Annual Report
2014

Regional Medical Research Centre
(Indian Council of Medical Research)
Bhubaneswar-751 023, Odisha, India

Inauguration of Symposium by Dr. V. M. Katoch,
Secretary, DHR & DG, ICMR in RMRC, Bhubaneswar

Opening of the bust of Prof. L.N. Mohapatra, 1st Director of RMRC, Bhubaneswar in RMRC, Library
(named as Laxminarayan Memorial Library) by Dr. V. M. Katoch, Secretary, DHR & DG, ICMR

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From the Director's desk...

The Centre has focussed its research activities in areas of communicable and non-communicable diseases, human resource development programme and expansion in establishing new field units in both tribal and rural set up in state. This was achieved due to strong linkage with State Health Department. Besides basic and applied research, translational research has been the major focus of research taken up in operational mode. Communicable research programme includes lymphatic filariasis, malaria, diarrhoeal disorder, tuberculosis and virology. Non communicable diseases include nutrition, sickle cell disease, hypertension and diabetes. The centre has been accredited as National Reference Laboratory for TB.

Besides establishing the field units at Rayagada and Kalahandi in collaboration with Govt. of Odisha. Last year, the council has signed MoA with Govt. of Odisha for establishment of 2 new field units at Keonjhar and Kandhmal. The centre has got sanctioned for Model Rural Health Research Unit (MRHRU) after agreement between State Govt. of Odisha and DHR. This will be helpful in promoting health research in Public Health setting and Medical Colleges. Bioinformatics cell has initiated data programming to link the data base of RMRC as well as its field units to facilitate central data sharing. Research on Diabetes and hypertension as new dimension added to research area of this centre. The Hypertension control strategy in tribal population has been initiated with baseline survey and is in the phase of intervention. Low BMI diabetes and insulin resistant diabetes in pre diabetics as a marker of progression are being focussed. Genetics and metagenomics are planned to be studied to add to epidemiology of diabetes and its associated morbidities. Translational research activities initiated at Rayagada and Kalahandi will address on improving health parameters of under five children focussing diseases of public health importance through strengthening IMNCI program using innovative strategy. Baseline health status survey and training need assessment of grass root level health workers has been undertaken in sampled population that will be used to formulate the strategy for implementation. While this activities has been undertaken up in first phase, burden of tuberculosis and augmenting RNTCP through strategy development in two field units will be addressed. Transfer of Technology, training and capacity building are included to ascertain sustainability of the programme.

During the period, 26 scientific projects (17 ongoing including 5 translational and 9 completed) were carried out by this Centre. Of which 22 are extra mural in nature funded by ICMR Task Force, DST, DBT, NVBDCP or Gates Foundation.

During the year 2013-14, till date 35 papers are published with average impact factor of 2.5. All publications are indexed, published in reputed International Journals.

The Center's library is accessed with ERMED consortia along with online subscription of JCCC@ICMR through ICMR consortia and ICMR E- Journal Consortia. The Centre's library is WiFi

enabled and initiated a new activity of Institutional Publication Repository along with daily article service to all biomedical scientists of ICMR institutes.

The Centre has generated 2.08 crore through sponsored research in year 2013-14. Human resource activity focused on imparting training to M.Sc students sponsored from various reputed Universities in the State and outside to complete their 6 month dissertation work. During 2014, 32 students completed their course work. Pre-Ph.D course has been introduced under Utkal University. University sponsored 10 students are regularly attending classes at this Centre from June to December 2014. Ph.D scholars sponsored from UGC and ICMR under fellowship as JRF/SRF altogether 9 candidates are continuing Ph.D programme on date. Three Ph.D awarded during 13-14 and 3 Ph.D scholars submitted thesis under the scientists of the Centre as guide. Training was imparted to around 100 paramedical staff on Hb% estimation, ELISA for field assessment of nutritional status and outbreak investigation (Dengue, Chick). At Kalahandi and Rayagada field units, technology transfer on ELISA & PCR for diagnosis of dengue and culture to diagnose diarrhoeal disorder has been completed and regularly monitored.

The Centre has established linkages with other ICMR and non-ICMR institution like State Govt. of Odisha, NVBDCP, Delhi, RGI, Gates Foundation, DBT, AIIMS, Delhi, IVI, DST in upgrading the expertise, sharing scientific information and collaborative research programme. Scientific staff of Virology lab was trained on Ebola virus diagnosis as a preparedeness for investigation. Research findings of this centre were presented in International conferences. Collaboration with State Health Department was strengthened in form of consultancy, undertaking evaluation of health programme, referral diagnostic services, epidemic investigations and disaster management.

In the centre, 86 staff is in position. Out of which 15 are scientists, 29 technical staff and42 supporting staff.

The Centre has organized regular seminars, several workshops, conferences and meetings including animal and human ethical committee, Pre-SAC reviews and SAC meeting. Biomedical symposium was organized for various medical faculties of Odisha.

During the year several developmental activities were undertaken by the Centre. OPD cum training facility was constructed through CPWD. Renovation of staff quarters and institute premises, horticulture, guest house and hostel facilities carried out with support from ICMR. BSL III laboratory and MRHRU at Tigiria is in the process. Construction for separate administrative building (G+5) adjacent to the main lab building and training facility for Ph.D scholars, M.Sc students were processed for construction during the period. Bio-informatics Cell was modernised with equipment and other required gadgets.

Several cultural functions and Annual Function of the Centre was organised as a Staff Welfare activity. For the staff, gymnasium facility has been provided. Besides, playground and canteen facility were processed for construction. I sincerely thank scientists and staff for their endeavour and contributions. I am also thankful to the State Health Department and other agencies, collaborating Institutes and experts of SAC, ethical and other technical committees for their assistance, support and co-operation. I extend my deep gratitude to DG, ICMR and Council for their continuous support, guidance and encouragement. With all round support, the Centre can continue its endeavour to achieve its goal.

DR. S. K. KAR
DIRECTOR

HIGHLIGHTS OF RESEARCH ACTIVITIES

This year the centre has addressed research issues on important priority health problems of this region like vector borne diseases, diarrhoeal disorders, bacterial meningitis, viral diseases, tuberculosis, and non-communicable diseases like under nutrition, diabetes, hypertension and sickle cell disease. Most of the studies are sponsored either by ICMR Task Force or DST, DBT, Gates Foundation, NVBDCP or MOHFW. Network has been strengthened with the State Health Department, Medical Colleges and Hospitals of the region for referral investigation of sporadic cases and outbreak investigation of viral and other bacterial infections. The centre is also undertaking various HRD programmes to develop manpower of this region through Pre-PhD, PhD and MSc dissertation / training programme. Two new field units at Rayagada (DHQ Hospital, Raygada) and Kalahandi (DHQ Hospital, Bhawanipatna) have started functioning by way of transfer of technology in diagnosis of diarrheal disorders and dengue infection that has put through in this region. Besides a community strategy is being developed in managing fever by syndromic approach in collaboration with District Health Authorities. To address under five mortality in hard to reach areas of Rayagada and Kalahandi districts, through Translational Research mode, activity is being initiated in collaboration with State Health services by strengthening IMNCI Prgramme at community level targeting to improve nutrition and reduce morbidity / mortality in under fives. To establish another two new field units at Keonjhar and Kandhamal DHQ hospital and MRHRU at Tigiria of Cuttack district as per the request of the State Government, MoA have been signed between Govt. of Odisha and ICMR and with DHR for MRHRU, which are now initiated. The major research activities of the centre carried out during 2014 are highlighted below.

Lymphatic Filariasis

The National Filaria Control Programme (NFCP) targets to eliminate lymphatic filarisis in the country by 2017 through mass administration of single annual dose of DEC (6mg / kg) with Albendazole (400mg). To overcome the major challenges in the programme like low rate of compliance, among children, to reduce the duration of MDA to achieve target in time and effective regimen of MDA to address hot spot areas, the centre has completed two studies. Firstly, no evidence was available earlier on lymphatic status of children infected with W.bancrofti, where around 25.30% of children acquire W.b infection in pediatric age group. Through standardizing newer technique of lymphscintigraphy and using tools like Ultrasonography and antigen detection (OG4C3), the study has revealed that majority (>70%) children between 5 to 18 years infected with W.b have lymphatic damage. More importantly, the study revealed that at least 80% of children who are asymptomatic but infected got reversal of pathology with standard MDA regimen (DEC+albendazole) given annually or bio-annually. Even those having overt lymphoedema exhibiting lymphatic pathology got reversed with reversal of lymphoedematous swelling. This finding demonstrates that MDA is not only effective in interruption of transmission but also for morbidity prevention. This can be used as strong advocacy tool for MDA improving compliance.

Another study completed and anlysed on four armed randomized hospital based clinical trial with altering the dose of albendazole (400 or 800 mg) with DEC (300 mg) given either annually or biannually for two years revealed that the regimen with albendazole 800 mg and DEC 300 mg given biannually had significantly achieved continued mf suppression with reduction in frequency and density of mf. It achieved adult clearance (100%) in one year and significant reduction of antigen level. This regimen can shorten the period of MDA and possibly be targeted for hot spot areas.

To explore the possible impact of MDA that excludes pregnant women, the centre has made an attempt to find out whether filarial infection in infected mothers has any role in increasing susceptibility to infection in the off springs. During this period it has been observed that 34.8% cord bloods collected from 145 CFA positive mothers had detectable circulating filarial antigen (CFA) indicating possibility of transpalcental transfer of the filarial antigen. Further filarial specific IgG1, IgG2 and IgG4 responses of cord bloods were found to be positively correlated with CFA of mothers. In contrast IgG3 responses negatively correlated with CFA of mothers. The similarity of recognition pattern in the cord blood with maternal blood was high for IgG3 response than IgG4_in all three groups. An increased levels of IL-10 and decreased levels of IFN- ã were observed in cord blood of infected mothers. IFN-ã was positively correlated with IgG3 and negatively correlated with IgG4 level. On the other hand IL-10 was positively correlated with IgG4 and CFA, indicating that cytokines may play a role in modulating the immune responses in cord bloods of sensitized foetus. The findings of the study reveal that *in-utero* tolerance or sensitization may influence the filarial-specific immunity to infection in neonates.

In a separate study, a positive correlation between polyreactive antibodies and B-1 cells in filarial-infected human subjects has been observed. Moreover after anti filarial treatment, levels of IgM antibodies to ss-DNA, actin, LPS and filarial antigen increased significantly indicating a role of polyreactive naturally occurring antibodies in filarial infection.

As a participating Centre, under National network for genotyping human filarial parasites, allele frequency of different gene loci (â-tubulin, ALT-2, ITS or r-DNA in *W. bancrofti* parasite population of endemic areas of Odisha was studied, which indicated the presence of the single nucleotide polymorphism at 200 position of â-tubulin gene of *W. bancrofti* ascribed to Benzimidazole resistance. These markers can be used for tracking the changes in the genetic heterogeneity of *W. bancrofti* and develop appropriate strategies for the control / elimination of lymphatic filariasis. Similarly L3 stage specific RT-PCR assay for detection of infective stage *W. bancrofti* in vector was evaluated as a part of multi-centric project. The assay was found to be sensitive and specific and can be useful for monitoring of the national LF elimination programme.

Malaria

Studies on malaria were addressed to identify the parasite species circulating in this region and the vector species transmitting infection. Malaria survey conducted using molecular tool in Badampahar CHC (Mayurbhanj Dist) and Ghatgaon CHC (Keonjhar Dist) has revealed *P malariae* mono infections in 11.6% of cases and mixed infections were 14.2% in Ghatagaon and 6% in

Badampahar. Under the current scenario of screen and treat strategy, presence of *P malariae* poses a difficulty, as the screening is performed by RDT alone. Further in the present study the species specific RDTs were unable to detect either the mono infection or mixed infections of *P malariae*. Therefore the molecular method can be used as a tool for surveillance to overcome such problems.

To identify the sibling species complex and their vectorial capacity in malaria endemic regions of Odisha. Multiplex PCR detected An. culicifacies sibling species A, B, C, D and E in the malaria endemic regions of Odisha. An. culicifacies E was detected for the first time in Odisha, which was further confirmed by molecular phylogenetics. Highest sporozoite rate and HBF percentage were observed in An. culicifacies E in comparison with other sibling species. An. culicifacies E collected from Nawarangapur, Nuapara and Keonjhar district showed high HBF percentage and sporozoite rates.An. culicifacies B was the most abundant species, followed by An. culicifacies C andE. High sporozoite rate and HBF of An. culicifacies E indicated that it plays a major role in malaria transmission in Odisha.

Diarrhoeal Disorders

The centre is conducting active surveillance and monitoring to identify the bacterial pathogens causing severe diarrhoea like V.cholerae and their drug susceptibility pattern to help the local health authorities in providing early warning of epidemic and appropriate drug against V.cholerae prevalent strains. Further, the centre last year undertaken Phase IV vaccine trial with OCV at community level. During 2013-14 the centre carried out outbreak investigations of severe diarrhoea in tribal dominated areas; Mohana, Laxmipur, Dasmantpur and Kashipur blocks of Gajapati, Koraput and Rayagada districts. Out of total 107 rectal swabs collected , 81 were culture positive (75.7%) from which 48 (59.2%) were E. coli, 16 (19.8%) were Vibrio cholerae O1 Ogawa, 11 (13.6%) were Shigella spp. and 6 (7.4%) were Aeromonas spp, while no *V. cholerae* were isolated from water samples. Early reporting of cholera had helped the health authorities of the district to take adequate control measures which could check the spread of cholera epidemic in this region.

In the year 2011-12 the Centre has conducted Phase IV Oral Cholerae Vaccine (OCV) trial in 52,000 population of Satyabadi block of Puri in collaboration with IVI Korea and Govt. of Odisha. During 2012-13 effectiveness of vaccine and individual cost analysis per vaccination and socio epidemiological factors were analyzed that have been completed this year. Effectiveness of vaccine was found to be 66% and individual cost per vaccine delivery was 0.98 $. The socio economic information and community perception have brought out important observations that can be beneficial in use of the vaccine in newer areas.

Tuberculosis (National Reference Laboratory) Lab activity

Tuberculosis Culture and DST laboratory of RMRC, Bhubaneswar has been designated as National Reference Laboratory by Central TB division in the month of October 2013. The laboratory is now looking after 10 states namely Odisha, West Bengal and 8 North East states for quality control and assessment of TB diagnosis facilities. During this period the NRL team has done monitoring visits to five states (Odisha, West Bengal, Sikkim, Meghalaya and Assam) assessing the TB diagnostic

facilities / function of the IRL and DMCs in the concerned states. Recommendations made for necessary corrective measures to improve quality diagnosis. Besides, it is also providing support to the state of Odisha in the field of MDR TB diagnosis by Line Probe Assay and solid culture. So far 141 MDR TB follow up samples from 7 tribal dominated districts has been tested and results used for case management.

Bacterial meningitis in under five children

The Centre undertook investigation of bacterial meningitis under the network of hospital based sentinel surveillance of bacterial meningitis funded by Ministry of Health & Family Welfare, Govt. of India. One thousand fifty eight clinically suspected cases of meningitis within 1 month to 59 months age admitted to paediatric hospital (SVPPGIP), Cuttack were investigated for *Haemophylus influenza* (HiB.), *S.pnenumoniae* and *N.menigitidis* by latex agglutination, culture and sensitivity and PCR assay from CSF and / or blood samples. The study revealed HiB in 4.5% and *S.pnenumoniae in 14% of* patients. Other organisms isolated were *S.aureus*, Group B *Streptococcus, Salmonella, Klebsiella* and *Pseudomonas.* The information provides the baseline for introduction of HiB and Pneumococcal vaccine to the children in India. This network will also provide information on impact of vaccination once introduced.

Grade I Virology Laboratory Activity:

This Centre is continuing surveillance and outbreak investigation of important viral diseases in the region through the established Grade-I viral lab as a part of network of viral research and diagnostic laboratories in India. Diagnostic services have been provided to more than 22,000 patients in last four years covering more than 50 viruses important for public health use. Last year the Centre received around 5,000 samples from different hospitals, medical colleges and outbreak investigations from various districts of Odisha. Network has been strengthened from State Health Department to District Health level for getting immediate out break information and investigating the outbreaks within 24 hours. During 2013-14, fourteen outbreaks were investigated that revealed Hepatitis A & E, Measles, Chickenpox, Dengue, Chick and JE causing morbidity and mortality. Immediate investigation and recommendation for control supported the State Public Health system for taking early prevention measures to control further spread. JE outbreak has been confirmed from Keonjhar district affecting tribal population which is the second report following the report from Malkangiri district last year. Hospital based surveillance has shown the different viral aetiology with prevalent serotypes and genotypes of viruses causing ARI in children, AES in children and adults, Carcinoma cervix, diarrhoeal disorders especially due to Rota and vector born diseases (Dengue, Chick and JE). The study revealed Measles out breaks inspite of the ongoing immunization programme in the State. The laboratory also supported the diagnostic services offered by the State for Dengue and Chick surveillance by imparting training to district level technicians of 21 districts and two tribal field units of Rayagada and Kalahandi. This Centre is making attempt to extend the services to neighbouring states so that it can act as a regional referral facility for investigation & research in viral diseases which is a public health need of the region.

Translational Research

Under translational research the centre has taken effort to develop two PCR based tools for public health use. One is to monitor the information of vector prevalence, incrimination of vector for malaria transmission, identification of the sibling species of vector and chloroquine (CQ) sensitivity of the parasite ingested by the vector. This technique has been internally validated and the practical aspects of the technique has been demonstrated to the researchers of NIMR and programme personnel of the state NVBDCP in a workshop held during 4th to 8th February 2013 at Regional Medical Research Centre, Bhubaneswar . The feasibility of technology transfer is being assessed following training. The technical manpower so developed will help monitoring and evaluation of malaria program in absence of adequate trained entomologists in the State run programme.

The other tool developed by the centre is to detect all serogroups of *V. cholerae* in a single PCR test. In-house validation of the technique has been done. The assay has been validated at NICED, Kolkata and a kit has been developed that can be used for rapid diagnosis of cholera. Applicability of both the tools is being now field tested.

Besides above, a LAMP assay technique for diagnosis of malaria is under standardization for field use.

Two operational research programmes are also ongoing for development and evaluation of innovative strategies to improve health of tribal population in the State. One of the above studies includes, fever management strategy following syndromic approach which is being implemented in 27 villages of Rayagada district where baseline survey has been completed in previous year covering 5600 tribal population. Community mobilization, capacity building ensuring logistic supply and monitoring & supervision are the components used for intervention. Early identification of fever by community volunteers and immediate diagnosis and management by ASHA has reduced the time lag in treatment seeking (from 3 to 7 days to 1 to 2 days) and morbidity duration was shortened by immediate management at household level. The referral chain / mechanism has been established from village to PHC / District Hospital using local transport (Mobilizing GKS fund) system and training for early warning signs to ASHA and Community Volunteers. These are the interim observations and it is being analysed with follow up for changes in morbidity and mortality pattern.

To reduce under five morbidity and mortality in tribal population of Rayagada and Kalahandi a Translational Research project has been initiated to address the major morbidities in children like ARI, Diarrhea, Malaria, Measles and Under Nutrition. Baseline survey for health status of under five children including immunization coverage and anthropometry is being carried out along with training need assessment of grass root health workers in sampled population from low and high tribal density blocks. The health accessibility of the villages are also being assessed. Seven thousand and 5,500 population from Kalahandi and Rayagada has been covered that includes around 400 under five children from each district. The baseline information is being analyzed to formulate the strategy for intervention. The State Health collaboration is being taken from the beginning so that the technology can be transferred and the strategy can be administered within the frame work of the existing health

system, while strengthening the IMNCI programme to improve under five health status to the level of State average.

Other activities:

Studies were undertaken to find out gaps in the ongoing programme on adolescent, reproductive and sexual health services in tribal dominated districts and evaluation of health status of migratory population of urban slums those will be useful for taking necessary improvement measures in the national programmes.

As a service component the centre is providing outpatient facility to patients of lymphatic filariasis and haemoglobinopathy at Capital Hospital, Bhubaneswar. The facility is being utilized for referral investigation, diagnosis management of suspected cases of filariasis and haemoglobinopathy from different parts of the state. Besides, the facility is providing treatment to acute and chronic filarial disease including decompression therapy for filarial lymphedema reduction. The centre has provided diagnosis and treatment to around 500 patients suffering from lymphatic filariasis and haemoglobinopathy that has Reduced morbidity and sufferings due to these diseases.

Bioinformatics cell has been developed by this centre for making database on epidemiology / trials of public health important conducted in this centre. This will also serve for monitoring of real time data generation and central data sharing with the council. Library of the centre has started daily article service (DAS) to all ICMR scientists and biomedical researchers liked to the centre.

HRD Activities:

This centre is providing training / facility to students and post docs of biomedical discipline in the region. During this year, 1 Post Doc fellow, 15 PhD scholars (ICMR, CSIR, DST, Lady TATA), 10 Pre PhD trainee, 32 M. Sc dissertation students, 50 paramedical workers and 5 library trainees has been provided with necessary guidance and support that will strengthen the biomedical manpower in the country.

New initiatives:

OPD cum training facility is nearing completion which will be useful for service, training and research pertaining to the local need. Two short training courses for laboratory technician proposed to be initiated to strengthen their capacity for vector born diseases surveillance and outbreak investigation on the request of the State. Initial processing for BSL III laboratory and construction of MRHRU building at Tigiria has been completed, which will be carried forward in next year. Site selection for Field units at Kandhmal and Keonjhar has been finalized within the premises of respective district hospitals for establishment in line with Rayagada and Kalahandi field units. Research proposals on non communicable diseases i.e. hypertension control in tribal population and low BMI diabetes has been added to the ongoing research program of the centre.

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On Going Studies

Contents

Translational Research

1. Identification of markers to detect the early onset of infection in children during their postnatal exposure to filariasis

Principal Investigator : Dr. M. S. Bal
Co-Investigators : Dr. S. K. Kar
Dr. A. K. Satapathy
Starting Date : July 2013
Closing Date : June 2016
Duration : Three years
Funding : Intramural

Objectives

i) To follow-up the children born to filarial infected and non infected mother for observing parasitological, antigenical and clinical out come

ii) To determine the influence of maternal infection on subsequent B cell response (antibody isotype) to filarial antigens among follow-up children

iii) To find out the extent of modulation of parasite specific cellular reactivity and cytokine production in children during their natural exposure to infection

Background

Lymphatic filariasis shows a wide spectrum of clinical manifestations ranging from acute attack of adenolymphangitis and chronic elephantiasis / nodule formation to occult manifestation of the disease like TPE, monoarticular arthritis and haematuria in filarial infected populations. About 22 million, children below 15 years of age are infected with filariasis which is around 17% of the total disease burden, but till now there are no reports available for infant infections. Plenty of evidences exist suggesting that infection is acquired in earlier childhood and the clinical manifestations appear much later. But our inability to explain why these different outcomes occur in exposed individuals reflects our poor understanding of the natural history of filarial infection. Although host genetics and other environmental factors may influence susceptibility to infection and outcome of the disease, maternal filarial infection has been considered as one of the major risk factor for increase susceptibility. Since the first exposure of an individual to filarial antigen takes place in-utero, maternal filarial infection presumed to play an important role in the outcome of infection. In our hypothesis susceptibility to filarial infection may be due to transfer of filarial antigen and subsequent intra uterine sensitization that modulates the outcome of infection in children. Though the *in utero* exposure to parasitic antigens provides a great deal of interest, still we are not able to test the entire above hypothesis. To prove the hypotheses the following projects have been undertaken to critically follow-up the children longitudinally born from filarial infected mother and non infected mother and monitor their immunological and parasitological consequences.

Progress of Work

Based on the records available with us at least 10 villages have been selected randomly for the study. A door to door survey is being conducted since July 2013 to identify the infected / non infected mothers and their children as per our previous records. Around 63 pairs of mothers and their corresponding children have been enrolled in the study till March 2014, after detailed clinical examination and parasitological / CFA analysis. At least 2ml of venous blood from each selected mother has been collected aseptically and 100 µl of finger prick blood has been collected from the children (< 5 years) for anti filarial antibody assay, circulating filarial antigen (CFA) assay, T regulatory cell assay by flow cytometry. Blood group analysis and clinical history of mothers and their children were recorded at the time of survey. Out of 63 children 15 were from filarial infected (CFA +ve) mothers and 48 were from uninfected mothers (CFA –ve). The circulating filarial antigen has been measured in

mothers as well as children born to both filarial infected and uninfected mothers. The CFA assay could revealed that two children (2 / 15; 13.3%) born to infected mothers are CFA positive whereas only one children (1 / 48; 2.08%) born from infection free mother are positive for circulating filarial antigen. The frequency of double positive (CD4+ CD25+) T-cell (T-regulatory) has been analyzed by flow cytometry using anti human CD4 and CD25 markers. Till now the frequency of T-reg cells has been analyzed in 20 pair of mother and their respective children belonging to infected and non- infected group. The study is in progress.

2. Hospital Based Sentinel Surveillance for Bacterial Meningitis in India: A Multi centric Study.

Principal Investigator : Dr. S. K. Kar
Co-Investigator(s) : Dr. B. Dwibedi,
Prof N Mohanty,
HOD Paediatrics,
SVP PGIP, Cuttack
Starting Date : February 2012
Closing Date : February 2015
Duration : Five years
Funding : Extramural (Ministry of H & FW, Govt. of India)

Objectives

Primary Objectives

1. To establish a hospital based sentinel surveillance for bacterial meningitis in children between 1 month and 59 months in six states in India
2. To determine the trends of bacterial meningitis in children between 1 month to 59 months of age in these states in India

Secondary Objectives

To determine the etiological profile of bacterial meningitis in children for *Haemophilus influenzae* type b, *Streptococcus pneumoniae* and *Neisseria meningitidis*.

Background

The aim of the project is it to establish a network for sentinel surveillance for bacterial meningitis caused by *Haemophilus influenzae* type b, *Streptococcus pneumoniae* and *Neisseria meningitidis* in India. Preparations are ongoing by the Government of India for the phased introduction of a Pentavalent vaccine (DPT-Hep.B-Hib) in selected states of the country as part of Universal Immunization Program. An ongoing surveillance network is critical to facilitate data flow and monitor the changing trends in disease pattern following introduction of potentially lifesaving public health intervention (Pentavalent Vaccine). The study of trends in the pattern of organisms and drug resistance across the country is also being planned as a part of the project.

The surveillance will provide hospital based data on bacterial meningitis specifically those caused by *S. pneumoniae*, *H. influenzae* and *N. meningitidis*. Data on drug resistance using MIC will be generated from all the surveillance sites. Generation of this data will help the government not only to observe trends in drug resistance patterns but will ultimately help in formulation of a policy guideline for management of the same.

Progress of Work

Investigators & Staff training / Reorientation: To maintain uniformity in the study methodology and quality of data all the site investigators attended reorientation training on GCP and GLP at CMC, Vellore. Project staffs were trained subsequently on the protocol and procedures involved in the study. The data entry operator engaged in the project was trained on Data entry through Epi Info software at NIE, Chennai. Technical staff (2 SRFs, 2 research assistants and two technicians) got laboratory training pertaining

to identification of isolates using gram stain, culture, biochemical tests during a workshop held at CMC, Vellore.

Standardization of laboratory procedures: Laboratory investigation has been undertaken on trial samples (Blood & CSF samples) using required laboratory procedures including CSF cytology (DC, TLC), CSF biochemistry (glucose, protein) by auto analyzer, culture (blood and CSF) and antibiotic sensitivity. Cultures were inoculated on blood agar, chocolate agar, Mac Conkey agar and Mueller Hinton agar plates for identification and antibiotic sensitivity respectively.

Quality control: Internal quality check was made on coded samples to see inter observer variations which were negligible. External quality control was inbuilt into the study, where CMC, Vellore acted as the reference laboratory. In the process coded isolates were received from CMC, Vellore and relevant laboratory tests were performed to identify the isolates and results were communicated to CMC.

Laboratory up gradation at SVPPGIP, Cuttack: The hospital facility selected for the study i.e. SVP Post Graduate Institute of Pediatrics, Cuttack is situated 35 kms away from this Center's laboratory and as per the laboratory protocol the samples need to be put into culture immediately (within 15 – 30 minutes) considering the sensitivity of *H. influenzae* & *S. pneumoniae* to external temperature and CO_2 concentration. Hence, it was planned to set up a laboratory facility inside the hospital. In this process laboratory space was identified and necessary civil modification (partitioning and ceiling etc.) undertaken with the help of state R&D Division, necessary equipment have been shifted to the laboratory from RMRC and installed. It has been made functional with help of the project staff who are already trained. Laboratory activity is ongoing to cover 24 hrs. x 7 days surveillance activity as desired.

Subject enrolment & Lab Investigation

No. of patients attending the hospital i.e. SVPPGIP, Cuttack, patients suspected of meningitis and no. of hospital admission were recorded during the period of surveillance i.e. March 2012 onwards through 24hrs. After obtaining written consent from parent or guardian accompanying the patient, the subjects were enrolled in the study.

Case report form was filled with the help of resident paediatrician. History of illness and history of immunisation was also recorded. Till date, a total of 955 suspected meningitis cases have been enrolled in the study, who satisfied the inclusion criteria laid down in the protocol. The children enrolled were between the age group of 1 to 59 months as per the protocol. The major presenting illness was fever with convulsion (64%). Other associated features were bulging fontanel (20%), neck rigidity (18%), and altered sensorium (16%). Around 62% of patient reported to the above hospital within 24hrs of onset of fever. History of use of antibiotics before admission was observed in 55% of cases.

There was no recorded history of immunisation against Hib and *Streptococcus pneumoniae* in all cases that were enrolled. CSF and blood samples were collected following standard practise and procedure in the hospital for investigation. A total of 724 CSF samples and 464 blood samples were collected for investigation. In all cases samples were processed immediately and put into culture (within 15-20 mins.). Latex agglutination test was done in all suspected cases of meningitis, out of which 28 samples were found to be latex positive (15 for Hib, 12 for *S. pneumoniae* and 1 for group B. *Streptococcus*). CSF cell count varied from 0 to 16500. About 28% of CSF samples presented with cell count more than 10, while only 10% of CSF samples had WBC count more than 100.

Of the total CSF samples subjected to culture, 3 were culture positive for *Staphylococcus aureus, 1* was positive for *Streptococcus pneumoniae* and 1 was positive for *Salmonella typhi*. The culture positive cases were subjected to antibiotic sensitivity testing and *Staphylococcus aureus* was found to be sensitive to Vancomycin, Ampicillin, Erythromycin, Chloramphenicol, Cefotaxime, Gentamicin and resistant to Ceftazidime. *Streptococcus pneumoniae* was found to be sensitive to Cefotaxime, Chloramphenicol, Penicillin, Vencomycin, Oxacillin, Teicoplanin, Rifampicin. *Salmonella typhi* showed susceptibility towards Gentamicin, Cotrimaxozole, Chloramphenicol, Ceftriaxone and was resistant to Ampicillin, Cefotaxime, Ceftazidime.

Out of 464 blood samples processed for culture, 2 were culture positive for *Klebseilla pneumoniae* and 4 were positive for *Pseudomonas aeruginosa*. Antibiotic susceptibility done against *Klebseilla pneumonia* revealed that it was sensitive to Norfloxacin, Cephotaxime, Azithromycin, Chloramphenicol, Ciprofloxacin, Gentamicin, Ceftazidime and resistant to Ampicillin and Neomycin. *Pseudomonas aeruginosa* was found to sensitive to Cefotaxime, Gentamicin, Ciprofloxacin and resistant to Ampicillin, Ceftazidime and Penicillin.

35 no of CSF samples were sent to CMC Vellore in first batch for real time PCR analysis, out of which 12 were positive for *S. pneumoniae*. At RMRC Laboratory we analysed 100 samples by real time PCR, out of which 21 were found to be positive. (*S. pneumoniae* 17 and *H. influenzae* type b 4).

Future Plan

Enrolment of the subjects into the project will be carried out as per protocol. Latex test and culture will be carried out in all cases.

3. National Hospital based Rotavirus Surveillance Network (NRSN)

Principal Investigator : Dr.S.K. Kar
Co-Investigators : Dr. B. Dwibedi
Co Investigator : Dr S. S. Satapathy
Starting Date : February 2014
Closing Date : February 2017
Duration : Three Years
Funding : Extramural

Background

In India, an estimated 100,000 children die each year because of rotavirus gastroenteritis. Rotavirus is a wheel shaped (rota) virus belonging to the family Reoviridae. About 20–70% of hospitalizations are attributable to rotavirus. Considerable research has been carried out in India on rotavirus disease in different settings. The collation of data from these studies was frequently not possible due to differences in study design, population examined and methodologies used, and hence a multi-centric surveillance system in India was established in 2005, jointly under the supervision of the Indian Council for Medical Research (ICMR) and the Centres for Disease Control and Prevention (CDC), Atlanta, USA. Standardized protocols for enrolment and diagnostic evaluation of children hospitalized with diarrhoea for rotavirus data were used. Strains of rotavirus circulating in the study population were characterized by standardized molecular methods. To build on the success of this network, it was proposed to extend the surveillance activities at sites located across the country in different geographical zones as recommended by the National Technical Advisory Group on Immunizations (NTAGI) with the goal to have an adequate nationally representative baseline data when rotavirus vaccine is considered

for introduction in the Universal Immunization Program (UIP).

The study objective is to assess epidemiological aspects of rotavirus disease in India and provide essential information before and during introduction of new interventions against rotavirus. The project will facilitate expansion of the multi- centric network by adding new centres and sites and will provide training to peripheral sites, enabling transferring of technology for antigen detection to peripheral sites and building basic capacity in clinical research.

Objective

(i) To establish a national hospital based surveillance to examine long term trends and pattern of diarrhea attributable to rotavirus among children <5 years of age at in patient facilities

(ii) To determine age, seasonal distribution and outcome of rotavirus associated disease among the population under surveillance, including monitoring trends over time

(iii) To characterize (G and P typing) prevalent strains of rotavirus in the population under surveillance

(iv) To estimate the economic burden of rotavirus gastroenteritis hospitalization by standardized costing studies at different levels of hospital based in-patient health care.

Work Plan

Study design

This is a multi-centric surveillance project to be conducted across the country in 4 Zones involving 4 Referral and 7 Regional Centres, which will each have peripheral in-patient facilities submitting clinical data and samples for testing and characterization. The study will be coordinated by the ICMR and the NIE.

Role of Regional centre (RMRC, Bhubaneswar)

- The centre is responsible for overseeing the Clinical Recruitment Sites / hospitals attached to them with respect to achievement of reaching the target size as per protocol (target size for capital hospital= 300)
- Screening of fecal samples by ELISA
- In the first year every 3rd rotavirus positive sample will be sent to referral centre for genotyping
- After first year, every 3rd rotavirus positive sample will be processed for genotyping by the regional centre

Methodology

For the purpose of surveillance, a child below 5 years of age who is admitted to peripheral hospital (Capital hospital, Bhubaneswar) as in patient for treatment of diarrhoea are enrolled in to the study after taking proper consent from the child parent or legal guardian. The following inclusion and exclusion criteria were used for subject enrolment.

