mcirocscope for malaria parasite to confirm the occurrence of malaria. The malaria data was alsoobtained from their local health centre/ PHC to accertain the prevelance of malaria in that area. A total of 7996 populations covered under the survey. Out of this, occurrence of fever was recorded 298(3.7%). All the cases were examined clinically. The result shows 5 - 6% P.f prevalence of malaria in that region.

Mono infection with P.f was obtained in proporsonately small no of fever cases encountered in Nayagarh and Cuttack districts. After accessing the individual requirement as per inclusion criteria the anti-malarial regimen will be randomly allocated. The Blood slides will be examined subsequent to the therapy and while keeping close observation for safety signs as per the protocol. The study in on going.

Principal Investigator:
Dr.B.B.Pal,
Co-Investigators:
Dr.G.P.Chhotray,
H.K.Khuntia, S.K.Samal
Funding: Intra-mural
Starting date: September- 2005
Closing date: August-2006

15. Epidemiological characterization of bacterial entropathogens among the children suffering from acute diarrhoea-A hospital based study.

Objectives:

1. To isolate and identify the various bacterial enteropathogens like E. coli, Salmonella, Shigella, Vibrio cholerae from inpatient diarrhoea patients of paediatric age groups (<14yrs) from capital hospital, Bhubaneswar and Sishu Bhavan of Cuttack.
2. To type the various bacterial enteropathogens by specific antisera and to study their antibiogram.
3. Detection of toxic genes of pathogenic E. coli and Vibrio cholerae by PCR assay.

During this period from September-05 to March-06, 179 rectal swabs were collected and bacteriologically analyzed. Among the bacterial enteropathogens isolated E. coli were 83(82.2%), Vibrio cholerae O1 16 (15.9%), O139 serogroups 0%, Salmonella 0%, Shigella 2(1.98%). Among the Vibrio cholerae O1 strains Inaba serotype were 7 and Ogawa sero types were 9. This is the first report of Vibrio cholerae O1 Inaba serotype, isolated from the children suffering from acute diarrhoea patients. Besides this the same serotype along with some Ogawa serotype were also isolated from the different outbreak areas of Orissa in different time periods. This shows that this new serotype were widespread in thin region.

Three hundred and eighty-nine rectal swabs were also collected during the study period from adult diarrhoea patients from ID hospital, Puri. The predominant

enteropathogens isolated were E. coli- 158 (68.7%), followed by V. cholerae-60 (26.1%) and Shigella spp.- 6 (3.9%) respectively. Among the Shigella isolates, most of them were S. flexneri type-6 (4) followed by S. boydii (1) and S. dysenteriae type-1 (1). Among the 60 V. cholerae isolates; V. cholerae O1 Ogawa were 23 (10%), Inaba were 35 (15.2%) and V. cholerae O139 serogroups were 2 only. The Shigella isolates were showing sensitive to ciprofloxacin, norfloxacin, gentamicin, chloramplenicol and ampicillin; whereas resistant to tetracycline, streptomycin, nalidixic acid, co-trimoxazole, neomycin and furazolidone. All the Vibrio cholerae Ogawa and Inaba isolates were uniformly sensitive to ampicillin, ciprofloxacin, norfloxacin, tetracycline, gentamycin, and chloramphenicol. The resistant profile of Ogawa and Inaba serotype were FrNaN and FrNa respectively. The Inaba serotype was isolated from a cluster of cases of diarrhoea patients of Gaudabadasahi, Puri town during the month of August 2005. Then subsequently these Inaba serotype were also isolated from other districts like Bhubaneswar(Khurda) and Chasapada (Dhenkanal) from September to October 2005 respectively causing localized outbreaks including some isolates from other areas of Puri districts also.

PCR assay of V. cholerae:

A multiplex PCR assay was conducted on some representative strains of Vibrio cholerae of Ogawa and Inaba for the detection of tcpA and ctx A gene. The multiplex PCR assay revealed that both the strains were ctx A and tcp A gene positive showing biotype El Tor.

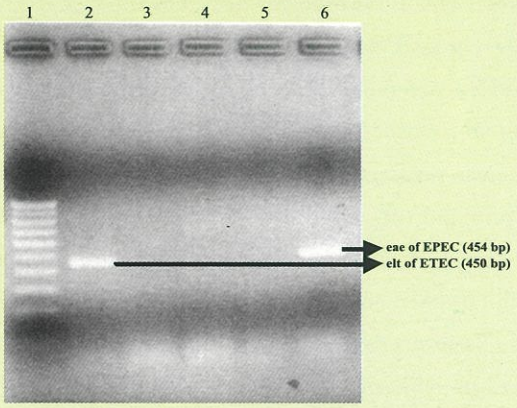
Simultaneously the Inaba sero types were showing dominance over Ogawa serotype and they were wide spread in the coastal districts also. This shows that the future outbreak might be due to Inaba serotype. But this was not true while the cholera outbreak in Cuttack town during 2006 was due to V. cholerae O1 Ogawa. The predominance of Inaba serotype over Ogawa was observed during 2005. Where as the outbreak during March 2006 was due to Vibrio cholerae of Ogawa biotype El Tor. This shows that the Ogawa serotype has again remerged as a predominant serotype, which may cause the future outbreak of cholera in this region.

PCR assay of E. coli:

Fifty strains of E. coli were subjected to PCR assay for the detection of eae gene of EPEC and elt gene of ETEC strains. The PCR analysis revealed that 2.7% and 2% were positive for EPEC and ETEC strains respectively. Isolation of other pathogenic E. coli like EAggEC, EHEC including EPEC and ETEC from about 210 DNA isolates will be characterized by PCR assay. Further serogrouping and antibiogram of the pathogenic E. coli will be done.

On Going Studies

Fig.1 Lane 1: 100 bp Ladder, 2: Positive, ETEC (elt), 3-5: negative, ETEC and EPEC, 6: EPEC (eae).



Principal Investigator :
Dr. Anna S. Kerketta
Co-Investigators :
Mr.P.K.Jangid, Dr.A.S.Acharya
Collaborator :
Director of Census Operation, Orissa.
Funding: Extramural
Starting date: January 2003
Closing Date: December 2006

16. A 6-year's Prospective study of the risks of death by cause from tobacco and alcohol use among 2million Indian men and women, a multicentric study.

Objectives:

1. To study all cause mortality and cause specific mortality (Tuberculosis, cancer, vascular disease, asthma, chronic obstructive pulmonary disease, and other causes) by age, gender and socioeconomic group in relation to tobacco and alcohol use among 2 million Indian adults surveyed for their tobacco and drinking patterns in 1998.
2. To study to what extent does tobacco smoking increases the risk of death from tuberculosis, vascular diseases, cancers and respiratory diseases in India.
3. To study what are the differences in patterns of tobacco and tobacco attributable mortality by socio-economic class, age and gender, and across various region (rural, urban, south, north) and find out the links to indoor air pollution and other potential confounders/effect modifiers.
4. To study to what extent do the alcohol use and amount drunk per week increase or decrease cause specific death rates from vascular disease, cancers, tuberculosis and unintentional and intentional injuries

Background:

The study envisages the following activities 1. Training and retraining of the SRS supervisors on Verbal Autopsy methodology 2.Resampling of 10% of VA of SRS supervisors 3. Assigning of cause of death as per ICD-10. Orissa SRS covers 36.7 million people; spread over 405 units and having 51 supervisors to carry out survey on vital statistics every half yearly.

Work Progress

The training of the supervisors of DCO Orissa was conducted, on Verbal autopsy methodology after which for first time the VA was implemented in SRS, during 2nd

On Going Studies

HYS and 2003 1st HYS.A total of 2780 deaths were recorded from all age groups during these surveys. Refresher's training was imparted to the SRS supervisors especially on the use of newer modified manual, use of single page VA form and symptom list .In the Special Survey of death (SSD) covering period of 2001-2003 (except the HYS mentioned earlier). VA has been undertaken on a total of 7000 deaths. These form have been sent back to the physicians from SCB Medical college, Cuttack who had received training on assigning cause of death (coding) in October 2004 and refreshers training was conducted by RMRC in June 2005.The web based assignment of cause of death has been initiated and so far around 5000 deaths have been coded. It will be analysed centrally by CGHR and RGI of India. Resampling of 10% death event was conducted for both the 2nd HYS and 2003 1st HYS as a quality control measure.

17. Epidemiology of viral hepatitis in tribal populations of Orissa, Madhya Pradesh/ Chhatisgarh and Jharkhand, India – a multicentric study

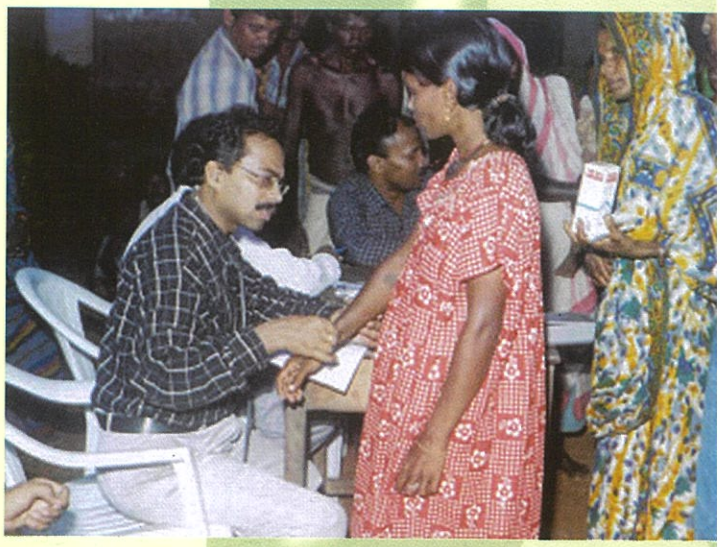
Principal Investigator :
Dr. S. K. Kar
Co-Investigators:
Dr. B. Dwibedi,
Dr. A. S. Acharya,
Dr. B. V. Babu, and
Dr. A. Mohapatra
Collaborator :
Dr. S. P. Singh
(Asso. Prof. SCB. Medical College, Cuttack)
Funding : Extramural (ICMR tribal Task force)
Starting Date : March 2006
Closing date : February 2009

Objectives:

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

Work Progress:

Funding received in March 2006 from ICMR. Clearance of Institutional Committee and permission from Department of Tribal development, Govt. of Orissa has been obtained for under taking the proposed research activity.



Clinical Examination of Hepatitis patients in field

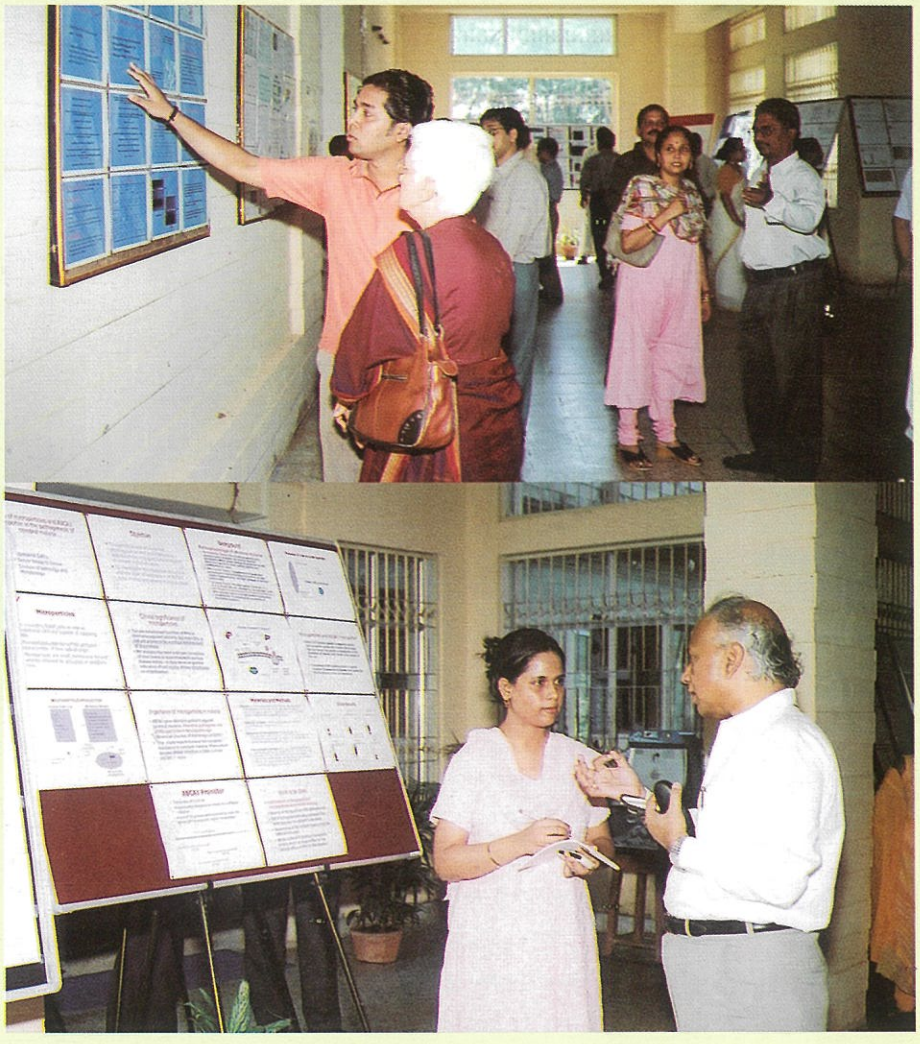
Sampling and Study population:

Since the prevalence data for this region on hepatitis infection is available, taking the prevalence of 10% a sample size of 2500 has been estimated and this will be distributed proportionately among the different primitive tribes of the study area.

Mayurbhanj, the highest tribal populated districts of Orissa has been selected as the study area. There are seven (7) primitive tribes identified in this district are (1) Lodha/saora (2) Lodha (3) Kharia/Hill (4) Kharia, (5) Mankidi and (6) Mankidia & (7) Juanga.the distribution partern of primitive tribe settlements in various blocks of the district are mapped for earch of the 7 tribes. Samples are drawn representing the each

On Going Studies

tribe and their settlement distribution. The population under different ITDAs has been identified in the first phase and administrative preparation started. District collector Mayurbhanj and Project Director ITDA Mayurbhanj were consulted regarding execution of the project and field level staff of the tribal agencies were contacted. Meetings organised with District welfare officer, special officers Lodha and Kharia, the community leaders of Lodha community as a part of motivation and awareness activity. IEC activities at village level were started in 2 villages in habited by Lodha tribe. Investigators meeting held for coordinating the activities among different centres and standardisation of laboratory and chemical reagents to be used to maintain uniformity, training in techniques was imparted to various new recruits of teams on ELISA for serology using around 100 sera standardisation of tests done. The study is ongoing.



Poster presentation by students during SAC Meeting in RMRC.

Completed Studies 2

1. Lymphatic filariasis in young children: an immunological prospective.
2. Study on nutritional status of Dongria Kondh primitive tribe and Domb scheduled caste populations of Orissa
3. Study of health consequences of domestic violence with special reference to reproductive health
4. Identification of serum immunosuppressive factors in human filariasis

Completed Studies

Principal Investigator:
Dr. M.K. Das

Co-Investigators:
Dr. M.K. Beuria, Dr. M.S. Bal, Mr. N.N.Mandal

Funding:
Intramural
Starting date: August 2001
Closing date: August 2005

1. Lymphatic filariasis in young children: an immunological prospective.

Objectives:

1. To detect pre-patent infection through IgG4 and circulatory filarial antigen assay.
2. Prevalence of anti-filarial antibodies in different age classes in children.

Background:

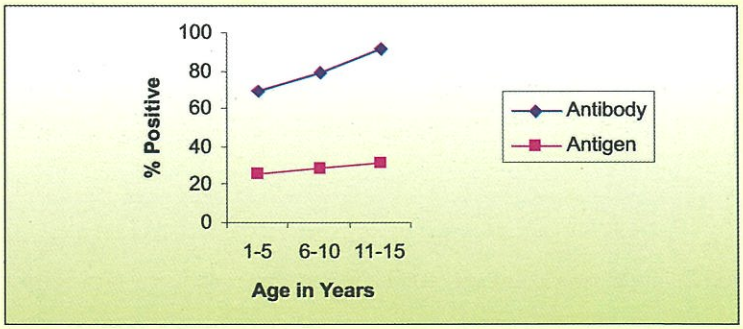
Children are most susceptible to acquire infection because of lack of immunity and high exposure to infective larvae in an endemic region. These infections, established in childhood, may act as the reservoir for the future disease later in life. As clinical manifestations in filariasis appear most frequently in early adulthood or later, most of the studies have been focused in adult population and the importance of filarial infection and disease in children has been markedly neglected.

Results:

The infection and disease status among children below 15 years of age was determined in villages of Khurda district, Orissa. Prevalence of microfilaria, acute disease and hydrocele cases was observed to be 10%, 14.9% and2.2% respectively. Presence of circulating filarial antigen (CFA) was determined using Og4C3 test kit. About 32% of the children were found CFA positive. Prevalence of filarial antigenemia of 28%, 32% and 34.5% was observed in 1-5 yr, 6-10 yr and 11-15 yr age groups respectively. The level of antigenemia although increased marginally with age in pediatric age groups but significant difference was not observed among the groups. Similarly, no difference in antigen prevalence and intensity (antigen unit) among asymptomatic amicrofilaraemic children indicating adult worm burdens were similar. Infection free children (antigen negative) were checked whether these subjects were exposed to the infection or not. About 95% IgG positivity to filarial antigens was observed indicating that these children were well exposed to filarial infection.