Enrollment and Exclusion criteria

- **Enrollment criteria:**
- Age in completed months 0-59 months (below 5 years)
- Suffering from acute diarrhoea (e" 3 unformed stools in any 24 hour period of less than 5 days duration)
- Parent / guardian willing for enrollment of child into the study
- **Exclusion criteria:**
- Child in eligible age group but admitted for other conditions (diarrhoea in not the primery reason for admission)

- Child in eligible age group but admitted in the hospital (for reasons other than diarrhoea) and who develops diarrhoea post admission
- Child in eligible group with history of diarrhoea for more than 5 days.

The stool samples are collected by qualified personnel and are transported in ice to the laboratory. In the laboratory the samples are tested by Premier Rotaclone ELISA kit (Meridian bioscience) for presence of Group A rotavirus.

Progress of work

Recruitment of the project staffs were carried out as per ICMR norms. The project staff were trained at National Institute of Cholera and Enteric Diseases, Kolkata on the various aspects of the project like overview of the project its mandates, subject enrollment, inclusion and exclusion criteria, filling of case recruited form, procedure for sample collection, laboratory testing of the samples, online data entry etc. Purchase of reagents and chemical for sample collection and laboratory testing were carried out. The sample collection from the peripheral site was initiated from 28th January 2014 and is being carried out regularly. The samples were screened by Premier Rotaclone ELISA kit (Meridian bioscience) for presence of Group A rotavirus and the result of the test is intimated to the treating physicians through the CoPI (Capital Hospital). Till 30th November 2014, 256 samples have been tested and 125 samples (48.82%) were found positive for rotavirus. Sex-wise and age-wise prevalence of rotavirus in children is presented in table 1 and 2 respectively.

Table-1: Sex-wise breakup of samples collected and result of ELISA test.

Sex	Rota EIA Positive	Rota EIA Negative	Total
Female	84	45	53.57%
Male	172	80	46.51%
Total	256	125	48.82%

Table-2: Age-wise breakup of samples collected and result of ELISA test.

Age group	Number of cases enrolled	No and percentage of sample positive for Rota antigen
0-6 month	33	10 (30.30%)
7-12 month	115	57 (49.56%)
13-24 month	87	50(57.46%)
25-36 month	16	6 (37.50%)
37-48 month	3	2 (66.67%)
49-60 month	2	0 (0%)
Total	**256**	**125 (48.82%)**

4. Distribution and bionomics of *Culex 'vishnui'* group of mosquitoes with reference to Japanese Encephalitis transmission in Odisha.

Principal Investigator : Dr.N.Mahaptra
Co-Investigator(s) : Dr.R.K.Hazra; N.S Marai
Collaborator : Veterinary Dept. Govt of Odisha
Starting Date : April 2013
Closing Date : March 2016
Duration : Three Years
Funding : Extramural (ICMR)

Objective

1. To map the adult and larval distribution of *Culex 'vishnui'* group of mosquitoes.
2. To study the adult density, seasonal prevalence, gonotrophic cycle, resting, biting and breeding behaviour and susceptibility status to insecticides used in the programme.
3. To find out the virus circulation in mosquito vector, human and pig population in the study area if any.

Progress of Work

During last survey (14th June to18th June, 2013), 48 human blood samples and known vector of JE were collected from the affected villages of Malkangiri district. All the samples were processed for the presence of IgM (using NIV kit). None of the samples were found to be positive for IgM. Since pigs are the amplifying host and their population is very high and most of the affected households have pigs in their home yard. So there is a need to examine pig blood sample for the presence of JE virus. Therefore a team visited **Korkunda** CHC area and conducted the survey along with the entomological team headed by Dr.Kirti Mishra, NVBDCP from 23.9.13 to 28.9.13. The results are as follows;

Blood sample collection from Pigs

The affected households were identified and blood samples were taken from the pigs of those household. The pigs were given identifying marks by the veterinary surgeon, the detail of the pig like their age, sex, colour, and health profile were recorded along with their owner's name. The blood samples

Table 1: Per Man Hour density (PMHD) of mosquitoes in Potrel village.

Sl.No.	Mosquito species	PMHD
1	*Cx.quinquefasciatus*	10.0
2	Cx.vishnui	22.5
3	*An.culicifacies*	9.5
4	*An.subpictus*	40.5
	Cx.gelidus	3.0

Table 2: Per Man Hour density (PMHD) of mosquitoes in Ushakapali village.

Sl.No.	Mosquito species	PMHD
1	*Cx.quinquefasciatus*	7.0
2	*Cx.vishni*	25.5
3	*An.vagus*	6.5
4	*An.culicifacies*	10.5.
5	*An.subpictus*	27.0
6	*An.fluviatilis*	1.0

Table 3: Per Man Hour density (PMHD) of mosquitoes in Pradhaniguda village.

Sl.No.	Mosquito species	PMHD
1	*Cx.quinquefasciatus*	2.0
	Cx.tritaeniorhynchus	11.0
2	*An.culicifacies*	5.5
3	*An.subpictus*	20.5

were brought to the Malkangiri hospital where serum were separated after centrifuge and were then brought to CDVO (Chief District Veterinary Officer) office to store the sample in -20°C.

Entomological Survey

Adult mosquito collections were done from indoor and outdoor of the household in Potrel village. Collected mosquitoes were brought to Malkangiri and were identified. The identified mosquitoes were kept in -20°C deep freezer. Larval collections were carried out in 80 rice field, 23pools, two ponds, Larvae were brought to RMRC lab, reared, and after adult emergence identification was done.

Observation from the entomological investigation

1. Paddy field, the major mosquito breeding habitat in the villages,.
2. Outdoor sites for mosquito resting, such as bushes, were plenty around the village.
3. Vector density was high in this season.

Twenty pools of Cx.vishnui group of mosquitoes were processed for detection of JE virus by molecular method after extraction of RNA from mosquito homogenates using QIAamp viral RNA Mini Kit (Qiagen). The Reverse Transcriptase step (Qiagen) will be carried out to produce cDNA. cDNA produced were amplified for the specific primers for flavivirus identification. Then further by semi nested PCR, typing of JE were done using specific primer. None of the pools were positive for JEV.

Observation on Blood samples collected from Pig

Blood samples were collected from 45 pigs, 10 cattles and 10 goats. Out of 45 samples 13 pig sample were tested for IgG by using kit (Inbios Intrernational, Inc., USA). Three samples were positive. However,

Discussion with CDMO, Malkangiri

Indoor collection of Mosquitoes

(Resting place of Pigs & Mosquito Breeding site.)

(Collection of blood sample from pig at Portel village by Vet. Surgeons.)

when these results were discussed with Director, NIV, Pune, he advised us to conduct neutralising inhibition test using JE mouse antigen for confirmatory test as NIV Pune does not produce IgM and IgG kit for pig. Therefore the process for the above test advised by Director NIV, Pune is under standardization.

5. New borne screening for sickle cell diseases in tribal's of Odisha and association of disease morbidity with genetic and nutrition modifiers of Hb F levels.

Principal Investigator : Dr. S K Kar
Co-Investigator : Dr. Sapna Negi
Dr. AS Kerketta
Duration : 3 years
Funding : Extramural

The project has been approved by 26th SAC and submitted to ICMR for extramural funding. However the research activity has been started since March 2013 at Kalahandi DHQ Hospital with intramural support.

Objectives

(i) To standardize and establish a protocol for collection of cord blood samples for screening of neonates for Sickle Cell Disease (SCD) and follow up of positive subjects

(ii) To get data on incidence of Sickle cell disease among Institutional deliveries of Kalahandi district hospital

Background

Sickle cell disease is a major health problem in the state of odisha. As per the State Health Department 2008-2012 report – Odisha has 5.35 lakh of population affected by the Sickle Cell disease, of which nearly 94% per cent live in 13 western Odisha districts including Kalahandi. Although, no systematic data is available from Kalahandi district, data collected from District Hospital shows that a total of 602 units of blood (one unit per hospital admission) had been transfused to patients with SCD in Kalahandi District hospital during the year 2011-2012. A newborn screening in this region will allow us to get data on incidence of SCD in the district and education of parents of the diseased about signs and symptoms of the SCD crisis which might help in reducing mortality and morbidity among those affected.

Progress of Work

Standardization of cord blood collection procedure was carried out at Gynecology & Obstetric Department, Capital Hospital which is close to our centre. The standardized procedure was then applied at Gynecology & Obstetric Department, Kalahandi District hospital in collaboration with State Government. Nurses of the Department were trained in collecting cord blood sample under sterile conditions. In order to get the systematic data, a preliminary newborn screening activity in this district was started intramurally from March to July 2013 and 761 newborns cord blood samples were screened for SCD using Hb variant HPLC analysis. The report of our screening has been given to the HOD Gynecology & Obstetric Department, District Hospital Kalahandi. A three monthly door-to-door follow-up of 11 families with 2 homozygous and 9 heterozygous SCD neonates was carried out for the confirmation of parental SCD status and to know any health problems encountered by the SCD babies and their parents using a predesigned morbidity assessment questionnaire.

Of the total cord blood samples tested, 125 (16%) were found to be SCD positive of which 13 (1.7%) were homozygous and 112 (14%) were heterozygous for the disease. The demographic data of the studied subjects indicates approximately equal proportion of males and females born at Kalahandi district hospital as well as those born with the disease (Table 1). The percentage of SCD homozygous cases was found to be highest in M. Rampur block (10%) of Kalahandi district (Table2). The result is obtained on a small number of deliveries therefore needs to be confirmed on large dataset. HPLC analysis of the cord blood samples of neonates demonstrated an overall higher average HbF levels among SCD homozygous than in heterozygous and healthy control neonates (Fig 1).

A follow up of two newborns with Sickle cell disease and 8 SCD carriers was carried out at 3 months of age and blood samples of the parents were collected for confirmation. No SCD related morbidity was detected in the newborns except for one SCD homozygous baby who was found to be having problem of stomach distention. HPLC analysis of the parent's blood confirmed SCD condition of the newborns.

From the door-to-door follow up it was experienced that 1) the villages visited at Kalahandi

Table 1: Demographic data of the subjects studied.

Disease Status	Total (n=761) (%)	Male (n=383)		Female (n=375)	
		No. of Males	Mean WT±SD	No. of Females	Mean WT±SD
Normal	635 (83%)	320 (84%)	2.86±1.19	312 (83%)	2.72±1.20
Sickle Cell Trait	112 (15%)	53 (14%)	2.68 0.86	59 (16%)	2.610.86
Sickle Cell Patients	13 (1.7%)	9(2.3%)	2.8±0.46	4(1.1%)	2.42±1.10
Hb D trait	1(0.13%)	1(0.3%)	3.2		

Fig.1: HbF levels of the cord blood sonples studied.

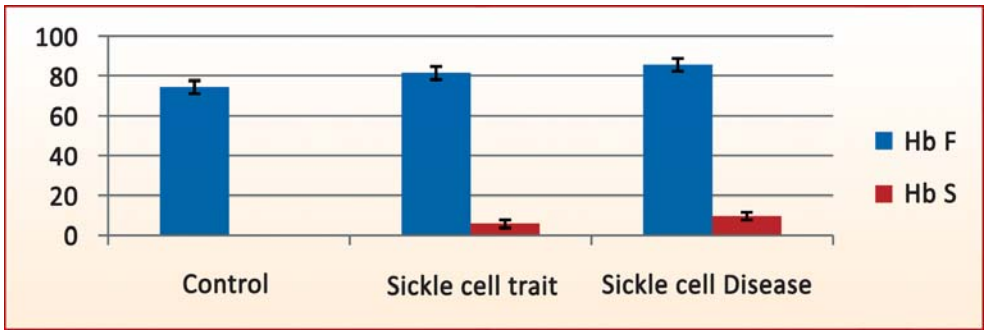


Table 2: Area Wise Distribution of Sickle cell Disease in Kalahandi.

Sl No.	Area	Total Number (n=761)	Normal (n=635)%	Sickle Cell Trait (n=112)%	Sickle Cell Disease (n=13)%	HbD Trait (N=1)%
1.	Biswanathpur	6	5(83.33)	1(16.67)		
2.	Bhawanipatna	292	243(83.21)	44(15.07)	5(1.71)	
3.	Dharmagarh	20	18 (90)	2(10.00)		
4.	Golmunda	11	9(81.810)	2(18.18)		
5.	Jaypatna	42	37(88.09)	5(11.90)		
6.	Jhunagarh	175	152(86.85)	20(11.43)	3(1.71)	
7.	Keogaon	29	20(68.96)	9(31.03)		
8.	Kesinga	36	31(86.11)	5(13.89)		
9.	Koksara	26	23(88.46)	3(11.54)		
10.	M.Rampur	19	13(68.42)	3(15.79)	2(10.52)	1(5.2)

district are far from each other and their sizes are very small with an average of 320 households per village, 2) the frequency of SCD per village was ~1, 3) confidentiality of the health status of the baby and his / her family members is at risk due to the frequent visits of a clinician / researcher to the affected households. Therefore, an alternative strategy like involving ASHAs of the village for informing family of the patient and asking them to report to RMRC field unit at Kalahandi District hospital for confirmation of result and for subsequent follow-ups should be implemented. This approach will also help us in guiding them for a regular checkup by a pediatrician at the District hospital.

6. Clinical, Anthropometric and Biochemical (CAB) components of Annual Health survey (AHS) in Odisha.

Principle Investigator	:	Dr.G.Bulliyya
Co-Investigator	:	Mr.R.K Das
Starting Date	:	September 2013
Closing Date	:	December 2014
Duration	:	One Year three Months
Funding	:	Extramural (ORGI Adhoc project)

General objective

To ensure accurate and reliable data collection on prevalence of under- and over-nutrition, anaemia, hypertension, diabetes, and use of iodised salt at district level by the survey personnel

Specific objectives

To train field investigators so that they acquire the skills to

(i) Ascertain, record age and infant feeding practices in all children below 3 years of age;

(ii) Ascertain acute morbidity in under 5 children;

(iii) Ascertain physiological status of women in reproductive age;

(iv) Use instruments/equipments to be used in the survey and measure the parameters accurately;

(v) Perform quality control procedures to ensure accuracy in measurements; and

(vi) Infection control and waste disposal practices that they have to use in the field.

Background

India is currently undergoing socioeconomic, demographic, nutrition and health transitions. The pace of these interrelated transitions has been steady but slow and uneven across decades, districts, states and segments of population. Over-nutrition, hypertension and diabetes are emerging as public health problems in both urban and rural areas. There have not been any nationwide surveys to provide district level data on prevalence of over-nutrition, diabetes and hypertension. The 12th Plan (2012-17) and National Health Mission emphasized the need for district-specific planning of interventions based on magnitude of the problems in districts/states and accelerate the pace of improvement in health and nutritional status.

The Annual Health surveys (AHS) conducted in each of the 284 districts of the 8 empowered action group (EAG) states (Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, Uttar Pradesh) and Assam referred as AHS states with poor h ealth indicators focusing attention to identify poorly performing areas (blocks). The objective is to yield benchmarks of core vital and health indicators at a district level and to map the changes on an annual basis. The Clinical, Anthropometric and Biochemical (CAB) component has been added for the first time in subsample of AHS (2011-12) in order to obtain all the districts level data on the prevalence of under- and over-nutrition, anaemia and hypertension, abnormalities in fasting glucose levels, and availability of iodised salt. This will enable the formulation of decentralised district-specific plans for interventions and also provide the baseline data against which the impact of interventions (process and impact parameters) during the 12th plan can be assessed. If the performance is suboptimal, factors responsible for the poor performance can be identified for midcourse corrections. The CAB survey covers a sub-sample of AHS that include 1500 households and about 6750 population per district spread across 12 primary sampling units (PSU villages /urban enumeration blocks).

*Clinical parameters include p*hysiological status of married women in reproductive age, infant & young

child feeding practices in children below 3 years, acute morbidity episodes in under-5 children, blood Pressure and pulse rate in adults, while a*nthropometric* (measurements of weight and length / height and body mass index in all age groups) and b*iochemical* (estimations of blood haemoglobin in all age groups, fasting blood glucose in adults and household salt for iodine content). CAB component of AHS is designed to provide district-specific data on magnitude of under- and over-nutrition, micronutrient deficiencies, hypertension and diabetes in all the 284 districts in 9 empowered action group states (EAG), with poor health indicators. DLHS-2 provided district-wise information on prevalence of under-nutrition, anaemia in preschool children, adolescent girls and pregnant women. However, district wise data on prevalence of anaemia and under-nutrition / over-nutrition in other age and physiological groups are not available. Available data indicate that infant and young child feeding and caring practices and morbidity due to infections are critical determinants of nutritional status of preschool children. The sample size is computed based on the assumption that the prevalence of abnormal fasting glucose level is likely to be seen in 4% of the population. The results of CAB tests, except hemoglobin are provided to the household by a health card for the first time through this survey.

Progress of Work

Training to field health supervisors/investigators

RMRC, Bhubaneswar is one among the 9 nodal centres in the country carrying out this survey that includes five ICMR and 2 non-ICMR institutions (NIHFW & NFI). The CAB survey has been outsourced to experienced two survey agencies (Nielson (India) Pvt Ltd and M/s. Sambodhi Research & Communications Pvt Ltd), who deputed a total 86 health investigators trained in 6 batches during the period September 2013 and June 2014. A four-day training session was imparted to 15 trainees in each batch covering orientation of CAB components, identifying PSU in the district, households and form filling from AHS data sheets. Training sessions covered accuracy checking of instruments, standardization of survey methods in the laboratory, quality checking and community household survey describing how to ascertain and record age and infant feeding practices in all children below 3 years of age and ascertain acute morbidity in under 5 children, the principles and instruments sensitivity, describing the quality control procedure to be used for each of the parameters being measured, acquire the skills to accurately measure height / length and weight, BP using digital manometer, collect 20ul of blood from finger prick onto a filter paper for Hb estimation, estimate blood glucose from finger prick blood using glucometer and test household salt for iodine content.

Total 16-teams are currently carrying out the survey at districts level. Each field team comprises one Health Supervisor and two Health Investigators that covers daily 12-15 households measuring all CAB components. Local Directorate of Census Operations (DCO-ORGI) officials supervised the training activities, and who will also monitor and supervise the field team activities on regular basis.

Haemoglobin estimation

Blood samples (20ul) collected on filter paper are received within 4 days after collection by RMRC Nodal Laboratory in sealed plastic zip lock envelops from field teams with proper labelling and coding (district, PSU, HH No, Line No ID No. and name). The dried blood samples are digested in 5 ml of Drabkins reagent in pre-labelled test tubes, mixed thoroughly after 10 hr and haemoglobin concentration is measured by cyanmethaemoglobin method using colorimeter at 540 nm against the standard.

Quality assurance

Colorimeters are calibrated daily for accuracy checking with blank and Hb standards. Every 10th DBS

samples measured for Hb estimation is ensured again for quality checks with an acceptance of +1 OD. Inter laboratory quality control is ensured every month by sending ten blood samples in anticoagulant to each of the seven nodal labs conducting the survey. From each of these samples make 10 dry blood spots (DBS) containing 20 ul of blood and send the DBS in plastic zip lock envelope with name, date of collection and date of dispatch entered on a sticker on the envelope to all the other six labs. Each Nodal lab estimates Hb of the samples within 15 days after collection and send the results to the respective

Table 1: Coverage of dry blood spot samples for haemoglobin.

Zone No Survey agency	District code	District	PSU/EB	Hb Samples Analysed	Duplicate Hb samples
I. M/s.	1	Baragarh	12	3554	891
Nielsen	2	Jharsuguda	12	4361	1156
India Pvt. Ltd,	3	Sambalpur	12	4009	961
Bhubaneswar	4	Deogarh	12	4123	1101
	5	Sundargarh	12	4507	1147
	6	Keonjhar	12	4055	1066
	7	Mayurbhanj	12	4893	1221
	8	Balesore	12	3484	900
	9	Bhadrak	12	3448	848
	10	Kendrapara	12	5777	1427
	13	Jajpur	12	3864	922
	14	Dhenkanal	12	4611	970
	15	Anugul	12	4584	993
	24	Bolangir	12	3318	839
II. M/s	11	Jagatsinghpur	12	4825	1238
Sambodhi	12	Cuttack	12	2881	640
Research Pvt Ltd,	16	Nayagarh	12	3372	805
Bhubaneswar	17	Khurdha	12	2440	634
	18	Puri	12	4347	1097
	19	Ganjam	12	3719	983
	20	Gajapati	12	4327	1119
	21	Kandhamal	12	3437	894
	22	Boudh	12	3725	913
	23	Sonepur	12	5805	1323
	25	Nuapada	12	3465	804
	26	Kalahandi	12	4393	1130
	27	Rayagada	12	4239	1074
	28	Nabarangapur	12	5019	1302
	29	Koraput	12	6027	1533
	30	Malkangiri	12	4587	1176
Total				**125196**	**31107**

lab which sent the samples. The lab which sent the sample consolidate the results and verify that Hb values reported by other labs is within permissible range (± 1 OD). If the variation is more, a repeat sample is to be sent. The results from all the nodal labs are being sent to NIHFW and NFI for compilation and analysis.

A total 60000 samples received from different districts have been analysed for Hb values. So far, the field survey agencies have been completed for 30 districts, from two zones in the state (Table 1).

Online data submission

The data is regularly being entered in RGI-CAB online software.

Future work

The online data is being entered in RGI-CAB online website software.

7. Assessment of morbidity management strategy of febrile illness at community level in Tribal area of Rayagada district, Odisha: An intervention study.

Principal Investigator	:	Dr. Nilam Somalkar
Co-Investigator(s)	:	Dr. A. S. Kerketta, Dr. B. Dwibedi, Dr G. Bulliya, Dr A. Mohapatra
Coordinator & Email	:	Dr S. K. Kar, Director RMRC, Bhubaneswar
Collaborator	:	Department of Health & Family Welfare, Govt. of Odisha
Duration	:	2 Years
Funding	:	Intramural

Training and laboratory activities of CAB components

Objectives:

Primary:

1. To implement alternate strategy for identification and management of febrile illness in tribal area of Rayagada district, Odisha
2. To evaluate the feasibility, acceptability of alternate febrile illness management strategy through community participation and capacity building

Secondary:

(a) To assess the behaviour and practices of community with regard to febrile illnesses

(b) To assess health providers attitude for febrile illness management

Methodology:

Study Area:

The study will be conducted in Rayagada district of Odisha . Raygada district is situated geographically between 19^0-20^0 North latitude and 23^0-80^0 east longitude. It has eleven revenue blocks and 8.23 lakhs population (2001 Census); out of which 55.8% belong to scheduled tribes. Among the scheduled tribes Kandha and Saura are the two major tribes. The literacy rate of the population of the district is low i.e. 35.6%. The population thrives on agriculture and forest product collection. Population survey reports undertaken earlier, shows that under nutrition and malaria are highly prevalent in Domb caste and Dongria Kondh population of Rayagada district.

Study population: Jemedipentha PHC of Rayagada district was randomly selected. 27 villages under three subcentre namely Pitamahal, Singiput and Tadma of Jemadeipentha CHC of Rayagada district were selected by convenient sampling during baseline survey. Total 5800 population residing in these villages form the study cohort for implementation and assessment of alternate febrile illness management strategy through community participation and capacity building.

Study Design (Operational Study):

Community based interventional study through community participation and capacity building.

Proposed febrile illness management strategy:

Based on baseline febrile illness survey, assessment of health seeking behaviour of community and health manpower available in this area, we have developed two alternate strategies for morbidity management of fever through syndromic approach.

First strategy involves:

(a) Training of health worker (ASHA, AWW, Auxillary Nurse Midwife (ANM), Multipurpose Health Worker (MPHW).

(b) Monitoring and feedback

(c) Ensuring supply of Logistics

Second strategy involves:

1. Community mobilization and participation in early case identification, reporting and treatment seeking.
2. Training of health worker (ASHA, AWW, ANM, MPHW).
3. Monitoring and feedback
4. Ensuring supply of Logistics

We discussed both strategies with District Health Officials and according to them the first strategy is already in action with training, routine disease

surveillance etc. It was suggested by the district health officials to adopt proposed second alternative strategy involving community mobilization for early identification of febrile illness in the community itself by community volunteer, school children, seek help of ASHA for Malaria diagnosis with the help of RDK and treatment so that duration of morbidity will be decreased, length of stay with morbidity will decreased and mortality can be reduced. This will be through identification and training of community volunteer, training of school children in healthy preventive practices, capacity building of Self Help Group (SHG), Goan Kalyan Samiti (GKS) members, Interpersonal Communication (IPC), Social Mobilization with the help of documentary film on common febrile illnesses, street play in community, folk dance will help in their behavioral change. In the present health system, the AWW is not involved in delivering health services; we propose to involve them in this strategy.

Progress:

1. Community awareness through meetings:

Community sensitization meeting organized in 27 study villages (3 villages included as per suggestion of DHS). Agenda of meeting was febrile illness identification, management at village level and role of CV. 15-35 community members were present in each meeting. Importance of Hand washing, IRS and use of bed nets explained to them. Demonstrate ion of Hand washing given by school children in meetings well appreciated by community.

2. Capacity building through training:

I. Identification and training of Community Volunteers.

Selection of community volunteers (CV) from 27 villages has been carried out. Total 30 CVs from 27 villages, one for each village selected. CV should be literate and ready to work without any honorium as discussed in community meetings. In small villages or where community not ready for CV, ASHA / AWW took responsibility as a CV. Training was given two times on fever case identification, its referral to ASHA / AWW and warning signals for immediate referral.

II. Capacity building of ASHA/AWW:

All 19 ASHA and 20 AWW were trained on RDT use, Malaria t/t with ACT and on fever case identification, its management and warning signals for referral in different febrile illnesses. Hands on training by practical demonstration at community level given to them at village level. 90% of ASHA are now able to perform RDT.

III. Promotion of healthy preventive practices by school children:

As suggested by the stakeholders during meeting, training on healthy preventive practices given to school children from 18 schools (1-10 std.) in 27 villages. Total 927 school children were trained two times. Focus was given on importance of Hand washing, food handling practices, hand wash practices using 6 steps as adopted by State Govt. of Odisha using rhyming poem to deliver message of Hand Washing. Use of mosquito nets during sleeping and its usefulness were also emphasized. School children spread this message in their families as stated by few parents.

3. Ensuring logistic supply:

Logistic supply at village level and subcentre level in the form of RDT, ACT, Paracetamol and other medicine was ensured by CDMO and Medical Officer of CHC. List of medicines supplied to CDMO and MO

I/C will give extra requirement of medicine for study villages.

4. Monitoring and supervision:

Monitoring and supervision of strategy by district health system is going on during VHND and by RMRC staff during their field visits.

Concurrent evaluation of intervention strategy:

Table 1: Input Indicator

Components	Progress
Identification of community volunteers (n=27)	100%
Training of community volunteers (n=28)	100%
Identification of SHG in different villages (n=54)	100%
Training of SHG members (n=324)	26.80%
Identification of VSS in different villages (n=8)	100%
Training of VSS members (n=80)	40%
Motivation of GKS members use of GKS fund in referral (n=190)	34.70%
Training of ASHA trained (n=19)	100%
Training of AWW trained (n=20)	100%
Training of health worker (n=05)	100%
Organization of community meetings (n=27)	100%
Sensitization of local practitioner (n=5)	60%
Training of school children for hand wash practices (n=927 in 18 school)	1st round-927, 2nd round-633
Advocacy meeting with stakeholdersincluding District Magistrate	6

Future activity

1. Community mobilization through various IEC tools continuously.
2. Capacity building of CV, ASHA/AWW every 3 monthly while that of health staff every 6 month.
3. Ensuring constant and sufficient logistic supply at village and subcentre level.
4. Monitoring and supervision of intervention using input, process, output and outcome indicators on monthly basis.

Table 2: Process Indicators

Components	Progress
Community volunteers actively referring fever cases to ASHA/AWW	70%
SHG actively referring fever cases to ASHA/AWW	0
VSS actively referring fever cases to ASHA/AWW	0
No. of ASHA with supply of logistics like RDK, ACT and Paracetamol (n=19)	94.70%
No. of AWW with supply of logistics like RDK, ACT and Paracetamol (n=20)	10.00%
Fever cases identified and referred by CV to ASHA/AWW	June-336, July- 245
Fever cases tested by ASHA/AWW using RDK	June-310, July- 241
Fever cases referred by ASHA to CHC/PHC/DHH	June-20, July- 14
GKS fund made available for referral: Yes/No	No

Table 3: Output Indicators

Components	Progress
CV identify fever cases in community	1-2 days
Suspected fever cases confirmed as Malaria by ASHA/AWW (June, n=336 July, n=241)	June-42, July- 54
	Positivity: June=12.5%, July=22.4%

8. Prevalence of Pulmonary Tuberculosis among two tribal districts of Odisha.

Principal Investigator : Dr. Nilam Somalkar
Co-Investigator(s) : Dr. Dasarathi DasD
Coordinator : Dr. S.K.Kar
Collaborator : District TB Officers of Rayagada and Kalahandi Dist
Duration : 2 Years
Funding :Intramural

Objectives:

Primary objective:

To estimate prevalence of pulmonary tuberculosis in tribal population of Odisha.

Secondary objective:

i. To compare the detection of smear-positive tuberculosis (TB) among TB symptomatic with cough of <2 or >=2 weeks duration

ii. To study risk factors for pulmonary tuberculosis in tribal population of Odisha.

Methodology:

Study design:

Community based cross sectional study in tribal area of two districts of Odisha.

Quality Control: Quality control will be done through routine On site evaluation (OSE) and Random Blinded Re-checking (RBRC) of RNTCP at district level.

Inclusion Criteria:

Person above 15 years of age having symptoms suggestive of TB present at the time of study in village.

Exclusion criteria:

Bed ridden person, person not traced in village after two visits to his house.

Expected Outcome:

1. The study will provide estimation of TB prevalence in tribal people of two blocks.
2. The study will provide information on duration of cough and TB disease in tribal people.
3. This study will also find out the possible risk factors of TB.

Progress:

Selection of study villages: Study will be carried out in Kolnara block of Rayagada ditrict and Koksara block of Kalahandi district covering 7500 population of each district total 15000 population will be screened for chest symptomatic of Pulmonary TB. Cough of any duration will be taken as symptomatic along with other symptoms of TB.

Kolnara Block in Rayagada district		
SC	**Village**	**Population**
Kolnara	Dhepaguda	186
Suri	Pongili	194
Bada Khilpadar	Radhangi	520
Rivalkona	Binisipur	336
G Sesikhal	Badapadu	143
G Sesikhal	Randikona	74
Theruballi	Geraput	401
Theruballi	Therubali	1978
Ellangapadu	D.P.Camp	1196
Mukundpur	Dhamuniguda	103
Bankili	Bhagudi	328
Bankili	Padmapur	255
Bhaoimoda	Rampur	271
Padratola	Jhiliguda	163
Padratola	Pandratola	542
Panichatra	Panichatra	804
Panichatra	Kutrupadu	155
Total	**17**	**7649**

Koksara Block in Kalahandi district		
SC	**Village**	**Population**
Kendudongri	boradonga	1921
Kendudongri	sunamal	1796
Chikli	chikli	1960
gotomunda	sarsamal&jharbondh	2386
Total	**4**	**8063**

Study villages finalized by cluster sampling and selected villages as a sampling unit and in consultation with District TB Officer of both district.

Study questionnaire has been prepared.

Study has been initiated.

9. A Prospective Study to determine the Incidence of Tuberculosis among Patients with Type 2 Diabetes Mellitus (Multi-centric).

Principal Investigator : Dr. T Hussain
Co-Investigators : Dr Makesh Kumar, Dr S Swaminathan, NIRT, Chennai
Duration : Three Years
Funding : Extramural (ICMR)

Project has been initiated with intramural fund

Objectives :

Primary Objectives :

1. To determine the incidence of TB among people with Type 2 Diabetes Mellitus.

Secondary Objectives :

1. To identify risk factors for TB among people with Type 2 Diabetes Mellitus
2. To study the diagnostic accuracy of sputum smear for diagnosis of TB among people with Type 2 Diabetes Mellitus.
3. To correlate clinical and radiographic features of TB with severity of Type 2 Diabetes.

Background :

The Diabetes epidemic has a major impact on the epidemiologic dynamics of tuberculosis and poses several challenges to control of TB in a resource-poor country like India. Diabetes / TB burden can be brought under control by timely diagnosis of TB among Diabetics by intensified case finding, by adequate and effective treatment of detected cases and preventive therapy. Given the serious threat posed by the Diabetes epidemic on control of TB, and the current gaps in knowledge related to diagnosis, prevention and treatment of TB among Diabetes persons in the Indian population, it is proposed to conduct this cohort study. In this study, we plan to enrol diabetic patients and screen them for signs and symptoms of TB. An early diagnosis, appropriate treatment and adequate care are the need of the hour for Diabetic patients. With interventions like counselling of at-risk patients and family members of known Diabetics, regular monitoring through SMBG (self monitoring of blood glucose), proper nutrition and exercise, one can delay the progression of complications like neuropathy, nephropathy, CVD, retinopathies, urinary tract infections, "diabetic foot" or infectious cellulitis, etc. Current TB control measures focus on the prompt detection and carefully monitored treatment of those with infectious forms of the disease to prevent further transmission of the bacteria. In populations, where diabetes affects the risk of tuberculosis to a greater extent, TB control might benefit from active case finding and treatment of dormant TB in people with diabetes and from increased efforts to diagnose and treat diabetes. The growing problem of Diabetes in India could make prevention of tuberculosis in this high-risk group a priority area in the years to come. Studies are needed to document TB incidence in this population and then evaluate different TB prevention strategies.

1. Prevalence & correlates of Metabolic Syndrome, Pre-Diabetes and Type 2 Diabetes mellitus among adults in an urban area of Bhubaneswar- a hospital based study

Indians are more prone for Metabolic syndrome (MS), Pre-Diabetes and Type 2 Diabetes mellitus (T2DM) than almost any other population in the world. MS, Pre-Diabetes and T2DM are major health problems associated with significant mortality and morbidity but can be prevented or delayed through lifestyle interventions. This study was carried out to determine the prevalence and correlates of MS, pre-diabetes and T2DM among adults in an urban area of Bhubaneswar. 105 adults were enrolled, after

obtaining pre-informed consent. The plasma and sera samples were used for various investigations namely random blood sugar, Liver function tests, blood urea, serum creatinine and lipid profile. The socio-demographic and anthropometric profile, reasons for stress, complications at the time of testing, habits, etc. were correlated with Blood pressure, fasting blood sugar levels and lipid profile at the time testing. Out of 105, 45 were having MS, 10 were pre-Diabetic and 70 were Diabetic. Further, 71 were males whereas 34 were females. About 32% people in the age range of 41-50 years are pre-disposed to develop MS, pre-diabetes and T2DM. Adults with regular job were prone to MS, pre-Diabetes and T2DM. With regard to lifestyle, 22% of adults with MS, 30% with pre-Diabetes and 52% with T2DM were sedentary. Most of them were having a genetic pre-disposition for developing T2DM as they had at least 1 of their family member with the similar condition. Stress appeared to be higher among the adults with MS and pre-diabetes. 20% adults with pre-diabetes had the habit of smoking whereas 44% with MS and 30% with pre-diabetes indulged in binge drinking. 89% of the adults with MS were overweight 36% of adults with MS, 30% with pre-Diabetes and 48% of the T2DM were having hypertension. Majority of adults with MS were having high cholesterol, high triglycerides and high BP (blood pressure). Random blood sugar levels were high among 56% of adults with MS, 30% with pre-Diabetes and 62% with T2DM. *4 were having extra-pulmonary TB* (TB Spine) and were undergoing treatment for the same. Only 1 was having arthritis and spondylitis. Further, about *30% adults were not aware that they were having anyone of the conditions, viz., MS, pre-diabetes and T2DM.* Those diagnosed with MS, pre-diabetes and T2DM were referred to the local Diabetes Clinic for further treatment, care and management. The increased risk of the 3 entities among adults warrants specific preventive action. All of them were counselled for adopting healthy life style changes, in terms of diet restriction, regular exercise and adherence to treatment. An early diagnosis, appropriate treatment and adequate care form the basis for control of Diabetes, Stroke and heart disease which would otherwise lead to various complications like neuropathy, nephropathy, CVD, blurred vision, etc. We, therefore, feel that monitoring adults above 40 years of age, irrespective of their complaints and symptoms, at regular intervals, for Blood pressure, Blood sugar and Lipid profile would go a long way in early detection of the MS, pre-diabetes and T2DM conditions. This is the first report of MS, pre-Diabetes and T2DM among adults in this region of the country.

2. *Prevalence and correlates of Type 2 Diabetes mellitus among TB patients.* Preliminary work has been initiated.

In this study, we determined the prevalence of diabetes and pre-diabetes among 220 patients with active TB disease, registered in RNTCP, attending the OPDs of 3 primary care hospitals, namely Bhubaneswar, Cuttack and Nayagarh. These patients were enrolled after taking informed consent. The socio-demographic data and anthropometric profile like age, gender, marital status, literacy status, profession, Life style (sedentary & active), Blood sugar levels, Complications at the time of testing, Habits (alcohol / smoking), etc. were documented and analyzed in the context of symptoms at the time testing. The medical history information namely, Type of TB, index of sputum positivity, status and period of treatment, were collected using standardised questionnaires. They were screened for random blood sugar (RBS) levels by finger prick method using a Glucometer. Of these, 121 (55%) were having high random blood sugar levels, suggesting impaired glycemia. These patients were advised to return to the clinic next day and / or next visit in a fasting state and

a repeat test was carried out for fasting blood sugar (FBS) levels. This test was used to differentiate pre-Diabetes and Diabetes.

Out of 220 TB patients, 24% (54) patients were having pre-diabetes, 14% (32) patients were having diabetes, and 1% (3) patients were found to be HIV-positive.

Socio-demographic profile:

Gender - In all, 74% (163) male and 25% (57) female TB patients were enrolled in the study and screened for RBS and FBS levels. Of these, 83% (45) males were having pre-Diabetes and 84% (27) were having Diabetes whereas 16% (9) females were having pre-Diabetes and 15% (5) were having Diabetes. This shows that more males were having either pre-Diabetes or Diabetes. *Age group* - 20% (11) people in the age group 31-45 years and 27% (15) in the age group 46-60 years, were having pre-Diabetes while 51% (28) people in the age group 31-45 years and 31% (10) in the age group 46-60 years, were having Type 2 Diabetes Mellitus. This shows that T2DM is more common with advancing age. *Marital status* - Among the TB patients included in the study, 81% (180) were married and 18% (40) were unmarried. Further, 85% (46) and 96% (31) of married TB patients were having pre-Diabetes and Diabetes, respectively. Among the unmarried TB patients, the prevalence of pre-Diabetes was 14% (8) and that of Diabetes was 3% (1).*Literacy Status* - 44% (97) of TB patients were illiterate and 45% (101) had studied upto high school. Among the illiterate TB patients, 37% (20) were having pre-Diabetes and 43% (14) were having Diabetes. 46% and 43% of those having less education were pre-Diabetic and Diabetic, respectively. Illiteracy is a known risk factor for TB and this might be contributing to pre-Diabetes and Diabetes as well. *Occupation* - 3% (8) of these patients were unemployed, 8% (19) had regular job, 20% (44) were labourers, 13% (30) had business, 24% (53) were either students or had no specified jobs and 14% (32) were farmers. Patients having no specified jobs had either pre-diabetes 25% (14) or Diabetes 18% (6). *Habits* - 37% (82) of TB patients were having habits of all types, namely chewing gutka / tobacco, smoking and alcohol. 19% (43) were addicted to chewing gutka / tobacco, 9% (21) were smokers and about 6% (13) consumed alcohol regularly. 27% (61) of TB patients did not have any such addictive habits. 38% (21) pre-Diabetics and 43% (14) of diabetics were having all types of habits. More diabetic patients were found to be addicted to either smoking, drinking alcohol and / or chewing tobacco / gutka which is a known risk factor for Diabetes. *Life Style* - Among 220 TB patients, 55% (122) were sedentary whereas 44% (98) were active. Further, 57% (31) and 65% (21) of sedentary patients, i.e., those not involved in activity were having pre-Diabetes and Diabetes, respectively. Prevalence of Diabetes was low, i.e., 34% (11) among those patients having an active life style. Being sedentary is also a risk factor for developing Diabetes. *Locality* - In our study, it was observed that 35% (78) of TB patients attending the RNTCP centers were from urban slums, 20% (46) were from housing colonies and 43% (96) patients were from rural areas. 42% (23) of these patients residing in urban slums were having pre-diabetes and 31% (10) were having diabetes. The prevalence of both the conditions is also high among those living in rural areas with pre-diabetes being 37% (20) and Diabetes being 40% (13). Overcrowding, poor living conditions as well as unhygienic environment are associated with both TB and Diabetes.

Clinical Profile:

Type of TB - 90% (198) of TB patients were having pulmonary whereas 10% (22) were having extra-pulmonary TB. Further, 88% (48) of pulmonary TB patients were having pre-Diabetes whereas 87% (28) were having Diabetes. *Bacillary Index* - with

reference to bacillary index, 40%, 24% and 17% of TB patients were having sputum status of 1+, 2+, 3+ sputum positivity, respectively and 18.18% had no bacillus in their sputum. 40% (13) of Diabetic patients and 38% (21) of pre-Diabetic patients were having 1+ sputum status. This shows that more patients with pre-Diabetes and Diabetes were having 1+ sputum positivity.

Category of treatment - Out of 220 TB patients, 55% (122) were of Cat I type and 22% (49) were Cat-II type. 55% (30) of Pre-Diabetes patients and 71% (23) of Diabetes patients were taking Cat I. These results indicate that more patients with pre-Diabetes and Diabetes were taking Cat I type of treatment. There is very less variation in RBG (Random blood glucose) and FBG (Fasting blood glucose) levels among pre-Diabetics, the range being 40-70 whereas the variation of RBG / FBG were very high, being 100 - 150, among patients with Diabetes. This indicates that the blood glucose levels show more fluctuations before and after intake of food among Diabetics. Our results show that out of 220 TB patients, 57% (31) were not knowing that they were pre-Diabetic and 43% (14) were not aware that they were having Diabetes. Only 42% (23) were knowing that they were having problems such as excessive thirst, excessive hunger and increased urination along with increased weight, central obesity, fatigue, high blood pressure, etc. but not aware that these could be the signs of pre-diabetes. 56% (18) were having Diabetes, established previously and were taking treatment for the same. This is very serious as T2DM is a silent progressive disease and in the absence of appropriate treatment and life style changes, it would lead to debilitating complications. All of them were referred to a Diabetic clinic for further treatment, care and management. Screening for DM in TB patients could improve DM case detection and early treatment and indirectly lead to better TB-specific treatment outcomes.

10. Effect of maternal filarial infection on infant's immune response following childhood vaccination.

Principal Investigator : Dr. A. K. Satapathy
Co-Investigators : Dr. S. K. Kar
Dr. M. S. Bal, Dr B. Dwibedi
Duration : 3 Years
Funding : Extramural (ICMR)

Objectives

1. To assess the extent to which maternal filarial infection influences the B-cells response (antibody isotype) to TT and BCG in children.
2. To find out whether maternal filarial infection modulate cellular and cytokine production to childhood vaccination in children.

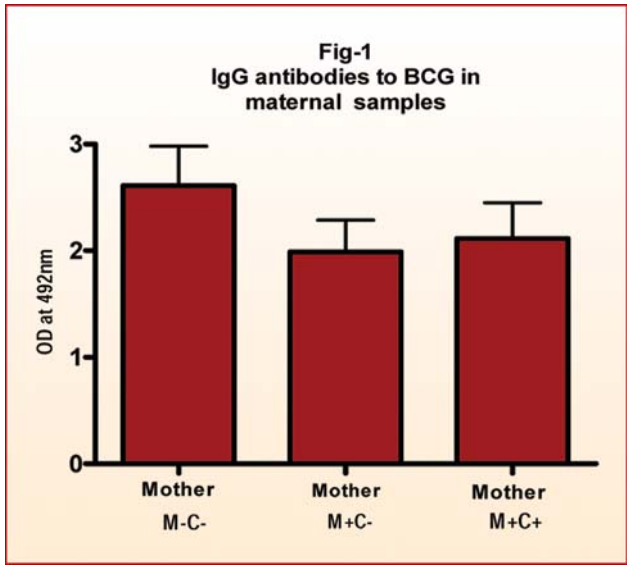
Background

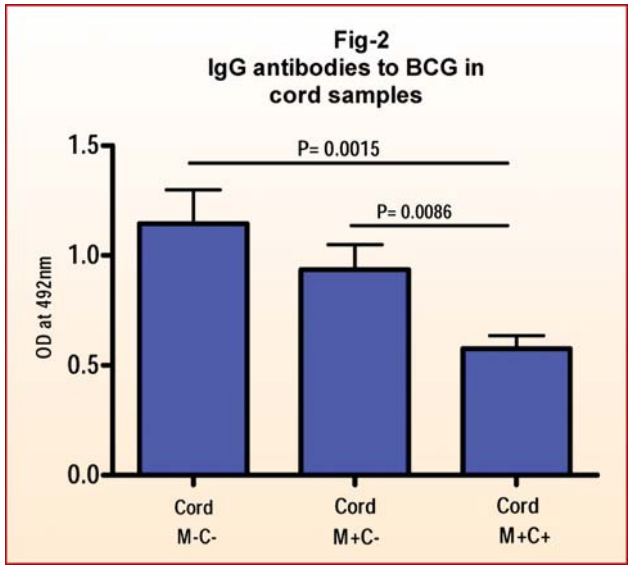
Distinct immunologic responses to filarial antigens in vitro have been observed among the various clinical groups. Individuals with asymptomatic microfilariemia or even circulating filarial antigen have been shown to display weak antigen specific T-cell proliferative response, reduced production of IFN-g and elicit strong type 2 regulatory immune responses. It is well established that some parasitic infections lead to an impaired ability to produce antibodies against T-cell-dependent antigens. Clinical evidence suggests that chronic antenatal parasitic infection can significantly alter infant immune responses to standard childhood vaccinations. Helminthic infection in human can influence vaccine effectiveness by modulating host immune response particularly when Th1 dependent cellular responses are required. Maternal parasitic infection such as Schistosomiasis and malaria during the period of gestation can suppress an infant's later immune responses to standard childhood vaccination. Although several reports suggest that helminthic

infection induced impaired cellular and humoral responses to non parasite vaccine antigens, there has been no work done examining response to bystander suppression associated with filarial infection. Therefore an attempt has been made to evaluate the extent to which maternal filarial infection influences the humoral and cellular responses induced in children born to such mothers to TT and BCG.

Progress of Work :

Approved by ICMR for funding. Fund not received. Project has been initiated with intramural fund (Sample are being collected from1) Mother infected with active filarial infection and their cord blood positive for CFA 2) Mother positive for CFA and their newborn negative for CFA 3) Both mother and their new born negative for CFA. IgG antibodies to BCG were quantified by enzyme linked immunosorbent assay in all three groups of mother and their respective cord blood samples.No significant difference was observed in the Ig G antibodies levels to BCG among filarial infected and uninfected mothers as known in fig-1 Ig G antibodies to BCG in children born from filarial infected and uninfected mothers are shown in Fig-2. Decreased levels of Ig G antibodies to BCG were detected in cord samples born from infected mothers compared to uninfected mothers indicating down regulation of IgG response in cord blood of infected mothers.





11. Biology and Bionomics of malaria vectors in Kalahandi district, Odisha for malaria stratification with a view to develop situation specific malaria control strategy.

Principal Investigator	:	Dr Rupenangshu Ku. Hazra
Co-PI	:	Dr Namita Mohapatra
Collaborators	:	State Health Department
Duration	:	3 years
Funding	:	The project approved by the ICMR Task force and awaiting for funds. Work started by seed money

Objectives:

- To assess the pattern of disease transmission and distribution of vectors at Sub centre levels in Kalahandi district.
- To study the bionomics and vectorial attributes of malaria vectors for malaria stratification.

- Develop situation specific vector control strategy to curtail the transmission of malaria.

Introduction

Kalahandi district covering an area of 7920 km^2 is situated in south western region of Odisha **between Latitude** 19º 3' N to 21º 5' N and **Longitude** 82º 30' E to 83º 74' E. The state Government data shows that the deaths due to malaria are increasing in Kalahandi from 2008 to 2012i.e. from 4 in 2008 to 13 in 2012. In spite of the control efforts malaria still persist though showed reduction. Therefore, a study is proposed to be undertaken in some selected areas to assess the cause of persistence of malaria pattern of disease transmission, bionomics and vectorial attributes of vector and to develop an appropriate demonstrable vector control strategy for further transfer of technology.

Preliminary work done so far:

- The study was undertaken in three sub Centres out of four sub centres under one CHC. Five villages were selected in each sub Centre for routine entomological studies. In these villages routine collection of mosquitoes by different methods was done in three seasons and their vectorial attributes and bionomics will be studied in different seasons. The seasonal mosquito collection data of Dhansuli and Sastiguda Subcentre revealed that *Anopheles culicifacies* was prevalent through out the year with peak density in summer season. In Icchapur Subcentre *An.culicifacies* density was found higher in summer and rainy seasons. *An. annularis* is found with maximum density during winter season in foothill, *An. culicifacies* is found with maximum density during winter season in riverrine and *An. fluviatilis* is found with maximum density during winter in hilltop ecotype.

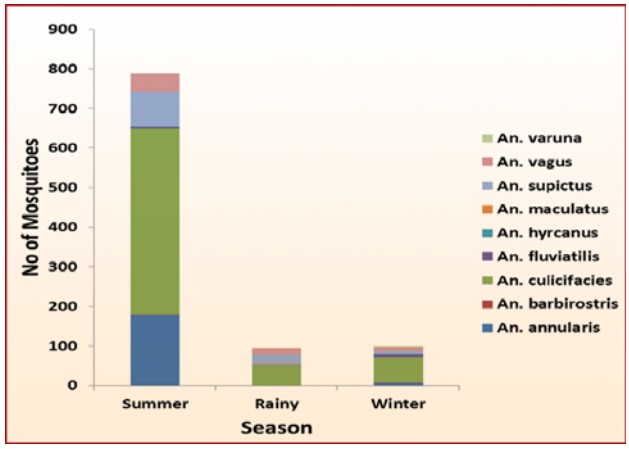


Fig. 1 Seasonal data for mosquito collection from Dhansuli sub centre under Jaipatna PHC during 2013-2014**.**

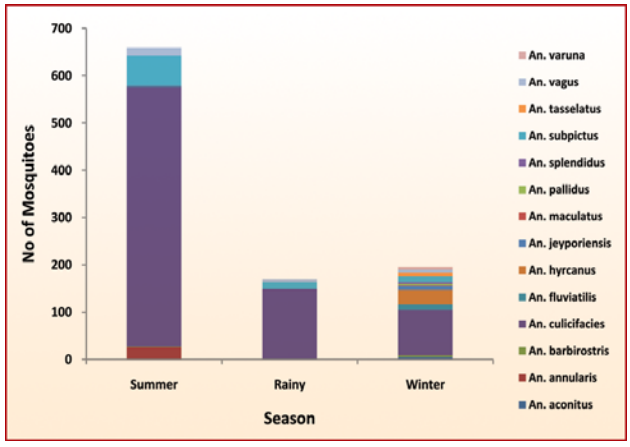


Fig. 2 Seasonal data for mosquito collection from Sastiguda sub centre under Jaipatna PHC during 2013-2014.

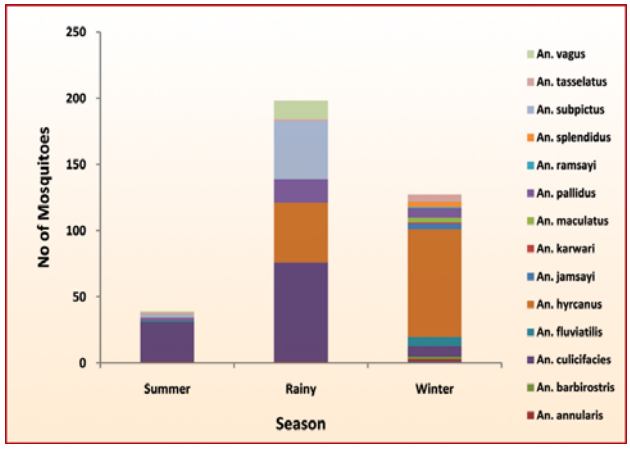


Fig. 3 Seasonal data for mosquito collection from Ichhapur sub centre under Jaipatna PHC during 2013-2014.

12. Surveillance Activity of Viral Diagnostic Laboratory. (GRADE I)

Principal Investigator : Dr.B.Dwibedi
Co-Investigators : Dr.R.K.Hazra, Miss S.Dixit
Co-coordinator : Dr.S.K. Kar
Starting Date : March 2010
Closing Date : March 2015
Duration : Five years
Funding : Extramural (ICMR)

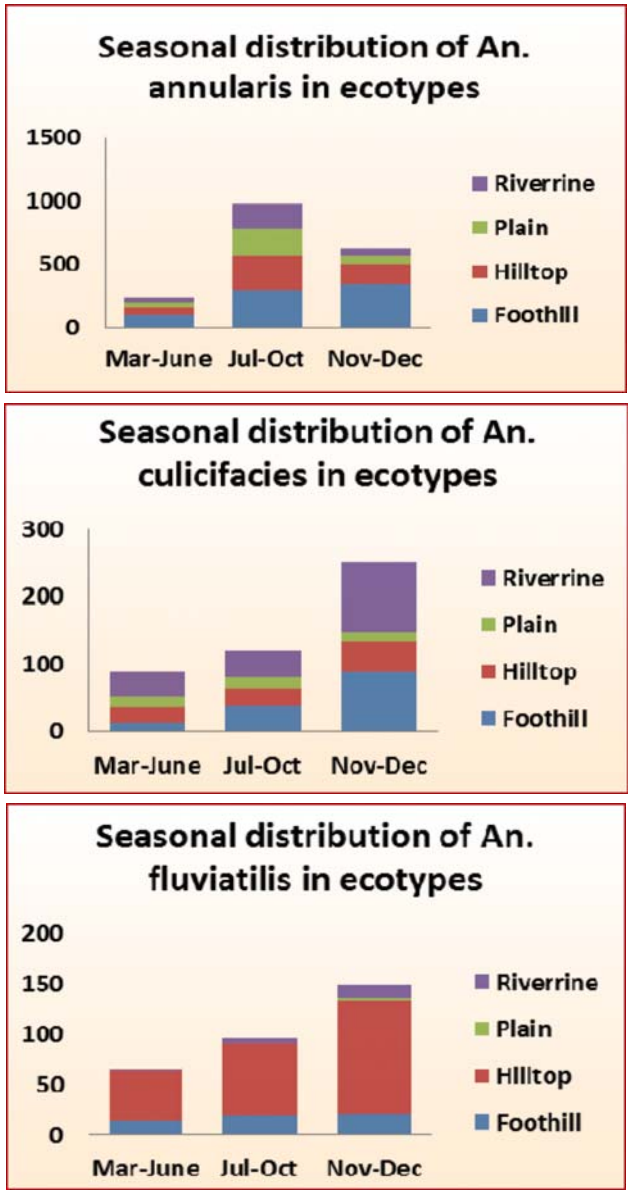


Fig. 4 Seasonal distribution of three species in the four ecotypes of Kalahandi district.

Background

It was aimed at creating regional facilities for laboratory diagnosis, surveillance and research in viral diseases of importance.

The proposal involves construction of the laboratory, procurement of equipments, training of involved staff, establishment of laboratory techniques like serology, molecular diagnosis, sequence analysis, cell culture and isolation etc. in phased manner. Outbreak investigation, surveillance during epidemic and inter epidemic period and sporadic disease diagnosis of important viral diseases of the region and emerging infections would be carried out which will be strengthened by research subsequently.

Objective

To establish a grade I diagnostic virology laboratory for investigation of viral diseases of regional and national importance including but not limited to

1. **Viruses transmitted by respiratory route**: Measles, Rubella, Mumps, Influenza viruses (A, B and C), Parainfluenza virus, Adenoviruses, Respiratory Syncytial Virus, Rhinoviruses, Coronaviruses.
2. **Viruses transmitted by intestinal route**: Poliovirus, Hepatitis A & E viruses, Rotavirus, Astroviruses, Calciviruses, Norwalk viruses, Enteroviruses.
3. **Vector Borne Disease Viruses**: Dengue, Chikungunya, Japanese encephalitis, West Nile, Kyasanur Forest Disease, Chandipura viruses.
4. **Zoonotic viruses**: Rabies virus, Nipah virus, Hanta virus.
5. **Viruses transmitted by body fluids**: HIV, Hepatitis B and C viruses.

Progress of work

Current strength of laboratory diagnosis

Laboratory investigation of different viruses coming under broad divisions like respiratory viruses,

Table 1: Laboratory investigation established for different group of viruses.

Group/Test	Serology	PCR/ RT PCR	Realtime PCR	Sequencing & Genotyping	Cell Culture	IFA
Respiratory viruses	Measles, Rubella, Mumps Varicella	Parainfluenza 1,2,3, HMPV, Measles, Rubella & Varicella Zoster	Influenza A, H1N1 & B, Para influenza, Corona, Rhino, RSV A &B, Adeno, Entero, Parecho, Boca & Measles,	H1N1 & Flu - A	Measles Varicella	Varicella
Enteric viruses	Rota, Adeno, Astro, Noro, Entero, Coxackie, HAV &HEV	Rota, Entero	Rota, Adeno, Astro, Noro, Entero, Coxackie	Rota Entero	Rota	
Vector Borne Disease Viruses	Dengue, JE, Westnile & Chikunguniya	Dengue, JE, Westnile, Chikunguniya & Chandipura	Dengue	Dengue, JE, & Chikunguniya	Dengue JE	Dengue
Viruses transmitted by body fluids & others	Hepatitis B,C,D CMV, EBV HPV Adeno	HBV, HCV, Parvo B19	CMV, EBV HHV 6 and 7 and Parvo B 19	HBV HCV		
Neurotropic viruses	HSV-1,HSV-II , Entero	HSV-1,HSV-II , Entero		HSV	HSV	HSV

enteric viruses and Arbo viruses were standardized and undertaken with quality control. Different viruses diagnosed following different sero molecular test are presented in the table below.

Man power training

Project staffs were given training on molecular techniques and epidemiology during the period. One Scientist (non medical) had undergone short training on Rota virus molecular typing at CMC, Vellore. Two scientists (Medical) were trained on GCP methodology of outbreak investigation and epidemiology of viral disease at NIE, Chennai.

Networking for obtaining information, Sample receipt, Investigation and reporting

Network with the State Health Department, Medical Colleges and Hospitals of the region for

referral investigation of sporadic cases and outbreak investigations was further strengthened through frequent interaction. Outbreak investigations are being undertaken along with the state health team upon getting information through media or health system. Immediate report is being communicated to the concerned hospital within 3 days of sample receipt.

I. Sample collection

A. *sporadic/ referred cases*

Sporadic / referral cases were received by the centre from different hospitals from different districts. From Jan to Nov 2014, 4145 number of samples were received by lab from different Govt. and Private hospitals from Odisha. The details of sample receipt from hospitals has been given in below mentioned tables. (1 and 2)

B. *Outbreak investigations*

Outbreaks were reported from different parts of the state and investigation was done in collaboration with the state health department. The team collected the samples both by direct investigation and through collection by the primary health centre / district hospital of the concerned area. Outbreaks of Measles, Varicella, Hepatitis and JE virus infection has been investigated with immediate reporting to State Health Department with recommendations for timely prevention. The outbreaks included 2 outbreaks of jaundice, 1 chikenpox 1 measles, and 1 Encephalitis (Follow up) covering 4 districts. The outbreak investigations conducted along with State Health Departments during this period were summarized below. (Table 3)

The major outbreaks investigated are summarized below

- *Outbreak investigation for Measles (Jan, 2014)*

(i) A research team from Regional Medical Research Centre (RMRC), Bhubaneswar comprising of research scientist, research assistant and technician had visited Banspal Block of Keonjhar district basing on information received from IDSP Cell, Govt of Odisha to investigate cases of fever with rash on 17th Jan 2013. The team visited 3 areas i.e. OMC Colony, Hating and Suakati of Bansapal Block having population of 457,950 and

Table 1: Sample received from different hospitals and medical colleges.

Source	Total No. of Subjects Investigated	Subjects investigated in 2014 (Jan-Nov)
SCBMCH, Cuttack	2811	374
SVPPGIP, Cuttack	3613	1643
SUM Hospital, BBSR	6069	340
Capital & Municipality Hospital, BBSR	3366	729
Other hospitals and PHC	3892	502
Outbreak investigation	2718	557
Total	**22469**	**4145**

Table 2: Suspected viral diseases investigated.

Sl. No.	Suspected Diseases	Total No. of samples	Samples investigated in 2014(Jan-Nov)
1	Chikungunya	831	64
2	Dengue	3592	275
3	AES including JE	4339	1898
4	Respiratory infection	841	204
5	Swine Flu	621	17
6	Measles	625	117
7	Chickenpox	373	43
8	Mumps	36	13
9	Rubella	1332	210
10	Viral Hepatitis	6352	642
11	Human Papilloma Virus	264	115
12	Viral diarrhea	3708	375
13	Coxackie	43	13
14	HFMD	32	6
15	CMV	277	245
16	EBV	184	160
17	Parvo B 19	44	32
18	Herpes	23	2

520 respectively. Total no of households surveyed were 25, 15 and 22 In OMC Colony, Hating and Suakati respectively. 25 blood samples were collected including cases and house hold contacts. Laboratory Investigation has revealed 13 (52%) out of the 25 blood samples were positive for Measles IgM through ELISA. Among the positives 13 (52%) were symptomatic with fever/ rash and 9(36%) were asymptomatic 8 (32%) were history of house hold contact. Among the positive cases 84% were having the history of vaccination.

(ii) During the same period 5 samples were received from CDMO, Keonjhar with fever and rash. The samples were tested for Measles IgM antibody and all were found to be positive.

- Outbreak investigation for Measles (March, 2014)

  During 28th March 2014 VDL team investigated the Nuagaon village of Samatarapur, Bhubaneswar after receiving the information from various news papers. After informing CMO, Capital hospital, Bhubaneswar, the team reached the affected area The total population of the village is 1200. The team surveyed 85 house hold. During the survey 35 patients were clinically examined that included house hold contacts, neighbours and isolated cases. A total of 35 blood samples were collected. The clinical features observed were fever of mild to moderate grade, maculo- papular rash and upper respiratory tract symptoms including cough and pharyngitis. The nutritional status was also assessed by taking parameters like weight and height of affected population. Vaccination coverage was found to be 100%. No vitamin A supplementation was given to the children in that area. The samples were tested for Measles IgM and in 4 children antibody (including 3 cases and one house hold contact) were detected.

- *Follow up survey for JE (March 2014)*

  A follow up survey was conducted in Swam Patana munda sahi and Jhalia pada village of Patna block and Dehuri Pusi village of Ghatagaon block from 28th Feb to 2nd March, 2014 to investigate sequel of previously reported

Table 3: Outbreak investigation report: Suspected disease, affected area and lab investigation result.

Outbreaks	Districts	No of villages	No of samples	Sero markers	Positive/No tested
Measles	Keonjhar Khurda	5	66	Measles IgM	22/66
JE	Keonjhar	5	89	JE IgM Dengue IgM HSV 1 HSV 2 Entero	0/21 6/21 9/21 4/21 0/21
Chickenpox	Ganjam Dhenkanal	4	42	Varicella IgM	19/42
Jaundice	Khurda Cuttack	7	115	HAV IgM HEV IgM	0/5 58/115
Dengue	Ganjam	1	10	Dengue IgM	0/10
Entero	Cuttack	1	2	Entero IgM	0/2
AES	Malkangiri	6	34	Dengue IgM JE IgM JE PCR Entero PCR	10/1 6/0 6/0 6/0

encephalitis cases (JE). No neurological complication was observed among the previously dignosed encephalitis cases and house hold contacts. Thirty nine blood samples were collected which include 6 paired sera which will be processed for JE IgG.

- *Chickenpox outbreak investigation in Ganjam(April 2014)*

An outbreak investigation was conducted in Mahadeipur, Samantarapur and Burupada village of Patrapur block in Ganjam district on 1/04/2014 for suspected fever and rash cases. A total of 38 blood samples were collected and tested for Varicella IgM. 17 out of 38 nos of samples were positive for Varicella IgM antibody. Among the positives 16 were symptomatics where as one was healthy contacts.

Table 4: Result of investigation on hospital based cases.

Sl No.	Virus	IgM +ve (%)	Antigen +ve (%)	PCR +ve (%)	Real time PCR +ve (%)
1.	HSV I	112/31		664/29	
2.	HSV II	112/10			
3.	JE Virus	80/1			
4.	Dengue	102/31	25/3		
5.	CHIK	6/0			
6.	Rota		96/46		
7.	Astro				
8.	Adeno(Enteric)		3/1		
9.	Coxackie	13/1			
10.	Measles	101/34		12/1	
11.	Varicella	39/17		6/4	
12.	Mumps	5/3			
13.	Rubella	160/1		1/1	
14.	Entero	74/3			
15.	HAV	97/27		22/14	
16.	HEV	175/23			
17.	HBV		227/96	35/13	
18.	HCV	216/6		11/0	
19.	HDV				
20.	HPV	15/2(13.3)		60/24	
21.	EBV	137/4			
22.	CMV	61/10		31/3	
23.	Adeno				61/3
24.	Influenza A(FluA)				61/1
25.	FluA(H1N1)				61/0
26.	Flu B				61/0
27.	HMPV A/B				61/0
28.	Rhino				61/3
29.	Para influenza 1				61/0
30.	Para influenza 2				61/0
31.	Para influenza 3				61/4
32.	Para influenza 4				61/1
33.	RSV A/B				61/0
34.	Corona viruses (Cor63,Cor229,Cor43, HKU1)				61/5
35.	Parecho virus				61/0
36.	Boca Virus(HBoV)				61/3
37.	EV				61/0

- *Investigation following JE outbreak in Keonjhar (April, 2014)*

  A follow up survey was conducted in Swam Patana munda sahi and Jhalia pada village of Patna block and Dehuri Pusi village of Ghatagaon block, Keonjhar district from 22nd - 25th April,2014 to investigate reported AES outbreak. 50 blood samples were collected out of which 21 samples were tested for JE, Dngue, HSV 1 and 2, Entero IgM. All tested samples were negative for JE and Entero IgM. 6 samples were positive for Dengue IgM, 9 for HSV 1 and 4 for HSV 2 IgM. Three samples were common for Dengue, HSV 1 and 2.

- *Investigation of Jaundice outbreak (May,14)*

  An outbreak investigation was conducted in Sunderpada, Bhubaneswar on 22nd and 23rd May 2014 for suspected Jaundice cases. A total of 37 blood samples were collected and tested for Hepatitis E IgM. 10 out of 37 no of samples were positive for HEV IgM antibody. Among the positives 6 were symptomatic where as one were healthy contacts.

- An outbreak investigation was conducted in Balipatna, Bhubaneswar on 25.5.14 for suspected Jaundice cases. A total of 19 blood samples were collected and tested for Hepatitis E IgM. Two samples were positive for HEV IgM antibody.

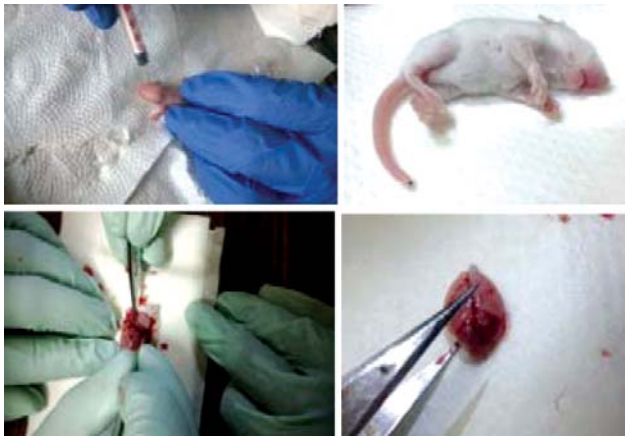
A. Investigation on Hospital based recruited cases

Result of investigation as summarized in the following Table 4.

B. New Technique standardized

Culture of JEV through intracerebral inoculation of JEV culture (supplied from KGMU Lucknow) in one day Suckling Mice was done. Viral titer increased through serial passages. The infected mouse brain dissected, antigen and RNA extracted from the dissected tissue. Antigen quoted in the flat micro titer plate. Positive control sera was confirmed by the NIV Kit and result interpreted found to be positive.

PCR standardized with the JEV culture samples. PCR was targeted to conserved region of Envelope protein of JEV through nested PCR amplification.



Future Plan

The above activities will continue for the next year. Cell culture will be established for Measles, Rubella, JE Viruses and any unknown etiology. Sequencing and typing will be established for HPV (presently only 16 and 18 is done), HEV, HAV and Influenza H1N1 viruses. Cloning will be done for Rubella, HSV, and HPV. Out break investigation will continue along with sporadic case investigation with collaborations of state hospitals. Network will be further strengthened to cover southern and western parts of Odisha. Focus will be given to

- Characterization of Rota virus strains in Odisha based on VP8 region which can serve a possible additional candidate for new Rota virus vaccine.
- Estimation of proportion of 6-11 yr girl and pregnant women susceptible to Rubella and mumps virus infection
- Development of Diagnostic kits for ELISA (JE, Dengue)
- Development of diagnostic kit for viral load estimation through RealTime PCR (HBV,HCV)
- Development of multiplex PCR for diagnosis of respiratory viruses.
- Networking for quality control for district head quarter hospitals for ELISA based diagnostic tests.