In order to check the transplacental transfer of filarial antigen and antibody, cord blood along with the maternal blood samples were collected (Khurda district hospital).

FIG: Prevalence of antigenaemia and anti-filarial antibodies in different age class of endemic children.



Completed Studies

IgG and IgM antibodies to Setaria digitata antigens were determined in both maternal and cord blood samples (n=154). IgG positivity of 85% and 43% were observed in maternal and cord blood samples respectively. IgM positivity rate of 55% was noticed in maternal blood samples. It is of interest to note that only one cord blood sample was found positive for the IgM antibody. Presence of circulating filarial antigen (CFA) was also determined in both maternal and corresponding cord blood. About 56% of mothers were found to be CFA positive where as 18% cord blood samples were found positive for filarial antigen.

Conclusion:

The results indicate the severity of filarial infection in young children in the endemic regions of Orissa. Adult worm burden were similar among the pediatric age groups and most of the infections are acquired early in life below 5 years of age, which in later life lead to overt clinical symptoms of Filaria Disease.

2. Study on nutritional status of Dongria Kondh primitive tribe and Domb scheduled caste populations of Orissa

Principal Investigator:
Dr. G. Bulliyya

Co-Investigator:
Dr. B. Dwibedi, Mrs.G.Mallick

Funding:
Extramural (ICMR –Taskforce)

Starting date: 01-07-2003
Closing date: 30.09.2005

Objectives:

1. To study the demography, socioeconomy and morbidity status;
2. To assess the nutritional status of all age groups;
3. To study the household food and nutrient consumption pattern and seasonal variation;
4. To evaluate the availability and utilization of health care and nutritional programmes;

Background

The present study was carried among the Dongria Kondhs primitive tribal group (PTG) and Domb scheduled caste populations in Rayagada district of Orissa. Dongria Kondhs confined to inhabit their traditional dwelling places in remote contagious hilltops of Niyamgiri hills in Eastern Ghats covering under Kalyansighpur, Bissamcuttack and Muniguda blocks. Their economy is solely based on shifting cultivation and collection of minor forest produce. Considering their backward characteristics of pre-agriculture level of technology, stagnant or declining population, extremely low literacy rate and subsistence level of economy, two Micro-projects namely Dongria Kondh Development Agency are functioning for their overall socioeconomic development. Dombs are only the neighbourhood landless population, who live separately in the Dongria villages, acting as mediators with mainlanders and involve in business activities. The Dongria population is limited to about 7500 and Dombs account for 2500 spread over 112 villages devoid of communication facilities.

Methodology

Half of the total villages were selected for study adopting PPS sampling. Sample size was estimated for each nutritional indicator separately using the formula assumed the

population size, expected prevalence of nutritional deficiency considering relative precision of the estimate at 95% confidence interval and design effect. The sample size for estimating micronutrient deficiencies calculated assuming prevalence of anaemia and goiter in target groups. Household data collected using a pre-tested questionnaire for socio-economic and demographic status, knowledge-attitude practices, awareness and utilization of healthcare services and nutritional programs. Diet survey was conducted on 10% sub sample of households covered for nutrition assessment by 24-hour recall method. Clinical examination was done for nutritional deficiency signs and related systemic disorders. The anthropometrical measurements were taken using standard equipment and procedure and nutritional status assessed using standard indices. Finger-prick blood samples were collected and haemoglobin levels measured by cyanmethaemoglobin method. A sub-sample of blood used for serum ferritin levels using ELISA. Venous blood samples collected from 50 adult subjects analysed for serum iron and total iron binding capacity using kits. Children were examined for presence of signs of goiter, urinary iodine excretion levels estimated by wet-digestion and salt iodine analyzed by titration methods.

Results

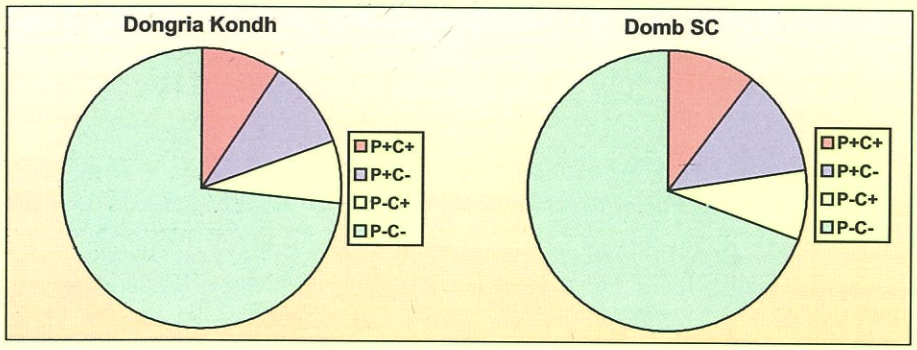
A total of 708 households were covered for the study that included 82% Dongria Kondh and 18% Domb communities. The sex ratio was 1273 and 1072 females per thousand males respectively for Dongria Kondh and Domb. Both the communities were Hindu by religion. The average family size 4.8 and majority of these households were nuclear families. Only 2.8% of Dongria and 16.7% Domb household heads were literate. The total literacy level found to be very low at 6.5% and 23.9% respectively for Dongria and Domb. Female literacy continued to be much lower than males in Dongria (male 11.7%; female 2.6%) and Dombs (male 28.2%; female 20%). None of the Dongria households had electrification and sanitary facility, while quite a few Domb households had electrification in Kurli village. Cultivation was the major occupation of Dongria besides collection of minor forest produce and business was the occupation of Domb. All Dongria households had agriculture lands and practicing shifting cultivation, while Dombs involved in different business activities.

Food and Nutrient intake

Data on food and nutrients intake was collected from 164 households. In general, rice and millets formed the bulk of dietaries and comparable to the suggested levels of 460g. The mean intake of pulses was much less than suggested 40g in both the communities (14.7g and 18.5g). The average consumption of green leafy vegetables was marginally lower 24g and 26g in Dongria and Domb than the suggested level of 40g. The consumption of vegetables and roots-tubers was less than 50% of the RDI. Consumption of milk and milk products, fats/oils, sugar and jaggery were grossly inadequate in both communities.

The proportion of Dongria and Domb households consuming adequate amounts of both protein and calorie (P+ C+) accounted for only 9% and 10% respectively, while

Figure 1. Distribution of households by protein and energy adequacy status



about 63% and 61% were consuming inadequate amounts of both protein and calorie (P- C-). The proportion of households consuming adequate amounts of protein but inadequate amounts of calorie ranged from 11% in Dongria to 14% in Domb. The percent of households with inadequacy of protein but adequate amounts of calorie ranged between 17% among Dongria and 14% among Domb (Fig 1).

Seasonal variation in food intake

There was a wide seasonal variation observed in food consumption pattern of Dongria Kondh in terms of quality and quantity. Rainy season was observed to be the food scarcity season, during which they were in practice of taking alternative foods to meet the food insecurity. Dongria people preferred consume mango kernels, tamarind seeds and pith of sago palm used in powder form as alternative ingredients of rice in mandia jawa as staple consumed through out the day. The coping methods of food scarcity continued up to August every year.

Morbidity history and clinical examination of children:

History of acute illness within two weeks prior to clinical examination was recorded among children aged up to 10 years. About 50% and 40% of children of 0-5 yrs and 6-10 yrs age respectively had some illness. Common cold, respiratory tract infection, febrile illnesses and diarrhoeal disorders were the common illness observed in order of frequency. Difference in frequency of illness observed to be minimal in Domb caste and Dongria tribe children.

Information on recurrent attacks of RTI, fever and diarrhoeal disorder for at least two episodes in last 3 months was collected. Recurrent respiratory tract infection was found to be the most common illness, where recurrent attacks of RTI/fever/ diarrhoeal diseases were found to be reduced as the age advanced (i.e. in 6-10 yrs. age group). History of exanthematous illness in terms of fever and/or rash was seen in quite a few children (about 5%). Clinical pallor was observed in two third of the children examined and prevalence rate was 10% higher in the 6-10 yrs children when compared to younger (0-5 yrs) children. Signs of protein energy malnutrition in forms of edema and changes in skin or hair were evident in about 8% of children of both the groups. Splenomegally

was observed in identical proportions (15%) in both the age groups from either groups and it was associated with hepatomegally in more than half of these cases. Auscultatory signs of lower respiratory tract infection or wheezy bronchitis syndrome detected in about 7% of Dongria children, where it was observed to be higher (17%) in Domb children.

Nutritional status

The nutritional status of preschool children assessed according to weight-for-age (underweight), height-for-age (stunting) and weight-for-height (wasting) by SD classification (Table 1). The proportion of Dongria children with underweight (<median–2SD) was 66.7%, of which 38.1% were severely underweight (<median 3SD). While 52.7% of Domb children were underweight and 20.2% of them were severely underweight. Nearly 63% and 52% of Dongria and Domb children respectively were stunted (<median-2SD), an index of linear growth retardation reflected chronic nutritional deficits. The prevalence of severe stunting (<median-3SD) was 21% in both the communities. The percentage of children with wasting was relatively higher among Dongria Kondh (34%) than Domb (27%). About 8% and 5% of children had severe grades of wasting.

Table 1. Distribution of 0-5 years children according to SD (z-score) classification

Nutritional index	Sex	N	<Median -3SD	-3SD to –2SD	-2SD to -1SD	≥-1SD
Weight-for-age						
Dongria	Boys	229	36.4	29.1	19.1	15.4
Kondh	Girls	259	39.7	28.1	25.6	6.6
PTG	Pooled	488	38.1	28.6	22.5	10.8
Domb SC	Boys	80	12.4	39.1	21.9	26.6
	Girls	95	27.7	26.1	20.0	26.2
	Pooled	175	20.1	32.6	20.9	26.4
Height-for-age						
Dongria	Boys	229	26.4	41.8	10.0	21.8
Kondh	Girls	259	18.2	40.5	18.2	23.1
PTG	Pooled	488	22.1	41.1	14.3	22.5
Domb SC	Boys	80	23.4	23.4	23.4	29.8
	Girls	95	16.9	27.7	24.6	30.8
	Pooled	175	20.2	25.6	23.2	31.0
Weight-for-Height						
Dongria	Boys	229	7.4	22.8	40.0	29.8
Kondh	Girls	259	8.9	28.9	38.0	24.2
PTG	Pooled	488	8.1	26.0	39.0	26.9
Domb SC	Boys	80	1.6	29.6	34.4	34.4
	Girls	95	9.2	13.8	35.5	41.5
	Pooled	175	4.6	22.6	35.0	37.8

Completed Studies

The body weight of children and adolescents were expressed as percentage of NCHS standards (Table 2). About 63% and 79% of Dongria and Domb school age children (6-10 years) respectively were underweight. The prevalence of moderate and severe undernutrition was 36% in Dongria and 49% in Domb children. The prevalence of undernourished adolescents was about 85% in both the study groups, while moderate and severe grades of undernutrition accounted for 57%. The proportion of 'at risk' children (grades II + III) tended to increased from 36% in children 6-10 years to 56% in 11-19 years children of Dongria Kondh, and it was 49% in 6-9 years to 58% in 11-19 years children of Domb.

The distribution of adults according to body-mass index (BMI) grades is shown in Table 3. The overall prevalence of chronic energy deficiency (CED: BMI<18.5 kg/m^2) accounted 57.5% for Dongria Kondhs and 62% for Dombs. The prevalence of CED

Table 2. Nutritional status of children and adolescents

Nutrition grade (%NCHS)	Dongria Kondh PTG			Domb SC		
	Boys	Girls	Total	Boys	Girls	Total
School-age children (6-10 y)						
N	214	191	431	62	48	110
Normal (≥90.0%)	38.8	20.9	33.4	19.4	22.9	20.9
Mild (75.0-90.0%)	30.8	29.7	30.5	29.0	31.3	30.0
Moderate (60-75%)	23.4	26.4	24.3	46.8	31.3	40.0
Severe (>60.0%)	7.1	23.1	11.8	4.8	14.6	9.1
Adolescents (11-19 y)						
N	127	54	181	35	48	83
Normal (≥90.0%)	18.1	5.6	14.4	25.7	4.2	16.9
Mild (75.0-90.0%)	31.5	22.2	28.7	31.4	16.7	25.4
Moderate (60-75%)	31.5	48.1	36.5	22.9	50.0	33.9
Severe (>60.0%)	18.9	24.1	20.4	20.0	29.1	23.7

Table 3. Distribution of adults (≥20 years) according to body mass index

Body mass index (kg/m^2)	Nutrition grade	Dongria Kondhs PTG			Dombs SC		
		Male	Female	Total	Male	Female	Total
	N	549	665	1214	203	215	418
< 16.0	Grade III	9.6	14.4	11.9	4.0	21.4	13.3
16.0 – 17.0	Grade II	14.4	11.6	13.0	12.2	25.0	19.0
17.0 – 18.5	Grade I	36.7	28.3	32.6	40.5	20.2	29.7
18.5 – 20.0	Low normal	28.2	30.5	29.3	32.4	25.0	28.5
20.0 – 25.0	Normal	10.8	13.0	12.0	9.4	7.2	8.2
≥25.0	Over weight	0.3	2.2	1.2	1.5	1.2	1.3

particularly grade II and III was more among females than among their male counterparts of Dongria Kondh (male 24% vs female 26%) and Domb (male 14.2% vs female 46%). The proportion of over-weight (BMI> 25.0 kg/m^2) was negligible in both the communities.

Iron deficiency anemia

The haemoglobin levels were estimated from 719 subjects (571 Dongria Kondh and 148 Domb). Only 12.8% of Dongria and 17.9% of Domb had normal levels of haemoglobin (Table 4). Overall, 87% of Dongria and 81% of the Domb population had some level of anaemia. The proportion of individuals having mild, moderate and severe anaemia were 39%, 31% and 17% respectively for Dongria Kondh, while it was 29%, 35% and 18% for Domb. The prevalence of anaemia among preschool children (<11 g/dl) was 74.2% with 3.2% having severe anaemia in Dongrias, while severe grade was 12.5% among Dombs. The prevalence of anaemia was reported to be more in adolescents, adult males and females as compared to children.

The mean ferritin concentrations were 34 ng/ml in males 33.9 ug/ml in females. The proportion of individuals (>10 years) with inadequate iron stores (< 15 ng/ml) was 56.4%, of which 59% and 41% were males and females respectively. The variation in mean concentrations of haemoglobin between normal and hypoferritienemia was significant. Iron deficiency is a reduction in serum iron (SI) levels, an elevation in total iron binding capacity (TIBS) levels, and hence a net reduction in iron saturation (SI/TIBC). The mean SI concentrations were 149.9 ug/dl and 118.6g/dl for males and females

Table 4. Prevalence (%) of anaemia by haemoglobin levels (g/dl)

Age, sex, physiologic Groups*	N	Normal	Anaemia		
			Mild	Moderate	Severe
Dongria Kondh PTG					
Children 1-5 yrs	31	25.8	41.9	29.1	3.2
Children 6-11 yrs	171	22.8	47.4	22.8	7.0
Children 12-14 yrs	25	4.0	56.0	24.0	16.0
Women above 15 yrs	186	9.1	31.2	35.5	24.2
Men above 15 yrs	158	5.0	36.1	36.1	22.8
Pooled	571	12.8	39.1	31.0	17.1
Domb SC					
Children 1-5 yrs	16	25.0	37.5	25.0	12.5
Children 6-11 yrs	17	35.3	11.8	41.1	11.8
Children 12-14 yrs	11	18.2	36.4	36.4	9.0
Women above 15 yrs	60	21.7	30.0	31.7	16.6
Men above 15 yrs	44	4.5	31.8	38.7	25.0
Pooled	148	17.9	29.2	35.0	17.9

*Anaemia grading done by Hb below 11g/dl for preschoolers and pregnant women, 11.5g/dl for 5-11 years children, ≤12g/dl for adolescents and adult females, and ≤13% for adult males

respectively. The mean TIBC was 376.5 ug/dl that included 409.4 µg/dl and 284.6ug/dl for males and females respectively. Using the cut off value below 50% of iron saturation, 84% of subjects were found iron deficient.

Iodine deficiency disorders

It was observed that the proportion of households consuming salt having adequate iodine (>15 ppm) was 6.0% among Dongria and 18% among Dombs. The percent of household salt with levels of iodine above 30 ppm were lower for Dongria (0.3%) than Dombs (6.2%). Of the total school age children, prevalence of total goiter rate (TGR) was 14.6% and 15.9% for Dongra and Domb respectively, while visible goitre was 4.9% and 2.4% (Table 5). The prevalence was more among female children as compared to male peers (13.2%). Sex differentials were found significant in the prevalence of TGR Dongria children ($\chi_{(1)}$=4.25, p<0.05).

Table 5. Prevalence of goiter among 6-12 year children

Community and sex	N	Goitre (%)			TGR
		Grade 0	Grade I	Grade II	
Dongria PTG					
Total	391	85.4	9.7	4.9	14.6
Boys	240	88.3	8.8	2.9	11.7
Girls	151	80.7	11.3	8.0	19.3*
Domb SC					
Total	220	84.1	13.5	2.4	15.9
Boys	108	83.9	15.2	0.9	16.1
Girls	112	85.6	10.1	5.3	15.4

! Total goiter rate is combination of goiter grades I and II
*Significantly different from boys ($\chi^2_{(1)}$) at p<0.05.

Table 6. Urinary iodine excretion levels (µg/l) among 6-12 year children

Community and sex	N	Urinary iodine (µg/L)			
		Normal (≥100)	Mild (50-99.9)	Moderate (20-49.9)	Severe (<20.0)
Dongria PTG					
Total	364	45.9	9.3	25.3	19.5
Boys	198	40.4	10.1	29.3	20.2
Girls	166	52.4	8.4	20.5	18.7
Domb SC					
Total	166	53.6	10.8	21.7	13.9*
Boys	83	54.2	10.8	25.3	9.7
Girls	83	53.0	10.8	18.1	18.1

*Significantly different from boys at ($\chi^2_{(3)}$) p<0.05

The median urinary iodine excretion levels were 36.0 mg and 40.5 mg respectively for children of Dongria Kondh and Domb communities indicating the problem of IDD as mild endemicity. The proportion of the children with UIEL below 50ug/dl was 51.7%, the same was 54.1% and 46.4% for Dongria and Dombs (Table 6). The proportion of children had normal ranges (>100 µg/l) were 45.9% and 53.6% respectively. Children with UIE levels <50.0 µg/L was 41.9%, while it was 44.8% and 35.6% respectively in ST and SC groups indicating the assumable endemicity of iodine deficiency. The variation in percent of UIEL grades between communities was insignificant.

Availability and utilization of healthcare services

There are three PHC situated at Kalyansighpur, Muniguda and Bissamcuttack block levels situated at distant of 8 to 20 km. Only about 10% of respondents reported that they were availing public healthcare services during illness. The reasons attributed for not availing the services were inaccessibility and lack of transportation. Majority obtained from traditional healers like Disari/Jani, followed by local multipurpose health workers or Anganwadi Workers. About 50% of women reported that they were aware of ORS and using it for their children. Equal proportions of women knew the signs and symptoms of malaria. Mosquito was stated to be the common causative factor, while others attributed to it water, air/ghost etc. Nearly one-fourth of women reported that Anganwadi Worker visited their house during the past few months and they were utilizing the Anganwadi services.

In general, awareness about anaemia was poor. About 7% of women reported 'tiresomeness' was the manifestation of anaemia, followed by paleness. Around 7% of women stated that dietary inadequacy was the cause of anaemia, while a few women attributed it to iron deficiency. A negligible proportion of mothers from Dongria (5%) reported that they had seen IFA tablets, whereas it was 17% from Domb. Out of 100 lactating mothers interviewed, 16% of Dongria and 33% of Domb reported that they had received IFA tablets during pregnancy and consumed all tablets. These tablets were received from Anganwadi Centre or ANM/MPHW. About 5-14% of total women were stated that IFA tablets meant for good health, and none of them attributed it for anaemia control. The proportion of respondents aware of goiter ranged from 7.4% in Dongria to 33.3% in Dombs. The causative factors of goiter was in the order of food, water and others like air, ghost etc. The proportion of respondents who were aware of iodized salt ranged between 24.3% in Dongria and 60.7% in Domb communites.

Conclusion:

The results indicated that the study populations were socially isolated and economically backward with a wide seasonal variation in food intake. Malnutrition was widely prevalent in all age groups with poor knowledge on healthcare, education and nutritional programs. There is an urgent need to strengthen the IEC activities on health and nutrition education and utilization of public healthcare and nutrition programs among the social isolate populations.

Completed Studies

3. Study of health consequences of domestic violence with special reference to reproductive health

Principal Investigator:
Dr. S. K. Kar,

Co-Investigators:
Dr. B. V. Babu, Dr. A. Mohapatra

Funding:
Extramural (ICMR Taskforce)

Starting date: March 2004

Closing date: January 2006

Objectives

1. To understand the people's perception of domestic violence.
2. To know the prevalence of domestic violence.
3. To find out the factors associated with domestic violence.
4. To identify gynaecological and obstetric outcomes of domestic violence.
5. To study it's perceived health consequences with special reference to reproductive health.
6. To report how women cope with domestic violence.

Methodology:

As it is a multi-centric study, it is initiated in all the six zones of India i.e. Northern, Southern, Eastern, Western, Central and Northeast zones. Three states from each zone are selected to have a wider representation of the zone. Since the prevalence rate of domestic violence is different for each state, the sample also differs which is calculated based on the NFHS-2 data. The RMRC, Bhubaneswar was given the responsibility of conducting the study in Eastern zone. The zone consists of Orissa, West Bengal, Bihar and Jharkhand states. The prevalence of domestic violence is largest in Orissa (28.9%) followed by Jharkhand (26.6%), and it is lowest in West Bengal (17.6%). The Jharkhand being a newly created state is a part of Bihar and reported 26.6% violence rate, the sample for this state has been calculated considering this rate. Thus, the sample considered for the three states are: 432~450 for Orissa, 469~500 for Jharkhand and 710~750 for west Bengal. The total sample required from Eastern Zone would be 1700.
Both urban and rural areas were considered for sampling. From each state four districts were selected from different corners of the state. Keeping in view the 70:30 ratio of rural: urban population, the sample sizes were calculated. The details of the sampling are provided in the previous annual report.

The study involved collecting both quantitative and qualitative data. The research team met village/community heads, elders, etc. before initiating the data collection. Rapport is established in the community and especially the woman is taken into confidence to get data on violence particularly. All married women of each household in the age group between 15-49 years were sampled. Corresponding to the women sample, men of the neighbouring village were selected. The quantitative data were collected from men and women by using a structured questionnaire. The qualitative data were collected through focus group discussions and case studies. The case studies were aimed to explore the coping strategies of women who experienced domestic violence. Standard methodology is followed during collection of qualitative data. The details of samples size are shown in the Table 1. The quantitative data were computerized through Epi-Info and qualitative data were processed and being analyzed through Atlas for Windows.

Completed Studies

Results:

The investigation created three principle measures for domestic violence against women: psychological violence, physical violence and sexual violence. These behaviour-based outcomes measured both lifetime prevalence (occurred at least once in womens' married life) and during pregnancy. Overall, about 58% of women in Orissa, 62% in women of West Bengal and 68% women in Jharkhand reported experiencing at least one form of violence. Up to 51% women reported psychological violence, 21% women reported physical violence and 34% reported sexual violence (Fig. 1). The prevalence of all forms of violence is highest in Jharkhand state, followed by West Bengal and Orissa. However, the sexual violence is more prevalent in Orissa than in the remaining states of the Eastern zone.

An attempt was made to assess the impact of occurrence of domestic violence on reproductive Health. Survey of the women who were pregnant earlier revealed 29.8% of women reported at least one form of violence during pregnancy. The rates of pregnancy outcome among these women are compared with those women who have not reported any form of violence during pregnancy (Fig. 2). A few women who are presently pregnant are excluded from the analysis. It is clear that violence has a strong association with pregnancy outcome. The percentage of full term live births is significantly lower among women who experienced violence during pregnancy than their counterparts. Violence has been linked significantly with increased risk of pre-term births, stillbirths and spontaneous abortions/miscarriages. Thus, violence operated through multiple pathways to affect women's sexual and reproductive health.

Conclusion:

The study indicated that the domestic violence in terms psychological, physical and sexual harassment against women is linked with increased risk of pre-term birth, stillbirths and spontaneous abortions/miscarriages.

Table 1. The details of the sample of various surveys

Name of the State	Habitat	Quantitative data collected		FGDs conducted collected	Case studies
		Male	Female		
Orissa	Rural	320	320	4	2
	Urban	142	140	4	4
Jharkhand	Rural	352	352	4	4
	Urban	150	150	4	2
West Bengal	Rural	528	528	4	5
	Urban	224	224	4	1
Total Sample		1716	1714	24	18

Fig. 1. Overall prevalence of domestic violence

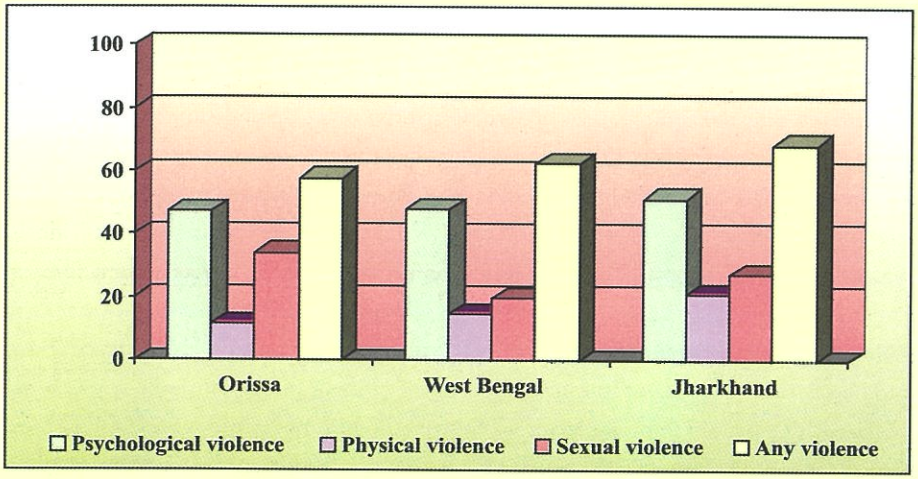
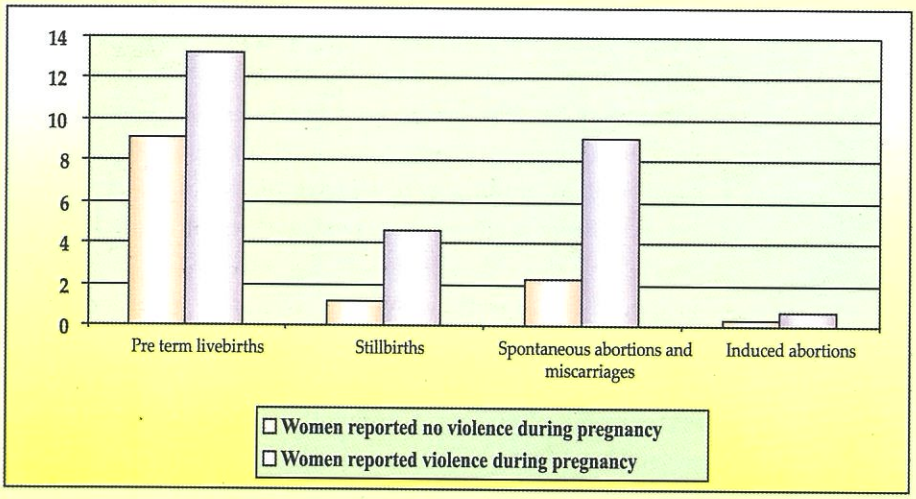


Fig. 2. Indicators of reproductive outcome among women reported violence during pregnancy and women with no such experience



4. Identification of serum immunosuppressive factors in human filariasis

Principal Investigator:
Dr A.K.Satapathy
Co- Investigators:
Dr P.K.Sahoo, Dr B.Ravindran
Funding:
Intramural
Starting Date: Feb 2002
Closing Date: Jan 2005

Objectives

1. To identify the immunosuppressive factors in sera of microfilaraemic subjects.
2. To correlate the degree of immunosuppression with presence/intensity of infection with adult stage parasite.

Results:

A hyporesponsive state characterized by low T-cell proliferation and down regulated IFN-g ?production has been observed in microfilaraemic individuals and individuals harbouring CFA. The hyporesponsive state in microfilaraemic individuals has been shown

to be largely specific for filarial antigens. The proliferative response to non-filarial antigens (PPD) has been found to be similar in both microfilaraemic and amicrofilaraemic individuals. The mf +ve serum mediated inhibition was demonstrable in PBMC collected from different amicrofilariaemic individuals. The percentage inhibition varied between Mf carriers sera indicating a role of serum factor(s) in mediating suppression of PHA induced T-cell proliferation. One of the objectives of this study is to study serum-mediated suppression of T-cell proliferative response in filariasis. Phytohaemagglutinin (PHA) mediated proliferation of T-cells was not inhibited by sera of amicrofilariaemic individuals. The mf +ve serum mediated inhibition was demonstrable in PBMC collected from different amicrofilariaemic individuals. The percentage inhibition varied between Mf carriers sera indicating a role of serum factor(s) in mediating suppression of PHA induced T-cell proliferation. The nature of immunosuppressive factors in microfilariaemic sera is being analyzed. The serum inhibitory factor was resistant to heat treatment at 56^{0}C for 30 mins indicating a lack of role for complement components. Further, Aminoguanidine, an inos inhibitor failed to reverse serum mediated inhibition. A Th2 type of hyporesponsiveness state observed in microfilariaemic individuals is associated with high levels of IL-10 production. Since IL-10 and TGF-b have been shown to play an important role in down regulating antigen specific proliferative responses in microfilariaemic sera, we measured anti-inflammatory cytokines such as IL-10 levels in sera of patients with different clinical manifestations of filariasis. IL-10 levels did not differ significantly between asymptomatic mf carriers and subjects with cryptic infection. Significantly elevated levels of IL-10 were observed in acute filariasis in comparison to endemic normals, mf positive cases and cryptic cases. We studied the relationship between serum levels of TGF-b and % inhibition of proliferative responses. To understand the mechanism underlying the inhibitory activity of microfilariaemic sera we examined the role of apoptosis in this process. The degree of apoptosis in the 96 hr cultured PBMCs was scored using Annexin-V - 7-AAD double staining by Flow cytometer. The percentage of cells undergoing apoptosis was found to be significantly higher in case of PBMCs cultured with microfilariaemic sera in comparison to autologus sera.

Inaguration of Auditorium, Guest House, Hostel and Animal House in RMRC by Prof. N.K. Ganguly, DG., ICMR, New Delhi.

Conclusions:

Microfilariaemic sera mediate profound inhibition of PHA induced T-cells proliferation. Inhibitory serum factor is dialyzable and is stable at 56°C, 30 min; it does not appear to be circulating TGF-ß since serum levels did not correlate positively with percentage inhibition. Inhibition of proliferation by sera does not appear to be mediated by induction of Nitric oxide. The possible cytotoxicity to lymphocytes mediated by inhibitory sera was studied. Serum inhibitory factor(s) in mf carriers induced apoptosis of lymphocytes indicating that induction of apoptosis by serum inhibitory factors is one of the important mechanisms underlying the inhibitory activity of microfilariaemic sera.

3 Other Scientific Activities & Service

Other Scientific Studies

1.	Effect of Annual single dose of DEC in filariasis transmission
2.	Filariasis OPD (Capital Hospital, Bhubaneswar)
3.	Referral Services in diagnosis of Haemoglobinopathy and sickle cell disorder
4.	Laboratory investigations of outbreaks of jaundice and fever
5.	Diarrhoeal Outbreak Study:

Human Resource Development

1.	SRF/JRF Joined under Ph.D Programme:
2.	M.Sc. Dissertation program:
3.	Short Term Training Program:
4.	Foreign Visit:

Contribution towards National/ State level Health Program

1.	A Mid Term Assessment of Mass Drug (DEC) Administration against Filariasis in Orissa
2.	Malaria Monitoring
3.	Swasthya Mela (Health Camp)

Other Scientific Activities & Services

Other Scientific Studies.

Investigators:

Dr. N. Mahapatra,

Dr. R.K. Hazra,

Dr.S.K.Parida,

Mr. N.S.Marai

Mr. H.K. Triparthy.

1. Effect of Annual single dose of DEC in filariasis transmission

DEC is highly effective microfilaricidal drug. Use of this drugs at community level results in reduction of human infection and consequently transmission. In some areas due to high vector density, effective reduction in transmission does not occur. Choudwar town of Cuttack district though a semi urban area is highly endemic for filariasis. Single annual dosages of DEC mass drug distribution was done in September 2004 & November 2005 this will be again instituted during November 2006. Baseline data on vector density, infection rate, infectivity rate and infective stage of parasite per mosquito (l3 load) were collected before and after the mass drug distribution in baseline period of 2004. The month-wise vector density (PMHD) of *Culex quinquefasciatus* is presented in fig-1. It varies from 18.3 to 58.6 in different months of the year. Figure 3 depicts the infection and infectivity rate of *Cx. quinquefasciatus*. It clearly indicates that soon after the drug distribution no infective larvae could be detected upto three months (October to December). However ,from the month of January,2005 infection in the vector appeared. There was 45.7% and 26% reduction in infection and infectivity rate compared to the base line data. Still the infection could be detected upto March. The second single dosage of DEC mass drug distribution was done on November 2005. The study was continued upto August 2006 and the vector density data, infection and infectivity rate data are depicted in fig 2 and 4.