13. Effectiveness of diet and lifestyle intervention through Information Education Communication (IEC) tools with Angan Wadi Centres (AWCs) as the centre of knowledge dissemination for hypertension (including hypercholesterolemia and diabetes) risk reduction – a cluster randomised controlled trial.

Investigators : Dr. S. K. Kar
Dr. B. Dwibedi
Chief District Medical Officer, Kalahandi, Odisha
Start Date : Dec. 2013
Closing Date : Dec. 2016
Duration : 3 Years

General Objective:

To assess the effectiveness of diet and lifestyle intervention through Information Education Communication (IEC) tools with Angan Wadi Centres (AWCs) as the centre of knowledge dissemination for Non-communicable Disease risk reduction.

Specific Objectives:

Primary objective:

- To assess the effectiveness of intense versus usual IEC interventions on diet and lifestyle modifications delivered by existing community-level health-workers (ASHA or equivalent) on population level blood pressure.

Secondary objectives:

- To assess the operational feasibility of integrating NCD risk reduction in community health programs through existing community level healthcare volunteers such as ASHA or equivalent.
- To assess the usefulness of trained healthcare workers to affect changes in dietary fat, fibre and salt, tobacco and alcohol consumption and increasing physical activity.
- To assess the efficacy of these interventions to evaluate changes in lipid levels and glycemia.

Progress of work:

- **Recruitment of project staff and man power development**: The project staffs were recruited and were trained at Centre for chronic disease control, New Delhi on protocol and study procedures.
- **Purchase of equipments**: Equipments to be used in the project work were purchased.
- **Odia translation of consent form and questionnaire**: The Consent form was prepared in the local language. Similarly, the questionnaires to be used in the study were translated to odia language for easy understanding of the local people.
- **Identification of control and intervention cluster**: For implementation of the project, control and intervention clusters were identified.

Intervention Cluster	Cluster ID
Sargiguda	01
Mahima	02
Khaliabhata	03
Urladani	04
Dedar	05
Mukundpur	06
Control Cluster	**Cluster ID**
Budfuria	07
Badabasul	08
Kandagarh	09
Dangapata	10
Pabli	11
Hirapur	12

- **Listing of households for baseline population survey: By Door to door visit, household**

enumeration, census of population and village map prepared.

Control Cluster

Cluster id and name	Number of households	No.Of Members >=18 years in HH
Cluster 01 Sargiguda	148	397
Cluster 02 Mahima	161	447
Cluster 03 Khaliabhata	160	428
Cluster 04 Urladani	117	285
Cluster 05 Dedar	93	229
Cluster 06 Mukundpur	107	264
Total clusters (06)	786	2050

Intervention Cluster

Cluster id and name	Number of households	No.Of Members >=18 years in HH
Cluster 07 Sargiguda	160	425
Cluster 08 Mahima	113	326
Cluster 09 Khaliabhata	119	302
Cluster 10 Urladani	139	358
Cluster 11 Dedar	102	276
Cluster 12 Mukundpur	108	323
Total clusters (06)	741	2010

Baseline assessment:

Baseline Assessment of the study population was carried out by personal interview. The following informations were collected; Personal details, socio-economic and other core demographic details, Knowledge, attitude, practice in relation to NCD risk factors, Tobacco use frequency and pattern, Alcohol consumption, General health questionnaire to assess the physical activity and mental health status of the individual.

Anthropometry measurement was performed on individuals and following data were recorded; Weight, Height, Waist circumference, Body fat percentage. Blood pressure examination was done using automatic BP measuring instrument 3 times and average taken as per protocol.

Coverage:

Demographic details of 911 individuals from four clusters have been completed. The following table shows the demographic details:

Age Group	Male	Female	Total
18-30	117	156	273
31-45	155	167	322
46-60	108	117	225
>60	43	48	91
Total	**423**	**488**	**911**

Prevalence of Hypertension in study group:

Among these 911 individuals' studied, 13.61% of individuals were found to be hypertensive. A person is said to be hypertensive if he has SBPe"140 or DBPe"90 or both. Blood pressure was measured thrice at intervals and average was taken.

Age group	Male	Female	Total
18-30	9.40%	5.13%	6.96%
31-45	10.97%	13.17%	12.11%
46-60	16.67%	21.37%	19.11%
>60	20.93%	29.17%	25.27%
Total	**13.00%**	**14.14%**	**13.61%**

BMI and Hypertension:

Body Mass Index (BMI) among study group:

An interim analysis was done to observe relationship between BMI and hypertension among the studied population and it was found that hypertension is more prevalent among people with BMI e"25.

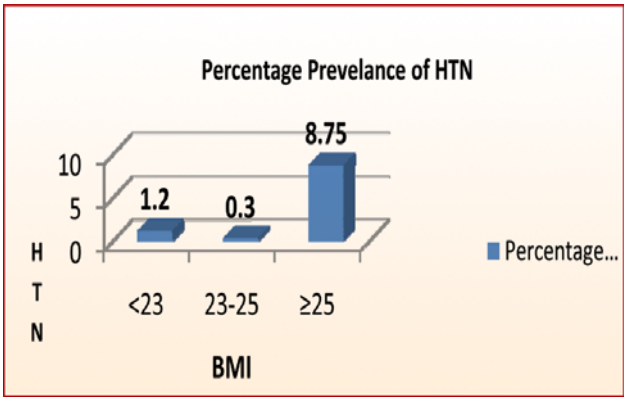
Age group	BMI < 23			BMI 23-25			BMI ≥ 25		
	Male	Female	Total(%)	Male	Female	Total(%)	Male	Female	Total (%)
18-30	107	146	253 (30.48)	02	05	07 (18.91)	08	05	13 (29.54)
31-45	138	151	289 (34.81)	11	10	21 (56.75)	06	06	12 (27.27)
46-60	103	101	204 (24.57)	01	07	08 (21.62)	04	09	13 (29.54)
>60	39	45	84 (10.12)	01	00	01 (2.70)	03	03	06 (13.63)
Total	387	443	830 (91.2)	15	22	37 (4.0)	21	23	44 (04.8%)

Distribution of various physical parameters: Related to CVD risk

Age Group	Mean body fat percentage			Mean bone mass			Mean body muscle mass			Mean visceral fat percentage		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total
18-30	13.6	23.2	19.1	40.9	30.7	35.0	2.27	1.65	1.91	2.30	1.71	1.96
31-45	14.7	23.9	19.5	39.7	30.0	34.7	2.22	1.70	1.95	3.58	2.49	3.02
46-60	14.9	23.9	19.5	41.6	30.1	35.7	2.14	1.62	1.87	4.45	3.0	3.70
>60	14.0	23.5	19.0	36.2	39.1	32.5	2.03	1.59	1.80	5.30	3.19	4.2
Total	14.4	23.7	19.3	40.2	30.2	34.8	2.19	1.65	1.90	3.63	2.42	2.98

Community risk behavior of Hypertension:

Of the studied population various community risk behaviour of hypertension was looked for and tabulated below..



Future Plan:

The study will continue to complete the base line assessment and specific strategy development for intervention. Then intervention will be implemented to the local health system and evaluated.

Base Line Survey:

Parameters	Prevalence (%)
Tobacco Consumption	58.33
Alcohol Consumption	39.21
Low Physical Activity (sedentary)	42.85
Iodine Salt Intake (≥ 5 gm per day)	88.1
Iodine Salt Intake (≥10 gm per day)	46.42

1. Raygada Project: Improvement health of under five health children in Rayagada district

Principle investigator : Dr SK Kar, Scientist-G & Director

Co-Investigator(s) : Dr MR Ranjit, Scientist-E, Dr B Dwibedi, Dr NM Somalkar, Dr G Bulliya, Dr A Mohaptra, Dr AS Kerketta, Dr BB Pal, Dr AS Acharya

iii) Collaborator (s) : Dr NK Das DHS, Odisha, Dr AK Padhi CDMO, Dr P Subudhi, DSMO, Raygada

Duration : 03 Years

Funding : Extramural

Aims:

To improve the health parameters of under 5 children with special reference to reduction of morbidity and mortality (prenatal, perinatal, childhood mortality and MMR) through health system strengthening using innovative approaches

Objectives

(i) To train and improve the skills of grass root level health workers for early detection, management and referral of diarrheal diseases, acute respiratory infections (pneumonia), malaria, measles, diphtheria and under-nutrition

(ii) To develop communication strategy for effective delivery of family and community interventions

(iii) To educate and create awareness among the community on the preventive health care related to diarrheal diseases, acute respiratory infections, malaria, diphtheria, measles and under-nutrition through innovative approach and increase health seeking behaviour

(iv) To strengthen the maternal and child health services (antenatal checkups, institutional delivery, puerperal care and neonatal care) undertaken by the programme (RCH III).

(v) To strengthen health management information system (HMIS) for effective monitoring and evaluation.

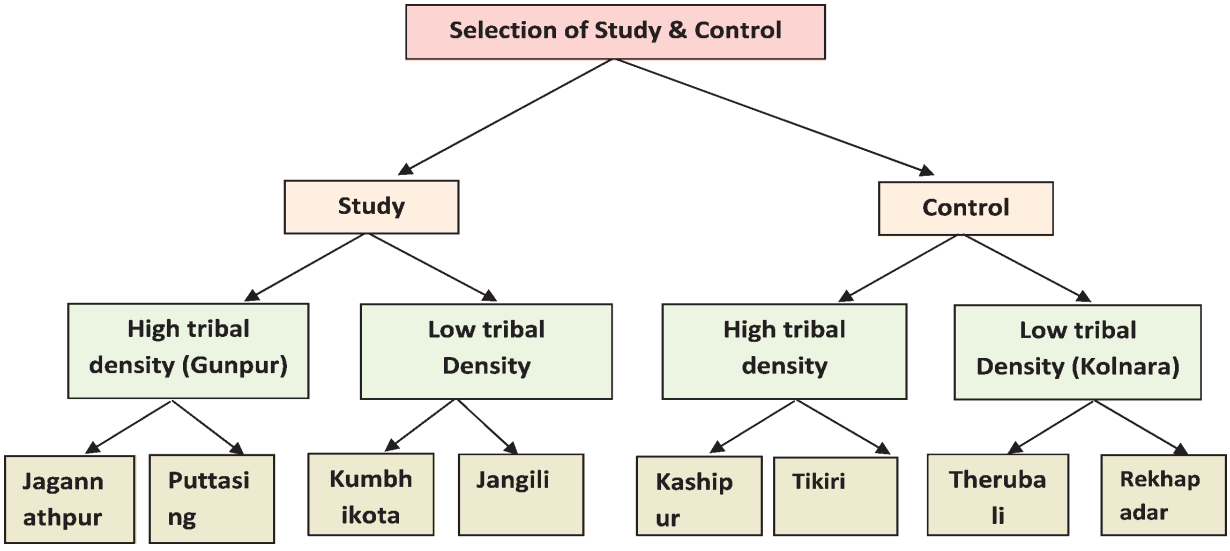
(vi) To improve the procurement and flow of logistics relevant to MCH services.

Progress:

SAC Approval: **Obtained**

Ethical Committee approval: Ethical clearance obtained from Human Ethical Committee of RMRC Bhubaneswar.

Proposed Plan of Action:



Selection of sector for study and control:

As per discussion with CDMO, Rayagada, sectors for study and control area in Rayagad district are as follows:

Study area (High tribal density)				
Block	Sector	SC	No. of Village	Population
Gunpur	Jagganathpur	4	81	14952
	Putasingh	5	80	21782
Study area (Low tribal density)				
Rayagada	Kumbhikota	7	100	26858
	Jangili	8	74	28429
Total		24	335	92021
Control area (High tribal density)				
Kashipur	Kashipur	6	66	26118
	Tikiri	9	101	39229
Control area (Low tribal density)				
Kolanara	Therubali	6	60	22319
	Rekhapadar	4	49	11598
Total		25	276	99264

Findings:

Baseline survey started from September 2014 including:

- Collection of village level information on availability of health facility.
- Census enumeration.
- Health status of Under five children including Immunization and Anthropometry.
- Health status of ANC and PNC.

Table 1: Age and sex wise distribution of population in 11 villages.

Age and sex wise distribution of study population in 11 villages						
Age group	M	%	F	%	Total	%
0-5	172	11.62	166	13.56	338	12.50
6-15	347	23.45	284	23.20	631	23.34
16-30	421	28.45	379	30.96	800	29.59
31-45	326	22.03	237	19.36	563	20.82
46-60	162	10.95	118	9.64	280	10.36
>60	52	3.51	40	3.27	92	3.40
Total	1480	54.73	1224	45.27	2704	100.00

- Knowledge and Training need assessment of ASHA / AWW / ANM on IMNCI.

Common source of drinking water facility in studied villages were tube well while there was no toilet facility available in any household in studied villages.

Treatment seeking behaviour revealed government health facility most commonly preferred for general and under five illnesses.

Use of bed net was used only in 39% children in last night during survey.

H / o of measles was done in 4% children in last 3 months.

Institutional delivery was found 56% among PNC.

Table 2: Age and sex wise distribution of under five children.

Age and sex wise distribution of Under five children						
Age group (Yrs)	M	%	F	%	Total	%
0-28 days	0	0.00	01	0.73	01	0.38
29 days-1 year	32	25.60	41	29.93	73	27.86
1year-3 year	56	44.80	56	40.88	112	42.75
3 year-5 year	37	29.60	39	28.47	76	29.01
Total	125	47.71	137	52.29	262	100.00

Table 3: Distribution of various under five morbidities according to age and sex.

MORBIDITY	0-28 days		29 days-1 year		1-3 year		3 -5 year		Total	
	M	F	M	F	M	F	M	F	n=262	%
DIARRHOEA	0	0	2	2	6	5	1	3	19	33.93
FEVER	0	0	3	2	6	9	3	4	27	48.21
COUGH	0	0	1	1	3	4	1	0	10	17.86
OTHER ILLNESSES	0	0	0	0	0	0	0	0	0	0.00
TOTAL	0	0	6	5	15	18	5	7	56	21.37

2. Kalahandi Project: Improvement of health status of under 5 health children in Kalahandi.

Principal Investigator : Dr. S. K. Kar
Co-PI : Dr. B. Dwibedi, Dr. M. R. Ranjit, Dr. NM Somalkar, Dr. G. Bhulliya, Dr. A. Mohapatra, Dr. A. S. Kerketta, Dr. B. B. Pal, Dr. A. S. Acharya
Collaborators : Dr. NK. Das, DHS, Odisha,CDMO
Duration : 3 years
Funding : ICMR

Aims:

To improve the health parameters of under 5 children with special reference to reduction of morbidity and mortality (prenatal,perinatal ,childhood mortality and MMR) through health system strengthening using innovative approaches.

Objectives:

i. To train and improve the skills of grass root level health workers for early detection, management and referral of diarrheal diseases, acute respiratory infections(pneumonia), malaria, measles, diphtheria and under nutrition.

ii. To develop communication strategy for effective delivery of family and community interventions

iii. To educate and create awareness among the community on the preventive health care related to diarrheal diseases, acute respiratory infections, malaria diphtheria, measles and under nutrition through innovative approach and increase health seeking behaviour.

iv. To strengthen the maternal and childhealth services (antenatal checkups,institutional delivery puerperal care and neonatal care) undertaken by the programme (RCHIII).

v. To strengthen health management information system (HMIS) for effective monitoring and evaluation.

vi. To improve the procurement and flow of logistic relevant to MCH services

Progress

SAC Approval: Obtained

Ethical Committee approval: Ethical clearance obtained from Human Ethical Committee of RMRC Bhubaneswar.

Selection of Sector for study and control:

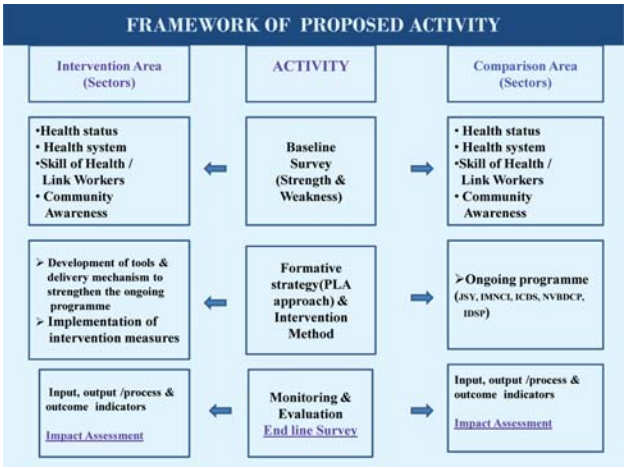
Recruitment of project staff: June, 2014

(Scientist 'B' Medical, Research Assistant, DEO, Lab Technician)

Training of project staff: July, 2014

Census, household questionnaire survey, anthrpometry measurements, FGD and coordination, Laboratory Investigation (bacterial culture, serology).

Proposed Plan of action



Findings:

Baseline survey started from August 2014 including:

- Collection of village level information on availability of health facility
- Census enumeration
- Health status of Under five children including Immunization and Anthropometry
- Health status of ANC and PNC
- Knowledge and Training need assessment of ASHA / AWW / ANM on IMNCI.

Common source of drinking water facility in studied villages were tube well while there was no toilet facility available in any household in studied villages.

Treatment seeking behaviour revealed government health facility most commonly preferred for general and under five illnesses.

As per discussion with CDMO Kalahandi sectors for study and control area in Kalahandi district are as follows:

Study area and population:

Study area (Low tribal density)				
Block	**Sector**	**SC**	**No. of Village**	**Population**
KESINGA	UTKELA	3	26	**14952**
	KANDEL	5	40	**21782**
Study area (High tribal density)				
TH.RAMPUR	GUNPUR	7	117	**26858**
	MAHULPATNA	4	59	**28429**
Control area (High tribal density)				
LANJIGARH	BISWANATPUR	6	126	**26118**
	LANJIGARH	6	85	**39229**
Control area (Low tribal density)				
JUNAGARH	CHILIGUDA	5	52	**22319**
	NANDOL	5	48	**11598**
Grand Total		**41**	**553**	**191285**

3. Transfer of a molecular technology from laboratory based study to field for mapping of malaria vectors and their vectorial attributes.

Principal Investigator : Dr. R. K. Hazra
Co-Investigator : Dr. N. Mahapatra (Collaborator from VCRC, Pondicherry NIMR, Rourkela and Director of Health Services, Govt. Of Odisha)
Starting Date : March 2012
Closing Date : March 2015
Duration : 3 years
Funding : Extramural (ICMR, Translational Research)

Objectives

(a) To standardize methodologies for different parameters for vector mapping.

(b) To test the standardized methodologies from Phase-1 (Phase-1 objectives are given below)

(c) To map the vectors at PHC level and identify operational issues.

(d) To prepare a vector map at district level.

(e) Transfer the laboratory based technology to field.

Area & Period of Operation

Total Population: 1,573,054 (2011)
CHC: 10
DHQ Hospital: 1
Sub centres: 213

Strategies will be implemented:
Two sectors of Thuamal Rampur CHC (High Tribal Density: > 60%)
Two sectors of Kesinga (Low Tribal Density: < 40 %)
No strategy will be implemented for comparison
Two sectors of Langigarh CHC (High Tribal Density: > 60%)
Two sectors Junagarh CHC (Low Tribal Density: < 40%)

Table-1. Age and sex wise distribution of population in 6 villages.

Age and sex wise distribution of population (Covered Villages-6)						
Age group	M	%	F	%	Total	%
0-5	115	4.52	122	4.80	0.57	9.32
6-15	248	9.76	264	10.39	1.24	20.14
16-30	323	12.71	318	12.51	1.50	25.22
31-45	250	9.83	236	9.28	1.11	19.12
46-60	166	6.53	159	6.25	0.75	12.79
>60	214	8.42	127	5.00	0.60	13.41
Total	1316	51.77	1226	48.23	2542	100.00

Table-2. Age and sex wise distribution of under 5 children.

Age and sex wise distribution of Under five children						
Age group	M	%	F	%	Total	%
0-28 days	5	2.1	4	1.6	9	3.7
29 days-1 year	12	5.0	17	7.1	29	12.2
1year-3 year	46	19.4	61	25.7	107	45.1
3 year-5 year	54	22.7	38	16.0	92	38.8
Total	117	49.3	120	50.6	237	100

Background

In Orissa, there is lack of trained entomologist for control programme. Molecular methods for species identification have received great attention in recent years. Recently, we developed a molecular tool for identification of main malaria vectors of Odisha. The method was also developed for simultaneous detection of species complex, their human blood indices and presence of sporozoites from single

Table 3. Health status of Under 5 children in Kalahandi District.

HEALTH STATUS OF UNDER FIVE CHILDREN IN KALAHANDI DISTRICT										
Village Name	Total Children		Diarrhoea		Fever		Cough		Malaria	
	Male	Female	Male %	Female %	Male %	Female %	Male %	Female %	Male %	Female %
Kokmunda	25	41	36.00	19.51	44.00	48.78	16.00	31.71	24.00	24.39
Themra	35	33	8.57	6.06	54.29	42.42	54.29	33.33	5.71	9.09
Kantamal_I	33	37	6.06	16.22	36.36	35.14	27.27	45.95	9.09	2.70
Kantamal_II	14	14	14.29	14.29	35.71	57.14	35.71	35.71	21.43	7.14
Kokodmal	29	24	3.45	8.33	34.48	37.50	31.03	25.00	6.90	12.50
Total	136	149	12.50	13.42	41.91	42.95	33.82	34.89	11.76	12.08

mosquito. Basing on this technique developed by our centre the total screening of Anopheline vectors can be undertaken in Odisha.Therefore, the present study will be undertaken to screen the malaria vectors from different parts of Odisha and their vectorial attributes.

PHASE 2: Vector mapping at PHC level (Duration: 12 months 01.10.13-28.02.14).

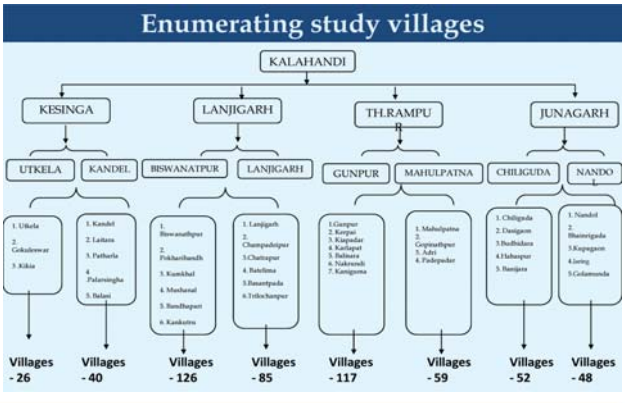
I. (a) Study area: One PHC representing all ecotypes with the report of insecticide resistance from each of the three districts.

(b) Five villages x 3 eco-types in each PHC.

II.(a) Training of state health personnel (MTS/ Health workers) on mosquito collection, preservation and transport of samples.

(b) Training of State and District VBD Consultants on species identification, insecticide susceptibility tests and PCR assays.

(c) Assessment of the technical efficiency of the trained state health personnel and reorientation, if necessary.



III. Field implementation

1. Mosquito collection:

a) Hand catch: in randomly selected 3 HD and 3 CS in each selected village.

b) Outdoor resting collection – hand catch: One hour in each village.

c) Four traps per village (two each in HD and CS).

d) Frequency of mosquito collection: One collection in each season (mid of the season).

2. PCR assay for vector species composition, human blood meal identification, vector infection (sporozoite / oocyst positive) and insecticide resistance.

IV. Data analysis and report preparation

Progress of work

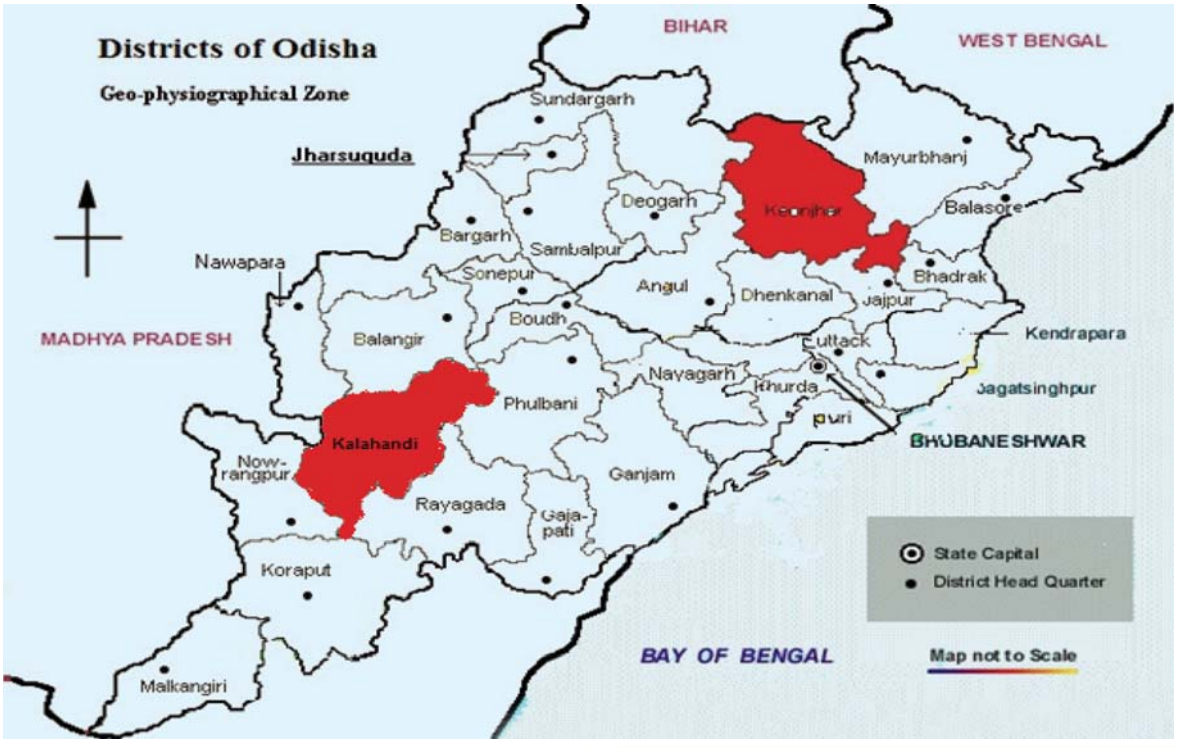
1. Study Area

In phase- I, Keonjhar district had been selected as the study area where collection methodologies were standardized for four ecotypes i.e. plain, riverine, foot hill and hill top. Jhumpura PHC had been selected for the study because of its high endemicity. From each ecotype collections had been made from one village. In the phase-Istudy; several standardizations had been made for ecotype collection, habitat of collection, frequency of collection, collecting device and preservation and transportation methods of field collected mosquito samples.

In the phase-II, one more district i.e. Kalahandi has been selected for further validation study. One CHC i.e.Jaipatna has been selected.According to the Epidemiological data of NVBDCP, Odisha- 2012 it has an API of 8.45. From this CHC five villages representing all ecotypes were selected for collection of mosquitoes and validation of the protocol. Sixtime collections i.e. twice in each season, have been made in the year 2013-14.

2. Training

Training and validation work has been initiated where the state govt. staffs,state entomologists, state entomological consultants, Entomologist IDSP, ICs, Technicians, Consultant vector control, were trained on various entomological methods viz. collection, preservation, transportation of mosquito samples along with molecular techniques.



The training programme was held at Kalahandi Filed Unit from 10th-13th January 2014.The District VBD consultant and Malaria Technical Supervisors were trained by the RMRC Entomological staffs.

Assessment of technical efficiency

For assessing the technical efficiency of trained personnel of state, lab based trainings has been given for rapid DNA isolation and PCR along with gel running and gel documentation on 20th-22rd April, 2013, 5th -7th May, 2013, 19th - 22nd November, 2013 and 12th - 15th December,2013. Optimization of the PCR assay for slot I was completed on 10th-14th February 2014.

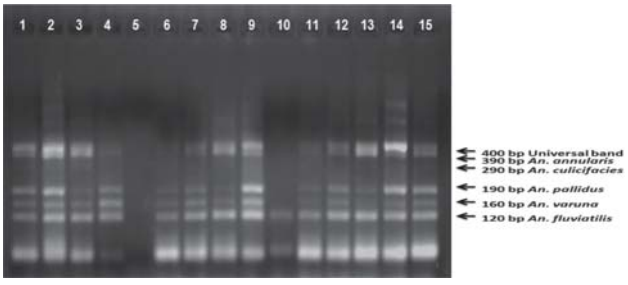


Fig 2: Lane 1-15 showing different species composition in pools. (Gel picture of the PCR by State staff at RMRC).

3. Field Implementation (Mosquito Collection)

Place of collection

Resting adult mosquitoes were collected twice from each village in each season i.e. Summer, Rainy and Winter during dawn (05:00am to07:00am) and dusk (06:00 to 08:00pm) hours. Mosquito collection was done both in indoor and outdoor. Indoor collection was donefrom randomly selected three human dwellings andcattle shades in each village. Collections were also carried out from mixed dwelling. Outdoor collection wasmade from tree holes and shelters.Collection was done by both light trap and hand catch using oral aspirator. In each village four traps were placed i.e. 2 in HD and 2 in CS throughout the study period. Collections were also made from four ecotypes i.e. Plain, Riverine, Foothill and Hilltop, where the prevalence of individual Anophelines were also studied.

Frequency of collection:

Mosquitoes were collected by trained Insect collectors, Technicians and Research Assistantsalong with State health workers for 4-5 days twice in every season during the study period.

Morphological identification:

The adult *Anopheles* mosquitoes were identified taxonomically based on their distinguishing features like head, thorax, wings, legs, halters, segmentation of body, size of proboscis, sitting posture and habits by following the key developed by Barraud 1934 (The fauna of British India). A key for morphological identification of *Anopheles* species was developed by Entomological division of RMRC and followed during the study.The adult mosquitoes were also identified using molecular methods.

Mosquito Preservation and processing:

After identification each individual specimen was dissected in two parts, the head thoracic part was kept in one micro centrifuge tube and rest of the body in another. These different parts were subjected for DNA isolation. The head thoracic part was processed further for sporozoite detection and abdomen part was processed for blood meal detection and for species identification. Out of the two methods fortransportation and preservation of mosquito samples, **one method i.e. mosquito drying chamber was standardized and adopted.**

Entomological collection

A total of **5995** of Anopheles mosquitoes were collected during the study period. *Anopheles* mosquitoes belonging to different species like *An.annularis, An.aconitus, An.barbirostris, An.culicifacies, An.fluviatilis, An.hyrcanus, An.jamsayi, An.jeyporiensis, An.karwari, An. maculatus, An.pallidus, An.ramsayi, An.splendidus, An.stephensi, An.subpictus, An. superpictus, An.tassellatus, An.vagus* **and** *An.varuna*were collected during the survey.

As per the standardized collection method, higher densities of mosquitoes were collected by hand catch using oral aspirator (**84.1%**) in comparison to light traps (**15.9%**).Though some rare species have been collected using ligh.

Primer designing for inclusion of non-vectors in

Table 1: Comparison of collection methodologies.

Species	Uv Trap	%	Hand Catch	%	Total
An.annularis	212	22.25	1631	32.35	**1843**
An. aconitus	0	0.00	5	0.10	**5**
An. barbirostris	43	4.51	339	6.72	**382**
An. culicifacies	58	6.09	400	7.93	**458**
An. fluviatilis	31	3.25	280	5.55	**311**
An. hyrcanus	89	9.34	504	10.00	**593**
An. jamsayi	6	0.63	2	0.04	**8**
An. jeyporiensis	2	0.21	0	0.00	**2**
An. karwari	0	0.00	1	0.02	**1**
An. maculatus	2	0.21	1	0.02	**3**
An. pallidus	189	19.83	737	14.62	**926**
An. ramsayi	1	0.10	0	0.00	**1**
An. splendidus	12	1.26	29	0.58	**41**
An. stephensi	7	0.73	1	0.02	**8**
An. subpictus	98	10.28	375	7.44	**473**
An. superpictus	0	0.00	2	0.04	**2**
An. tassellatus	4	0.42	3	0.06	**7**
An. vagus	123	12.91	467	9.26	**590**
An. varuna	76	7.97	265	5.26	**341**
TOTAL	**953(15.9)**		**5042 (84.1)**		**5995**

multiplex PCR has been completed. Primer designing and standardization for inclusion of *Plasmodium vivax,Kdr*(insecticide resistance) andblood mealin multiplex PCR is also completed.

Major Achievements

1. A simple, rapid and very efficient protocol for DNA isolation from mosquito species was established in our laboratory.
2. A workshop was organized for five days where different concept regarding the use of different molecular technique and transfer these technique to field was taught. These aspects would be useful in rapid monitoring and evaluation of malaria of an area. The participants were from entomologists of health department Govt.of Odisha and scientists and research staffs from five field units of NIMR.
3. One paper communicated for publication.

Applied value of the project

1. Translation of this method will help the State Government for entomological evaluation of malaria control activity which will provide them accurate scenario of different intervention activities. As on today the Govt. of Odisha do not adopt entomological tool for evaluation purpose and they evaluate and monitor different intervention activities like IRS, supply of LLIN and use of ACT for malaria positive cases from reduction of cases from which the degree of transmission cannot be assessed. Our method will help them to assess the prevalence of vector and their vectorial attributes before and after the intervention. From which they can know the degree of transmissionby adopting the intervention and further it will help the decision maker to adopt appropriate measure for controlling the malaria.

Table 2: Hand catch collectionsof *Anopheles*from indoor and outdoor habitats.