Fig. 1

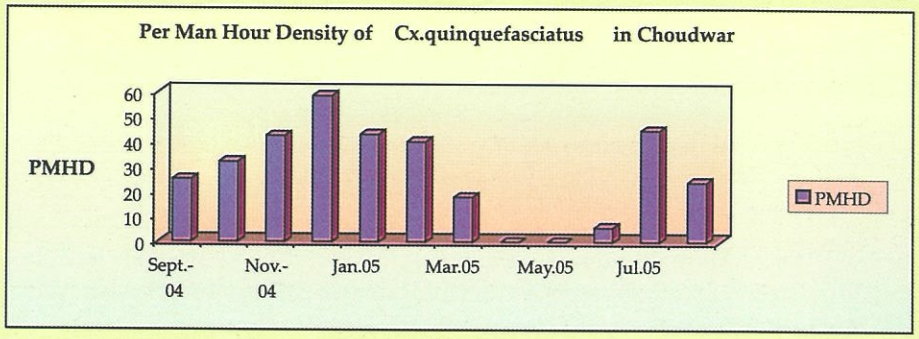


Fig. 2

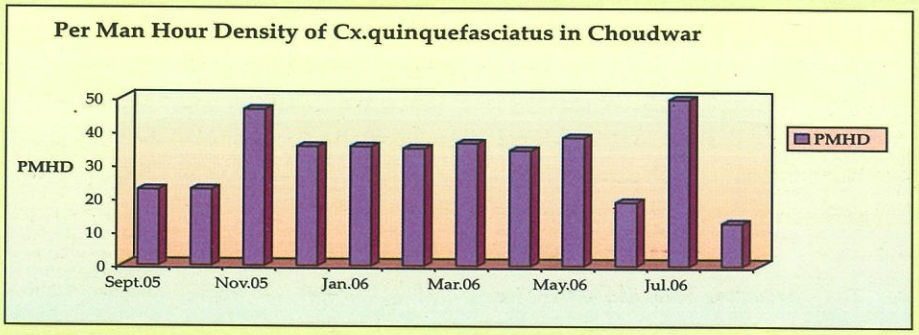


Fig. 3

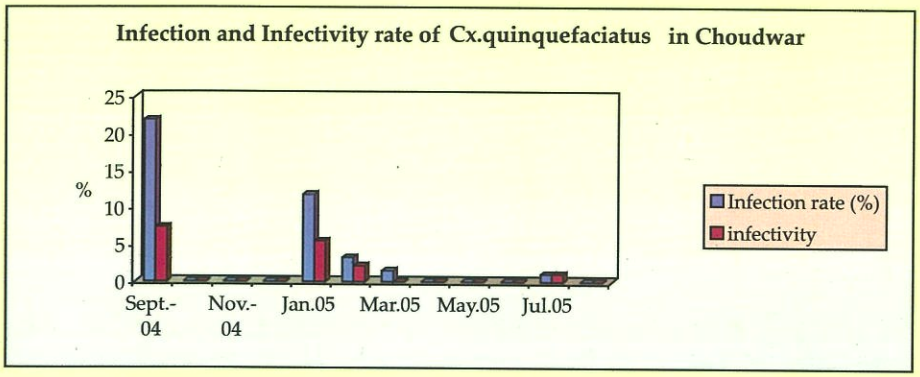
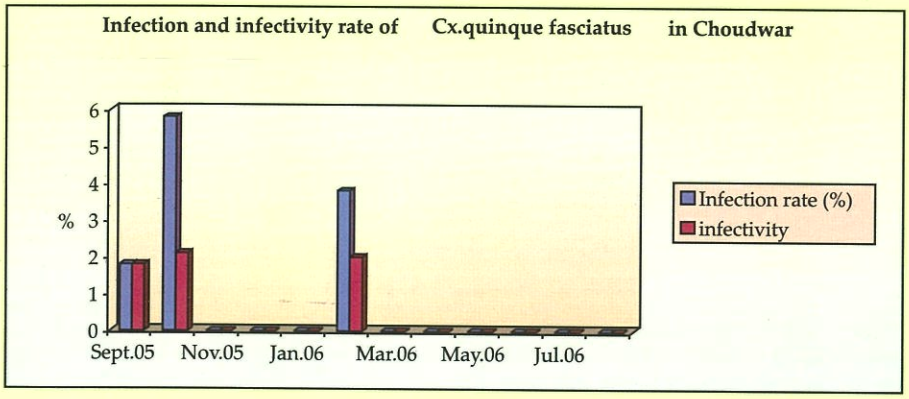


Fig. 4



2. FILARIASIS OPD (CAPITAL HOSPITAL, BHUBANESWAR)

During current year a total 1219 cases of lymphatic filariasis reported to the filaria OPD. Out of those 714 came for follow up, and 505 were new cases. All the cases were examined clinically, diagnosed and treated. Out of new cases, total number of males were 327 (64.8%) and female 178 (35.2%). Out of the new cases 5 were of the age group below five years, 11 were between six to fourteen years, 101 between fifteen to twenty-five years, 197 between twenty-six to forty years, 165 between forty-one to sixty-five and twenty-six were of more than sixty-five years of age. More number of male patients and of the age group more than twenty-five to forty are reporting to the OPD. The clinical diagnosis shows that majority 216(42.8%) presented with lymphoedema grade I followed by adenolymphangitis 142 (28.1%). Among the acute ADL cases 32 (22.5%) had only lymphangitis, 25(17.6%) had lymphadenitis in the inguinal region, 85(59.8%) had both acute lymphangitis and lymphadenitis. The chronic lymphoedema cases having acute ADL attack due to secondary infection were given treatment and advised for foot care management. The procedure of foot care like bandaging and exercise was demonstrated to the patients. The decompression therapy was given to 18 cases of filarial Lymphedema of different grades.

Investigators:
Dr. A.S.Kerketta,
Dr. B. Dwibedi, Dr. E. V. Rao

Technical Staff:
Mr. S.Rout, Mr. T. Moharana,
Mr. K Dhal, and Mr. R. N Nayak

Other Scientific Activities & Services

Distribution of Filariasis OPD cases according to Clinical Manifestation

Clinical condition	N=505	Total (%)
LMD* gr I	216	42.1
LMD gr II	27	5.3
LMD gr III	15	3.1
Elephantiasis	15	3.1
Hydrocele	15	3.1
Orchitis	9	1.8
Nodule	2	0.4
Adl	142	28.1
TPE	3	0.6
Chyluria	2	0.4
Arthritis	14	2.8
Myalgia	21	4.2
P.Neuritis	10	2.1
Others**	14	2.8

Investigators:
Dr. R.S.Balgir,
Dr G P Chhotray,
Dr M R Ranjit,
Mr B N Sethi,
Mr K C Dalei,
Mr B K Kanhar

3. Referral Services in diagnosis of Haemoglobinopathy and sickle cell disorder

Observation:

In one series of such referrals, 143 (83 male and 60 female) cases from various medical colleges and peripheral hospitals of the state were examined. Most of the cases were having complains of refractory anaemia, progressive weakness and jaundice. Out of 143cases, 111 belong to General Caste, 4 to Scheduled tribe, 28 to Scheduled caste. A detailed clinical examination and laboratory investigation such as haematological profile by automated cell counter (MS9), quantitative analysis of Hb, Hb A_2, HbF and its electrophoresis was carried out by standard methods. Out of total 143 cases 30.7% were found to be electrophoretically normal (Hb AA), 24.4% were HbAS, 9.7% HbSS, 2.0%Sβ-thalassaemia, 23.7% β-thalassaemia minor, 5.5% β-thalassaemia major and 3.5%Eβ-thalassaemia .The community wise distribution of the Hbpathies has been shown in table 2. Molecular characterization of these samples revealed the presence of IVS1-5 (G->C) mutation in all the cases of β-thalassaemia.

In another series diagnostic services were provided to 8 families referred during period from April 2005 to March 2006, for electrophoresis, a total of 16 subjects were screened. Out of 16 cases, 2 (12.5%) were diagnosed as homozygous sickle cell disease, 3 (18.8%) sickle cell traits; 1 (6.3%) β -Thalassemia, 1 (6.3%) β-Thalassemia

Other Scientific Activities & Services

trait; and 9 (56.3%) cases were found normal. Of the 16 cases, 6 (37.5%), 1 (6.3%) and 1 (6.3%), respectively belonged to general castes, scheduled castes and scheduled tribes. Genetic/marriage counseling were given to affected families.

Table2: Caste wise distribution of Hb pathies amongst the referred cases

Category	Total	AA	AS	SS	SB	thal Major	thalMinor	E thal
General	111	33 (29.7%)	25 (22.5%)	11 (9.9%)	3 (2.7%)	8 (7.2%)	28 (25.2%)	3 (2.7%)
SC	28	10 (35.7%)	8 (28.5%)	2 (7.1%)	0 0%	0 0%	6 (21.4%)	2 (7.1%)
ST	4	1 (25.0%)	2 (50.0%)	1 (25.0%)	0 0%	0 (0%)	0 (0%)	0 0%
Muslim	0	0 0%	0 (0%)	0 (0%)	0 0%	0 0%	0 0%	0 0%
Total	143	44 (30.7%)	35 (24.4%)	14 (9.7%)	3 (2.0%)	8 (5.5%)	34 (23.7%)	5 (3.5%)

4. Laboratory investigations of outbreaks of jaundice and fever

Based on request from the state health department blood samples from several outbreaks of jaundice and fever were investigated and results communicated for intervention .Out of four epidemics of jaundice two were due to HEV infection and two were due to HAV infection .One outbreak of fever of unknown cause was investigated for presence of Dengue IgM antibody and all the samples (twenty) were negative for the antibody but two of them were found positive for antibodies of IgM to Chickenguniya virus as confirmed from NIV, Pune. This is first report of Chick virus infection in the state

Outbreaks of cholera in Orissa (April, 2005-March 2006)

SlNo.	Place	Period	Total Samples	No. Positive for V. cholerae	
				Ogawa	Inaba
1	Malipur, Pattamundai, Kendrapara	July 2005	10	3 (30%)	0
2	Gaudabada Sahi, Sea Beach, Puri	August 2005	03	0	3 (100%)
3	Rangamatia, Bhubaneswar, Khurda	September 2005	04	0	4(100%)
4	Chasapada, Dhenkanal	October 2005	05	0	5 (100%)
5	Ranihat, Cuttack	March 2006	12	10 (83.3%)	0

Chief minister of Orissa Shree Naveen Patnaik opening the souvenir of lymphocon-10 in NALCO Auditorium Bhubaneswar.

Other Scientific Activities & Services

5. Diarrhoeal Outbreak Study:

During the period under report 5 Diarrhoeal outbreaks were studied.

- July 2005 outbreak : *V. cholerae* O1 Ogawa
- August-October 2005 outbreak : *V. cholerae* O1 Inaba
- March 2006 outbreak : *V. cholerae* O1 Ogawa

All the *Vibrio cholerae* O1 Inaba and Ogawa serotype were uniformly sensitive to ampicillin, chloramphenicol, gentamycin, ciprofloxacin, norfloxacin and tetracycline. The Inaba serotypes were resistant to furazolidone and nalidixic acid (100%) and about 50% resistant to neomycin, cotrimoxazole and streptomycin. On the other hand the Ogawa serotype were 100% resistant to furazolidone, nalidixic acid and neomycin; about 50% resistant to neomycin and streptomycin respectively.

10th Annual Conference of Lymprology Society of India being organised by RMRC, BBSR from 15-16, December 2006.

Other Scientific Activities & Services

Human Resource Development

1. SRF/JRF Joined under Ph.D Programme:

In the Ph.D Program of the Centre, following is the list of research schiolars undergoing their research activities in Ph.D program under Utkal Universty, Bhubaneswar.

Sl. No.	Name	Date of Joining Ph.D program	Funding	Title of the Research Topic	Guide/ Co- guide
1	Mr. Alok Das Mohapatra	7/1/2003	CSIR (SRF)	A study of apoptosis in filariasis	Dr. B. Ravindran
2	Mr. Sudhansu Sekhar Nisank	29/1/2004	CSIR (SRF)	Molecular characterization of Thalassemia and its clinical significance in Orissa	Dr. G.P.Chhotray
3	Mr. N.S. Marai	16/3/2001	RMRC Staff	Current trends in malaria transmission in Orissa, India	Dr. A.P.Dash
4	Mr. Aditya K Panda	24/2/2005	CSIR (SRF)	Genetic Polymorphism in Malaria and Filariasis.	Dr. B. Ravindra.
5	Dr. S. S. Padhi			Immuno Epidemiological correlation between Malaria & Filariasis	Dr. B. Ravindran
6	Mr. Santos K Panda	22/1/2004	CSIR (SRF)	Innate and adoptive immunity in experimental and Human Filariasis	Dr. B. Ravindran
7	Mr. B. R. Sahu	1/10/1999	UGC (SRF)	Role of antibodies in protective immunity in human and experimental filariasis	Dr. B. Ravindran
8	Mr. Mahendra Panda	19/12/2001	RMRC (SRF)	Problem of Endemic Malaria among tribal and Non- tribal; population in KBK region of Orissa	Dr. A.Mohapatra
9	Ms. Anamika Das	15/1/2002	RMRC (SRF)	Clinical malaria: association of CD36 gene polymorphism and P.falciparum genotypes (Completed w.e.f 14/7/2004	Dr. M.R.Ranjit
10	Upasana Sahoo	4/8/2005	RMRC (SRF)	Role of Microparticles and ABCA1 transporter in the pathogenesis of cerebral malaria	Dr. M. R. Ranjit

Other Scientific Activities & Services

11	Prajyoti Sahu	3/8/2005	RMRC (SRF)	Prevalence of HBV & HCV infection and their genotypes among acute/ chronic symptomatic hepatitis patients in hospital set up.	Dr. B. Dwibedi
12	S.K.Samal	16/8/2005	RMRC (SRF)	Isolation characterization and diagnosis of A. hydrophilia isolated from freshwater fishes	Dr. B. B. Pal
13	P. G.S.Sethy	3/8/2005	RMRC (SRF)	Protein energy malnutrition in association with micronutrients deficiency of public health significance	Dr. G. Bulliyya
14	Madhumita Panda	29/7/2005	CSIR (GRF)	Immuno regulation of regulatory cells in human and experimental malaria	Dr. A.K.Satapathy
15	Basanta Kumar Swain	1/8/2005	RMRC (SRF)	Impact of Health and Nutrition Education Intervention by Peripheral Health Institutions among Pregnant Women in Tribal Orissa, India	Dr. G. Bulliyya & Dr. B.V. Babu
16	Sasmita swain	16/8/2005	Lady TATA Memorial fund (JRF)	Moleculaar Identification of an Annularis comples of Orissa	Dr.R.K.Hazra
17	Ronaly Rout	23/5/2006	UGC (JRF)	Role of Pf. EMPA in Severe Clinical Manifestation of f. Malaria	Dr. M.R.Ranjit
18	Biswaranjan Purohit	19/9/2005	RMRC (SRF)	Malaria Preventive Intermittent Treatment of Choloroquine among the Pregnant Women- an Anthropological Perspective	Dr. A.Mohapatra
19	Asima Tripathy	31/8/2006	RMRC (SRF)	Factors affecting the vectorial competence of anopheles vectors in Orissa and its impact in Malaria.	Dr. N.Mohapatra

Other Scientific Activities & Services

Ph.D Thesis Submitted:

1. Mr. N.N. Mandal, R.A, submitted his Ph.D thesis on the topic "Studies on the immuno-protective potential of detergent soluble and lipid antigen of filarial parasite in lymphatic filariasis" under utkal university, Bhubaneswar.
2. Mr. H.K.Khuntia , R.A submitted his Ph.D thesis on "Molecular epidemiological analysis of Vibrio cholerae associated with epidemic and endemic cholera in coastal and tribal districts of Orissa" under Utkal University, Bhubaneswar.

2. M.Sc. Dissertation program:

The Centre conducts M.Sc. dissertation program from various Universities/ Institutions. Followings are the list of M.Sc. dissertation work being in the Centre under scientists of various departments.

Sl No.	Name of the student & University	Dissertation Title	Name of the Guide	Period
1	Ajit Kumar Mohanty – MITS, Rayagada	Clearance a *Wolbachia* in *Aedes aegypti* mosquito by tetracycline treatment and its action on the development of *Brugia malayi* in mosquito	Dr. R.K.Hazra	5/05 – 4/06
2	Amit Routray – Amity, Lucknow	Molecular characterisation of V.cholerae.	Dr. G.P.Chhotray	8/06 – 1/07
3	Arnapurna Behuria – TACT, BBSR	Molecular phylogenetic analysis of Anophelines	Dr. R.K.Hazra	8/06 – 1/07
4	Banishree Panigrahi – NIMS	Molecular strain typing of P.falciparum, using MSP2 Gene	Dr.M.R.Ranjit	5/06 – 7/06
5	Bijay Laxmi Choudury – UU, BBSR	Co-infection of lymphatic dwelling w.bancrofty & intestinal helminth in endemic population	Dr. B. Dwibedi	1/06 – 6/06
6	Bishnu prasad Mohanty – OUAT	A study on alpha gal determinants in filarial parasites	Dr. A.K.Satapathy	4/06 – 9/06
7	Biswajit Sahoo – S.U, Burla	Prevalance of Setaria digitata in cattle population& mosquito	Dr. R.K.Hazra	3/06 – 5/06
8	Biswaranjan Samanthray – S.U, Burla	E- coli stain typing	Dr. B. B. Pal	1/06 – 3/06
9	Chandrasekhar Satapathy – MITS, Rayagada	Enteric pathogen	Dr. B.B.Pal	1/06 – 3/06

Other Scientific Activities & Services

10	Chandrasree Rajguru – Ravensaw	HBV infection in acute chronic liver disease cases in hospital setup	Dr.B. Dwibedi	4/06 – 9/06
11	Dhabaleswar Pradhan – S.U, Burla	Prevalance of Setaria digitata in cattle population	Dr. R.K.Hazra	3/06 – 5/06
12	Ipsita Mohanty – TACT, BBSR	V. Cholerae	Dr. G.P.Chhotry	1/06 – 3/06
13	Jita Dash – VIT, Vellore	Molecular typing of G6PD deficiency	Dr. M.R.Ranjit	8/06 – 1/07
14	K.K.Sahu – Rai Foundation, Delhi	Study on Ann.Spe by ITS2 region	Dr. R.K.Hazra	1/06 – 3/06
15	Kumari Vishi – NOU, Baripada	Combined detection of wucheria bancrofti and brugia malayi by singlr PCR	Dr. R.K.Hazra.	9/05–11/05
16	Liza Jena – U.U, BBSR	Immune response to Filaria lipids	Dr. M.K.Beuria	1/06 – 6/06
17	Monali Bal – Amity, Lucknow	Molecular characterisation of E-coli	Dr. G.P.Chotray	8/06 – 1/07
18	Monalisa Priyadarsini – TACT	Immune response to surface lipids in human filariasis	Dr.M.K.Beuria	2/06 – 5/06
19	Pradip K Das – Khalikot	Effect of plant extract on wolbachia population	Dr.R.K.Hazra	5/06 – 7/06
20	Prangya P Das – Khalikot college.	Filarial antigenemia in individuals living in areas endemic for Bancroftian filariasis	Dr.M.K.Beuria	5/06 – 8/06
21	Priyadarsini Gochhayat – U.U, BBSR	Incidence of different bacterial enteropathogens causing diarrhoea among hospitalised patients	Dr.B.B.Pal	1/06 – 6/06
22	Pulak Ranjan Nayak – NOU, Baripada	Isolation, Identification and antibiogram of escherichia coli from hospitalised diarrhoea patients- A preliminary finding	Dr. B.B.Pal	5/05–8/05
23	Ranjan Kumar Pati – MITS, Raigarha	PCR detection of *Wolbachia* in *Culex quinquefasciatus* and its clearance by Tetracycline Treatment.	Dr.R.K.Hazra	5/05 – 2/06

Other Scientific Activities & Services

24	Ruchika Kar – U.U, BBSR	Cryptosporidiosis among hospitalised diarrhoeal children in Bhubaneswar	Dr. M.R.Ranjit	1/06 – 6/06
25	Sangram Behera – OUAT	Cryptosporidiosis among cattle population in Bhubaneswar	Dr.M.R.Ranjit	4/06 – 9/06
26	Sarmila Sahoo – TACT, BBSR	E- Coli	Dr. G.P.Chhotry	1/06 – 3/06
27	Sasmita Das Sutar – OUAT, BBSR	Choloroquine Resistance of Plasmodium fapciparum : study on PfCRT gene polymorphism and its diagnostic perspective	Dr. M.R.Ranjit	10/05–3/06
28	Sasmita Panda – Gandhi Inst. Biol Sc., Raygarda	Cryptosporidiosis among hospitalised diarrhoeal children in Bhubaneswar	Dr. M.R.Ranjit	8/06 – 1/07
29	Shilpa Das – MITS, Raygarda	Exposure to microbiological techniques in identification of V-cholerae & E-cholerae	Dr. G.P.Chhotray	5/06 –6/06
30	Snigdha Dash – Neelachal Institute of Med Science, BBSR	Isolation identification & stain typing	Dr. G.P.Chhotray	8/06 – 1/07
31	Soubhagya Bhuyan – Rai Found. College New Delhi	Molecular identification of sibling species complex of Anopheles annularis	Dr. R.K.Hazra	1/06 – 3/06
32	Soumya P. Panda – TACT, BBSR	Effect of Plant extract on mosquito larvae and Wolbachia present in them	Dr.N.Mohapatra	2/06 – 4/06
33	Soumya Sucharita Das – NOU, Baripada	Prevalence of Vibrio Cholerae among hospitalized Diarrhoea patient of same selected areas of Orissa	Dr. B.B.Pal	5/05 – 8/05
34	Subhalaxmi Mallick – NIMS	Molecular strain typing of P.falciparum using MSP1 Gene	Dr.M.R.Ranjit	3/06 – 6/06
35	Subhra Swetapadma – Khalikot	Cryptosporidiosis among hospitalised rural children during winter season	Dr.M.R.Ranjit	5/06 – 7/06

Other Scientific Activities & Services

36	Suchitra Mohanty – Utkal University, BBSR	Ecoli strain typing	Dr. M.R.Ranjit	8/06 – 1/07
37	Sujata Sahoo – NOU, Baripada	Shigellosis among acute diarrhoea patients- A hospital based study	Dr. B.B.Pal	5/05 – 8/05
38	Sujata Sahoo – Dayanada Sagar Coll. Bangalore	Anculicita complex using D3 and ITS2 region	Dr. R.K.Hazra	1/06 – 3/06
39	Sunita Kund – Ravenshaw College	Prevalence of Vibrio cholerae among hospitalised patients of some selected areas of Orissa	Dr.B.B.Pal	4/06 – 7/06
40	Susree Sangita Routray – Khalikot	Molecular identification of D3 and ITS2 regions of Anopheles subpictus complexes.	Dr. R.K.Hazra	5/06 – 7/06
41	Swati Kumari – Ravensaw	Molecular identification of sibling species complex of Anopheles culicifacies in Anugul district of Orissa and to study their Sporozoite rate.	Dr.N. Mohapatra	4/06 – 9/06
42	Sweety Mohanty – MITS	IgG & IgM antibody response to glutathimane-S transferase in human filariasis	Dr.M.K.Beuria	2/06 – 6/06
43	Tanusree Mohanta – OUAT, BBSR	IgG and IgM antibody response to filariallipid antigen in human bancroftian filarial region	Dr. M.K.Das	1/05 – 6/05
44	Kanchan M.Bihari – TACT, BBSR	Isolation and identification of aeromonas species from different hospitalised diarrhoea patients & water samples	Dr.B.B.Pal	2/06 – 5/06
45	Sindhu tanaya mohanty – MERIT, Ooty, T.N.	Molecular characterisation of pathogenic e-coli among UTI patients	Dr. B.B.Pal	12/05–5/06

Other Scientific Activities & Services

3. Short Term Training Program:

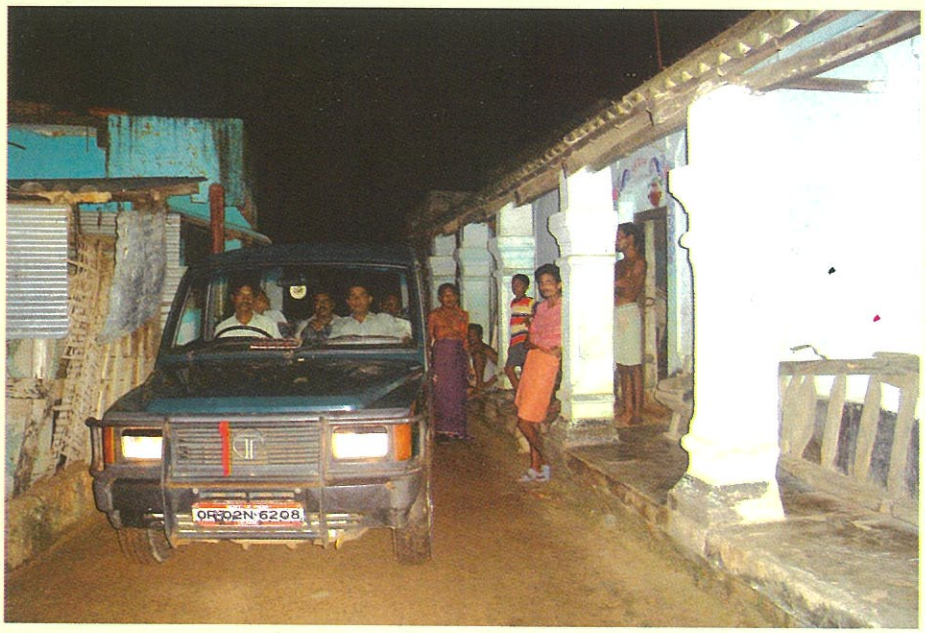
A refresher Training on Verbal Autopsy for SRS supervisors was organized at RMRC, Bhubaneswar in June 2005. Dr.A.S. Kerketa, SRO was the coordinator of the training program.

1. RMRC scientists under Professional Development Course (PDC) in Public Health Management and health sector reform delivered talk for senior district Medical Officers of Jharkhand, Chhatisgarh and Orissa on 22nd June 2005.

2. Soumya Mohanty (B sc 2nd Year) of Vellore Institute of Technology (Deemed University) has undergone a short-term training on " Molecular methods on identification of haemoglobin variants" under the super vision of Dr M R Ranjit, SRO.

3. Ms Gynalipsa Pradhan(M Sc Final Year Biotechnology) of Dayananda Sagar College of Science, Bangalore and Mr Sandeep Mohanty (M Sc Final Year Biotechnology)of Administrative Management College, Bangalore has undergone short term training on "Diagnosis of Malaria parasite by PCR Technology under the suprvision of Dr M R Ranjit, SRO.

4. Also two M.Sc.Biotechnology students from Utkal University and one B.Tech (Biotechnology) from IIT, Khargpur have undergone practical training in Immunology Dept. under the guidance of Dr.M.K.Das, DD (SG).



RMRC Research Team in survey area.

Other Scientific Activities & Services

4. Foreign Visit:

5. Dr.B.V.Babu , Asst. Director visited Geneva, Switzerland as invited member for WHO/TDR meeting of Scientific Working group on Lymphatic Filariasis, held during 10-12 May,2005 at WHO. He presented a working paper entitled "Social and behavioral issues of mass drug administration and morbidity management in the programme to eliminate lymphatic filariasis.

6. Dr. B. Ravindran, Deputy Director, (SG) visited University of Bonn, Germany in connection with the on- going Indo- German collaboration Project from 31st Oct. to 14th November 2005. He delivered a seminar on "Does host immunity operate inside filarial worm? in the dept. of Parasitology at University of Bonn on 10th Nov. 2005

DG. ICMR along with Scientists RMRC

Other Scientific Activities & Services

Contribution towards National/ State level Health Program

1. A Mid Term Assessment of Mass Drug (DEC) Administration against Filariasis in Orissa

Investigators:

Dr. B.Dwibedi, Dr. S.K.Kar, Dr. S.K.Parida, Dr. S.Acharya, Mr. P.K.Jangir, Mr.. R.C.Parida, Mr. S.C.Rout, Mr. T.Moharana,

Introduction

National health policy of 2002 envisages its goal to eliminate lymphatic filariasis in India by 2005. NVBDCP accordingly initiated the MDA programme in all filarial endemic states of India. As per the programme the consecutive second round MDA with DEC has been undertaken in Orissa on November 11th to 13th 2005. Upon request from Directorate of National Vector Borne Diseases Control Programme, while informing the state health department; Regional Medical Research Centre, Bhubaneswar has undertaken independent evaluation of MDA programme in two districts of Orissa namely Cuttack and Khurda as per guideline provided by NVBDCP. The evaluation was carried out in sampled households of study area in three phases i.e. a) Pre MDA phase *:* Parasitological, entomological and disease survey b) MDA phase *:* Process evaluation on MDA days and c) Post MDA phase : Impact evaluation as per format provided by NVBDCP ; primarily consisting of coverage & compliance of DEC during MDA and side reactions if any after drug intake and reasons of non compliance. The observations made are incorporated in this report.

Objectives

1. To assess the transmission and disease status by rapid one time survey in sampled households.
2. To review the progress of activities of single dose DEC mass administration in the sampled population of two selected districts namely Khurda and Cuttack.
3. To recommend mid course corrections and suggest necessary steps for further course of action.

Methodology

Sampling procedure:

Households were selected following the sampling procedure laid down in the operational guidelines of WHO and NVBDCP. Out of thirty districts in the State twenty are covered under MDA as identified. Two districts were selected for evaluation out of twenty districts covered under MDA as per NVBDCP guideline. From each district three rural and one urban site were selected covering thirty households in each site thus making 120 households (approximately 600 population) in each district.

Survey site and population:

Following above procedure two districts namely Cuttack and Khurda were selected for evaluation. . Three Villages viz. 1. Sriram Berhmpur (Bentkar PHC) 2. Brahmanabastar (Berhmpur PHC, Athagarh) 3. Sainda (Telengapentha, PHC) and one ward (No. 2) of

Other Scientific Activities & Services

Chowduar NAC from Cuttack district. and three villages viz 1. Mendhasala (Mendhasala PHC)2. Rambhabeli (Tangi PHC)3. Jariput (Haladia PHC) and one ward (No. 9) of Jatani NAC of Khurda district were selected for evaluation

All individuals (all ages and both sexes) from the sampled household were included in morbidity, parasitological and coverage survey. All the above selected households were also taken as units for entomological survey.

Pre MDA house hold survey

Household survey included; age, sex, and socio-economic status of all members of households. Physician examined the individuals and presence of chronic filarial disease like Lymphedema or Hydrocele were noted by door to door visit of these sampled households.

Finger prick blood samples were collected between 8-12 P.M. for preparation of thick smear for microfilaria detection. Simultaneously rapid ICT test for presence of filarial antigenimia was done using 100microlitre finger prick blood For vector survey insect breeding sites were assessed and mosquito collection carried out from the living rooms of the selected households during morning hours (6-10 A.M) following standard procedure.

MDA phase evaluation

During the MDA days (Nov-11to 13th) the team revisited the village/ wards during 9 A.M to 5 P.M. The distribution pattern undertaken by the volunteers was observed. The households were enquired about the drug distribution, consumption and problems if any.

Post MDA coverage survey

After the mop up round of DEC distribution (13th NOV.) was over, the team revisited each of the identified households and the members were asked in detail about the receipt of drug, DEC consumption, side reaction and it's management and their suggestions regarding the MDA progress which was recorded in preformed questionnaire. The knowledge and awareness of the individuals regarding filariasis, use of DEC in filariasis control, its benefits and outcome were assessed through interrogation.

Observation

Pre MDA Phase:

The total number of households surveyed by the team was 246 in both the districts covering a total population of 1843. The pre MDA observations recorded are depicted in the following table.

Other Scientific Activities & Services

Table -1 District wise characteristics of households surveyed and pre MDA (2005) status

Parameters	Khurda	Cuttack
No. of households under study and covered	120	126
Total population surveyed	987 (98.1)	856 (97.8)
No. of Person with chronic filarial disease	54 (6)	68 (7.9)
Individuals covered by ICT test	198	300
Number of persons positive for ICT	82 (41)	95 (31)
Prevalence of microfilarimia (slide positive)	6.28	2.5
No of individuals willing to take DEC during MDA 2005	691(70)	756 (88.4)
No of households surveyed for vector study	120	120

- Figures within the parenthesis indicate the percentage.
- ICT- Immuno Chromatographic Test for Rapid detection of W. Bancrofti antigen
- Endemicity Rate expressed as percentage of individuals with infection (Mf+ or ICT+) or chronic disease

Insect vectors were collected from all the sampled households. Vectors collected from Cuttack district were Culex Quinquifasciatus, Culex Vishnui, Mansonia, Anophelines and Armigeris species and those collected from Khurda district belonged to Culex Quinquifasciatus, Culex Vishnui, Anophelines and Armigeris species.

MDA Phase. In most sites the distributors were assigned to distribute DEC tablets in 70-80 households covering 350-400 population and they could complete drug distribution in around forty percent of the households under their coverage on first day i.e. 11th November. During the mop up days (12-13th November 05) they covered the rest of households.

The drug distributors made no pre MDA visit to the households prior to day of MDA. Time spent in each household by the distributor during drug distribution days was not adequate for explaining the members about Filariasis and MDA programme.. And the distributors could not revisit the population untouched in their first roundDistributors did not persuade the people to swallow the tablets in front of them instead almost all distributors advised the family members to take the tablets after they took food. Only 9.7 percent of the individuals actually swallowed DEC tablets in front of the distributor.

Post MDA Phase: The team immediately after mop up round of DEC distribution revisited identified households. The family members were interviewed regarding their perception on performance of MDA, actual consumption of DEC and any encountered side reactions. The information collected was recorded in pre-designed format and the observations are depicted in following tables (Table2 and Table3).

Other Scientific Activities & Services

Table–2: Post MDA (2005) Observations on Drug coverage and compliance

Parameters	Khurda	Cuttack
Total no. of households under survey	**120**	**126**
Houscholds not covered by distributor	9	4
Total population surveyed	987	856
Population received DEC	790 (80)	688 (80.34)
Population reported consumption of DEC	405 (41)	348 (40.57)
Reported under dose intake *	62 (15.4)	56 (16)
Reported over dose intake *	4 (1)	7(2)
Persons reported side reaction to DEC	22 (5. 6)	22(6.2)

Figures within the parenthesis indicate the percentage.

* Revealed from the number of tablets the individuals reported to have swallowed

DEC distribution coverage and consumption

DEC tablets were distributed in 95 percent of the households under survey. Household coverage by DEC was lower in urban (86.7%) as compared to rural (96.7%) areas. Reported reasons of not covering these households were; all the family members were not present in the house during the visit or door was closed when the distributor came to those houses. Few (3/246) households also refused to receive the medicines from the distributor.

Table 3: Reasons for non-receipt and non-consumption of DEC

Reasons for non- receipt DEC tablets		Khurda (n=197)	Cuttack (n=168)
A.	Refusal to receive DEC tablets	54.8	54.1
	Tablets not dispensed to children of 2-5 yrs. of age, elderly, and persons with minor illness or on other medicines	40.1	41.1
	Out of station on MDA days	5.0	5.9
B.	Reasons for non-consumption of DEC among those received	(n=385)	(n=340)
	Fear of side reaction	40.0	42.1
	Could not consume due to festival	24.9	23.2
	Given reason- As not having filariasis	16.8	20.0
	Having other minor illness	21.8	20.8
	Taking other medicine	3.8	5.9
	Forgotten to take the tablets	5.9	7.9

Other Scientific Activities & Services

- Figures represent the views given by the individuals either not received or not consumed DEC tablets during MDA expressed in percentage.

Though 95 percent of the households were covered, DEC tablets were not distributed to all the eligible individuals of the covered household. On average 80.5 percent of the sampled population received the drug from their distributor. The major reasons for above non coverage were: Refusal to accept the tablets distributed to the individuals and tablets not being dispensed to children between 2-5 years of age, persons with minor illnesses and persons receiving other medications.