	INDOOR						OUTDOOR				
Species	**CS**	**%**	**HD**	**%**	**MD**	**%**	**Shelters**	**%**	**Tree holes**	**%**	**Total**
An.annularis	829	33.01	136	28.87	634	33.94	8	10.96	24	20.17	**1450**
An. aconitus	1	0.04	0	0.00	4	0.21	0	0.00	0	0.00	**285**
An. barbirostris	165	6.57	29	6.16	124	6.64	17	23.29	4	3.36	**647**
An. culicifacies	135	5.38	61	12.95	197	10.55	0	0.00	7	5.88	**1469**
An. fluviatilis	102	4.06	31	6.58	142	7.60	1	1.37	4	3.36	**547**
An. hyrcanus	292	11.63	56	11.89	122	6.53	13	17.81	21	17.65	**99**
An. jamsayi	0	0.00	0	0.00	2	0.11	0	0.00	0	0.00	**4**
An. jeyporiensis	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**126**
An. karwari	0	0.00	0	0.00	1	0.05	0	0.00	0	0.00	**599**
An. maculatus	0	0.00	0	0.00	1	0.05	0	0.00	0	0.00	**3**
An. pallidus	412	16.41	79	16.77	198	10.60	21	28.77	27	22.69	**3**
An. ramsayi	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	**1**
An. splendidus	9	0.36	3	0.64	17	0.91	0	0.00	0	0.00	**15**
An. stephensi	0	0.00	1	0.21	0	0.00	0	0.00	0	0.00	**1**
An. subpictus	246	9.80	14	2.97	112	6.00	0	0.00	3	2.52	**5**
An. superpictus	0	0.00	0	0.00	2	0.11	0	0.00	0	0.00	**35**
An. tassellatus	0	0.00	0	0.00	3	0.16	0	0.00	0	0.00	**6**
An. vagus	222	8.84	23	4.88	186	9.96	11	15.07	25	21.01	**372**
An. varuna	98	3.90	38	8.07	123	6.58	2	2.74	4	3.36	**1**
Total	**2511(49.8%)**		**471 (9.34%)**		**1868(37.05%)**		**73 (1.45%)**		**119(2.36%)**		**5042**

Similarly from the total hand catch, **Indoor** collection contributed to**96.19%** of the collection whereas outdoor contributed to only **3.81% of collection.** From the indoor collection **cattle shade** contributed highestcollection (**49.8%**) followed by mixed dwelling. Very few numbers of mosquitoes were collected from Human dwelling.

Table 3: Percent composition of Anopheles mosquitoes in four ecotypes of Jhumpura PHC:

Species	**Plain**		**Riverine**		**Foot hill**		**Hill top**		**Total**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
An.annularis	488	21.91	278	25.09	745	42.02	332	37.43	1843	30.74
An. aconitus	1	0.04	0	0.00	4	0.23	0	0.00	5	0.08
An. barbirostris	183	8.22	67	6.05	97	5.47	35	3.95	382	6.37
An. culicifacies	96	8.04	179	8.66	138	7.78	45	5.07	458	7.64
An. fluviatilis	21	0.94	2	0.18	232	13.09	56	6.31	311	5.19
An. hyrcanus	318	14.28	87	7.85	143	8.07	45	5.07	593	9.89
An. jamsayi	0	0.00	0	0.00	3	0.17	5	0.56	8	0.13
An. jeyporiensis	0	0.00	0	0.00	2	0.11	0	0.00	2	0.03
An. karwari	0	0.00	0	0.00	1	0.06	0	0.00	1	0.02
An. maculatus	0	0.00	0	0.00	0	0.00	3	0.34	3	0.05
An. pallidus	398	17.87	211	19.04	134	7.56	183	20.63	926	15.45
An. ramsayi	0	0.00	0	0.00	0	0.00	1	0.11	1	0.02
An. splendidus	0	0.00	0	0.00	32	1.80	9	1.01	41	0.68
An. stephensi	5	0.22	2	0.18	1	0.06	0	0.00	8	0.13
An. subpictus	278	12.48	110	9.93	53	2.99	32	3.61	473	7.89
An. superpictus	2	0.09	0	0.00	0	0.00	0	0.00	2	0.03
An. tassellatus	1	0.04	0	0.00	4	0.23	2	0.23	7	0.12
An. vagus	308	13.83	201	18.14	38	2.14	43	4.85	590	9.84
An. varuna	45	2.02	54	4.87	146	8.23	96	10.82	341	5.69
Total	**2144 (35.8%)**		**1191 (19.9%)**		**1773 (29.6%)**		**887 (14.8%)**		**5995**	

From the ecotype collection highest density was observed in plain followed by foothill, riverine and hilltop. Prevalence of vector species was highest in foothill followed by riverine *An. culicifacies*was prevalent in all the ecotypes but with higher density from riverine whereas *An.fluviatilis*was found with maximum density from hill top.

Table 4: Seasonal prevalence of Anopheles mosquitoes.

Species	Summer (March - June)		Rainy (July- Oct)		Winter (Nov- Feb)	
	No.	%	No.	%	No.	%
An.annularis	234	19.80	976	34.13	633	32.43
An. aconitus	0	0.00	2	0.07	3	0.15
An. barbirostris	67	5.67	196	6.85	119	6.10
An. culicifacies	88	7.45	119	4.16	251	12.86
An. fluviatilis	66	5.58	92	3.22	153	7.84
An. hyrcanus	82	6.94	313	10.94	198	10.14
An. jamsayi	0	0.00	6	0.21	2	0.10
An. jeyporiensis	0	0.00	0	0.00	2	0.10
An. karwari	0	0.00	1	0.03	0	0.00
An. maculatus	0	0.00	0	0.00	3	0.15
An. pallidus	92	7.78	583	20.38	251	12.86
An. ramsayi	0	0.00	1	0.03	0	0.00
An. splendidus	0	0.00	9	0.31	32	1.64
An. stephensi	0	0.00	1	0.03	7	0.36
An. subpictus	232	19.63	163	5.70	78	4.00
An. superpictus	2	0.17	0	0.00	0	0.00
An. tassellatus	0	0.00	0	0.00	7	0.36
An. vagus	286	24.20	212	7.41	92	4.71
An. varuna	33	2.79	187	6.50	121	6.20
Total	**1182(19.7%)**		**2861(47.7%)**		**1952(32.6%)**	

Season wise analysis of the mosquito's collection indicated highest density (**47.7%**) in **Monsoon** while lowest during **Summer (19.7%)**. Winter collection contributed to**32.6%** of the total collection.

PCR Assay: Multiplex PCR

Area	No.of pools	pool size	Pool +ve for *Pf*	Pool +ve for Human blood
Plain	107	10	0	49
Riverine	60	10	0	11
Foot hill	89	10	1	29
Hill top	44	10	1	09

Table: 5 Result of multiplex PCR assay showing mosquito pools positive for *Pf* and human blood.

2. As Kalahandi is a highly malariogenic area, the current protocol can be applied for successful control strategy at this district. RMRC has an established field unit at Bhawanipatna headquarters where the assays would be performed.
3. This technique will help in total screening of Anophelines vectors of Odishawith their vectorial attributes. Therefore this study will be under taken to screen the malaria vectors from different parts of Odisha, which will be helpful for the operation group to take proper control measures.
4. Pool based screening for species identification, blood meal identification and vector incrimination will reduce time and man power in monitoring and evaluation programme.
5. Pooling of mosquito samples and extraction of their genomic DNA can be performed either by grouping the mosquitoes irrespective of their species composition or by extracting the DNA from individual mosquito and pulling them. But

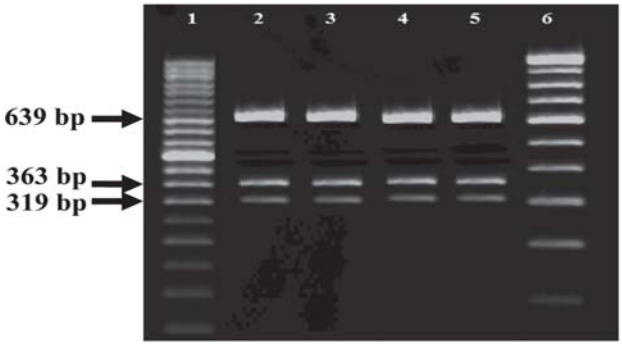


Fig 3: Ethidium bromide stained gel-electrophoresis of Multiplex PCR PCR products for detection of host specific blood meal. Lane 2-5: Homo sapiens (Human) (639bp), Capra hircus (Goat) (363 bp), Bosprimigineius (Cow) (319 bp). Lane 1: 50 bp DNA ladder, Lane 6: 100 bp DNA ladder.

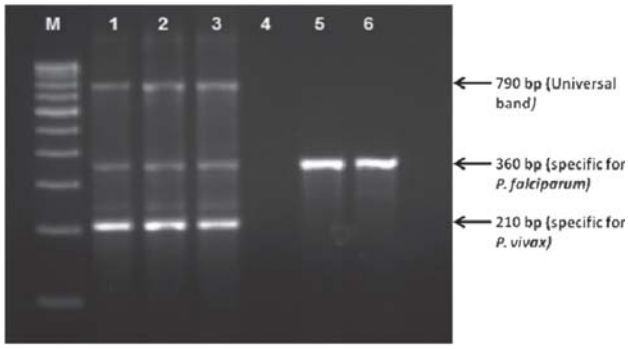


Fig 4 : Ethidium bromide stained gel-electrophoresis of Multiplex PCR products for detection of Plasmodium species. Lane 1-3: P. falciparum (360bp), P. vivax (210bp). Lane 5-6: P. falciparum (360bp). Lane M: 100 bp DNA ladder.

Validation of the assay: The establishment of Laboratory and validation is in progress in other Institutes like in NIMR, Rourkela and NIMR, Delhi. Validation completed in the host Institute in other laboratories (Molecular Biology and Microbiology Division). External validation by state govt. entomology unit has been initiated.

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Initiatives & Developments under RMRC's translational Research project

The study entitled "Transfer of a molecular technique from lab based study to field for mapping of malaria vectors and their vectorial attributes" under the translational research project of RMRC, Bhubaneswar is being carried out under the joint investigation of the Medical Entomology Division of RMRC and the State Entomology wing of NVBDCP, Odisha. **This study is all about the validation of a laboratory technique for assaying field collected samples for identification of vector species and their vectorial attributes.**

Under this initiative, following activities have been conducted so far:

Details of the activities conducted	Participating personnel/Organization	Date
A 5-days workshop and hands on training on molecular techniques for identification of vectors and their vectorial attributes - Theory & Practical	State Entomologist from GoO, State Consultant for Entomology (NVBDCP), IDSP-Entomologist (SSU-Odisha), Consultant, Vector Control (ROH & FW, GoI)	4th -8th February, 2013
Standardization of the protocol for rapid isolation of DNA from mosquitoes	State Entomology wing	17th-19th April, 2013 6th -8th May, 2013 19th - 22nd November, 2013
Standardization of protocol for PCR, gel running and gel documentation		10th -13th December,2013
A training was organized at Kalahandi Filed Unit on "field collection, preservation & transportation of mosquitoes & molecular techniques and its scope for mapping of vectors"	District VBD Consultant & Malaria Technical Supervisors	10th-13th January, 2014
Optimization of PCR assay - slot I completed	State Entomology wing	10th -14th February, 2014

The activities are going on. More PCR optimization assays are necessary for getting the desired multiplex assay standardized on field collected samples. Further, this assay should be standardized to work on the samples of large pool sizes so that it can screen more mosquitoes in one pool by minimizing both time and cost of the process.

By providing the scope for assessment of infection in vectors, it offers advantages for the **monitoring of the disease transmission in an area thereby evaluating the performances of large scale control interventions in a given epidemiological setting.**

26.3.14
Deputy Director of Health Services, NVBDCP, Odisha

in the first approach human blood index and infection rates cannot be calculated . If the pool is found with a pf band, in order to confirm the infected mosquitoes, the processed will be reversed and DNA from individual mosquitoes will be checked for conformity.

6. Standardization of entomological studies at different ecotypes, habitats, seasons and the collecting devices will fasten the entomological collection. Also the changing pattern in the habitat, feeding preferences of different species and their seasonal fluctuation can be recorded from active entomological surveillance.
7. Standardization of mosquito preservation method will help the workers from PHC level to transport it without any damage the centre.

Future Plan

PHASE 3: Vector mapping at district level

(Duration: 18 months: 12 months for data collection and 6 months for data analysis and guideline preparation)

(After the completion of Phase1 and Phase 2, Phase 3 will be undertaken)

I. (a) Study area: Three districts (one district each by RMRC, NIMR and VCRC)

(b) All PHCs in each district will be covered by selecting three villages (one from hill-top, foot-hill and plain / riverine ecotype) from each PHC (Number of villages per district: max 3 villages per PHC x no. of PHCs)

II. (a) Training of state health personnel (MTS / Health workers) on mosquito collection, preservation and transport of samples.

(b) PCR assays will be done by the staff trained during Phase II.

III. Field implementation

- **Mosquito collection:**

(a) Hand catch: in randomly selected 3 HD and 3 CS in each selected villages

(b) Outdoor resting collection – hand catch: One hour in each village

(c) Four traps per village (two each in HD and CS)

(d) Frequency of mosquito collection: One collection in each season (mid of the season)

- PCR assay for vector species composition, human blood meal identification, vector infection (sporozoite / oocyst positive) detection and insecticide resistance.

IV. Data analysis, preparation of report and guidelines.

4. Quadruplex PCR for diagnosis of V.Cholerae 01 and/or 0139 serogroup causing cholera: A novel technique.

Principal Investigator : Dr. H. K. Khuntia

Objectives:

1. (a) To optimize, inter and intra observer variations of the Qudruplex PCR assay will be checked for detection of V. cholera O1 and O139 serogroups.
   (b) An easy Qudruplex PCR kit will be prepared for detection of V. cholera O1 and O139 serogroups
2. To map out the V. cholerae strains found in Orissa by Quadruplex PCR by examining both hospital and outbreak samples
3. Transfer of the Quadruplex PCR technology from laboratory to the field.

Progress of Work

1. **Intra observer variation of the Quadruplex PCR:**

To study the intra observer variation of the PCR technique, an in-house validation was conducted with coded *V. cholerae* O1 and O139 strains. A total of five PCR expert Research Scholars of RMRC, Bhubaneswar were assigned each with five coded V. choleare strains and three control strains (Positive control: *V. cholerae* O1 and O139 and Negative control: Salmonella spp). Each student was taught in detail about methodology and a protocol of Quadruplex PCR assay was given before the experiment. The results of Quadruplex PCR assay of all 25 coded *V. cholerae* strains confirmed genetically their serogroup encoding *rfb* O1 / *rfb* O139 sreogroup that matched with their respective actual serogroups showing positive for other genes *ctx*A, *tcp*A, and *Tox* R (Fig1).

2. Mapping of *V. cholerae* strains found in Odisha by Quadruplex PCR assay by examining both hospital and outbreak strains.

A total of 332 rectal swabs sample in Carry Blair transport (CBT) medium were collected / referred from hospitalized diarrhoea patients. Rectal swab sample were inoculated on TCBS plate and incubated at 37^0C for 18 hour. DNA was extracted from the colonies resembling the *V. cholerae* strains and subjected for Quadruplex PCR assay for genetic confirmation of serogroup and other virulent genes. Of the 332 rectal swabs, 23 *V. cholerae* were confirmed by PCR assay with the detection of *rfb* O1 gene encoding surface antigen that matched with the conventional method of sero-diagnosis. All the *V. cholerae* strains showed positive for *ctx*A, *tcp*A (El Tor) and *Tox*R genes.

PREPARATION OF A TEST KIT (Objective 1B)

We developed an easy Quadruplex PCR Kit that can be easily used by technicians for detection of cholera. The Kit gives correct results and can be used up to one year if will be preserved at -20^{0}C.

Third party Validation of Quadruplex PCR Kit

SAC-2013, suggested for third party validation of the Quadruplex PCR Kit in three independent neighbouring institutes, where PCR assay for cholera diagnosis is performing, like (1) NICED Kolkata, (2) ILS, Bhubaneswar and (3) MKCG medical college Berhampur.

Validation at ILS, Bhubaneswar:

The kit was validated in ILS that gave appropriate results with 100% sensitivity and specificity as follows.

Future Work

Validation at NICED, Kolkata and in MKCG medical college will be done very shortly. After validation, the technology in will be transferred to the District Headquarter Hospital in cholera prone area for diagnosis of cholera.

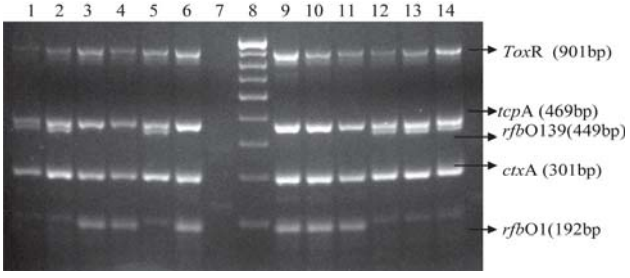


Fig. 1 shows results of in-house validation of Quadruplex PCR assay of *V. cholerae* O1, O139, positive control (*V. cholerae* O1 and O139) and negative control (Salmonella spp.)

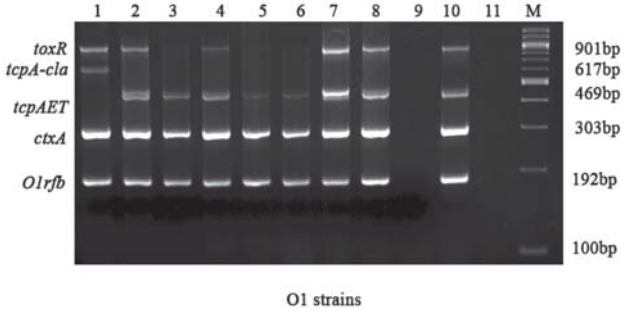


Fig.2 A: Lane1, V. cholerae O1, classical strain 569B; Lane2 through lane 8: V. cholerae O1 El Tor strain; Lane 9: E coli DHa negative control; Lane 10:V. cholerae O1 El Tor reference strain N1696.

5. Development of a LAMP assay for diagnosis of human malaria.

Principal Investigator : Dr M R Ranjit

Co-Investigator : Dr S K Kar

(Identified as Affordable Technique for Public Health Use under Translational Research programme of ICMR)

Background

Microscopy is the gold standard for diagnosis of malaria even though various rapid and simple tests have been developed in recent years. But loop-mediated isothermal amplification (LAMP) of nucleic acids seems to be a promising new technique, which enables to detect malaria parasites in a setting with limited resources. However, LAMP assay in its current form lacks sufficient accuracy in detection of the end product. Therefore, optimization of the current method for visualization of LAMP end products is important. The proposed project will help to develop a suitable method for detection of end product.

Progress of Work

To reduce the time of test isolation of DNA from 20 µl of direct finger prick blood (infected) by boiling method has been standardized. The SOP of the test procedure has been prepared and the internal validation of the test has been completed by taking two Technical Assistants, one Laboratory Technician and one Laboratory Assistant of the institute.

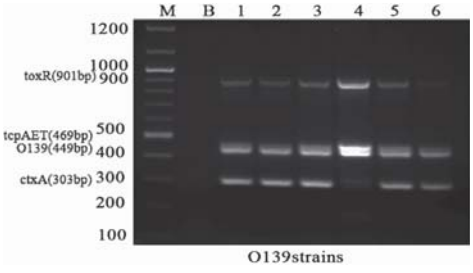


Fig.2 B. Lane1, through lane 5 V. cholerae O139 strains; Lane 6, V. cholerae O139 reference strain MO10, lane B without template.

Serogroup	No of strains	Specificity	Sensitivity
V. cholera O1	07	100	100
V. cholera O139	05	100	100
V. cholera O1, 569B	Positive control, classical	100	100
V. cholera O1, N16961	Positive control El Tor	100	100
V. cholera O139	Positive control O139	100	100
E.coliα	Negative control	0	0

Completed Studies

Contents

1. Etiology of diarrhoea in three tribal districts of Orissa.

Principal Investigator : Dr. B. B. Pal, Scientist E
Co-Investigator : Dr .H. K. Khuntia
Collaborator : Dr. Bikash Patnaik
Starting Date : October 2010
Closing Date : September 2013
Duration : 3 Years
Funding : Extramural (Tribal Task Force, ICMR)

Objectives

1. Phenotypic characterization of common enteric bacteria including the *Vibrio cholerae* from diarrhoea patients from the tribal populations of Orissa.
2. To find out the antibiotic susceptibility test of the diarrhoeagenic *E. coli* (EPEC, ETEC, EHEC, EAggEC), Salmonella, different Shigella spp., Aeromonas spp. and *V. cholerae* isolates.
3. To find out the correlation between clinical isolates of *V. cholerae* by different molecular techniques for the detection of biotype (tcpA-classical / El Tor), serotype (O1 / O139), virulence (ctxA) and regulatory genes (toxR).
4. The clonality of all serogroups of *V. cholerae* isolates will be done by RAPD PCR, PFGE, etc. to track their migration from one outbreak area into other.

Work Report

(A) **Study period**: 2010-2013 Three years.

(B) **Study site**: The selection of site has been done depending on the incidence of diarrhoea cases in different tribal blocks of respective districts (from the previous hospital records). The existence of *V.cholerae* and different bacterial enteropathogens in different geographical location, habitat, climatic conditions to look for their endemicity and further spread to other regions. Again the site selection for stool samples has been done based on our earlier experience and the area from where *V.cholerae* was frequently isolated from the hospitalized diarrhoea patients of the affected villages.

Study site

(C) Processing of stool specimens

The stool samples were collected once in a week during monsoon and post monsoon seasons and fortnightly collection was made during rest of the season from the indoor diarrhoea and dysentery patients before the administration of antibiotics. Stool samples were processed as per the WHO guidelines (1987) and as modified by NICED, Kolkata .The rectal swabs were sub cultured in TCBS agar, Mac Conkey agar, HEA, Aeromonas isolation agar plates. The suspected colonies were further subjected to a series of biochemical tests and finally it was confirmed by specific antisera. The pathogenic *E coli* (EPEC, ETEC, EAggEC, EHEC EAEC) were detected by simplex / multiplex PCR assay.

Results

The project was carried out in 4 blocks of 3 tribal districts like Rayagada, Koraput and Gajapati districts for the detection of bacterial pathogens causing diarrhoea in this population. The rectal swabs from

Sl No.	Name of District	Name of Block
1.	Koraput	Dasamantpur, Laxmipur
2.	Rayagada	Kashipur
3.	Gajapati	Mohana

the diarrhoea patients (IPD and outbreak villages) were collected for bacteriological analysis. The water samples were processed for *V. cholerae.*

Bacteriological analysis

During this period (Oct, 2010 to Sept, 2013) the rectal swab samples from indoor diarrhoea patients and also from the outbreak areas are collected and analyzed. In total (May, 2010 to Sept, 2013) 1427 rectal swabs were collected and processed. Out of the total samples collected 930(65.2%) were culture positive and 497(34.8%) were culture negative. Out of the culture positive 636 (68.4%) were *E.coli* followed by *V.cholerae* O1(Ogawa and Inawa) 146(15.7%), Salmonella spp. 10(1.1%), Shigella spp.79 (8.5%), Aeromonas spp. 59 (6.3%). Among the Shigella spp., *Shigella flexnerae* were

Table 1: Bacteriological analysis of enteropathogens isolated from diarrhoea patients (May 2010 to September 2013).

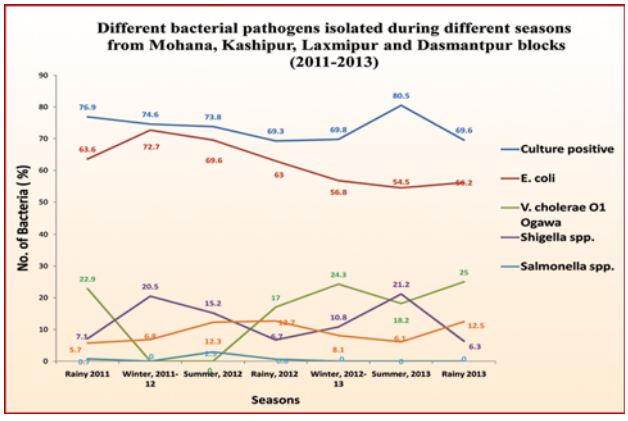
Year'!	2011(%)	2012(%)	2013(%)	Total(%)
Total samples	608	666	153	1427
Culture positive	330(54.3)	487(73.1)	113 (73.9)	930(65.2)
E.coli	249(75.5)	321(65.9)	66 (58.4)	636(68.4)
V cholerae O1	62(18.8)	60(12.3)	24 (21.3)	146(15.7)
Salmonella spp	4(1.2)	6(1.2)	--	10(1.1)
Shigella spp	15(4.5)	51(10.5)	13 (11.5)	79(8.5)
Aeromonas	--	49(10.1)	10(8.8)	59(6.3)
Culture negative	278(45.7)	179(26.9)	40 (26.1)	497(34.8)

Table 2: Analysis of water samples for the presence of *V cholerae* (May2010 to September2013).

Year'!	2011(%)	2012(%)	2013(%)	Total(%)
Total samples	361	356	12	729
No. of +ve V ch Non O1 & non O139	39:12	2(0.6)	0	14(1.93)
No. of +ve V ch O1	4 Open well-3 Tubewell-1 (mohana area)	9(2.5) Stream Chua Kashipur Nala Openwell Tubewell Mohana	0	13(1.8)

Table 3: Seasonal analysis of four blocks.

	Rainy 2011	Winter, 2011-12	Summer, 2012	Rainy, 2012	Winter, 2012-13	Summer, 2013	Rainy 2013
Culture positive	76.9	74.6	73.8	69.3	69.8	80.5	69.6
E. coli	63.6	72.7	69.6	63	56.8	54.5	56.2
V. cholerae O1 Ogawa	22.9	0	0	17	24.3	18.2	25
Shigella spp.	7.1	20.5	15.2	6.7	10.8	21.2	6.3
Salmonella spp.	0.7	0	2.9	0.6	0	0	0
Aeromonas spp.	5.7	6.8	12.3	12.7	8.1	6.1	12.5



Antibiogram patterns of different pathogens isolated from diarrhoea patients from Mohana, Kashipur, Laxmipur and Dasmantpur blocks.

highest in number followed by *Shigella boydii, Shigella soneei* and *Shigella disentry* type 1 were least isolated. Among the *V. cholerae* strains it was completely dominated by Ogawa serotype followed by few Inaba strains and no *V. cholerae O139* stains were isolated.(Table 1). Similarly environmental water samples were collected from stream, nala, chua, river, open well and they were analyzed for the presence of *V. cholerae.* In total 729 water samples were analyzed collected from different environmental sources which were collected during outbreak periods reported from different study blocks. Only 13 water samples were positive during 2011 and 2012 (stream, nala, chua, open well) reported from Kashipur and Mohana blocks (Table 2).

Seasonal analysis

The seasonal analyses of different pathogens have been described under table 3. The *E coli* were predominantly found throughout the year. *V cholerae* O1 (Ogawa and Inaba) strains were isolated highest during rainy followed by winter and summer seasons. The dominance of *V cholerae* strains were observed during rainy and post rainy seasons. The *Shigella spps.* were isolated highest during winter and summer seasons. The isolation of *Salmonella spp* was very low which cannot be compared. Similarly the *Aeromonas* spp. were isolated more in rainy and summer season (Fig1).

V. cholerae: The *V. cholerae* isolated from diarrhoea patients of Mohana, Kashipur, Laxmipur and Dasmantpur blocks were uniformly sensitive to

Tetracycline, Chloramphenicol, Azithromycin, Neomycin, Gentamicin, Norfloxacin, Ciprofloxacin, Ofloxacin, Doxycycline and resistant to Ampicillin, Nalidixic acid, Furazolidone, Streptomycin, Erythromycin, Co-trimoxazole and Polymixin-B.

Shigella spps: The *Shigella* spp. were uniformly sensitive to Tetracycline, Azithromycin, Streptomycin, Neomycin, Gentamicin, Ciprofloxacin, Ofloxacin and resistance to Ampicillin, Chloramphenicol, Nalidixic acid, Furazolidone, Erythromycin, Co-trimoxazole and Norfloxacin.

Aeromonas spps: The *Aeromonas* spp. were uniformly sensitive to Tetracycline, Chloramphenicol, Azithromycin, Streptomycin, Neomycin, Norfloxacin, Ofloxacin and resistant to Ampicillin, Nalidixic acid, Furazolidone, Erythromycin, Co-trimoxazole, Polymixin B, Gentamicin and Ciprofloxacin respectively (Table 4).

PCR assay on *E. coli*:

Two hundred pure *E. coli* isolates were subjected to simplex PCR assay for the detection of EPEC and ETEC strains. The PCR analysis revealed that 5.1% and 7.0% were EPEC and ETEC strains respectively.

Rota virus infection

A total of 482 rectal swabs collected from diarrhoea patients from four tribal blocks (Feb.12 to Sept.12) were subjected to ELISA kits for the detection of rota virus antigen. Ten samples (2.1%) were positive for Rota A and the genotypes were P and G sub types detected through PCR assay.

Molecular analysis

1 .Quadruplex PCR assay Some representative strains (20) of *V. cholerae* isolated during this period from the study areas were subjected to Quadruplex PCR assay for the detection of different genes. All the strains were positive for *ctxA, tcpA* (El Tor), *rfb* (O1) and *ToxR* genes (Fig 2).

2. MAMA PCR assay

The MAMA PCR assay on *V. cholerae* indicated that those were dominated by El Tor variants of *V. cholerae* O1 Ogawa followed few normal El Tor strains. (Fig 3)This indicates that the El Tor variant *V cholerae* O1 strains are completely dominated above normal El Tor strains. The early reporting and implementation of adequate control measures could check the spread of the eminent cholera epidemic in this region. The RAPD PCR assays with 1281 and 1283 primers on selected *V. cholerae* strains indicated that they are clonal in nature (Fig. 4).

Outbreak Investigation

Cholera epidemic in the Rayagada District (July to October 2010)

There was a cholera epidemic reported in the Rayagada district from July to October, 2010 accounting for high morbidiy and mortality affecting 8 out of 11 blocks. The cholera epidemic was affecting 96 grama panchayatas, 443 villages and 2087 diarrhoea cases and 41 deaths, with an attack rate of 0.25% and 1.96% of death rate. Similarly there was a cholera outbreak in two villages of Mohana block of Gajapati

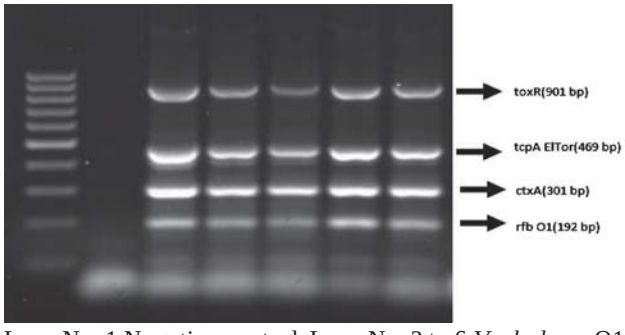
Table 4: Antibiogram profiles of different bacterial pathogens.

Enteropathogens	Resistance	Sensitive
V cholerae	Am, Na, Fr, S, Er, Co	T, C, Az, Ne, g, Nx, Cf, Of, Do
Shigella spp	Am, C ,Na, Fr, Co, E, Nx	T, Az, S, Ne, g, Co, Cf, Of
Aeromonas	Am, Na, Fr, Er, Co, g, Cl	T, C, Az, S, Ne, Nx, Of

district during the month of August, 2010. The date wise incidence of diarrhoea cases has been described in Fig No 5. Out of eight diarrhoea affected blocks Kashipur, Kalyan Singhpur, B. Cuttack were worst affected. The present cholera epidemic in Rayagada district indicated that new blocks and new villages were affected in comparison to 2007 cholera epidemic. Consumption of contaminated water, un-hygienic condition, poor knowledge on diarrhoea and migration of people were responsible for acquiring and spread of the infection. The MAMA PCR results indicated that 60% strains were hybrid *V.cholerae* El for variant and rest 40% were normal El for strains. This indicated that the *V.cholerae* strains were dominating over the normal *V.cholerae* El for strains and spread to the diarrhoea unaffected areas in comparison to 2007 cholera epidemic.

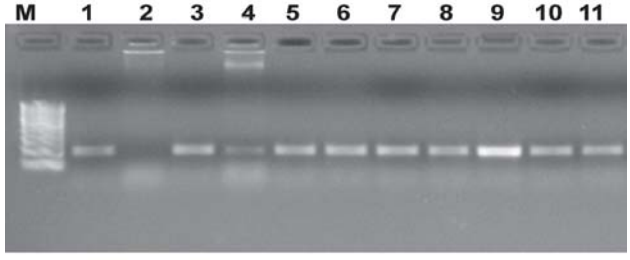
Cholera outbreak in Mohana Block (Gajapati district) during 2011

The large cholera outbreak was reported in the Mohana block from **July to October 2011** accounting for high morbidity. During the diarrhoeal outbreak in Mohana block 264 severe diarrhoea cases, 88 diarrhoea affected villages, and one death was reported. 64 water samples were analyzed from Mohana block from which 7 were positive for *V.cholerae* O1 Ogawa biotype El Tor and those were collected from open wells and tube well. (Fig.6) Similarly El tor variants of *V. cholerae* were isolated from diarrhoea patients and stream and



Lane No. 1 Negative control, Lane No. 2 to 6 *V. cholerae* O1 positive for *ctxA, tcpA, rfb* O1 and *ToxR* gene.

Fig 2: Quadruplex PCR assay of clinical strains of *V. cholerae* O1.



Lane-M:100 bp Ladder, 1- Control V.Ch, 2- MHW 89S, 3- MH91, 4- MHW92, 5- MH93, 6- MHW94, 7- MH95, 8- MH96, 9- MH97, 10- MHW98, 11- MH99

Fig 3: MAMA PCR Assay for the detection of hybrid stain of V. cholerae (Stool and Water from Mohana: July-Sept. 2011.

Fig.4 RAPD-PCR of *V. cholerae* O1 Ogawa isolates with 1283 primer. Lane 1: 1 Kb DNA Ladder; Lane 2: 569B *V. cholerae* classical strain; Lane 3: VC 20 *V.cholerae* O1 Ogawa biotype El Tor; Lane 4: 1669N El Tor variant *V. cholerae* O1 Ogawa; Lane 5-20: clinical isolates of *V. cholerae* strains.

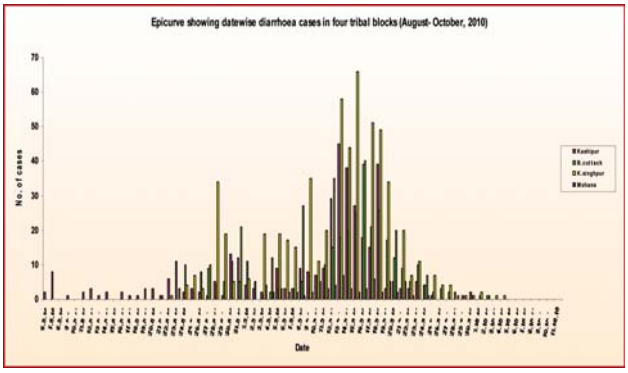


Fig-5: Date wise incidence of diarrhoea cases in Kashipur, K. singhpur, and B. cuttack and Mohana blocks.

nala water of Kashipur block during rainy season of 2012. Gradually the cholera outbreak spreaded to other blocks of Rayagada district and the Gudari block was worst affected. Consumption of contaminated water, unhygienic practices, poor knowledge on diarrhoea, and migration of people etc. were responsible for acquiring and spread of diarrhoeal infection. Early isolation, identification, antibiogram profile of the pathogens enabled the state health machineries to check the spread of the diarrhoeal out break to unaffected areas of the tribal population.