About half of those received the tablets reported that they have swallowed the tablets. The over all compliance rate among the eligible sampled population was 40.6 percent. In few families the members could not trace out the actual number of tablets left over and not consumed. Many of them reported that tablets were supplied in loose paper covers and they do not have proper storing place and it would have been better if supplied in strips.

Morbidity Survey for Filariasis

Adverse reaction following DEC administration and its management

Side reactions were reported in 6% of population who have consumed the DEC tablets .The reported side reactions were mild and transient requiring no treatment except two individuals who suffered from reactions of moderate severity and were at need of medical attention. They received outpatient's treatment and were relieved within 5 days with analgesics.

Interpretation and recommendations

The observation from the selected districts has revealed that, though coverage of DEC distribution during MDA days (November 11 –13) was adequate (about 80%), the rate of DEC consumption (around 40 percent of the sampled population) was below the target level of eighty percent. Training and motivation of volunteers can improve the coverage of children and supervised consumption. Adequate IEC are needed for population to make them understand and realise the purpose and importance of MDA in prevention of Filariasis amongst children and for those not affected by disease. Fear of side reaction from the experience of previous year MDA (2004) was observed to be the major cause of non-compliance at study area. Festive days coinciding with the MDA days, confusion in drug dosage as per age both at household and distributor level, poor knowledge of the public about the role of single dose DEC in community for prevention of filariasis & benefits incurred to them and, lack of awareness about side reaction management are among the other major factors responsible for low compliance. Some modifications and suggestions that can be helpful in improving the population acceptance to the programme are given below.

Other Scientific Activities & Services

1. Filariasis elimination awareness workshop with community participation at village level in presence of a medical officer, community leaders, drug distributor and village heads.
2. Distribution of DEC tablets in three strengths is with different colour in individual packs for different individuals in the family to avoid dose confusion at household level.
3. IEC materials should focus on purpose and benefit of MDA, highlighting coverage of paediatrics group: 2-5 years of age for prevention of Filariasis.
4. Training and education to drug distributors and health personnel should be given emphasis.
5. Training to the volunteers selected for drug distribution should be adequate and their activities needs supervision by spot check at supervisory level.
6. Repeated telecasting in attractive form during prime timings of popular TV serials and informative education through popular health serials like KALYANI (Oriya) in local languages. Radio, mike announcement and posters can also motivate rural population.
7. All the stakeholders to be involved in that community including private practitioners, religious leaders and leaders from different caste or group so that community perceives the importance of MDA.

The community needs to be made very clear about the possibility of side reactions, reversibility and mild nature of reaction and how easily they can be treated,

2. Malaria Monitoring

This centre undertook monitoring of malaria endemic districts, as requested by NBVDCP, from time to time. The malaria-monitoring programme was carried out from 2003 onwards to till date. The team of Scientists and Technician visited various allocated districts PHCs, Sub-Centres and DDCs & FTDS every month. The monitoring was done to emphasize the EDPT component of the programme. The teams used to visit 2 PHCs that were most endemic for malaria and from each PHC, 2 Sub-centers were monitored, along-with 2 DDC/FTDs at the village level were monitored regularly every month for each of these allocated districts. Till date 8 malaria endemic districts were monitored; in these districts 25 PHC/CHCs, 31 Sub-Centres and 69 DDC / FTDs at village level were monitored upon to improve the functioning of EDPT component The teams used to monitor data on epidemiological parameters of the district every month, and the gaps if any in the programme were discussed with the district health authorities, for district, PHC and village level. In addition to this the DDC/FTD monitoring, Spray & Larvicidal component etc. of the programme is also monitored at the village level as per the guidelines of the NVBDCP. The report thus generated is informed to the Director NVBDCP and intimated to the local Health Programme Officers responsible for malaria

Other Scientific Activities & Services

control, in the State. During 2002-2006, 2 districts like Sambalpur and Sundergarh were monitored.

Bed Net Evaluation:

Evaluation of the Bed net use and distribution for the enhancement of the malaria control programme was evaluated by this centre. In this direction three districts were evaluated so far on impact of bed net use and the results reveal that, the acceptability of the net among the people in general has increased. There is a potential of bed net use in this State. The detailed reports of 3 districts surveyed for impact of bed nets were submitted to the Government.

2. Assessment of iron deficiency Anaemia among adolescent girls in Orissa

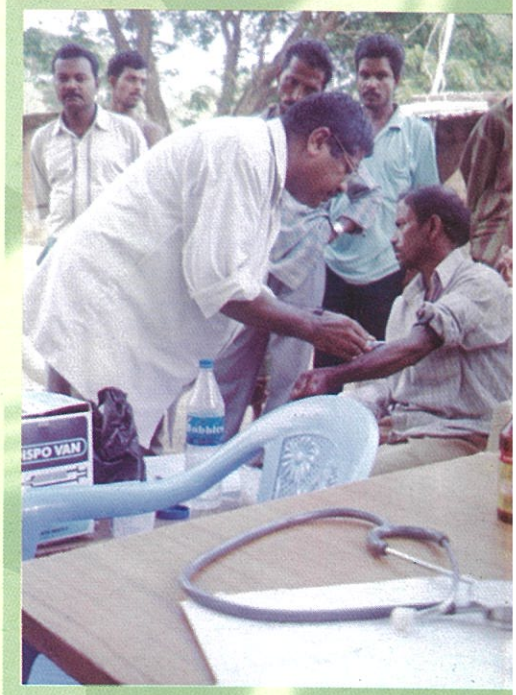
A Study entitled 'Assessment of iron deficiency anaemia among adolescent girls in Orissa' was conducted Khurda, Jajpur and Bargarh districts of Orissa during 2004-2005 as a part of National anaemia control program of "Kishore Shakti Yojna" implemented for adolescent girls in the statc.

3. Swasthya Mela (Health Camp)

Regional Medical Research Centre, Bhubaneswar was provided a stall for preliminary diagnosis of Sickle cell anaemia as invited by the Chief District Medical Officer, Anugul in the Mega Swasthya Mela-2006 from 11.03.2006 to 13.03.2006 for 3days at Zilla Bhawan Talcher, in the district of Anugul. Mr. B. Murmu RA and Mr. P.G.S. Sethi SRF were deputed for opening a stall at Swasthya Mela at Talcher. In the three days camp A total of 151 samples tested for sickle cell anaemia and NESTROFT (Necked Eye Single Tube Red cell Osmotic Fragility Test). Out of 151 cases, 88 cases were positive for sickle cell anaemia and 17 cases were positive for NESTROFT where as 13 cases of NESTROFT positive cases are also sickle positive. 4 cases are positive for NESTROFT only.

Caste-Wise Distribution of Sickle Cell Anaemia

Name of the caste	Number of sickle cell positive cases	Percentage (%)
Chasa	32	21.2
Pana	25	16.6
Karana	11	7.3
Gouda	4	2.6
Paika	4	2.6
Dhoba	2	1.3
Keuta	2	1.3
Muslim	2	1.3
Munda	1	0.7
Others	5	3.3
Total	**88**	**58.2**



Malaria Monitoring

Other Scientific Activities & Services

RMRC Scientists displaying research activities in 13th National Science Congress at Bhubaneswar from 27th to 30th December 2005 in KIIT Campus.

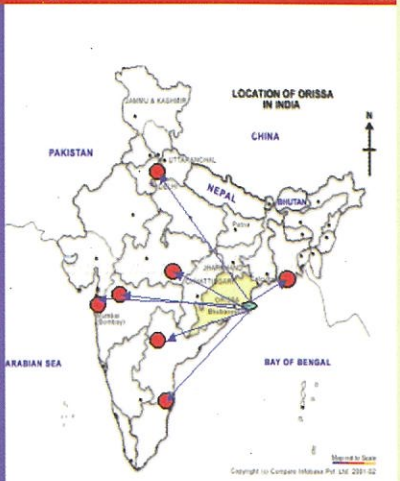
RMRC in 13th Children's Science Congress at Bhubaneswar.

The 13th Children's Science Congress was held from 27th to 31st December 2005 at Bhubaneswar, which was inaugurated by Honourable President of India Dr. APJ Abdul Kalam. A scientific stall was opened by RMRC, Bhubaneswar from 27th – 30th Dec. 2005 in KIIT Campus. The scientists and researchers of this centre have demonstrated the various techniques, research achievements and activities in the form of posters and Papmlets in Malaria, Filariasis, Diarrhoea, Haemoglobinopathy and nutrition. The stall was visited by experts and students from various states of the country.

Networking

Networking

- **Networking with other ICMR institutes:**
  - VCRC – Collaboration & technology transfer on filariasis
  - NICED – technology transfer on Diarrheal disorders
  - MRC – Collaborative research & technology transfer on Malaria
  - NIV – Collaboration on Hepatitis
  - NIRRH – Technology transfer on chlamydial diagnostics
  - NIN – Collaboration & technology transfer on Nutrition
  - IIH – Collaboration and technology transfer on Haemoglobinopathies
  - NARI – Planning collaborative research



LINKAGES

Institutes	Area
International:	
WHO/TDR, EU, Univ. Toronto (Canada)	Financial Support
National:	
-DBT, MOH&FW	Financial & Training Support, Technology Transfer
-TIFR, BARC, NII, RGI, IHS	Collaborative Research
Other ICMR Institutes:	
-NICED,VCRC,MRC,NIV, NIRRH	Interactive
-NIN, IIH	Collaborative
Local:	
State Health Dept. Medical Colleges & Universities, WHO, WFP, UNICEF	Consultancy & Technical support Referral Services

4

General Information & Publication

General Information and Publication

General Information and Publications

1. Publications:

(Calendar year 2005)

1. Babu BV, Nayak ANand Dhal K. Epidemiology of episodic adenolymphangitis. a longitudinal prospectivesurveillance among a rural community endemic for bancroftian filariasis in coastal Orissa, India. *BMC Public Health*. 2005;5:50.

2. Babu BV. A rapid method to assess the coverage of the mass drug administration of diethylcarbazine in the programe to eliminate lymphatic filariasis. *South Asian Journal Of Tropical Medicine and Public Health*. 2005; 36: 44-45.

3. Balgir RS. Detection of rare blood group " Bombay (oh) phenotype among the Kutia Kandh primitive tribes of Orissa, India. *International J Human Genetics*.2005; 5(3): 193-198.

4. Balgir RS. The spectrum of hemoglobin variant in two scheduled tribes of Sundergarh District in North- Western Orissa, India. *Annals of Human Biology*. 2005. 32(5): 560-73.

5. Balgir RS. Spectrum of hemoglobinopathies in the state of Orissa in India. A Ten-year cohort study. *JAPI*. 2005. 53: 1021-1026.

6. Bulliyya G. Growth status of children under-six in a tribal dominated ICDS block of Kalahandi district of western Orissa, India. *South Asian Anthropologist*, 5 (1): 61-76 (2005).

7. Chhotray GP, Ranjit MR,Khuntia, KH and Acharya AS. Precontrol observation on lymphatic filariasis and geo- helminthes in two coastal districts of Orissa. *Indian J Med Research*. 2005; 122: 388-394.

8. Das D, Kumar S, Dash A P and Babu, BV. Knowledge of lymphatic filariasis among the population of an endemic area in rural Madhya Pradesh. *Annals of Tropical Medicine and Parasitology*. 2005; 99: 101-104.

9. Das D, Kumar S, Sahoo PK and Dash A. P. A survey of branctoftian filariasis for microfilariae and circulating antigenaemia in two villages of Madhya Pradesh. *Indian J Medical Research*. 2005; 121: 771-775.

10. Kerketa AS,Babu BV, Rath K, Jangid PK, Nayak AN, Kar SK. A Randomised clinical trial tocompaire the efficacy of three treatment regimens along with foot care in morbidity management of filarial lymphoedema. *Tropical Medicine and International Health*. 2005; 10: 698-750.

General Information and Publication

11. Mishra K, Raj D Kumar, Dash AP and Hazra RK. Combined detection of Brugia malayi and wuchereria bancrofri using single PCR. *Acta Tropica*. 2005; 93: 233-237.

12. Mishra K, Raj D. Kumar, Hazra RK and Dash A.P. A simple, artificial membrane feeding method for the radioisotope labeling of Aedes aegpti polypeptide in vivo. *Annals Trop Med Parasitol*. 2005; 99: 803-806.

13. Ranjit MR, Das A, Das BP, Das BN, Dash BP and Chhotray GP. Distribution of Plasmodium genotypes in clinical mild and severe malaria cases in Orissa, India. *Trans Royal Soc Trop Med Hygn*. 2005; 99: 389-395.

14. Rath K, Swain BK, Mishra S, Patasahani T, Kerketta AS and Babu BV. Peripheral health workers' knowledge and practices related to filarial lymphoedema care: a study in an endemic district of Orissa, India. *American Journal of Tropical Medicine and Hygien.2005;* 72: 430-433.

15. Sahoo PK, Satapathy AK, Michael E and Ravindran B. Concomitant parasitism: Bancroftian filariasis and intenstinal helminths and response to albendazole. *American Journal of Tropical Medicine & Hygiene* 2005. 73(5): 877-80.

16. Sahu B R, Mohapatra AD, Majumdar A, Das PK and Ravindran B. A flow cytometry based method for studying embryogenesis and immune reactivity to embryogenic stages in filarialparasites. *Filaria J*. 2005 Nov 7;4(1):11.

Publications in 2006 (Published in Press)

1. Babu BV, Rath K, Kerketa A S, Swain B. K, Mishra S and Kar S.K. Adverse reactions following mass drug administration during the programme to eliminate lymphatic Filariasis in Orissa state, India. *Transactions Royal Soc. Trop Med Hygn*. 2006; 100: 464-469.

2. Babu BV, Nayak AN, Rath K, Kerketta AS.Use of the Dermatology Life Quality Index in filarial lymphoedema patients. *Trans R Soc Trop Med Hyg*. 2006 Mar; 100(3): 258-63.

3. Babu Bv, Swain B.K and Rath K. Impact of chronic lymphatic filariasis on quantity and quality of productive work among weavers in an endemic village from India. *Trop Med Int Health*. 2006; 11(5): 712-7.

4. Pal BB, Khuntia JH, Samal SK, Das SS and Chhotray GP. Emergence of Vibrio cholerae O1 biotype El Tor serotype Inaba causing outbreaks of cholera in Orissa, India. *Jpn. J. Infect. Dis.*, 59, 264-266, 2006.

General Information and Publication

5. Satapathy AK, Sartono E, Sahoo P. K, Dentener M.A, Michael E, Yazdanbakhsh M, Ravindran B. Human bancroftian filariasis: Immunological markers of morbidity and infection. *Microbes and Infection*. 2006 (In Press).

6. Mand S, Supali T, Djuardi J, Kar SK, Ravindran B & Hoerauf A Detection of adult Brugia malayi filariae by ultrasonography in humans in India and Indonesia. *Tropical Medicine and International Health*. 2006 (In Press).

7. Parida S K. Hazra RK Marai N .Triphathy HK and Mohapatra N. Host Feeding patterns of Malaria vectors of Orissa, India. *J Am Mosq. Cont. Association*. 2006 (In Press).

8. Bulliyya G, Mallick G, Sethy GS, Kar SK. Haemoglobin status of non-school going adolescent girls in three districts of Orissa, India. *International Journal of Adolescent Medicine and Health* (In Press).

9. Babu BV, Behera D K, Kerketta A S, Mishra S, Rath K, Swain BK, Mishra S and Kar S K. Inclusive partnership strategy to increase compliance of mass drug administration during the programme to eliminate lymphatic filariasis in urban areas of India. *Annals of Tropical Medicine and Parasitology*. (In Press).

10. Rath K, Nayak AN and Babu BV. Community's knowledge and perceptions about filarial elephantiasis and hydrocele in coastal Orissa, India. Asia Pacific *Journal of Public Health*. (In Press).

11. Babu BV, Nayak A N and Rath K. Utilisation of primary healthcare services: experiences and perceptions of rural community of East Godavari district, South India. *The Indian Journal of Social Work*. .(In Press).

12. Swain BK and Mishra S. Immunization coverage among migrant tribal children inhabiting slums of Bhubaneswar city, Orissa, India. *Indian Paediatrics*.(In Press).

Symposium on Morbidity Management on Lymphatic Filariasis.

General Information and Publication

Publications in Edited books/Monograph:

1. Bulliyya G. Environment and health status of primitive Paudi Bhuiyan tribe in northeastern part of Orissa. In: P. Dash Sharma (Edition), Anthropology of Primitive Tribes of India. ISBN: 81-8387-007-4 Serial Publications, New Delhi.2006; pp.336-368.

2. Meetings/Workshops Conducted:

1. The Centre organized Protocol development meeting on AIDS on 23rd August 2005 at RMRC. It was envisaged to develop a common protocol with partnership of state AIDS cell, three medical colleges with scientific support from RMRC and NARI, Pune. The project Director of State AIDS Cell, Orissa have discussed various issues on AIDS control in Orissa. Professors of Medicine, Microbiology, Obstetrics & Gynecology of three Medical Colleges have participated in meeting. Among the other dignitaries Dr. S. P. Tripathy, Ex- D. G, ICMR and Dr. R. S. Paranjape, Director, National AIDS Research Institute, Pune and Director RMRC also addressed the meeting. Areas of research were identified.

2. The Centre organized protocol development meeting on proposal " Randomized clinical trial to study the therapeutic efficacy of the different antimalarials " on 9th August 2005 under chairmanship of Director, RMRC. Experts from local medical colleges, Hospitals and state programme officials SIHFW, IGH, Rourkela working in the field of malaria participated in the meeting. The drug regimen arms were planned in the meeting to be incorporated in the protocol.

3. The Centre organized a meeting on "Multi-site monitoring of human influenza virus in India" on 25th October 2005 at RMRC, Bhubaneswar.

4. Dr.Lalit Kant, Sr. DDG, ICMR, Dr. Godkiri, consultant Virology and local experts and medical professionals attended the meeting. Director, RMRC addressed the meeting.

5. An one-day workshop on "Diagnosis of Infectious Diseases by using Molecular Tools" was organized for the national participants of AMBICON on 26th Dec 2005 in the Centre . Department of Pathlogy and Microbiology of the Centre demonstrated the latest techniques during the workshop.

19th SAC Meeting in Progress

General Information and Publication

6. The Centre conducted training programme for medical doctors on ICD-10 coding of cause of death on June 2005.

7. The Centre Conducted training programme for supervisors of TRC, Chennai, on verbal autopsy from 5th-7th October 2005.

8. The Centre Organized symposium on " Current challenges in health care delivery in malaria" on 31st March 2006 at RMRC, Bhubaneswar under the chairmanship of Dr. P.K.Senapaty, Director, Health Services, Govt. of Orissa. Experts from state Govt., CMO, Capital Hospital, Joint Director, Malaria, officials of SIHFW, Medical colleges,, Director in charge of ROH&FW , other dignitaries and scientists from RMRC presented the ongoing activities and issues related to control program and alternative approaches were discussed for effective compliance.

9. The Centre organized the 19th Scientific Advisory Committee (SAC) Meeting from 27th – 28th Sept. 2005. During SAC Meeting a poster sessions on Ph.D students was held. The Ph.D. scholars have presented research highlights in poster forms in their respective topics.

3. Conferences/Meetings attended by Scientists.

1. Dr. S.K.Kar participated in meeting organized by Secretary, DST, Govt. of Orissa on "Setting up of Biotech Park in Orissa" at IDCOL House, Bhubaneswar on 26th April 2005 and presented the areas of health research in biotech plan.

2. Dr. S.K.Kar participated in 45th Annual Function of Utkal University, Dept. of Zoology as an invited speaker and delivered a guest lecture on recent prospective of Biotechnology in health care on 29th April 2005.

3. Dr. B. V. Babu participated in meeting of Scientific Working Group on Lymphatic Filariasis, during 10-12 May 2005, WHO/TDR headquarters, WHO, Geneva, Switzerland.

4. Dr. A.S. Kerketa attended training work-shop on cause of death at Hyderabad from 5- 7 May 2005.

5. Dr. S.K.Kar attended 2nd Governing Body Meeting of Association of Physicians of India at S.C.B. Medical College, Cuttack on 26th June 2005.

6. Dr. R.S.Balgir participated in 33rd World Environment Day held on 5th June 2005 Bhubaneswar .

7. Dr. B. V. Babu participated in meeting of ICMR Task Force Project on

operational feasibility and impact of co-administration of albendazole and DEC in controlling lymphatic filariasis, held at Directorate of National Vector Borne Diseases Control Programme, Delhi, on 15th June 2005.

8. Dr. R.S.Balgir participated in "Investors Meet on Biotechnology", Science & Technology Department, Govt. of Orissa on 4th July 2005, Bhubaneswar.

9. Dr. G. Bulliyya attended a "Regional Consultation Meet on Nutrition' organized by Food and Nutrition Board and Women & Child Development, Government of Orissa held during July 18-19th, 2005 at New Marion Hotel, Bhubaneswar.

10. Dr. S.K.Kar participated in the 9th Annual Congress of Lymphology Society of India held at Kakinada and delivered guest lecture "Morbidity management in Filariasis" on 13th August 2005.

11. Dr. S.K.Kar participated in the CME organized by Association of Physicians of India Orissa branch on "Rational magement of Falciparum Malaria" at SCB Medical College and delivered guest lecture on Epidemiology of Malaria on 28th August 2005.

12. Dr. N. Mohapatra participated meeting on "Multicentric on stratification of malaria's area in tribal areas" held at ICMR Hqr on 6th September 2005.

13. Dr. S.K.Kar delivered a guest lecture on "Pathogenesis and clinical manifestation of Lymphatic Filariasis" in a conference organized by APICON held at Puri on 2nd October 2005.

14. Dr G P Chhotray participated and delivered a guest lecture on "Modern trends in diagnosis of Lymphatic filariasis" at the annual meeting of Association of Physicians of India (Orissa Chapter) held at Puri on 2nd Oct 2005.

15. Dr G P Chhotray participated and presented the paper entitled "Molecular analysis of the major enteropathological agents associated with diarrhoeal disorders in Orissa" at the Indo-US workshop on Diarrhoea and Enteric Protozoan parasites: New challenges in the era of HIV/AIDS in poster session held at NICED, Kolkata from 3-6 Oct. 2005.

16. Dr. A.S. Kerketa attended workshop on Lymphatic filariasis for the study team of multicentric study at NICD, New Delhi from 27-29 October 2005.

IEC activities on Hepatitis in field.

General Information and Publication

17. Dr. S.K.Kar delivered a guest lecture on "Prevention of Communicable Diseases – scientific approach" in Children's Science Congress at DAV Public School, Chandrasekharpur on 30th October 2005.

18. Dr. B. V. Babu delivered a talk on " Filariasis elimination program" as guest speaker in CME organized by Association of Physicians of India (Orissa State Branch) at Puri on 2nd October 2005.

19. Dr. S.K.Kar participated in the review meeting on "Malaria Situation in Orissa" with Hon'ble Minister, H&FW, Secretariat and talked on CQ resistance on 2nd November 2005.

20. Dr M R Ranjit participated the International Conference on Malaria and presented the paper entitled " The PfCRT (K76T) point mutation favours clone multiplicity and disease severity in *Plasmodium falciparum* infection" held at New Delhi from Nov 4-6, 2005.

21. Dr. S.K.Kar participated in the meeting on Elimination of Lymphatic Filariasis at Hotel Keshari, Bhubaneswar and delivered a lecture on "Clinical features & management of filariasis" on 3rd November 2005.

22. Dr. S.K.Kar participated in the state conference of Association of Physicians of India (Orissa branch) and chaired a session on " Clinical Management of Malaria" at Hotel May Fair, Bhubaneswar on 12-13th November 2005.

23. Dr. N. Mohapatra participated ICMR GIS Task force meeting on 10th November 2005 and presented the project mapping of breeding habitats.

24. Dr. N. Mohapatra participated Entomological Forum meeting at VCRC, Pond cherry on 11th November at Pond cherry.

25. Dr. R.K.Hazra participated International Conference on Malaria at New Delhi on November 2005 and presented a paper on "The effect of insecticide treated bed nets on morbidity of Boarding School children".

26. Dr. S.K.Kar delivered a guest lecture on "Diabetic Foot Care" on the eve of World Diabetes Day at IDCOL House 14th November 2005.

27. Dr. S.K.Kar delivered a guest lecture on " Thallassemia" in a workshop on "Thalassemia and Sickle Cell Anaemia" organized by district authorities of Jajpur held at Jajpur on 25th November 2005.

28. Dr M.K.Beuria presented a paper entitled "Immune response to Glutathione-s-

transferase in human filariasis " in 32nd Annual Conference of Indian Immunology Society held at Chandigarh during 24-27 Nov. 2005.

29. Dr. S.K.Kar delivered a guest lecture on " Role of pharmacology in management of Malaria" in 14th National Pharmacy Week – 2005 held at College of Pharmaceutical Science, Tamando on 26th November 2005.

30. Dr. R.S.Balgir participated in Workshop on Thalassemia and Sickle Cell Anemia and delivered a Talk on "Prevention of Thalassemia and Sickle Cell Anemia" on 25th November 2005 held at Jajpur, Orissa

31. Dr. S.K.Kar participated in 3rd Professional Development Course at SIH & FW as Resource Person & delivered a lecture on Malaria in Orissa on 3rd December 2005.

32. Dr. S.K.Kar delivered a guest lecture on "Molecular approach in diagnosis of malaria and applications of Biotechnology" in Dept. of Botany, Ravenshaw College, Cuttack on on 15th December 2005.

33. Dr. S.K.Kar participated NNMB Steering Committee Meeting at NIN, Hyderabad as a Member and evaluated the projects as a Member on 20th December 2005.

34. Dr. S.K.Kar delivered guest lecture on " Malaria" to young scholars organized by Regional Research Laboratory at RRL on 21st December 2005.

35. Dr. S.K.Kar participated as chairman of scientific session in Workshop on "Health Care of Elderly" at Red Cross Bhawan, Bhubaneswar organized by APICON, Orissa branch on 24th December 2005.

36. Dr. B. V. Babu presented a paper entitled " Inclusive partnership strategy to increase compliance of mass drug administration during the programme to eliminate lymphatic filariasis in urban areas of Orissa, India" in the 3rd Southeast Asia and Western Pacific Bi-Regional TEPHINET Scientific Conference held at Chennai during 9-12 January, 2006.

37. Dr A.K.Satapathy participated Molecular Immunology Forum held at Bhubaneswar from 27th-30th Jan 2006.

38. Dr A.K.Satapathy attended ICMR-MIHR workshop on " IP And Technology management in Health" held at New Delhi on Jan 23rd 2006.

39. Dr. G. Bulliyya presented a paper entitled "Study on prevalence of iron deficiency anaemia among non-school going adolescent girls of Orissa" in 3rd Southeast Asia and Western Pacific Bi-Regional TEPHINET Scientific Conference held at Chennai during 9-12 January, 2006.

40. Dr. S.K.Kar participated in Meeting organized by UNDP on " Health Status of

Fishermen in Coastal Districts of Orissa" and delivered talk on the Occupational Health Hazard on Fishermen Community on 31st January 2006.

41. Dr. S.K.Kar participated in a national workshop cum-Training Programme on Bioinformatics and Statistics in Aquaculture Research held at Central Institute of Freshwater Aquaculture (CIFA) , Bhubaneswar on 7th February 2006 and delivered a guest lecture on " use of bioinformatics and statistics in health care research".

42. Dr. A.S. Kerketa participated in National workshop on Tribal Health at Visakhapatnam from 8th to 10th February 2006.

43. Dr. S.K.Kar delivered a guest lecture on " Tribal Health" in National Workshop on Health problems & Health Care systems organized by Andhra University at Visakhapatnam from 8-10 February 2006.

44. Dr. B. V. Babu participated and presented a paper on " Tribal Health in India and Millennium Development Goals" in a workshop on Health Problems and Health Care Systems among the tribes of India at Department of Anthropology, Andhra University, Visakhapatnam, Andhra Pradesh, during February, 8th – 10th 2006 at Visakhapatnam.

45. Dr.R.S.Balgir participated and presented a paper entitled "Tribal Health Problems, Disease Burden and Ameliorative Challenges in the Tribal Communities of Eastern Ghats with Special Emphasis on the State of Orissa" in the National Workshop on "Health Problems and Health Care Systems among the Tribes of India " held at Visakhapatnam during 8-10th February 2006.

46. Dr. R.S.Balgir participated and presented a paper entitled "Spectrum of Hemoglobinopathies in Two Primitive Tribal Communities of Northwestern Orissa, India" in International Symposium on Human Genomics and Public Health held at New Delhi during 27th February to 1st March 2006,

47. Dr. B. V. Babu participated as Guest Speaker and delivered a lecture entitled " Domestic violence and women's reproductive health: some evidences" in National Symposium on Gender Symmetry: Challenges Encountered held at Sambalpur University on 10th March 2006.

48. Dr. S.K.Kar delivered a Key Note address on gender bias in National Symposium on "Gender Symmetry : Challenges Encountered" held at Sambalpur University on 10th March 2006.

49. Dr. S.K.Kar participated in the National Task Force Meeting on Lymphatic Filariasis at Nirman Bhawan, New Delhi on 22nd March 2006.

50. Dr G P Chhotray participated the meeting on "National Consultation on Control Programme for Hemoglobinopathies" held at ICMR Headquarters, New Delhi on March 2006 .

4. Events:

a. National Technology Day:

The Centre observed the National Technology day on 13th May 2005. Dr. N. Sarangi, Director, Central Institute of Fresh Water and Aquaculture (ICAR) ,Bhubaneswar delivered a talk on "Technology on Aquaculture- Present, Past and future".

b. Vigilance Awareness Week:

RMRC, Bhubaneswar observed vigilance awareness week from 7th – 11thth November 2005 in its premises. A meeting was held on at the center on 11th Nov. 2005 at 3.30 P.M at Seminar Hall of the Centre . All the officials in the seminar also took the pledge as directed by Central Vigilance Commission.

c. ICMR Foundation Day:

The Centre observed ICMR Foundation Day on 18th Nov. 2005. The Member of Parliament & Editor of the Local daily " The Dharitri" Sri Tathagata Satapathy was invited as chief guest on the occasion. He narrated about the rural health care needs of Orissa.

d. RMRC Foundation Day

25th RMRC Foundation Day was celebrated on 29th March 2006. During the morning session eminent scientists like Prof. S.N.Behera, Ex- Director, Institute of Physics, Bhubaneswar and Prof. D.B. Tompey, Retd. Prof. & Head of Dept. of Cardiology, SCB Medical college, Cuttack were invited for deliberation. Prof. Behera have delived a lecter on Nanotechnilogy and medical science where as Prof. Tompey have discussed on cardiac diseases and care of heart. The evening session was dedicated for the children's of the staff of RMRC. The dance, song and drawing competition was held among the children and colorful program was organized in the campus followed by prize giving ceremony and dinner.

RMRC Foundation day celebration

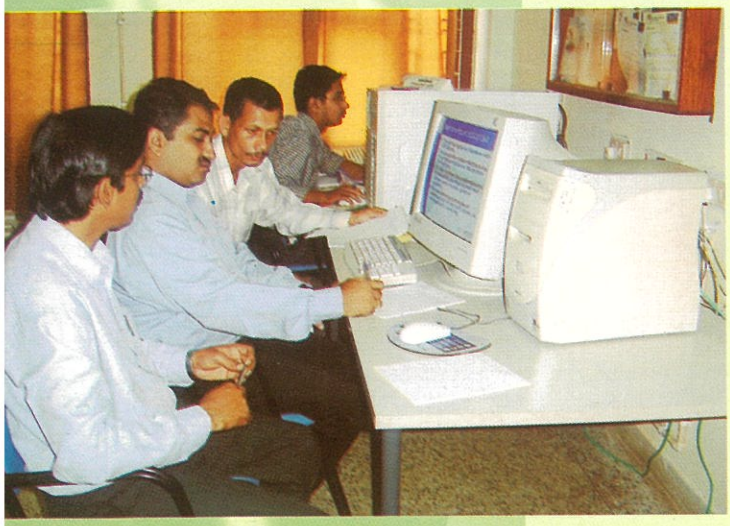
e. Guest Lectures:

Dr. Graham Serjeant, prof . Emeritus, University of West Indies, Kington, Jamaica has delivered a guest lecture on Sickle cell diseases on 17th Jan 2006.

General Information and Publication

5. Library & Information Services

Library & Information Centre of Regional Medical Research Centre, Bhubaneswar houses an exclusive collection of books, foreign and Indian journals, databases, reprints, etc. on various subjects of biomedical sciences. For the calendar year 2006, the library subscribed 34 foreign journals and 37 Indian journals and procured 250 books. The library provides services like reference, inter-library loan, on-line literature/database search through Internet and off-line MEDLINE services. The reprint request is also provided to the scientists through ICMR Librarians Group Mail services (icmrlibrarians@yahoo.com) and through JCCC@ICMR. The Local Area Networking (LAN) facility has been provided to all scientists, researchers and office staff along with INTERNET connection to all computers (presently 30 connections) through BSNL broadband. Online journals (Nature, BMJ, Lancet, Science, NEJM) are being accessed through ICMR library consortia through Internet. The library organized the JCCC@ICMR training program for eastern ICMR institutions.



JCCC@ ICMR Programme in RMRC Library

The library & Information division is doing publication activities of the centre. RMRC News Bulletin entered 6th year of its publication and carries research articles contributed by its own scientists and researchers on various field of their working areas. In addition, the library is publishing a biannual library News Letter. IEC materials are also made on various diseases on local languages for distribution to the public. Besides, the division Publishes Centre's Annual Report every year.

The following are publications from RMRC being published from library and information division.

1. RMRC Annual Report (Annually)
2. RMRC News Bulletin (Six monthly)
3. Library News Letter (Six monthly)
4. IEC Materials on various diseases on Malaria, Filariasis, Sickle cell diseases, IDD, in regional languages.
5. Posters on recent advances in Fiariasis, Malaria, Sickle cell diseases, and diarrhoea for children.

6. Facility

(i) Insectorium

The Centre maintains the insectorium facility at the Entomology division by rearing of various stages of vectors used for laboratory studies. Cyclic colonies of

three mosquito species i.e. Aedes *aegypti* (black eyed Liverpool strain), *Anopheles stephensi* and *Culex quinquefasciatus* are being maintained. This year attempt is being made to rear Aedes albopictus and *Anopheles culicifacies.* Cyclic colonies are maintained for conducting different experiments such as development of different strains and species of filarial worms that will help in the selection of proper animal model and conducting bio-assays of different plant products for observation of its insecticidal properties. Different stages of mosquitoes are also supplied to Universities, other laboratories and state Govt. for giving training g for identification of species. Students from various universities, Research laboratories also come for training to know the technique of rearing of mosquitoes.