Conclusion

Cholera out breaks / epidemics were observed in the tribal areas as evidenced from this study. So, continuous surveillance is highly essential to monitor the diarrhoea patients and environmental water samples together in this region. As cholera puts a significant threat in the tribal areas which leads to high morbidity and mortality; the epidemiology of cholera including socio cultural and behavioral studies are highly essential in this region.

Applied value of the project

The existence of different bacterial enteropathogens including *V.cholerae* in different areas in 4 tribal blocks of 3 districts was known. From the present data it is evident that cholera is seasonal and it occurs mostly in rainy season and post rainy season. Among the four study blocks Kashipur was worst

Water sources positive for *V.cholerae*, Mohana block (July-October, 2011)

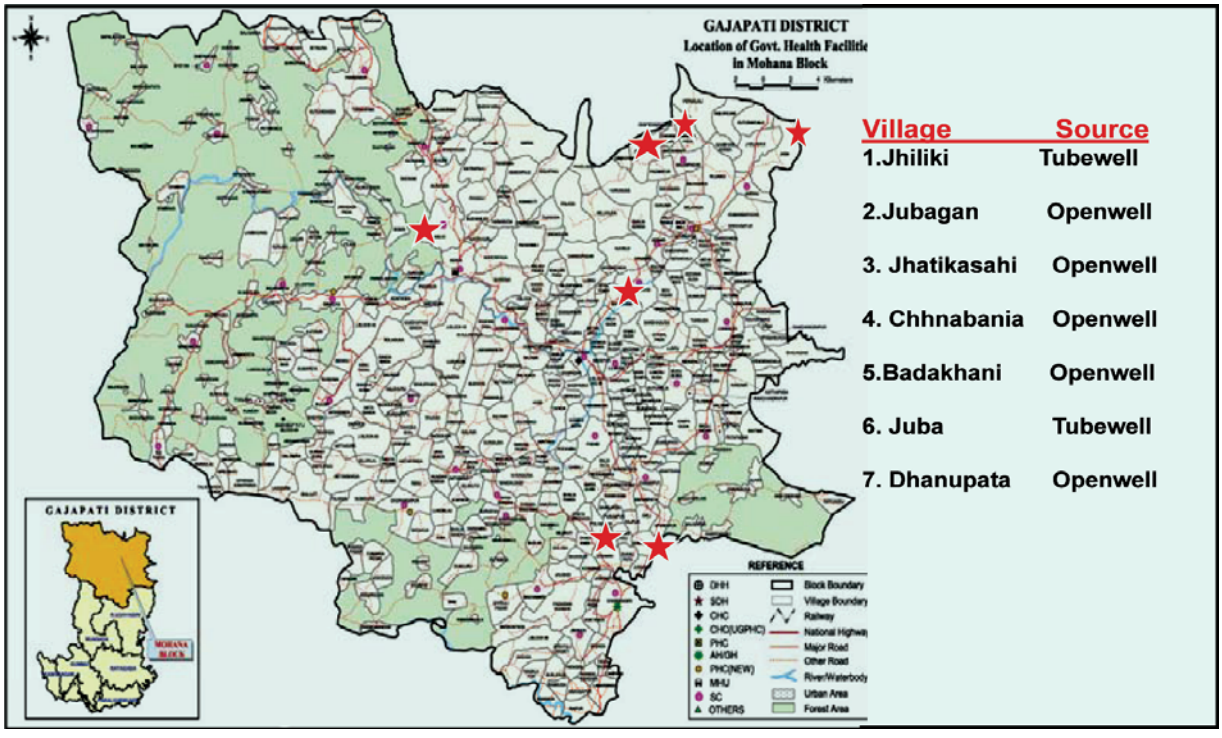


Fig 6: Water sources positive for *V cholerae* in Mohana block, 2011.

affected due to cholera outbreak during 2010 and Mohana during 2011.The sources of cholera infection was due to contaminated water from the chua, nala, stream and open well water. Early isolation and reporting enabled the state health authorities to implement adequate control measures to check the spread of the outbreak. The previous cholera outbreaks / epidemics in Koraput and Nawarangapur districts were due to *V.cholerae* O1 Ogawa / Inaba serotypes biotype El Tor from 1993 to 2003.From 2007 to 2013 the cholera outbreaks in the tribal areas were due to El Tor variants *V. cholerae* O1 Ogawa with changing antibiogram profile from time to time. Lot of morbidity and mortality occurs almost every year due to cholera outbreaks. The tribal populations with different tribes with limited population are residing in inaccessible areas. If the trend of mortality will continue the specific tribes will be reduced. So to save the tribal population this type of study with intervention programme is very much essential. This will, augment the primary health care delivery system for the treatment, care and management of diarrhoea patients in this region. This will be ultimately helpful for planning control measures for future cholera outbreaks in this area. The reports were submitted regularly to the concerned health authorities for treatment, management of diarrhea patients and implementation of adequate control measures in time to check the spread of the vital cholera epidemic in the tribal areas; as a result of which many lives were saved.

Water sources positive for V.cholerae in Kalahandi District during cholera outbreak, 2012.

Pond water +ve V.cholerae, chlorination in progress Kashabahi Village, Kolampur, Kolahandi

Dumping at the pond site of Kashabahi village

2. Detection and phylogenetic analysis of chikungunya virus from human cases and vector mosquito species in different endemic regions of Odisha.

Principal Investigator : Dr. R. K. Hazra
Co-investigator : Dr. B. Dwibedi
Duration : Three years
Starting date : October, 2010-September 2013

Objectives:

(a) Screening of human cases and selected mosquito species from defined areas of Odisha State for the detection of chikungunya virus infections by serologic and molecular tests.

(b) Nucleotide sequencing of the entire E1 genomic region for phylogenetic analysis.

Background

Chikungunya fever is an arboviral disease caused by Chikungunya virus (CHIKV), an *alphavirus* of the family *Togaviridae.* The virus primarily spread by the bites of *Aedes* mosquitoes. The CHIKV was first isolated during an outbreak in Tanzania in 1953. The presence of this virus in India was reported for the first time in Kolkata and subsequently from many

VILLAGE SURVEY (2010 – 2011): Rayagada District

other places. The explosive epidemic of 2005-06 was experienced in India that accounted for 1.3 million human infections. Activity of CHIKV was detected in India after a gap of about 32 years. Both *Aedes aegypti* and *Aedes albopictus* mosquitoes were involved in transmission of chikungunya in India and in many parts of the world.

Orissa was considered as an endemic region for chikungunya since 2005. According to the reports of Govt. of Orissa, chikungunya has affected many parts of coastal areas and presently many suspected CHIK cases are continuously being reported from the State of Orissa.

CHIKV belongs to family *Togaviridae* and genus *Alphavirus.* CHIKV is an enveloped virus of about 45 nm in diameters. Of the seven antigenic complexes of the genus *Alphavirus,* CHIKV is grouped under Semliki Forest Virus (SFV) antigenic complex and is most closely related to O'nyong-nyong virus on the basis of serological cross reactivity of the envelope proteins E1 and E2. The virus comprises of ~11.8 kb single stranded positive sense RNA genome consisting of a 5' cap-untranslated region (UTR), non-structural proteins (nsp1-nsp 4), structural proteins (C-E3-E2-6K-E1) and a 3' terminal poly-A tail. A novel feature of the CHIKV genome is the presence of an internal poly A stretch of between 19 and 106 adenine residues immediately after the structural protein coding region.

The Indian 1963 and 1973 CHIK virus isolates were of Asian genotype and the recent 2005-06 isolates matched (99.9%) with the African Genotype. The Yawat (Maharashtra) mosquito isolates of 2000 showed 98.2% homology with the 2006 Indian CHIKV isolate suggesting the presence of African genotype much earlier than the explosive epidemic of 2005-06. The A226V mutation in the E1 gene was indicative of better adaptation of CHIK virus to its vector mosquitoes. This was detected in Reunion Island in the later part of the epidemic and was also detected in CHIKV in India.

Although CHIKV could be considered as a re-emerging threat, presently no drug or vaccine is available for treatment or cure of this viral disease. A definitive diagnosis of Chikungunya infection can be made only with the aid of laboratory support since clinically it resembles with symptoms of dengue fever. However, recent rapid diagnosis mainly relies on IgM ELISA and PCR followed by nucleotide sequencing. Neutralization test is also recommended for convalescent serum specimens or for confirmation of new isolates with reference immune serum. Three main laboratory tests are used for diagnosing chikungunya fevers: virus isolation, serological tests for demonstration of virus specific antibodies and genomic detection by reverse transcription polymerase chain reaction (RT-PCR) methods. Virus isolation is rarely used for diagnosis because it is time consuming and technically demanding. Alternatively, the presence of IgM antibodies (serology). The presence of virus specific IgM antibody indicates recent infection and usually appears by day 5. It is therefore of limited use for detection of infection in early acute cases. RT-PCR can be a method of choice for early detection of CHIKV in epidemiological surveys .Many species of *Aedes* mosquito have been incriminated as potential vectors of CHIKV. Although both *Aedes aegypti* and *Aedes albopictus* mosquitoes are prevalent in India, the former is the main vector . Though suspected CHIK cases are continuously being reported, there was no data on laboratory confirmed cases and CHIKV genotype(s) from Orissa. Many suspected cases have also remained undiagnosed.

Keeping the above facts in view, the research was focused on the rapid detection of CHIK infections in humans and also on its detection in the major mosquito vectors. CHIKV genotypes from human and mosquito viruses were compared.

Results

Entomological Survey:

Mosquitoes both adult and larvae collection was carried out in rural areas of Jagatsinghpur,

Kendrapara, Bhadrak, Ganjam, Angul, Gajapati, Mayurbhanj, Cuttack, Khurda, Rayagada and Sundargarh districts . The adult Aedes mosquitoes were identified taxonomically based on their distinguishing features like head, thorax, wings, legs, halters, segmentation of body, size of proboscis, sitting posture and habits by following the key developed by Barraud 1934 (The fauna of British India).The larvae and pupae were identified taxonomically based on their morphological features like their size, siphon tube length, "S" shaped movement etc. From larvae and adult collection, four species of adult was confirmed by our team i.e. *Aedes aegypti, Aedes albopictus, Aedes vitatus,* and *Aedes edwardsi.* Out of these four Aedes species, *Ae. albopictus* was found to be dominant

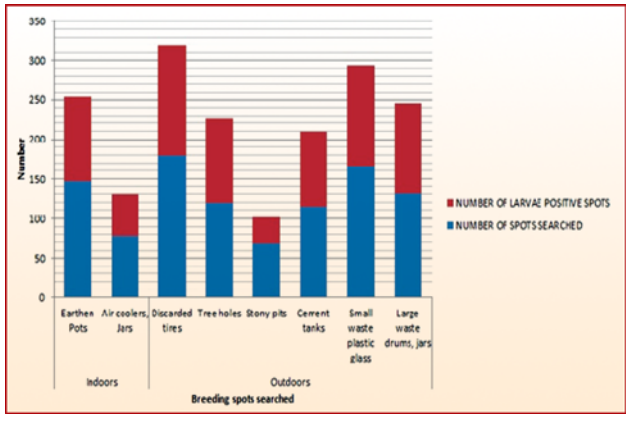


Fig 1: The graph showing the number of Aedes larval positive spots in the six Chikungunya endemic districts.

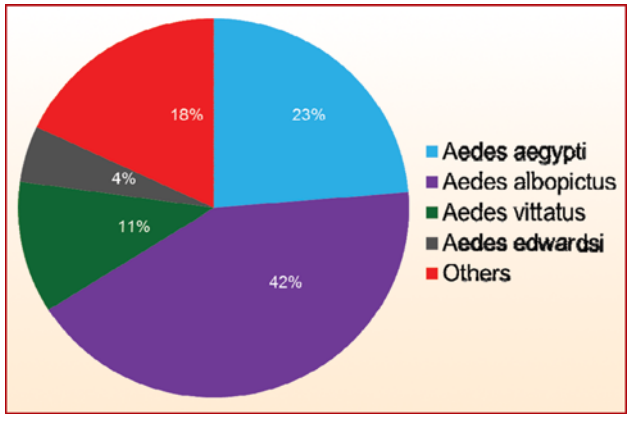


Fig 2. Pie chart showing the distribution of Aedes species in Orissa.

species in all the above study districts. From the number of positive breeding spot surveyed, the Breteau Index of *Aedes albopictus* in all the blocks under each district was greater than 100 thereby indicating high vector densities and hence being the main vector responsible for transmission of arbovirus in the affected areas.

Multiplex PCR: The multiplex PCR method detected maximum number of *Aedes albopictus* larvae and pupae in most breeding spots surveyed which is a prevalent mosquito species of Aedes in Odisha. Discarded tires were the most abundant breeding spots of Aedes mosquitoes that were obtained from the areas surveyed.

Blood collection: 5 ml blood was collected from each suspected case (Patient) showing symptoms of chikungunya in the respective areas which were surveyed. The blood was immediately brought to the laboratory and the serum was separated by centrifugation at 8000 rpm for 10 mins. The serum was then stored at -800C for further study.

ELISA result: IgM captured ELISA was performed to detect CHIKV by using ELISA kit developed by NIV, Pune. All serum samples were tested for the presence of CHIKV specific IgM antibodies using Chikungunya-IgM capture ELISA. 263 serum samples from suspected cases of chikungunya collected from affected areas were tested for CHIKV by IgM capture ELISA. Out of 263 samples, 99 (37.6%) shown positive for CHIK ELISA, thereby indicating acute epidemic outbreak in the affected areas (Table 1).

Again all serum samples from suspected cases of chikungunya were tested for Reverse Transcriptase PCR (RT-PCR) for detection of virus which was escaped in IgM capture ELISA. A total of 104 numbers of samples were tested positive for RT-PCR (39.5%). RT-PCR positive samples were tested for viral gene for genomic analysis. RT-PCR detected the chikungunya viral partial E 1 gene specific band at 294 bp from patients serum obtained from different

epidemic areas. The E 1 gene band was found in four mosquito pools (10 mosquitoes / pool) collected from Gajapati and Ganjam that were analyzed by RT-PCR.

Phylogenetic analysis:

From the isolated complete E1 gene, a phylogenetic tree was constructed which is given below. This phylogenetic tree indicates that the sequences from Odisha were grouped along with sequences of CHIKV belonging to IOL (Indian Ocean Lineage) strain within ECSA (East Central South Asian) genotype, originating probably from the Kenya 2004 strain (predecessor). Hence IOL group, ECSA genotype of chikungunya virus can be attributed to

Table 1: Number of samples collected and tested positive for CHIKV from 2010 till date.

Sl No	District	Village	No of sample	IgM Positive	RT PCR Positive
1.	Khurda	Hadapada	30	17	18
2.	Khurda	Kurampada	14	6	7
3.	Jagatsinghpur	Sahada	9	2	2
4.	Jagatsinghpur	Patapur	9	6	5
5.	Jagatsinghpur	Balipari	1	1	1
6.	Jagatsinghpur	Arakhiya	13	13	13
7.	Sundargarh	Rourkela	26	1	1
8.	Jagatsinghpur	Pokharipada	8	6	6
9.	Kendrapada	Ali(Palimi)	6	0	0
10.	Jagatsinghpur	Pakharipada	4	0	0
11.	Jagatsinghpur	Patpur	1	0	0
12.	Bhadrak	Baudpur	6	1	1
13.	Gajapati	Gurandi	10	7	8
14.	Gajapati	Kumbharsahi	17	8	9
15.	Gajapati	Adarshnagar	2	1	1
16.	Gajapati	Odia Sahi	17	5	6
17.	Gajapati	Badhai Sahi	4	0	0
18.	Gajapati	Gauda Sahi	1	0	0
19.	Gajapati	Bisoi Sahi	4	0	0
20.	Gajapati	Christian Sahi	3	1	1
21.	Gajapati	Jhola Sahi	4	2	2
22.	Ganjam	Kankorda	7	0	0
23.	Ganjam	Kaudia	17	2	2
24.	Ganjam	Dharakote	14	4	4
25.	Ganjam	Sundarpada	12	5	5
26.	Ganjam	Gudiali	10	7	7
27.	Ganjam	Rangailunda	9	3	3
28.	Ganjam	Satyasaibaba sahi	5	1	1
		Total	**263**	**99**	**104**

recent outbreaks of chikungunya in Odisha. Further evidence of the ECSA genotype circulation in Odisha was due to the abundance of Aedes albopictus vector that efficiently transmits this genotype. This was supported by high larval indices of Aedes albopictus in different breeding spots surveyed. The phylogenetic analysis shows more of a temporal pattern rather than a topographical pattern. Many South-East Asian isolates were found to cluster with the isolates under study depicting that a similar genotype has circulated during the recent outbreak in different districts of Odisha.

Mutation analysis:

A226V primary adaptive mutation in E1 gene region along with I211E and E2 L210K in E2 region which acted as second step adaptive mutations were detected in all Odisha isolates (vectors and sera). All the above mutation collectively supported the hypothesis: increase in viral dissemination and multiplication in Ae.. albopictus species that finally renders it to be the chief arboviral vector in this region.

Conclusions

From the present results, it can be concluded that the recent outbreaks of chikungunya in Odisha have been caused by viral strains of IOL group of the ECSA genotype with E1-A226V, E2-I211T and E2-L210Q mutations, which in turn has favoured *Ae. albopictus* to be the main arboviral vector in this region. This is the first report confirming the association of the IOL strains of ECSA genotype with chikungunya outbreaks in Odisha. Since the CHIKV isolates were from a single geographical region and cluster around the IOL group, this suggests endemicity of this group in Odisha. The resurgence and persistence of CHIKV warrants the need for continuous monitoring and identification of arboviral vectors and genetic divergence of newly evolving variants with a view to plan for appropriate strategies for vector control and vaccine development.

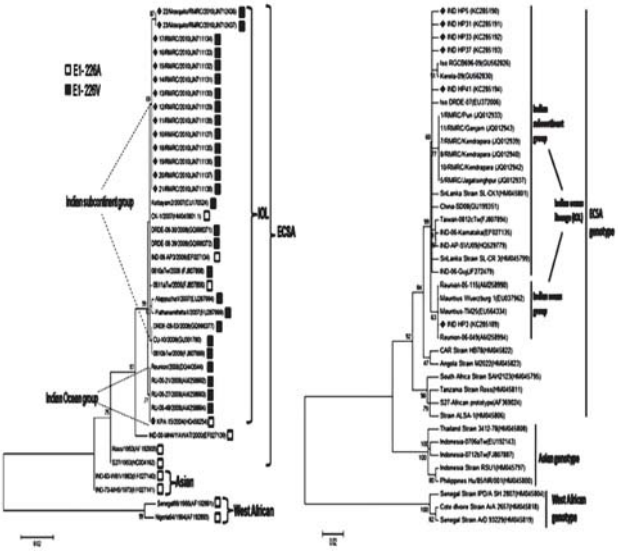


Fig 3: A. Phylogenetic tree of 294 bp sequence of E 1 gene of different genotypes of chikungunya virus showing all CHIKV sequences from Odisha belong to East Central South African genotype. B. Phylogenetic tree of E 2 gene of different genotypes of chikungunya virus showing all CHIKV sequences from Odisha belong to East Central South African genotype.

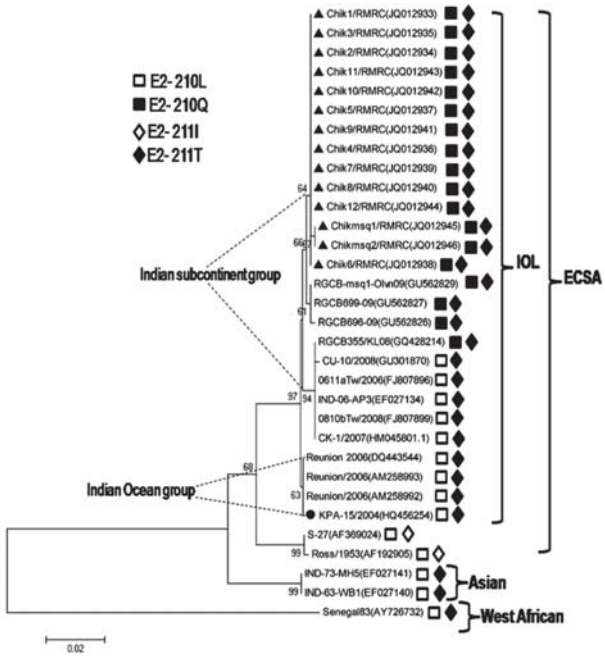


Fig 4: Phylogenetic tree of 768 bp sequence of E 2 gene of different genotypes of chikungunya virus showing all CHIKV sequences from Odisha belong to East Central South African genotype.

3. Epidemiology of malaria with special reference to *P malariae* in two tribal blocks of Odisha.

Principal Investigator	:	Dr. M.R. Ranjit
Co-Investigator(s)	:	Dr. S K Kar, Dr A S Kerketta, Dr. A.S.Acharya, Dr M M Pradhan (DD: Malaria, Govt of Odisha), MO I/C Ghatgaon & Badampahar CHC.
Starting Date	:	March 2012
Duration	:	Two Years
Closing Date	:	Feb 2014
Funding	:	EM: ICMR (Concept/8/2010-ECD-II Dated 5/2/2012

Objectives

(i) to find out the incidence of *P malariae* along with *P falciparum* and *P vivax*

(ii) to analyze the intra-species diversity of *P malariae* among the clinical isolates

(ii) to investigate the association of *P malariae* with severe clinical malaria particularly renal failure

Background

Every year at least 0.4million people in Odisha are reported to be slide positive for malaria parasites and more than 200 deaths are being reported due to it. Even though the tribal dominated forested districts are known to contribute substantially more malaria than the non-tribal districts, the exact cause of persistence of malaria in those areas is not known. According to the NVBDCP malaria report the *P falciparum* accounts >80% of the malaria cases in the state followed by 10-15% of *P vivax*. However, we have observed as high as 44.6% of *P malariae* by PCR in some selected tribal and forested areas of Orissa compared to 8.3% by microscopy. Although, the reason for such unexpected hike in *P malariae* occurrence is not known, the apparent shortage of *P malariae* prevalence by light microscopy could include morphologic variations that may contribute to misdiagnosis, but the seasonal incidence of the high prevalence cannot be ruled out. Moreover *P malariae* can remain long in blood circulation and cause chronic nephritis. The increased hospitalization of severe malaria cases with multi-organ failure in recent years and growing incidence of malaria attributed renal failures in the tribal districts of the state may be due to misdiagnosis of *P malariae* infection (both mono and mixed) as mono infection of *P falciparum* that needs to be evaluated. Therefore in the proposed study we will do a systematic investigation on the incidence of *P malariae* along with *P falciparum* and *P vivax* and its association with clinical outcome of severe malaria particularly nephrotic syndrome in Odisha.

Work Report

During the period (from 1/3/2012 to 28/2/2014) about a total of 1589 fever cases (Ghatgaon: 974 and Badampahar: 615) suspected to be malaria were screened by bivalent RDK for malaria in selected sub-centers and patients attending malaria clinic at CHC hospitals. Out of the total 974 fever cases screened in Ghatgaon CHC area 103 (10.6%) were found to be found to be RDK positive. Amongst these RDK positive samples 77 (7.9 %) samples were found to be PCR positive and 70 (7.2%) are microscopically positive. Out of total 77 PCR positive samples 30(29.12%) were found to be positive for *P falciparum*, 19(18.4%) were *P vivax* and 9(8.7%) with *P malariae* monoinfections. Most interestingly by PCR about 19(24.67%) cases were found to harbor mixed infections as out of them 11 were with *P malariae* .Most significantly microscopy only 1(1.29%) was found to have *P malariae* monoinfections . The present study indicates that the mixed infections are more common than it was expected. The prevalence of *P falciparum* is more common in all three seasons than *P vivax* and *P malariae*. Season wise analysis indicates that the prevalence is high in rainy and winter but less in summer and there is round the year transmission. Further it is evident that the prevalence

of *P malariae* is more during the rainy season indicates seasonal prevalence.

In Badampahar out of 615 fever cases screened for malaria 60 (9.8 %) were RDK positive and amongst them 33 (5.4 %) were found to be PCR positive and 29 (4.7%) microscopically positive (Table 2). Out of total 33 PCR positive samples 11(18.33%) were found to be *P.falciparum* 17(28.3%) were *P.vivax*. In this area total 5(8.33%) were found have been mixed infections of them 2(3.33%) were of *P, malariae*. The *P.malariae* here were found to be both in rainy and winter season, but not in summer. Microscopically no *P.malariae* could be detected. The prevalence of *P vivax* seems to be equal to the *P falciparum* infection. The *P vivax* infection is more prevalent during the winter season and *P malariae* infection is less than the Ghatgaon CHC. Similar to the situation of Ghatgaon the mixed infections are more common than it was expected. In West Africa and PNG the P.malariae has been characterized to exhibit opposing seasonal fluctuation with *P.falciparum* and *P.malariae* prevalence and / or the parasite densities increasing the dry season.

In our earlier survey carried out during July to October during 2008 we have detected 108 *P. malariae* infections by PCR (>60%) out of 212 positive cases in Mayurbhanj, Sundergarh, Keonjhar, Nayagarh, Rayagada, Kalahandi, Kandhamal and Angul district. Majority of them were found to be co-infected with *P.falciparum* or *P.vivax*. Since 2009 Odisha has revised its treatment policy by adopting ACT as the first line of treatment in case of *P.falciparum* and CQ +PQ for *P vivax*. Screenings of cases are being done by using RDT. After this the incidence of malaria has come down significantly in both the study areas. In Keonjhar the API has come down from 17.08(2008) to 10.85(2012) and in Mayurbhanj the API has come down to 3.25(2012) from 4.82(2008). Even then during the present survey we have detected the *P.malariae* monoinfections in 11.6% of cases and mixed infections with were 14.2% in Ghatagaon of Keonjhar and 6% (*P.malariae* mixed infections) in Badampahad of Mayurbhanj district. Most importantly these infections are often found as mixed infections as reported in West Africa and PNG. The potential interactions of *P malariae* with *P.falciparum* and *P.vivax* might explain some basic questions of malaria epidemiology and understanding these interactions could have an important influence on the deployment of interventions such as malaria vaccines.

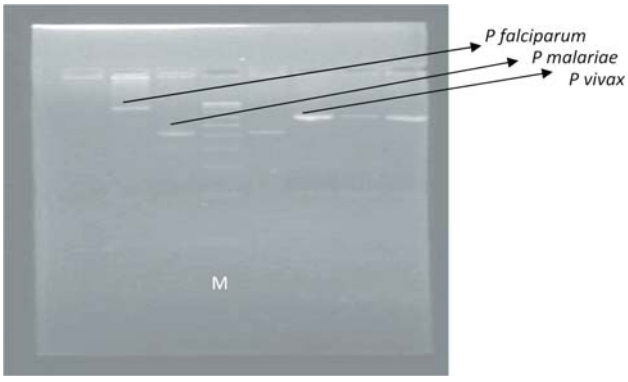


Fig 1: PCR Detection of Malaria Species.

The age wise distribution of species of parasites indicates that the *P.malariae* was more prevalence in older age (>6 years) like *P.vivax* but unlike *P.falciparum* which is present in all age groups in Ghatgaon. Similar to the situation in Ghatagaon the *P.malariae* is more prevalence in older ages in Badampahar here the *P.malariae* is present as mixed infections. In West Africa, *P.malariae* prevalence has been reported to peak at ages similar to those of *P.falciparum* (i.e. in children under ten years of age) and in PNG however, *P.malariae* infection is observed predominantly in older children (seven to nine years) like in Odisha.

With respect to asymptomatic cases a total of 241 cases (Ghatgaon: 127 , Badampahar: 114 have been screened. On them 1 (0.4 %) cases were found to harbor *P malariae* mono infection and 4 (3.5 %) mixed with either *P falciparum* or *P vivax*.

Association of P malariae with renal failure

Total 17 malaria attributed acute kidney injury cases admitted to the hospital have been enrolled in the study. Briefly the definition of malarial ARF is a serum creatinine concentration > 3mg / dl (>265ìmol / L) and / or 24-hour urine output < 400 ml, despite

rehydration, in patients who have asexual forms of malarial parasite on their peripheral blood smear and absence of any other disease. The venous blood samples (approximately 1 ml) were collected by the concerned Medical Officer I/C of the hospital and transported to RMRC within 24 hours of collection in an ice box for detailed biochemical (renal function and liver function) and hematological analysis. The identification of the parasite species was done by PCR analysis revealed *P falciparum* mono infection in 7 cases and *P falciparum* mixed plus *P malariae* in 2 cases.

Conclusion

Our findings are very important in the current scenario of screen and treat policy of the programme. Under this screen and treat strategy, presence of *P malariae* poses a difficulty if the screening is performed by RDT alone. Further in the present study the species specific RDTs were not able to detect neither the monoinfection nor the mixed infections of *P. malariae*. Therefore the molecular method can be used as a tool for surveillance to overcome such problems.

4. A study of sub-clinical Lymphatic Manifestation in W. bancrofit Infection.

Principal Investigator : Dr. S.K. Kar
Co-Investigators : Dr. B. Dwibedi
Starting date : October 2009
Closing date : April 2014
Funding : Extramural
(GATES Foundation, USA)

Background

Several reports from filarial endemic regions globally including Odisha indicated that while most of the endemic children (25-30%) below 5 years of age get infected, overt clinical disease appears later in life, ie. late adolescence or adult hood. It is not clear about any pathology that develops following infection till the clinical signs appear. Lymphoscintigraphy evidences suggest sub-clinical lymphatic abnormality in mf carriers who does not show any clinical signs. Study on *B. malayi* infected children (3-15yrs) has shown evidence of sub clinical lymphatic pathology in form of lymphatic obstruction.

It was proposed to undertake an observational study to find out any sub-clinical lymphatic pathology in filariasis infected children and adolescents in *W. bancrofti* endemic area of the state; and to observe the effect of MDA with DEC and Albendazole (alb) on the lymphatic abnormality.

Objective:

1. Prevalence of sub clinical lymphatic pathology in population between 5-18 years with *W. bancrofti* infection in defined endemic community.
2. Effect of single annual and biannual dose of DEC plus Albendazole on lymphatic pathology in the identified group.

Results

Screening and Enrollment:

102 subjects have been enrolled to the study after confirming the eligibility criteria, of which **52** subjects were assigned randomly to annual and **50** to biannual dose (DEC + Albendazole) group. Out of **102** subjects, **50** were symptomatic and rest of the children were asymptomatic, but with detectable mf and/or antigenimia.

Out of **52** asymptomatic children **32** were mf negative and antigen positive where **20** were positive for antigen and mf. In **50** symptomatic children clinical signs or symptoms of filariasis were observed in form of presence or history of lymphadenitis, lymphedema, testicular enlargement or hematuria. Out of these children **10** were positive for mf.

Baseline investigation and follow up:

All the subjects enrolled at baseline **(n=102)** had undergone Lymphoscintigraphy and ultrasound examination. They were given dose of DEC + Albendazole in the dosages prescribed for their age

and study arm (annual or biannual). Till date **101** children completed 6 month follow up, **100** completed follow up for 12 month, **100** completed 18 month follow up and 5**3** subjects have completed 24 months follow up. All the investigations were repeated 6 monthly. The lymphatic abnormality noted at baseline was compared with the subsequent follow up results which is outlined below.

In the enrolled subjects, the initial microfilaria (mf) count ranged from **2 to 1540 mf/ ml** (GM=**208.75**) The Og4C3 titre in the Baseline was **182 to 15107 units (Mean=5108).**

Lymphoscintigraphy of both upper and lower limbs was carried out by expert in nuclear medicine using radio labeled sulphur colloid. The procedure was standardized before initiating the study. Effect on lymphatic pathology was evaluated by comparing the scintigraphic observation made at the follow up visit with the pretreatment (baseline) findings. The scintigraphic image showing visualization of lymph nodes and lymphatic channels on both the limbs and the tracer uptake ratio from the distal end of the limb was compared with the baseline observations in the same limb, to interpret on the lymphatic flow/ pathology and improvement if any.

Out of **102** subjects **73(71.5%)** had shown some abnormality in the lymphatic scan at baseline. The earliest age showing lymphatic pathology was 6 years among the studied children. Ultrasonography has shown filarial dance sign (FDS) of adult worm in **9** subjects.

All the enrolled children were given required dose of DEC plus Albendazole supervised by a physician and they were followed for any side reactions. Among them **10 (9.8%)** children reported to have side reactions like fever, headache, and leg pain, nausea, head reeling and cough. All were mild in nature and managed at home. 4(3.96%) had side reaction at 6th month and 3(3.19%) at 12th month and 2(4.25%) at 18th month & no side reaction was recorded at 24th follow up period.

Out of the **102** children **(50** Symptomatic & **52** Asymptomatic) enrolled at baseline **101** children completed 24 months follow up successfully. Result of repeat lymphoscintigram at these time point compared with the baseline status has shown improvement in lymphatic.

- There is gradual increase in % of Mf & Adult (USG) clearance at different follow up periods.
- Adult (Ultrasound) clearance coincided (100%)

Lymphatic Pathology in enrolled children (Baseline)

	Symptomatic (N=50)	*Asymptomatic (N=52)*	*Total (N=102)*
Numbers with lymphatic abnormality (%)	40 (80 %)	33 (63.4 %)	73(71.5%)
Numbers showing Filarial dance sign (%)	5 (10%)	4 (7.6%)	9 (8.82%)

Pattern of Lymphatic Pathology in enrolled subjects (n=102)

Pattern of Abnormality (No. of Cases)	Symptomatic (n=50)	Asymptomatic (n=52)	Total (n=102)
Sluggish flow	32	28	60
Collateral channels	3	6	9
Abnormal lymph node visualization	12	13	25
Significant tracer uptake difference	6	7	13

with improvement in lymphatic pathology.

Conclusion

- Drugs used in MDA programme are capable of reversing Lymphatic pathology in children.
- This has strong implication on advocacy that will be useful to children and augment LFE.
- MDA can serve as Morbidity prevention tool in children and can also reverse early disease.

The study has shown the following findings that can be useful for the programme.