(ii) Animal house

Animal facility in the center continues to be used for all relevant on-going projects. Currently M. Coucha, Balb/c mice, Guinea pigs and Rabbits are available for experimentation. All the projects concerning animal use/ experimentation are discussed in Animal ethical committee of the center and work progress also review periodically by the committee. Staff has maintained periodic records of animal house. This facility is maintained regularly with periodic inspection and health monitoring by veterinarian.

7 Activities of NNMB Unit, Orissa, Bhubaneswar

The NNMB unit, Orissa under NIN, Hyderabad functioning at RMRC, Bhubaneswar has undertaken the Project on Assessment of Diet and Nutritional status of communities & Prevalence of Hypertension and Anamia in Adult males and NPNL women in Rural areas from January 2004 and was completed sixteen (16) districts of Orissa by May 2005. The data was regularly sent to NIN, Hyderabad for analysis. The final report on the said Project is being awaited.

At present the unit is undertaking second repeat survey of Assessment of Diet & Nutritional status of Tribal Population' along with assessment of Prevalence of obesity and hypertension among adult men and women of ≥ 20 years of tribal population. The objectives of the survey are as follows.

1. To assess the food and nutrient intake among different age/sex/physiological groups of tribal population living in the Integrated Tribal Development Agency/Project (ITDA/P) areas in NNMB states.
2. To assess their nutritional status of all the available individuals in terms of Anthropometry, clinical examination and to study the time trends in the nutritional status.

General Information and Publication

3. To assess the prevalence of obesity and hypertension among the adult men and women (≥ 20 years). in tribal population and

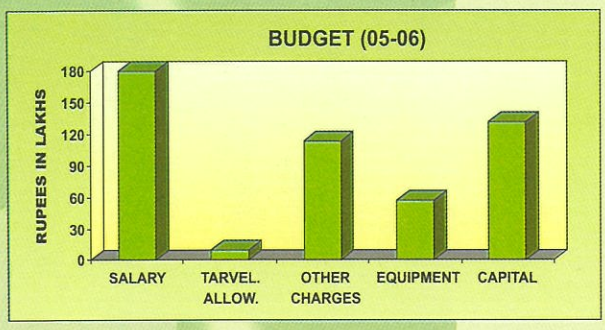
4. to assess awareness about hypertension and diabetes among adults (≥ 20 years) of the tribal community.

Till July 2006 the unit has covered 27 villages in 4 districts where 1080 households are covered, clinical Examination, Anthropometry and morbidity status was done in 3492 individuals.

Diet survey was completed in 270 households using Individual dietary food intake method KAP on Hypertension and Diabetes mellitus with blood pressure measurement, waist circumference & Hiplirumference measurement was done in 655 individuals. The data is being sent to NIN, Hyderabad for analysis.

8. Budget and Resource Generation:

The total sanctioned Budget in respect of the Centre (Non-Plan & Plan) for the year 2005-06 is 5 Crore 10 lakhs. The head-wise expenditure of budget is shown below in the graph. During this year, 10 extramural projects were under taken at RMRC, Bhubaneswar. The budget for these projects is 71.85 lakhs and it has been generated from both Indian and international funding agencies.



Besides the usual sanction, resources generated by this centre were from extramural research grant, human resource development plan for taking Ph.D. courses from CSIR, UGC scholars and equipment sanction from NACO amounting to Rs. 71.85 lakhs.

Inaugural function of Auditorium, Guest House, Hostel and Animal House In RMRC, BBSR

General Information and Publication

9. 20th Scientific Advisory Committee

1.	Dr. Sandip K. Basu Director, National Institute of Immunology Aruna Asaf Ali Marg, New Delhi 110 067	Chairman
2.	Dr. S. Pattnayak B-91, Swasthya Vihar, Delhi 110 092	Member
3.	Lt. Gen. D. Raghunath Principal Executive, Sir Dorabji Tata Centre for Research in Tropical Diseases, Innovation Centre, IISc Campus, Bangalore 560 012	Member
4.	Dr. Sarita Agarwal Addl. Professor, Deptt. of Genetics, SGPGIMS, Raebareli Road. Lucknow 226 014	Member
5.	Dr. K. Ramachandran Consultant, National Institute of Epidemiology, Chennai	Member
6.	Dr. Asis Datta Director, National Centre for Plant Genome Research J.N.U. Campus, PO BoX: 10531, New Delhi 110 067	Member
7.	Dr. R. Reuben No.52, Rashmi Apartments, 5th Floor, D Monte Part Road, Bandras, Mumbai 400 050	Member
8.	Dr. Indira Chakravarty 110, Chittaranjan Avenue, Kolkatta 700 073	Member
9.	Dr. Ira Ray B 265 GKI, New Delhi-110 048	Member
10.	Dr. D.S. Aagarwal B-24, Swasthya Vihar, Delhi 110 092	Member
11.	Dr. Sarita Agarawal Professor, PGI, Chandigarh	Member

12.	Director of Health Services, Govt. of Orissa, Heads of the Dept. Building, Bhubaneswar	Member
13.	Dr. Satish Gupta National Institute of Immunology Aruna Asaf Ali Marg, New Delhi-110 067	DG's Nominee
14.	Dr. Dipali Mukherjee DDG (SG) & Chief, ECD Indian Council of Medical Research Ansari Nagar, New Delhi 110 029	ICMR Representative
15.	Dr. Rashmi Arora DDG (SG), ECD-II Indian Council of Medical Research Ansari Nagar, New Delhi 110 029	ICMR Representative
16.	Dr. S.K. Kar Director, Regional Medical Research Centre (ICMR Bhubaneswar	(Member Secretary)

10. Human Ethical Committee:

1.	Justice (Mrs.) A.K. Padhi Former Judge, Orissa High Court 10, Bhasakosh Lane Nimchouri, Cuttack-753 002	Chairman
2.	Dr. B B. Tripathy Retd. Prof. of Medicine Saradiya Mission Road, Cuttack-753 001	Member
3.	Dr. (Mrs.). P. Mohanty Hejmadi Former V.C., Sambalpur University GM-8, VSS Nagar, Bhubaneswar-751 004	Member
4.	Mrs. Kasturika Pattanayak Ex-Chair Person, Social Welfare Board Govt. of Orissa, 1, Lewis Road, Bhubaneswar	Member

5.	Dr. (Mrs.) Manorama Das C/o. Prof. G.C.Das, Santiniketana, Mathasahi, Cuttack	Member
6.	Dr. S.K. Kar Director, Regional Medical Research Centre, Bhubaneswar	(Member-Secretary)

11. Animal Ethical Committee:

1.	Dr. S.K. Ray Professor & Head, Dept. of Veterinary Medicine Orissa College of Animal Husbandry & Veterinary Sciences, O.U.A.T. Bhubaneswar – 751 001	Chairman
2.	Dr. G.B.N. Chainy Professor & Head, Dept. of Zoology Utkal University, Bhubaneswar – 751 004	Member
3.	Prof. P.C. Supkar Institute of Life Sciences Bhubaneswar-751 023	Member
4.	Mr. N.R. Mansingh Inspector, SPCA, C/o. CDVO office, Puri – 752 002	Nominee of the CPCSEA
5.	Dr. M.K. Das Deputy Director (Sr. Gr.) RMRC, Bhubaneswar	Biological Scientist
6.	Dr. B. Ravindran Deputy Director (Sr. Gr.) RMRC, Bhubaneswar	I/C Animal facility
7.	Dr. (Mrs.) N. Mohapatra Assistant Director RMRC, Bhubaneswar	Biological Scientist
8.	Dr. S.K. Kar Director RMRC, Bhubaneswar	Convener

General Information and Publication

12. Technical Equipment Purchase Committee:

1.	Dr. A.K. Sahoo Principal Scientist CIFA, Kausalya gang Bhubaneswar- 751 002	Chairman
2.	Prof. P.C. Supakar Director-in- Charge Institute of Life Sciences Bhubaneswar-751 023	External Member
3.	Dr. A. Padhi, MD Pathologist, Kalinga Hospital Bhubaneswar	External Member
4.	Dr. Pankaj Agarwal Lecturer, Institute of Physics Bhubaneswar	External Member
5.	Mr. A.K. Mohapatra AO, RMRC, Bhubaneswar	Member
6.	Mr. R.V.Rao, ACO, RMRC, Bhubaneswar	Member
7.	Dr. B. Ravindran, DD (SG) RMRC, Bhubaneswar	Member (Subject Specialist)
8.	Dr. M.K. Das, DD (SG) RMRC, Bhubaneswar	Member- Secretary

13. Technical Building Maintenance Committee:

1.	Mr. D.N. Tripathy Retd. Chief Engineer, CPWD	Chairman
2.	Mr. P.K. Pattanik Retd. Sup. Eng. (Elect.), CPWD	Member
3.	Mr. P. Kapoor Retd. Jt. Director (Agriculture)	Member

4.	Dr. M.R. Ranjit Assistant Director, RMRC	Member
5.	Mr. A.K.Mohapatra Admn. Officer, RMRC	Member
6.	Mr. G. Behera Section Officer, RMRC	Member

14. Staff position (up to Sept. 2006)

DIRECTOR

DR. S.K. Kar, MD, Dip. Clin. Epid.

IMMUNOLOGY DIVISION

Dr. M.K. Das, M.Sc., Ph.D.	Deputy Director (Sr. Gr.)
Dr. B. Ravindran, M.Sc., Ph.D.	Deputy Director (Sr. Gr.) On Deputation, post transferred to RMRC, Belgaon)
Dr. M.K. Beuria, M.Sc., Ph.D.	Asst. Director
Dr. A.K. Satapathy, M.Sc., Ph.D.	Asst. Director
Mr. N. Mandal, M.Sc., M.Phil., B.Ed.	Research Assistant
Dr. P. K. Sahoo, M.Sc., Ph.D.	Research Assistant
Dr. (Mrs.) M.S. Bal, M.Sc.,M.Phil., Ph.D.	Research Assistant
Mr. H.S. Naik, Dip. MLT	Lab. Technician
Mr. K.C. Parichha	Insect Collector
Mr. S.C. Das	Lab. Attendant
Students:	
Mr. Alok Das Mohapatra, M. Sc.	SRF (UGC)
Mr. Santosh Kumar Panda, M. Sc.	SRF (UGC)
Mr. Aditya Kumar Panda, M. Sc.	JRF (CSIR)
Miss. Madhumita Panda, M. Sc.	JRF (UGC)

PATHOLOGY AND MICROBIOLOGY DIVISION

Dr. G.P. Chhotray, M.D.	Deputy Director (Sr.Gr.)
Dr. M.R. Ranjit, M.Sc., Ph.D.	Asst. Director
Dr. B.B. Pal, M.Sc., Ph.D.	Senior Research Officer
Dr. H.K. Khuntia, M.Sc.	Research Assistant
Mr. R.K. Das, M.Sc.	Research Assistant
Mr. B.N. Sethi, Dip. MLT	Lab. Technician
Mr. K.C. Dalai, B.A., ITI	Lab. Assistant
Mr. B.K. Kanhar	Lab. Assistant

General Information and Publication

Mr. C.R. Samantray	Lab. Assistant
Mr. K.C. Jena	Laboratory Attendant
Mr. S. K. Mallick	Lab. Attendant

Students

Mr. Sudhansu Sekhar Nishank, M. Sc.	SRF (CSIR)
Miss. Ronali Rout, M.Sc.	JRF (UGC)
Miss Upasana Sahoo, M.Sc.M.Phil	SRF (RMRC)
Mr. S.K.Samal, M.Sc.	SRF (RMRC)

CLINICAL, EPIDEMIOLOGY AND STATISTICS DIVISION

Dr.B.V.Babu, M.A., Ph.D., PGDAS	Assistant Director
Dr. A. Mohapatra, M.Sc., M.Phil., Ph.D.	Asst. Director
Dr. (Mrs.) A.S. Kerketta, M.B.B.S.	Senior Research Officer
Dr. E.V.Rao, MBBS, M.D	Senior Research Officer
Dr. Bhagirathi Dwibedi, M.B.B.S, M.D	Research Officer
Mr. P.K. Jangid, M.Sc.	Statistical Assistant
Dr. A.S. Acharya, M.Sc., M.Phil, LL.B.,Ph.D	Research Assistant
Mr. D.P. Hansdah, M.Sc.	Research Assistant
Mr. R.C. Parida, M.Sc.	Research Assistant
Mr. S.C. Rout	Lab. Technician
Mr. T. Moharana	Lab. Assistant
Mr. R.N. Nayak, B.A.	Census Taker
Mr. K. Dhal, B.A.	Census Taker
Mr. N.N. Pattnaik	Laboratory Attendant
Mr. H.K.Jena	Field Attendant
Mr. K.C. Nayak	Sweeper

Students

Mr. Basant K. Swain , M.A	SRF (RMRC)
Miss Prajyoti Sahu, M.Sc. M.Phil	SRF (RMRC)
Mr. Biswa Ranjan Purohit , M.A	SRF (RMRC)

MEDICAL ENTOMOLOGY DIVISION

Dr. (Mrs.) N. Mohapatra, M.Sc., Ph.D.	Assistant Director
Dr. R.K. Hazra, M.Sc., Ph.D.	Senior Research Officer
Dr. S.K. Parida, M.Sc., Ph.D.	Technical Officer
Mr. N.S. Marai, M.Sc., LL.B.	Research Assistant
Mr. H.K. Tripathy, B.Sc, PGDME	Technical Assistant
Mr. G.D. Mansingh	Insect Collector
Mr. B. Pradhan	Insect Collector
Mr. C.S. Tripathy, B.Com. LL. B.	Insect Collector

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Mr. S.S. Beuria	Insect Collector
Mr. G. Simhachalam	Insect Collector
Mr. Banamali Nayak	Field Attendant

Students:

Mr. Sasmita Swain M.Sc.	JRF (Lady Tata Fund.)
Ms. Asima Triparthy, M.Sc.	SRF (RMRC)

HUMAN GENETICS DIVISION

Dr. R.S. Balgir, M.Sc. (Hons.), Ph.D.	Deputy Director (Sr. Grade)
Dr. G. Bulliyya, M.Sc., Ph.D.	Senior Research Officer
Mr. B. Murmu, M.Sc., M.Phil.	Research Assistant
Mrs. G. Mallick, M.Sc.	Research Assistant
Mr. Baburam Behera	Sweeper- cum- Attendant

Student

Mr. Priyadarsi Girija Shankar Sethy, M.Sc.	SRF (RMRC)

LIBRARY & INFORMATION

Dr. B. Sahoo, M.L.I.Sc., Ph.D	Asst. Lib. & Inf. Officer
Mr. Chakradhar Naik	Sweeper-c-Attendant
Mr. R.S. Bahadur	Watchman

ADMINISTRATION

Mr. A.K. Mohapatra, B.A., LL.B.	Administrative Officer
Mr. G. Behera, M.A.	Section Officer
Mr. B. Sutar, M.Com	Assistant
Mr. R.C. Muduli, B.A.	Assistant
Mr. P.C. Nayak, B.A.	Personal Assistant
Mr. Abani K. Nayak, B.Com.	Personal Assistant
Mr. B.S. Rao	U.D.C.
Mr. S. Nayak	L.D.C.
Mr. R. Rath	L.D.C.
Mr. S.K. Das, B.Com.	L.D.C.
Mr. S.K. Majhi, M.A., LL.B.	L.D.C.
Mr. R.C. Dash	Office Attendant
Mr. M.B. Thappa	Watchman
Mr. R.S. Rai	Watchman
Mr. Som P. Sharma	Watchman
Mr. T. Bahadur	Watchman
Mr. D.C.Rao	Sweeper

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DIRECTORS' OFFICE

Mr. L.S. Rao, B.A.	Private Secretary
Mrs. R. Varghese	Steno
Mr. K.G. Samal	Attender
Mr. R.K. Hembram	Field Attendant

ACCOUNTS

Mr. R.V. Rao, B.Com.	Accounts Officer
Mr. A.P.Parida, B.A	UDC
Mr. S.K. Satapathy	U.D.C.
Mr. Sankar P Sharma	Watchman

WORKSHOP, INSTRUMENT & BUILDING MAINTENANCE

Mr. B.K. Biswal	Electrician
Mr. S. Sutar	Generator Operator
Mr. J. Behera	P.H —Wireman
Mr. B.K. Moharana	Plumber-c-Carpenter
Mr. Banamali Sahoo	Gardener
Mr. Sankar Bisoi	Cook-cum-Guest House Attd.

ANIMAL FACILITY

Mr. A. Senapati	Animal House Attendant
Mr. S.K. Das	Animal House Attendant
Mr. Jaladhar Naik	Animal House Attendant
Mr. Pandav Sahoo	Animal House Attendant

TRANSPORT

Mr. Md. Daulat Khan	Driver (Special Grade)
Mr. Sibaram Patra	Driver (Grade-I)
Mr. R. Pradhan	Driver (Grade-I)
Mr. Anakar Nayak	Driver (Grade-II)
Mr. A.R. Khan	Driver (Grade-II)
Mr. P.K. Behera	Driver

NATIONAL NUTRITION MONITORING BUREAU (NNMB) STAFF

Dr. S.K. Das, MBBS	Research Officer (Medical)
Mrs. S. Paikray	Asst. Research Officer
Mrs. Haraprava Sahu	Social Worker
Mr. D.K. Mohanty	Steno-C-Office Asst.
Mr. R.K. Sahoo	Driver
Mr. J.K. Mohanty	Field Attendant

Regional Medical Research Centre
(Indian Council of Medical Research)
Chandrasekharpur, Bhubaneswar-751 023, Orissa, India
Tel. : 0674-2301322, 2301332, Fax : 0674-2301351
E-mail : sahoo@icmr.org.in