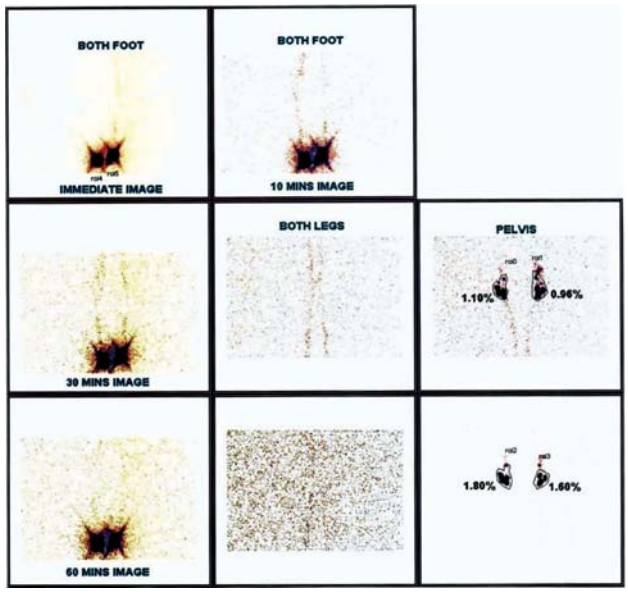
- 73% of *W.bancrofti* infected children (5-18 Yrs) shown lymphatic abnormality.
- Lymphatic pathology observed as earlier as 5 yrs.
- 91.4% of children with lymphatic pathology at Baseline shown improvement at 24 Months with standard MDA dose.
- Complete reversal seen in 79.0% cases at 24 months with MDA.
- Improvement of lymphatic pathology observed in 100% subjects in 24 months.
- Drugs used in MDA are capable of reversing Lymphatic pathology in children.
- This has strong implication on advocacy that will be useful to children and augment LFE.
- MDA can serve as Morbidity prevention tool in children and can also reverse early disease.

Complete reversal seen in 65.7% at 24 months, which was independent of age, symptomatic status & drug frequency.

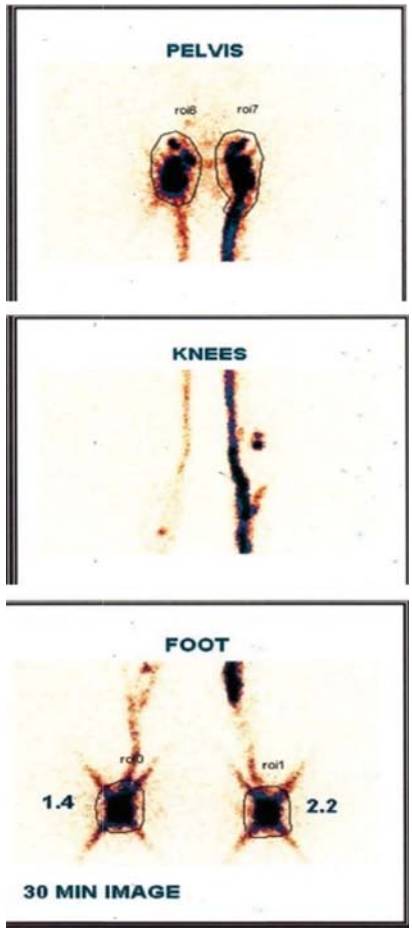
Application

The above information can be useful as a strong advocacy message to the programme for improving compliance among children. The study also adds a new dimension to MDA programme i.e, secondary prevention of lymphatic disease following *W. bancrofti* infection.

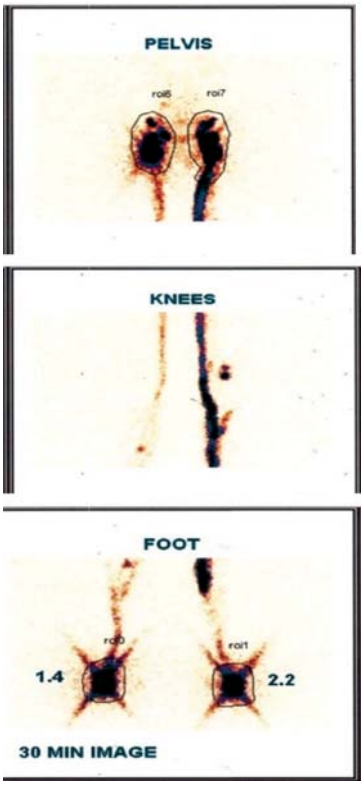
NORMAL LYMPHOSCINTIGRAM



LYMPHATIC ABNORMALITIES

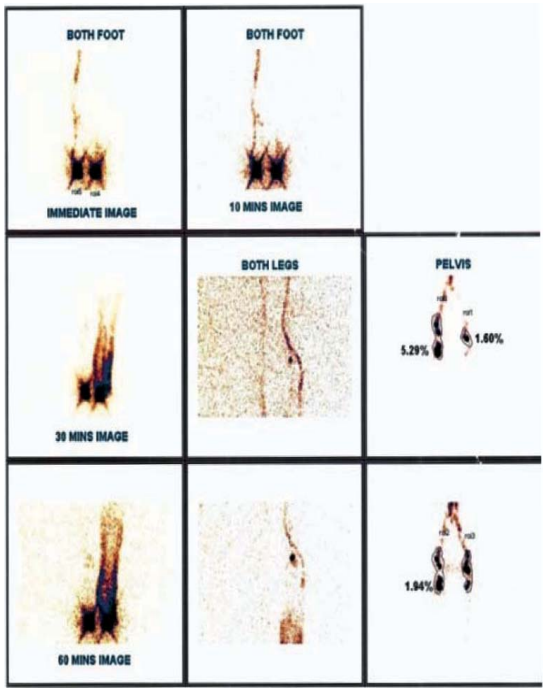


(ASYMPTOMATIC)

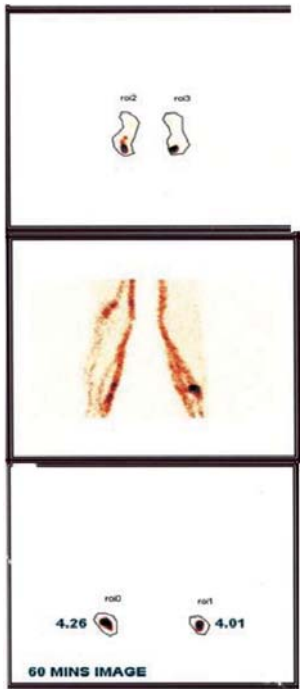


ABNORMALITES (SYMPTOMATICS)

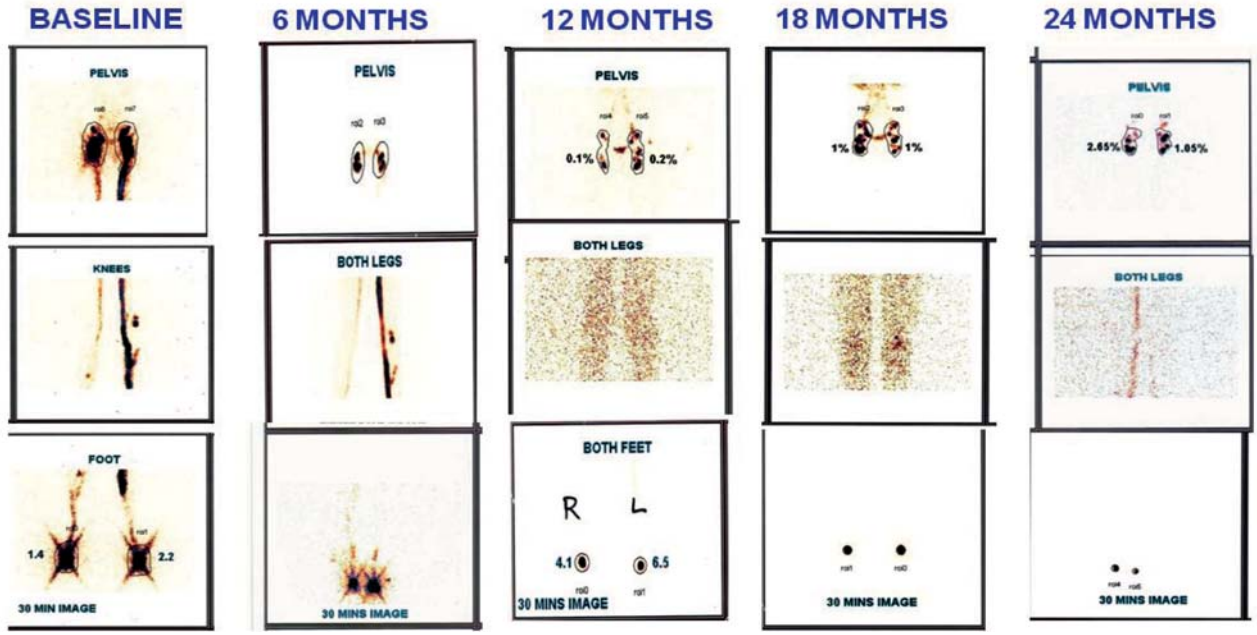
Case-A: 18 Yrs Female (Lymphedema)



Case-B: 15 Yrs Male (ADL)



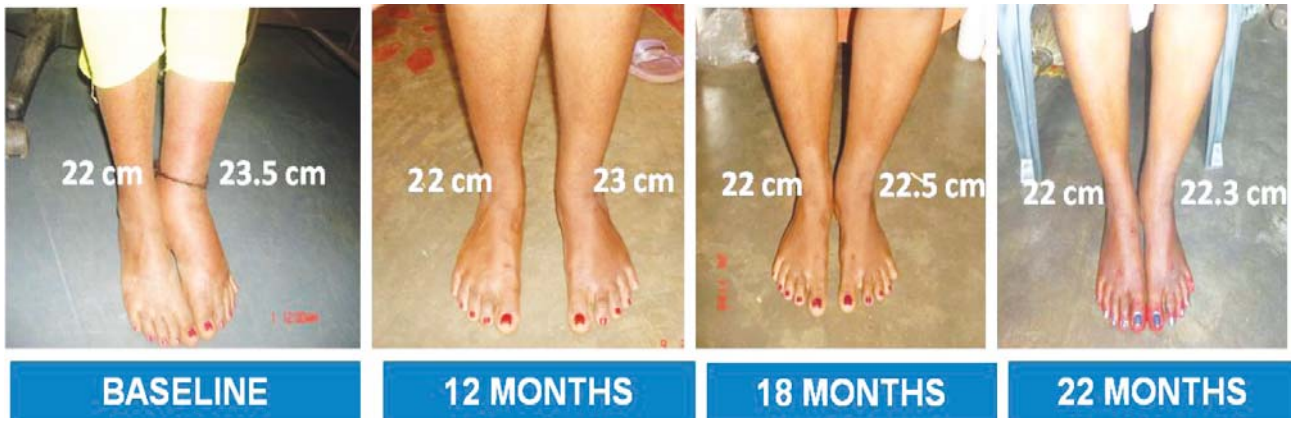
POST TREATMENT REVERSIBILITY



- Lymphatic flow obstruction on left leg at Baseline.

Complete reversal at 1 Year & sustained at 18 & 24 Months

POST Rx REVERSIBILITY (Symptomatic)



POST Rx-EFFECT ON LYMPHATIC PATHOLOGY (n=73)

Effect at different period	Improvement	Reversal
6 Months	70.8%	4.22%
12 Months	88.7%	21.1%
18 Months	98.5%	38.02%
24 Months (n=38)	100.0%	79.0%

No difference within: - Symptomatic Vs Asymptomatic & -Annual Vs. Biannual Dose.

POST Rx EFFECT ON MF & ADULT

	18 Months	24 Months
Mf Clearance	93.1%	96.2%
Adult (USG) Clearance	77.7%	85.7%
Og4C3 Clearance	96%	100%

5. Migration, poverty and access to healthcare: a multi-centric study on people's access and health system's responsiveness in fast-growing city Bhubaneswar.

Principal Investigator	:	Dr.A.S Kerketta
Co-Investigators	:	Dr. G. Bulliyya, Dr. D. Das
Starting Date	:	July 2011
Closing Date	:	July 2014
Duration	:	Two & Half Years
Funding	:	Extramural (ICMR)
(Extension	:	6 Months)

Intervention Phase:

Goal: To develop, implement and evaluate a supportive strategy of healthcare, which would achieve the desired levels of access to health care services by migrants living in fast-growing smaller cities in India.

Specific objectives:

To implement a supportive interventional package through the following components:

- Advocacy through findings of formative research at higher levels.
- Building partnership with potential people/ groups from community, civic society and health and non-health governmental departments, NGOs and CBOs.
- Advocacy, motivation and training to all levels of health care workers.
- Generating demand for healthcare at community level – use of community level capital / resources, empowerment of the community and facilitation of community participation through CBOs.
- Identifying and addressing the issues, based on the formative research that need to be intervened through above approaches.
- To assess the feasibility of executing this intervention.
- Identifying the prerequisites for implementing the model of intervention.
- Identifying obstacles in implementation of above intervention.
- To assess the impact of the intervention by process evaluation and impact evaluation.

Intervention site/clusters:

The two slums having 100-500 households namely Tuigutu / Jharanasahi basti slum (Mancheswar) and Tarini basti (Rasulgarh) were selected as per the protocol. The site selection was done in consultation with Chief Medical Officer of Bhubaneswar Municipal Corporation and the PPP consultant, NRHM, Govt of Odisha. Since in Bhubaneswar city the Urban health programme (UHP) has already been started involving 11 NGOs, of which 6 NGOs are getting technical support from Health of the Urban Poor (HUP) programme of USAID, it was suggested to select the intervention slum/ cluster under the UHP but not receiving any technical support or out of the HUP technical support. These selected slums were covered in the formative research study. All households of Tuigutu (including Jharanasahi basti) 304 and Tarini Basti 152, were included for intervention. Out of these two intervention clusters, one slum is having high tribal population & other is having mixed category people like Odia & Telugu of bordering area of Odisha. Two other clusters namely Line sahi and Chilipokhari having similar characteristics as study clusters were selected as control clusters.

Intervention Plan based on problems Identified through formative research:

The result of formative study conducted during 2012-13 in 125 slums of Bhubaneswar indicated low health care service utilization (45%) and complete ante natal care to be only 12.9%. Delayed identification & registration of pregnant women and overall low utilization of all the components of antenatal care services was observed. The reasons for this poor

service utilization are lack of awareness, odd opening time of health facilities and non availability of drugs. Based on the findings of formative research an intervention strategy aiming at optimal utilization of maternal health care through community participation and partnership approach was developed. The strategy encompasses following components: Quick assessment of the area to identify target population, advocacy, partnership and community mobilization and health care delivery. Intervention was conducted for a period of one year.

Quick assessment of the study area: That was done using both quantitative & qualitative method to identify pregnant women, lactating mothers & baby of 6 months or below and adolescent girl and to collect the information on health seeking and knowledge of adolescent girl on reproductive health and ongoing programme.

Advocacy:

Advocacy was done for both the partners and population. The advocacy to the key partners like Health Authority (BMC), Director and PPP consultant NRHM, NGOs involved in Urban Health Project (HUP), BBSR was done by dissemination of formative research findings through individual meetings. The partners suggested for Community Mobilization as the key components and RMRC has to coordinate the activities and prepare micro-planning and holding cluster level meetings involving all stakeholders of that clusters.

Partnership:

Partners like NRHM (PPP consultant), Health authority of Bhubaneswar Municipal Corporation, NGOs working in the area (VIKASH), CBOs like Basti unnayan sammitties, SHGs, Mahila mandal, local representatives, community leaders were involved in various stages of intervention strategy.

Formation of community advisory board (CAB):

As suggested by the partners to mobilize the participation of target group (women) in an effective manner CAB was formed involving active community members.

Additional helping hand at community:

Repeated meeting was conducted in intervention clusters with active involvement of all partners. CAB members advised for selection of Swasthya Sangini (SS) didi who hails from the same slum, literate, active, voluntarily agreed to participate, afford time to meet target group, coordinate link volunteer's activities.

Community Mobilization:

Community mobilization was carried out through door to door visit and holding group meetings in which the result of formative research was shared. Awareness on MCH services, ANC, Immunization, family planning and common health problems like malaria, filariasis, tuberculosis and ARI was done using IEC materials of Govt. Awareness with regards to organisation responsible for health and MCH care services for their area, contact persons (Link volunteers / ANMs), referral services (Available ambulance services) done. Local NGOs, CBOs and community leaders are involved and continued these activities.

Workshop / training:

Various training programme for the adolescent girl and link volunteer were conducted in a partnership mode.

(i) Training for adolescent girls four sessions in each cluster (once in three months) were held. Topic for the training was reproductive health & personal hygiene and current adolescent programme of IFA.

(ii) Training for link volunteers on identification of pregnant woman, tracking of the woman, basic antenatal, post natal care, essential new born care, breast feeding counseling, identification of danger signs for referral, immunization and family planning was done.

Health care delivery

(i) Access to health facilities including referral awareness on Anbulure service contect number of health workers in the area, place and organization responsible in health care services.

(ii) Health camp organized by NGO VIKASH facilitated by Local stakeholders and researcher.

Impact assessment:

Both quantitative and qualitative data were used for the evaluation.

The quantitative data on general health care access and health system's responsiveness, on antenatal / obstetric care and childhood immunization was collected using household questionnaire.

The qualitative data on the intervention process, its impact on health access was collected through in-depth interviews with key-informants, health system personnel and from partners involved like NGOs, Community based organization (CBO)s.

Indicators for assessment used:

Access of maternal child care services: ANC and other services available in the area, number of pregnant women identified to avail ANC, Number of women consumed Iron and Folic acid tablets and institutional delivery.

Conclusion

The study indicated a remarkable benefits of the partnership intervention strategy involving local NGOs, CBOs and health system. This collaborative approach could bring change in the community with respect to access health services. The community awareness on health facilities available in the area resulted in increased use of health facilities for general health services. With regards to antenatal care, health providers are visiting their slums regularly and providing IFA and immunization to the pregnant women and children. Thus the availability of IFA for pregnant women has been increased than the pre intervention period. Institutional delivery and other service like ambulance for referral are available. Health camps organized collaboratively in slums was very useful. People came to know about the various health programmes and services available for slum people by Govt. The supportive strategy of healthcare access undertaken collaboratively by local NGO, health system, community based organizations and RMRC brought significant change in health care access by this group of people. This partnership strategy can be replicated in other smaller cities in India.

6. Assessment of adolescent reproductive and sexual health programme in Orissa: Advocacy for intervention strategies.

Principle Investigator	:	Dr.G.Bulliyya
Co-Investigators	:	Dr.A.S.Kerketta
Starting Date	:	June 2011
Closing Date	:	August 2014
Duration	:	Three Years
Funding	:	Extramural (ICMR Adhoc project)

Objectives

The general objective is to evaluate the adolescent reproductive and sexual health (ARSH) program and adolescent friendly health clinic (AFHC) services through developing advocacy-based intervention in Orissa.

Specific Objective

(i) To assess the knowledge, attitude and behavior on reproductive health problems of adolescents

(ii) To assess the quality of care at Adolescent Friendly Health Clinics;

(iii) To assess the accessibility and utilization of health care services by adolescents; and

(iv) To devise plausible ways and intervene with package of services to explore opportunities for improving utilization of adolescent health services.

Background

Adolescence (10-19 Years) is a vital stage of growth and development. Adolescents in Odisha constitute 22% of population, there are estimated 37,75,262 adolescent girls in the state (Census 2011). It is a heterogeneous group, marked with physical, physiological, sexual and behaviour changes and their situation varies by age, sex, marital status, class, region and cultural context. A large proportion are out of school, malnourished, get married early, work in vulnerable situations, sexually active, and exposed to peer pressures. Adolescence is perceived to be healthy period of life because mortality is relatively low in this age group. Yet they face many challenges in their life, which are related to their health and inadequate access to health care. Recognizing unique *reproductive and sexual health* needs, Adolescent Reproductive and Sexual Health (ARSH) strategy launched as a part of Reproductive and Child Health (RCH-II) under National Rural Health Mission (NRHM 2005) Programme Implementation Plan (PIP 2006) focuses on reorganizing the existing public health system in order to meet their service needs. These services are in anticipation of positive influence on maternal and infant deaths, delay in age of marriage, reduce incidence of teenage pregnancy, unsafe abortions, unmet needs of contraceptive, sexually transmitted diseases and rapidly rising proportion of HIV positive cases. To achieve the goals, Adolescent Friendly Health (AFHC)/ SHRADDHA Clinics established at L-3 institutions to improve quality of healthcare, counseling services and to build a supportive environment. In order to achieve Millennium Development Goals (MDGs by 2015) 4 (reduce child mortality), 5 (improve maternal health) and 6 (combat HIV/AIDS, malaria and other diseases), it is essential to address adolescents' health.

Progress of Work

The study was conducted in two phases:

Phase-I: comprised formative research on evaluation of baseline process indicators of ARSH program and quality of care at AFHC. At the community level, health needs and accessibility of adolescent health services and stakeholder was assessed. Further situation analysis was made as the first step for systematic scaling up that involved analysis of data and identifying factors for promoting optimal accessibility and coverage of ARSH services.

Phase II: The findings of phase-I are used for strategy implementation based on indentifying gaps from baseline evaluation to improve ARSH services towards achieving the envisaged goals.

Study area

The study was carried out in Kalahandi and Rayagada districts, where 29% and 35% of women married before 18 years (DLHS-3, 2010). Multistage stratified random sampling adopted for selection of two identical blocks, sub-centres and villages. In Kalahandi district, Junagarh and Dharmagarh blocks while in Rayagada Jamdehipenta and Gunupur blocks were selected. In each study block, one sector covering 3 Sub-Centres having maximum SC/ST population was included. Data was collected through pre-tested questionnaires separately for household survey, adolescents, and married adolescent groups in the community. Nutritional status was assessed by anthropometric measurements and anaemia by hemoglobin estimation. Similarly stakeholder's questionnaires used for Auxiliary Nurse Midwife (ANM), Anganwadi Workers (AWW), Accredited Social Health Activist (ASHA), Panchayat Raj Institutes (PRI) and teachers. Further independent structured questionnaires were used for facility-based survey and healthcare providers such as Medical Officers, ICTC Counselors, Lady Health Visitors (MPHS-Female), MPHS-Male, ANM (MPHW-Female), MPHW-Male.

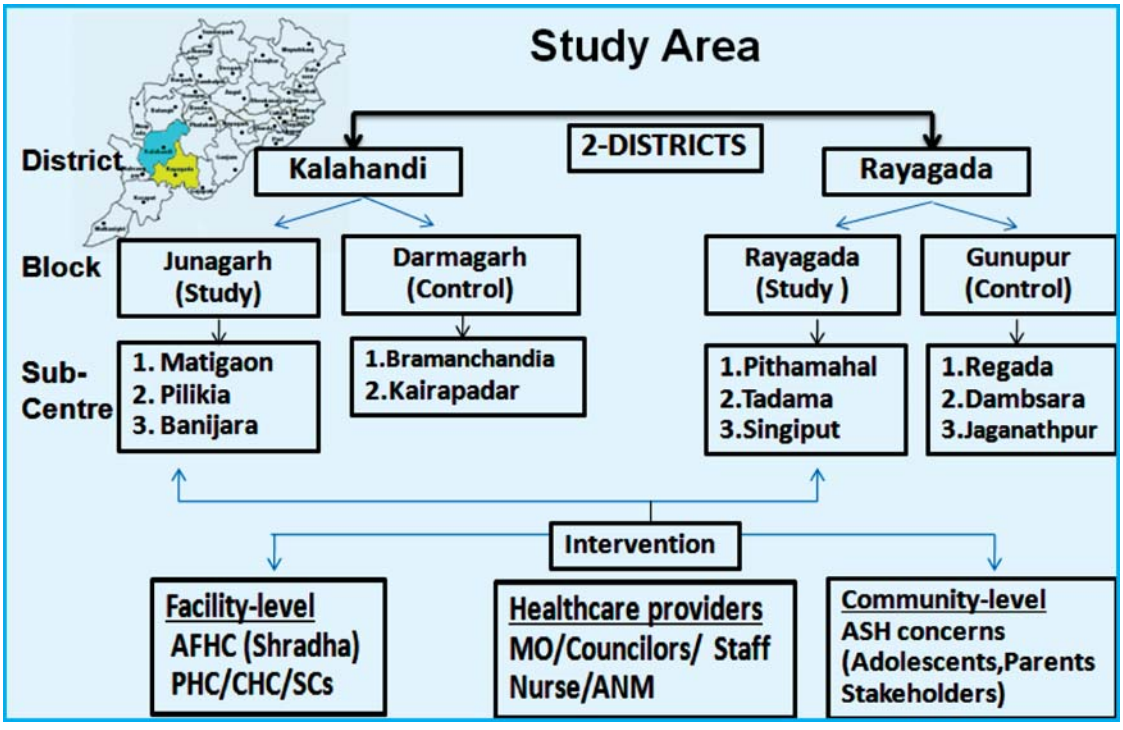
The baseline data included a total 1615 households (HHs) from Kalahandi (872) and Rayagada (743) in Rayagada districts covering two blocks in each district, Kalahandi (Junagarh and Dharmagarh) and Rayagada (Rayagada and Gunupur). From each study block 3 sub-centres

included in the study. A total 2087 adolescents were covered from four blocks.

Baseline indicators

The baseline data analysed for a total 1132 adolescents in Kalahandi (Junagarh 672, Dharmagarh 460) and 955 in Rayagada (531, Gunupur 424) districts respectively. Of total adolescents, married constituted 9.2% (male 7.0, female 10.4) in Junagarh, while in Dharmagargh (7.9%; male 2.0, female 9.5), Rayagada (8.9%, male 4.3, female 11.7) and in Gunupur (9.4%, male 3.0, female 16.3). Of married married adolescent girls 11-18% are pregnant while 9-15% lactating.

The baseline data revealed that awareness about ARSH problems among adolescents are found to be very poor in both the study districts. At community level, adolescents awareness in terms of their pubertal changes (10-23%), legal age of marriage (23-43%), consequences of teenage pregnancy (22-51%), menarche (11-44%) and consequences of menstrual hygiene (20-38%). Quite a few adolescents had the knowledge on RTI/STI (6-23%), symptoms (2-14%) and complications (2-9%). A majority aware about HIV/AIDS (40-63%), symptoms (6-37%), modes of transmission (43-57%) and prevention (33-52%), unmet needs of contraception (7-40%) and family planning (31-52%). The knowledge of adolescent programs, ARSH (0.7-3.3%) and AFHC are negligible (0.2-3%). Community health workers (AWW, ASHA and ANM) knowledge on ARSH issues poor at community level. The level of awareness and referrals is better among ANMs and AWW as compared to ASHA and LHVs. At AFHC level, quality of adolescent friendly services evaluated by a pre-tested scoring ranged from 19 to 38 of total 42 points. Service providers KAP on AFHC quality services are better in Dharmagarh, followed by Junagarh, Rayagada and Gunupur. The findings show responses from adults, youth and community leaders on several community social cultural aspects, knowledge, attitude and practices that negatively affect access to adolescent sexual reproductive health services and rights. The community members and service providers felt that it is inappropriate for girls to access ARSH services.



Implementation of intervention strategies

Advocacy strategies implemented for a period of 18 months after randomization of 4 blocks where baseline data collected and allocated to implement intervention in Junagarh in Kalahandi and Rayagada rural in Rayagada districts, whereas, Dhamagarh and Gunupur blocks taken as controls. In each block, 3 Sub-centres selected for intervention (Study Plan). Advocacy strategies implemented thrice orienting about the ARSH services to target adolescents, community health workers, and other stake holders in the community with the primary aim to improve the utilization of services by adolescents. Strategies for the project were focused to create a supportive environment for ARSH services for adolescents, strengthen the capacity of the public health system to offer adolescent-friendly health services accessibility for creating confidence and confidentiality, and increase awareness among members of the community about HIV / AIDS, STIs, contraception, and ASRH services.

Orientation training to community health providers

Orientation on ARSH program imparted twice to AWW / ANM / ASHAs on the occasion of monthly meetings such as VHND / Mamta Divas at their ICDS Sector or PHC / CHC. Adolescent health issues and concerns during the transit phase, adolescent growth and development (physical, psychological & social changes), conception & contraception process, knowledge on menstruation, personal & menstrual hygiene practices: health concerns for adolescents, RTI, ST), HIV / AIDS issues and concern among adolescents and ill consequences, early marriage and teen age pregnancy among adolescents, and its impact, nutrition and anemia among adolescents, a matter of great concern.

Community sensitizing on social issues

Community was sensitized on prevailing social issues, which are also very much effecting proper socialization and grooming up of adolescence. The community, situation, circumstances, peer pressure, imitating changing life style around them compelling the adolescent affecting, directly or indirectly, this group is very much vulnerable to such issues. Similar to other interventions, sensitization of community gatekeepers, involving young people directly in community mobilization, person to-person counselling, participatory learning, and action approaches were used in the outreach component that was found to be effective to improve service utilization. Local school teachers involved the better change agent who can inculcate better habit / knowledge and sensitize / aware the adolescents on social issues of gender discrimination and equity, which would enable an adolescent friendly environment around them.

Education and Counselling

Community-based adolescent peer-groups identified at the village level to raise awareness and sensitivity among adolescents with respect to ASRH services, in an engaging and entertaining manner, improving their health-seeking behaviour. Key activities conducted at peer-group are counselling on the issues of adolescent health, growth and puberty, early marriage, contraception, HIV / AIDS, reproductive tract infection (RTI) / STI, nutrition and mental health, discussions on the issues of adolescent SRH and rights and identified gender wise peer group leaders to discuss the adolescent issues and to seek health services.

Logistics supply

A wide range of advocacy IEC materials such as posters, pamphlets and flip charts developed specific to adolescent reproductive and sexual health issues that used in creating knowledge-awareness and positive behaviour changes among adolescents. Communication-education package disseminated information through group discussions, interpersonal communication with gender-matched trained health educators.

Monitoring and Evaluation

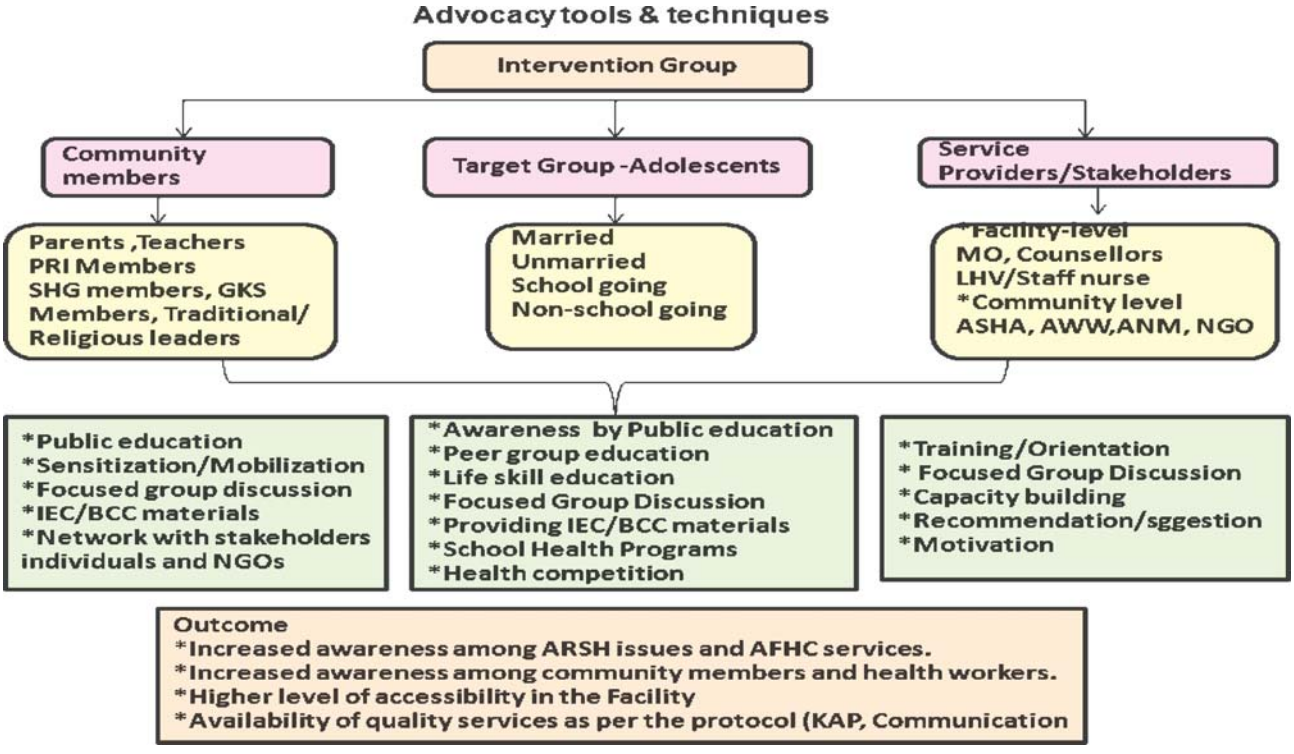
The strategy plan was followed for a period of 18 months with effective implementation and monitoring tools using process indicators of the programme in achieving the stipulated goals as endorsed in ARSH programme. Monitoring indicators in the project are mainly process oriented, the number of adolescent peer groups established, the number of adolescents visiting peer groups; the number training sessions for health-care providers conducted; the number of health-care providers reporting on ASRH; and the number of community gatekeepers who are sensitized to adolescents' needs. The interventions are monitored targeting adolescents (school going, non-school going and married), health workers, stake holders in the community for knowledge generation on ARSH, preventing methods and curative services accessibility at specific health facilities creating confidence and confidentiality.

Awareness

The strategy findings indicate that majority of the adolescents in study blocks had exposed to knowledge of the ASRH issues such as pubertal changes, legal age at marriage and contraception methods, RTI, HIV / AIDS. Out of these, a majority of the adolescents in both districts were aware of the site of clinic. Overall, the percentage of adolescents who were aware of the ARSH program and AFHC services being offered at a health-care facility was higher in Rayagada (3.3 vs 28.4% & 0.0 vs 52.5%) as compared to Junagarg in Kalahandi (3.3 vs 11.5% & 3.0 vs 20.49%). Further, those accessed to AFHC and satisfied with quality of health services are very poor. The findings also showed that most young girls age 10 - 19 years, do not have a place within their communities where they are able to visit and talk about relationships, sex, contraception, sexually transmitted infections and HIV / AIDS.

Utilization of services

Further, in both the districts, outreach workers of AFHC played some key role in spreading information on adolescent-friendly health services (3-



5%), while in Hosakote, in addition to outreach workers of the AFHC (3-4%), doctors (2%), ANMs (15%) and ASHAs (14%) also played a noteworthy role in spreading information. Results from the exit interviews illustrated that 3% of adolescents had accessed the AFHC at least once. In addition, out of

Table 1: Impact Assessment of adolescents on Knowledge and Awareness on ARSH Issues.

Study parameter	Kalahandi				Rayagada			
	Junagarh (Study group)		Dharmagarh (Control)		Rayagada (Control)		Gunupur (Control)	
	B.line	E.line	B.line	E.line	B.line	E.line	B.line	E.line
Number	672	911	460	270	531	880	424	561
Boys	35.7	35.3	38.3	50.7	42.9	47.8	47.8	44.6
Girls	64.3	64.7	61.7	49.3	61.1	52.2	52.1	55.4
Knowledge on Puberty/ Changes	24.0	75.2*	33.9	22.1	24.0	66.1	33.9	34.1
Awareness fertile age period	18.3	66.1*	14.3	34.1	38.3	75.2	16.4	22.1
Legal age of marriage for boys	23.4	72.5*	25.0	32.9	42.6	71.6*	23.9	37.9
Legal age of marriage for girls	28.3	78.6*	29.2	54.4	43.1	75.2*	31.1	33.1
Consequences of early marriages	44.8	53.2	22.2	23.6	51.2	65.2	23.6	24.3
Ever heard of contraception	44.9	75.5*	39.8	40.1	41.7	69.6*	21.8	23.7
If yes, known by any methods	86.1	87.5	60.2	71.2	83.0	82.0	74.0	70.2
Aware of any disease related to RTI /STIs	63.4	74.0	58.5	58.5	48.1	86.0*	36.7	37.2
Aware of HIV/AIDS	57.7	82.3*	43.0	43.0	39.7	85.1*	30.4	32.1
If yes, modes HIV/AIDS transmission	48.3	74.5*	41.2	41.2	44.2	78.3*	42.2	44.8
Know about Govt. programs on adolescents	53.7	74.6*	26.9	27.1	72.3	85.6	82.3	82.3
Receives Iron tables for anaemia control within 1yr	10.3	25.2*	6.5	13.3*	21.1	36.5*	9.9	10.3
Received deworming tables for within one year	0.4	2.2*	0.4	10.0	1.7	3.5	0.9	15.8*

Currently using sanitary pads	2.9	12.8	7.2	10.4	7.4	18.3	19.4	18.6
Aware of ARSH Program	3.3	20.4*	3.0	10.4*	0.8	28.0	0.7	21.5*
Aware of the (AFHC) "SRADHA"	3.0	11.5*	0.2	19.3	0.0	52.5*	0.2	2.4
If, yes know about the day & timings of 'SRADHA	0.0	8.3	0.0	1.4	0.0	51.2	0.0	1.2
Ever been referred / availed to AFHC / ARSH Centre	0.0	6.4	0.0	3.1	0.0	13.0	0.0	0.0
If availed, whether you are satisfied with the services	0.0	3.8	0.0	1.5	0.0	20.5	0.0	0.0

*Chi-square test, p<.005.

those adolescent who had visited at least once, reported that the AFHC staff / activities had motivated them to seek services at the ASRH clinic. Respectively, about 2-3% of the adolescents perceived positive change in the attitude of adults towards their reproductive and sexual health concerns during the last 2 years.

Quality of services

One of the criteria used to assess ARSH rights, is whether providers guarantee privacy and confidentiality when providing adolescents with services. While facilities in AFHCs had separate waiting and counseling rooms specifically for adolescents, some blocks lagged behind in Gunupur. Adolescents' perceptions of the friendliness of services further confirm inconsistent implementation. The quality of services improved consistently in each of the AFHC. Moreover, monthly adolescents attending AFHC increased over period of intervention in both the study districts.

Summary and Conclusion

The present study is the evaluation of ARSH programme and strategies to assess the impact of the intervention on awareness, utilization and quality of services for adolescent in the selected blocks of Kalahandi and Rayagada districts, using multiple sources of data. The findings revealed that advocacy intervention has considerable impact on awareness of adolescent health issues, accessibility of utilization of adolescent-friend health services in facilities, as well as their uptake. There is an unmet need for longer-term follow-up intervention assessments, which could provide data on whether or not the changes sustained through limited period would be further evaluated over time. Further research is also needed on evidence-based program implementation and dissemination to increase youth and parent program participation within the contexts of school and work obligations, as well as cultural constructs and social norms which deny the need for sexual health knowledge prior to marriage. Therefore, the intervention activities to be undertaken in a very specific context, so that the public health system could evolve strategies to improve its reach and enhance service utilization. Although the majority of adolescents were unsatisfied with the services at adolescent-friendly health services, there is a need to strengthen the privacy and confidentiality components and to improve the physical environment at the clinics. With the largest cohort of adolescents, it is essential to continue to carefully design interventions and review their impact to assure that adolescents have the tools to make informed and healthy choices concerning their sexual and reproductive health.

Table 2: Quality of health care services accessed at Adolescent Friendly Health Clinics.

Quality of services at AFHC	Kalahandi district				Rayagada district			
	Junagarh		Dharmagarh		Rayagada		Gunupur	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Designated AFHC 'Shraddha' board displayed	0	1	1	1	1	1	0	0
Open weekly on specific Saturday/Monday	1	1	1	1	1	1	0	0
ARSH information display at prime locations	0	1	1	1	0	0	0	0
Availability of ARSH oriented Medical Officer	0	1	0	1	1	1	1	1
Availability of ARSH oriented Health Worker	1	1	1	1	0	1	1	1
Confidentiality policy displayed in Clinic	0	1	0	1	0	0	0	0
Separate room provision for consultation	1	1	0	1	1	1	0	0
Provision ensuring auditory/visual privacy	1	1	0	0	1	1	0	0
Height/weight measuring tools available	0	1	1	1	0	1	1	1
Provision for vaccination (TT) available	0	1	1	1	1	1	0	0
Pregnancy test strips available	0	1	0	1	1	1	1	1
Rapid Plasma Reagent kits for syphilis	0	1	0	1	0	1	0	0
Condoms - at least 100 pieces available	1	1	1	1	1	1	1	1
Oral Contraceptive Pills available	1	1	0	1	1	1	1	1
Emergency Contraceptive Pills available	1	1	0	1	1	1	1	1
IEC material available for adolescents	0	1	0	1	0	0	0	0
Posters/pamphlets on ARSH displayed	1	1	1	1	0	1	0	0
ARSH Guidelines available	0	1	1	1	0	1	0	0
Total scoring (18)	8	17	9	17	10	15	7	7








7. Effectiveness of a bivalent, killed whole-cell based oral cholera vaccine (Shanchol®) delivered through community-based mass vaccination campaign in a high-risk population in India: Matched case-control studies.

Principal Investigator : Dr. A.S Kerketta
Co Investitgator : Dr. S.K. kar &
Dr. H.K. Khuntia
Starting Date : March 2013
Closing Date : April 2014
Duration : One Year
Funding : Extramural, IVI Korea

Objectives:

To evaluate the individual-level protective effectiveness of one or two doses of modified, bivalent, killed, whole cell-based OCV against culture-confirmed cholera episodes, severe enough to seek a formal health care.

Design and Methods

Following the mass immunization with oral cholera vaccine (Shanchol®) in Satyabadi block during May-June 2011, protective effectiveness of community-based mass vaccination campaign with one or two doses of modified, bivalent, killed, whole cell-based OCV was measured based on a case-control design approach. Vaccine effectiveness was measured against culture-confirmed cholera episodes that are severe enough to seek a formal health care.

Cases were captured based on the intensified healthcare provider based surveillance of diarrhea, with cholera culture confirmation. Five healthcare facilities that serve the catchment population were included in this intensified surveillance.

Age matched controls were selected in a random manner. Vaccine effectiveness was measured by the odds of vaccination in cholera-confirmed cases relative to the odds of vaccination among controls while adjusting for significant confounders.

A bias-indicator study was conducted in parallel to assess whether biases play an important role in findings (vaccine effectiveness) of primary case-control study. Each week during the main case-control study, up to three non-cholera diarrhoea cases were selected in the bias-indicator study and 4 matched controls for each case, was selected based on random sampling.

Sample size assumptions:

The protective effectiveness of a modified, bivalent, whole cell OCV would be 65% following one or two doses. With an attack rate of 1.5 per 1,000 persons and assumption of 65% of vaccine coverage with a protective effectiveness = 65%, a total of 48 cholera cases are likely to be captured in one cholera season. This number can achieve at least 80% study power under the following assumption.

- Alpha = 0.05 1-tailed
- Beta = 0.2
- Correlation coefficient for vaccination exposure between cases and matched controls (phi) = 0.2
- Number of matched controls = 4
- Vaccine coverage = 65%
- Vaccine protection = 65% (OR = 0.35)

Methods

The source population for cases and controls in both the primary and bias-indicator studies were the residents of the coverage areas of OCV study. The focal time for cases and their matched controls was the date of onset of the diarrhoeal illness in the case.

Cholera Surveillance

In the project area of Odisha State, cholera surveillance system already exists, utilizing the passive reporting from the nearby public healthcare facilities and laboratory confirmation at the RMRC. For this case-control study, effort was made to capture as many eligible cases as possible five healthcare facilities that

serve the catchment population were participated in the case-control study, including the primary health care centre (s) and Area Hospital in Satyabadi block and the Infectious Disease Hospital (IDH) and Paediatric ward of Chief District Medical Office (CDMO) in Puri.

Residents of project area presenting to a study facility with acute, watery (bloody or non-bloody) diarrhoea were invited to participate in this case-control study. A registry was located in each facility to record any diarrheal patients whether or not coming from study area. Verbal informed consent was obtained and data was collected based on a pre-structured questionnaire. Then rectal swab was collected and the details were recorded in the lab transmittal form. Treatment was provided to patients according to existing guidelines by the local medical doctor. Inoculated swabs were placed in Cary-Blair media and transferred to the RMRC lab within 24 hour period following the collection.

Laboratory case confirmation

The WHO recommended procedures were implemented to identify V. cholerae. Rectal swabs were plated directly onto Eiken thiosulfate citrate bile salt sucrose (TCBS) agar as well as after enrichment in alkaline peptone water (APW) for 6 and 20 hours (pH 8.6, 37OC). After overnight incubation, suspected colonies from TCBS were tested biochemically and agglutinated with polyvalent, Ogawa and Inaba antisera. Biotyping of O1 isolates was done with chicken erythrocyte agglutination tests and with determination of polymyxin sensitivity. Non-agglutinating strains were tested with antiserum to V cholerae O139 strain. V. cholerae isolates were tested for susceptibility to the following antimicrobials: tetracycline, erythromycin, furazolidone, trimethoprim-sulfame thoxazole, ciprofloxacin and norfloxacin.

The Laboratory Transmittal Form with complete report was sent to the project office on a daily basis. In the laboratory, registry was maintained for each rectal swab received.

Selection of cases

The focal time for cases was the date of onset of the diarrhoeal illness in the case. Selection criteria for cases of the main case-control study were as follows:

- Giving verbal informed consent / assent, or in the case of minors, a parent or guardian give informed consent to participate in the study
- Living in the study area since the start of the mass vaccination
- Submitted a faecal specimen
- Whose residence could be located
- Whose stool specimens yield V. cholera O1 or O139
- Belonging to study population through census database

Once a diarrheal patient was confirmed as cholera case, a follow-up home visit was made on day 7 following the presentation to a health facility. A pre-structured questionnaire was used to collect additional information.

Study staff who enrolled the cases and controls and obtain information on vaccination status and other exposure variables was not aware that a separate indicator study was being conducted, and was also unaware of whether *V. cholerae* O1 was cultured from the case and of how the information on vaccination status was used in the analysis.

Selection of Controls

Controls are defined as a random sample of the population in the same age groups as of the index case and did not had diarrhoea (self-reported or based on perception of care-taker, in case of children) in last 7

days from the date of onset of the diarrhoeal illness of their index case but rectal swabs should V.cholerae negative.

Bias indicator study

The goal of the bias-indicator study was to assess whether there is an expected absence of vaccine protection against non-cholera diarrhoea. An absence of vaccine protection in the bias-indicator study was interpreted to suggest an absence of bias in the primary study. During the main case-control study, diarrhoea patients that were positive for *shigella* were selected cases and were compared to *shigella* negative diarrhoea continues.

Ascertainment of vaccination history

The history of receiving one or two doses of Shanchol® during the government-led mass vaccination was ascertained by the review of electronic vaccination registry in addition to the confirmation of vaccination cards during home visits. Only the presence of vaccination cards or confirmation through electronic vaccination registry was used in confirming the vaccination history, although recall of vaccination was recorded on the data collection form.

Results:

A total of 3678 acute diarrhoeal cases were encountered in five health facilities of Puri district. Of which the rectal swab could be collected from 3488 cases who consented for the sample collection. The samples were collected and analysed at RMRC. The result indicated a total 491 samples found to be positive for V cholera. Of these 271 were from IDH Puri, 107 from CDMO Puri, 84 from area Hospital, 11 from Alagum CHC and 18 from Sukala PHC. of the total positive cases 44 were from study area and were having ID number in previous vaccination registry. The results were shared with Chief District Medical Officer for reference and other medical officers for management of the cases according to guideline for the various entero pathogens.

The 44 *V. cholerea* cases and 366 *V. cholerae*-negative hospital-controls were considered for the per protocol analysis. The cases and controls were comparable for most population characteristics. Cases were less likely to be under 15 years of age than controls (15.9% vs. 27%, p=0.0011) and cases were more likely to have traveled further than 2.5 kilometers to seek health care than controls (47.7 vs. 27.0, p=.0012). The adjusted vaccine effectiveness for residents that received two doses 69.0%(95%:14.5% to 88.8%)cl For the bias indicator analysis, there were 19 laboratory-confirmed *Shigella*-associated cases and 606 non-*Shigella* cases. Shigella-associated diarrhoea cases were more likely to be male than female, (73.7 vs. 57.7%, p<0.0001) and to reside further from a health care facility (57.9 vs. 31.0, p=0.0012). There was no statistically significant association between *Shigella* risk and cholera vaccine doses.

Conclusion:

The Oral Cholera Vaccine Shanchol piloted in Odisha, in a mass campaign mode is found effective in preventing cholera associated diarrhoea with a protective effectiveness of 69.0% for people receiving 2 doses of vaccine. This vaccine may be implemented in cholera endemic areas of state as well as in the country to prevent cholera and related mortality.

8. Performance of Light Emitting Diode microscope in different settings for a TB diagnosis: a multi-centric study.

Principal Investigator : Dr. D. Das
Starting Date : November 2013
Closing Date : October 2014
Duration : One Years
Funding : Extramural (ICMR)

Objective

To evaluate the performance of LED Flouroscence microscope in different settings for TB diagnosis

Progress of Work

The study was being carried out at Capital Hospital, Bhubaneswar from November 2013 to October 2014. Clinically suspected pulmonary TB patients (new or previously treated) attending Designated Microscopy Centre were requested to take part in the study. The sputum samples of those patients were collected from DMC after the DMC, LT completed his sputum smearing for AFB microscopy. A structured questionnaire was being used for assessment of treatment history and patients were either identified as new or re-treatment cases and cross checked with TB number. The samples were processed at RMRC tuberculosis laboratory for microscopy and solid culture by Nalc- NaOH method. For microscopy two direct smears each per sputum were made and two deposit smears were made after processing for solid culture. The smears were stained by both Ziehl-Nelsen and Auramine-Phenol method and examined by conventional light microscopy, Fluorescence microscopy and LED fluorescence microscopy. The processed deposit specimen was inoculated in to two Lowenstein Jensen (LJ) medium and one LJ medium containing Paranitrobenzoic acid (PNB) for isolation of mycobacteria. The identities of the isolates were made by growth rate, colony morphology, PNB susceptibility, catalase and niacin tests. Drug susceptibility testing (DST) was performed by the economic version of proportion method for the following drugs at the concentrations indicated: Streptomycin (SM) 4 µg / ml, Isoniazid (INH) 0.2 µg / ml, Rifampicin (RMP) 40 µg / ml and Ethambutol (EMB) 2 µg / ml. The critical proportion for declaring a strain as resistant to the drugs was 1%. Internal quality assurance for DST results was performed using two strains, one susceptible, H37Rv and one fully resistant strain (resistant to SHRE) of *M. tuberculosis* provided by NIRT, Chennai. MDR-TB was defined as TB caused by bacilli showing resistance to at least isoniazid and rifampicin. Written informed consent was obtained from all the patients. The Ethical Committee of RMRC, Bhubaneswar approved study protocol.

A total number of 1362 sputum samples were collected from Capital Hospital, Bhubaneswar during the study period. It was observed that about 20% smears were found positive by LED FM in comparison to 16.5% by ZN microscopy. Out of 60 smears graded as 1+ by LED FM, 5, 16.7, 48, 10 and 20% of the smears were graded as 3+, 2+, 1+, scanty and negative by ZN microscopy respectively. Whereas among the 63 smears graded as scanty by LED FM, 60.3% of the smears found negative by ZN microscopy and 1.6, 23.8 and 14.3% of smears graded as 3+, 1+ and scanty respectively. Only 0.6% of smear negatives by LED FM were found positive by ZN microscopy in comparison to 4.7% of negative smears by ZN microscopy were found positive by LED FM.

While comparing the microscopic techniques with the culture technique (gold standard) (Table-1) it was found that 78.8% and 67.8% smears positive by LED FM and ZN respectively were became culture positive. It was also observed that 2.8% and 1.8% smears positive by LED FM and ZN microscopy respectively could not yield any growth in LJ medium up to 8 weeks of incubation excluding slants with contamination or non tubercular mycobacteria.

Conclusion:

LED FM compared to ZN, detects higher smear positives and can be used as an alternative.

Other Scientific Activities

1. Development of integrated vector management for demonstrating control of co-exiting mosquito borne diseases such as malaria, filariasis and chikungunya in Nayagarh District of Odisha.

Principal Investigator : Dr. N. Mahapatra
Co-Investigators : Dr. R. K. Hazra
Mr. N. S. Marai
Starting Date : April 2012
Closing Date : March 2014
Funding : Intra Mural

Rationale

Several vector control programme targeting specific vector borne diseases like filariasis, malaria and Chikungunya are being operated in the country, while the vectors that transmit these diseases are prevalent in and around the households where population resides. There are lots of similarities in those causative vectors bionomics and habitats. Hence comprehensive strategy will help in controlling the vector population and transmission of the above three diseases which will be feasible, less laborious, and cost effective.

Thus the study is planned to be carried out in Nayagarh district where Malaria, Filariasis and Chikungunya are prevalent with the following

Objectives

1. To study the bionomics of the vectors of co-existing mosquito borne diseases such as malaria, filariasis and Chikungunya.
2. To develop evidence based, location specific and technically sound vector control strategies to reduce the prevalence of co-existing mosquito borne diseases.

The strategy thus developed, for appropriate mosquito control measures, will be more effective, economical, safe with minimal disruption to the local environment and simple for application

Kural village of the Odagaon PHC of Nayagarh district (Fig.1) was selected as study site which showed co-prevalence of malaria, filariasis, chikungunya as per the Govt. data. Mashabari village was taken as control.

The initial vector survey was intensely carried out in the selected population reporting all the three diseases to assess their density and bionomics to generate data on transmission indicator which will be compared after intervention.

Prevalence of diseases:

Epidemiological data collected from the District Health Services, showed prevalence of Malaria: Slide Positivity Rate-7.8%, Filariasis: microfilaria rate- 6.8%, Chikungunya: attack rate-10.5% in Kural village.

Salient findings

1. Seasonal Prevalence of the vectors

The entomological survey conducted,showed, *Cx.quinquefasciatus, An.annularis and Ae. aegypti* showed highest density in winter where as **d**ensity of *An.culicifacis and Ae.albopictus* were highest during rainy season. Significant variation in the density of *Cx.quinquefasciatus ,An.culicifacies and An.*annularis were seen in between summer and rainy season.

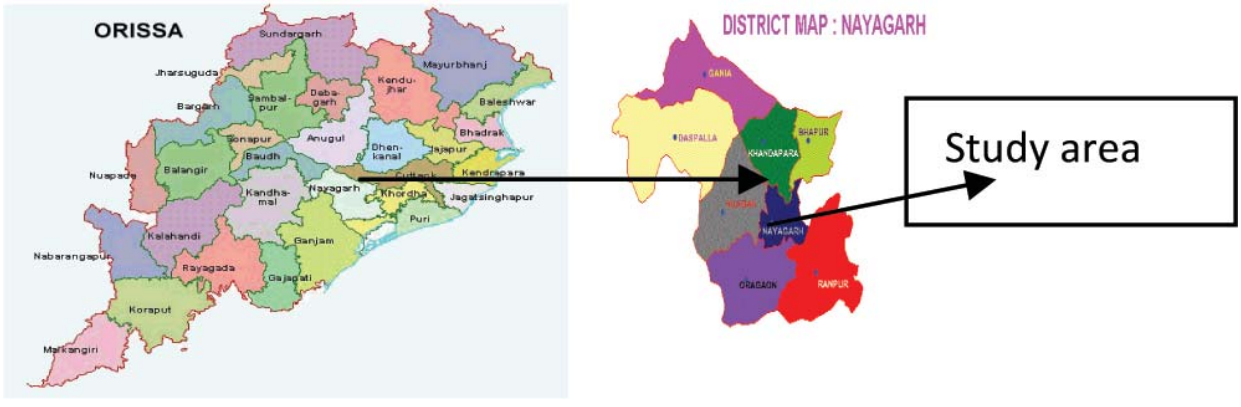


Fig.1: Odisha map showing the study area.

2. Abdomination condition of vectors

- High un fed & freshly fed Population Indicates the Vector preference to indoor resting. Accordingly it suggests a control measures to intensify the Indoor Residual Spray**(IRS)**

3. Transmission

3. High Transmission of Filariasis (Infectivity rate 1.97 %)and Malaria was observed with sporozoite rate of 1.2 % in *An.culicifacies* and 0.31% in *An.annularis*

4. Sibling Identification.

An.culi A,B&C were found to be prevalent and Presence of An.culi C indicates **for IRS** as its bites during evening.

5. Insecticide Susceptibility

All the vectors are **susceptible** to Deltamethrin

6. Larval breeding-

- Cesspit was the major breeding spot of *Cx.quinquefasciatus.*
- Rice field contributes 57% of the breeding of *An.culicifacies* and *An.annularis.*
- Earthen pot was found to be the major breeding spot for Aedes
- Amongst all different breeding sites 30% are common to all the three disease vectors

4. Larval Indices

- The HI, BI and CI of both Aedes Species are higher than the recommended value
- **Community awareness**
- Meetings were held with Sarpanch, Wardmembers ASHA, ANM and GKS membersand volunteers to encourage them to participate in the control programme.
- Both Live demonstration and visual aids of various stages of mosquito (egg, larva, pupa, adult)and adult breeding spots were shown to the students of the school. This encouraged the students to take part in the control prograame.
- **Development of Intervention strategy**

Basing on the above informationThe intervention strategy was developed in consultation with state DMO, state entomologist and VBD Consultant**.**

- Meeting were held with ward members, health supervisors, ASHA GKS member were held**.**
- Panchayat will be taken as Operational Unit as Sarpanch can better facilitate the programme
- **Intervention strategy**
- The following intervention strategy is being developed.
- 1. Chemical control - use of insecticide treated bed net and impregnation of community bed net with synthetic pyrethroid
- 2.Environmental management and source reduction
- 3. Biological control - Larvivorous fish
- identify volunteers in their ward for taking training on impregnation of net.

Conclusion:

Implementation of the above strategy and monitoring will be a useful tool for controlling the vector of filariasis,malaria and Chikungunya .

2. Establishment of Biomedical Informatics Centre (BIC).

Coordinator(s) : Dr Sapna Negi &
Dr N Mahapatra
Duration : Five Years
(April 2013 –March 2018)

It is established under the umbrella of the task-force project on 'Biomedical Informatics Centres of ICMR'. The main objective of establishing the facility is to promote and support informatics in medical research by giving support in identifying genetic loci associated with diseases of national interest such as diabetes, cancer, stress, mental illnesses *etc.* in Indian population, developing solutions for controlling pathogens causing diseases of national interest such as Tuberculosis, Malaria, and AIDS etc. ,developing a national repository of clinical information / data, high-throughput data, genotype and phenotype and promoting applications of cutting-edge technologies in medical research.

The civil and electric work related to establishment of infrastructure in rooms allotted for the Biomedical informatics centre has been completed on April 2014. Under this, two rooms has established with the complete online UPS facility using the available facility. One work station, 3 desktops (1 windows and 2 linux systems), one printer and one

scanner has been ordered for this centre of which one desktop (windows) has been procured. Space for further expansion of the centre and for future server has been considered. Renovation and electrical fittings undertaken by CPWD is complete. Recruitment of staff which includes scientist II (one post), Scientist I (one post), Research Assistant (one post) one post of lab attendant has been done. Indent for a separate UPS facility has been put and is being processed for procurement. Meanwhile facilities for LAN networking are also being established.

During the period under report under objective 1 an MSc dissertation study on "Interpreting the complex network of genes associated with Type II diabetes and function of their polymorphisms using insilico analysis" was carried out. In this study functional analysis of SNPs collected from Genome wide Associated SNPs of diabetes mellitus type II was carried out using GWAS catalogue and gene networks of the associated genes was established using freely available softwares. Damaging and non damaging nature of SNPs was assessed using online software PolyPhen and SIFT and as per Objective 4 to promote applications of cutting-edge technologies in medical research…" training is being provided to 18 pre-PhD students and 1 Msc dissertation students on the genomic and proteomic database resources and softwares available online.

3. Recognition of TB Lab as National Reference Laboratory (NRL).

Principal Investigator : Dr.D Das

The Central TB division approved Tuberculosis Culture and DST laboratory of RMRC, Bhubaneswar has been designated as National Reference Laboratory in the month of October 2013. The laboratory has been accredited by Central TB Division for 1st line anti TB drug susceptibility testing by solid culture and Line Probe Assay. For monitoring, supervision of RNTCP work 10 states namely Odisha, West Bengal and 8 North East states were included under the new NRL. During this period the centre has initiated onsite evaluation visits to Odisha, West Bengal, Sikkim, Meghalaya and Assam to assess laboratories involved in RNTCP work.

4. Organization of Symposium on "Biomedical Research in Medical Institutions- 2014"

Coordinator(s) : Dr Sapna Negi Dr AS Kerketta, Dr B Dwibedi and Dr N Somalkar

In order to attract the medical faculties of this region to the research a symposium was organized and concept proposals were invited to be submitted to ICMR for consideration of developing into full proposals for funding. In response to it 55 concept proposals were received from Medical Institutions like AIIMS, Bhubaneswar; VSS medical college, Burla; SCB medical college, Cuttack; MKCG Medical college, Berhampur; IMS & SUM hospital, Bhubaneswar; LV Prasad Eye hospital, Bhubaneswar; and sent to ICMR. A review committee was formed by ICMR for scrutinizing these concept proposals. Total 28 concept proposals were selected and a symposium was conducted, under the chairmanship of Dg, ICMR, at the centre on 25th March 2014 for reviewing of full proposals by ICMR expert committee. 22 presentations were made during the symposium and comments for improving the research proposals were made by the review committee. The comments were communicated to all the PIs and they were asked to modify their proposals as per the expert's comments.

Future Plan

The modified proposals will be received by 30th June 2014 from PI's of 22 full proposals presented in the symposium and will be sent to ICMR for further screening by expert committee for funding. Those proposals which were not selected have been asked for modifying their concept proposals as per expert comments during the symposium and resubmit for consideration. The comments have been sent to the PIs for necessary action.

5. Hemogobinopathy detection among patients from Government hospitals of Odisha.

Principal Inestigator : Dr. Sapna Negi
Starting Date : April 2012

As a part of diagnostic service to the public haemoglobinopathy testing of the referred cases from Government Hospital was carried out during 2013-2014, with intramural funding. The objective of this activity is to support Government Medical colleges of the State where there is no facility for these tests. Under this a total of 240 patients have been tested and clinical report has been given to the Hospital authorities.

During this year out of a total 240 referred patients from Capital Hospital and Municipality hospital, Bhubaneswar, tested for haemoglobinopathies 80 were normal, 44 β-Thalassemia trait, 58 Sickle cell trait and 45 Sickle cell disease, 4 β-thal major, 2 Hb E trait, 1 HbD heterozygous, 4 Hb E β-thal and 2 were found to be with hereditary persistent HbF disease (HPFH).

6. Support to Odisha state on Programmatic Management of Drug Resistant TB.

Principal Investigator : Dr.D Das

The centre is providing solid culture based support to MDR TB follow up cases under Programmatic Management of Drug Resistant TB for seven tribal districts of Odisha under this programme. Sputum samples of MDR TB patients undergoing DOTS Plus treatment were sent to RMRC, Laboratory by the District Tuberculosis Officer from the respected districts using courier services. On arrival of samples at RMRC, the sputum samples were processed by Nalc-NaOH method for culture and a deposit smear was made for ZN staining for AFB. The processed specimen was inoculated to two LJ and one LJ-PNB slants. The growth of mycobacteria were observed up to 8 weeks. The results of microscopy and culture were communicated electronically to concerned DTO and state TB officer. Up to now 104 sputum samples from Seven districts were received and results of 95 samples were communicated to the concerned DTO. Growth of mycobacteria was observed in two sputum samples so far. The work is in progress.

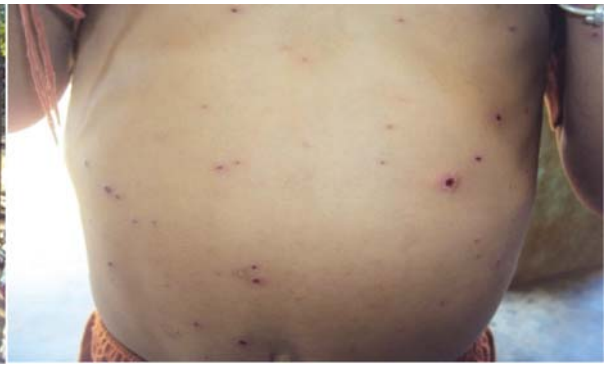
7. Epidemic investigation

Team Leader: Dr. N.M Somalkar

(a) An outbreak investigation of JE in tribal area of Keonjhar district: An outbreak of Acute Encephalitic Syndrome investigated in two villages of Keonjhar district in Nov. 2013. Sudden death of 7 children in age group 3 months to 5 years occurred in one village. Total 78 blood samples and 3 CSF samples collected. 14 blood samples Ig M +ve for JE virus. JE vectors were found in villages during survey.

(b) An outbreak of Chickenpox investigated in three villages of Rayagada district in Dec. 2013. 39 blood samples were collected from 56 cases of Chickenpox. Total 24 cases were found Ig M +ve for Chickenpox. Primary case in this outbreak was from Ashram School.

(c) Investigation of Chronic Kidney Disease in Cuttack and Balangir district: A camp based survey for CKD was conducted in all six villages of Balangir district from 11 to 12 June 2014. Investigation and treatment records of reported cases including deaths were reviewed in detail by the team along with the team of district health officials and CHC MO. Other suspected cases and willing males and females of the affected households were also examined. Out of six affected villages with CKD, Dhauradadar village



having familial inherited Polycystic Kidney Disease as the problem while in other five villages, 34 cases having mixed picture of Malaria induced ARF, Kidney stone and CKD as diagnosed clinically and on USG is observed for which detailed investigation including normal individuals for identification of mild grade CKD cases is required.

Team Leader : Dr. N.Mahapatra

(a) Investigation of JE Outbreak in Keonjhar: In last week of November 2014**,** there were six deaths in the village Swammundasahi of Swampatna Block which is 45 kms away from the Keonjhar district head quarter. A total of 19 blood samples from the children were collected by the state Govt and processed at RMRC, virology department by NIV IgM kit. Fifteen samples (15) were positive for IgM.

During the survey by the team a total of 84 suspected cases and contacts of the deceased one were enquired. Among these, 79 blood samples were collected and three CSF samples were collected. Out of these 79, 61 samples were from Swampatna village of Patna block. Rest, eighteen samples were from Dehuriposi village of Ghtgaon block. Fourteen samples (14) were positive for IgM(12 from Patna and 2 from Ghatgaon block).

Entomological survey revealed the presence of *Cx.vishnui* group of mosquitoes along with *An.subpictus*, *An.vagus*, *An culicifacies*, *An fluviatilis* and *Mansonia uniformis*. A total of 367 *Cx. vishnui* group of mosquitoes were collected and they are under process for detection of JEV virus.

Suspecting the death might be due to the JE infection .The collector of the district had ordered to capture all the pig from the affected village as well as from the near by villages and left them in far away forest. So during our survey we could not get any pig. The collector of the district had captured all the pig from the affected village as well as from the near by villages and left them in far away forest. So during our survey we could not get any pig.

Future Plan

Epidemiological investigation, entomological investigation will be continued along with pig surveillance. Seasonal variation of vector population, resting and feeding behavior and human blood index and virus detection will be conducted to know the transmission pattern of virus during inter epidemic situation.

(b) Investigation of Dengue Outbreak in Cuttack: An outbreak of Dengue fever occurred in Cuttack city of Odisha during mid of September 2013. On request of the state Govt, an entomological survey was conducted in the affected wards to find out the vector prevalence and transmission, so as to control the outbreak.

The team went to the affected wards. The objectives of the project were explained to the ward member along with local leaders in order to report and co-operate the team during various entomological, epidemiological and demographical survey. During the survey, local volunteers were sensitized to take part in source reduction in controlling dengue in their villages.

A total of 235 adult *Ae.aegypti* and *Ae.albopictus* mosquitoes were collected to see the mosquitogenic condition. The larvae and adult were brought to the laboratory for further processing. The larval index and Breatue index (BTI) were more than recommended value i,e (>5) Dengue 2 virus was detected only in one *Ae.albopictus*. The information was communicated to the Collector State Govt to give emphasis on source reduction to control dengue.



Works of Ph.D Scholars

1. A study on neurotropic viruses causing encephalitis in adults and children of Odisha.

Name : Sushil Kumar Rathore
Guide : Dr. B. Dwibedi
Status : SRF (ICMR)
Date of Joining : 2009

Introduction:

Encephalitis is one of the life threatening diseases. It is the inflammation in the brain parenchyma resulting from direct viral invasion or hypersensitivity initiated by virus or another foreign protein. Sudden fever, stiff neck, photophobia, confusion and convulsions are some characteristic symptoms of viral encephalitis. It can occur in the individuals of all age group. Generally children are more affected than adults, so also adults that have compromised immune system and elderly people. The major causative agents are viruses but bacteria, parasites, protozoa and fungi have also been reported. Virus causing endemic and sporadic encephalitis throughout the world are Japanese encephalitis virus (JEV), Herpes simplex virus (HSV), Enterovirues(EV), Myxo / paramyxoviruses and Chikungunya.

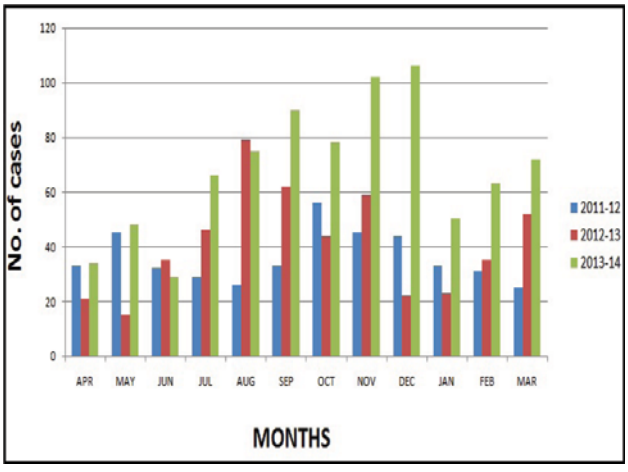


Fig. 1 No. of cases enrolled in every month during the study period.

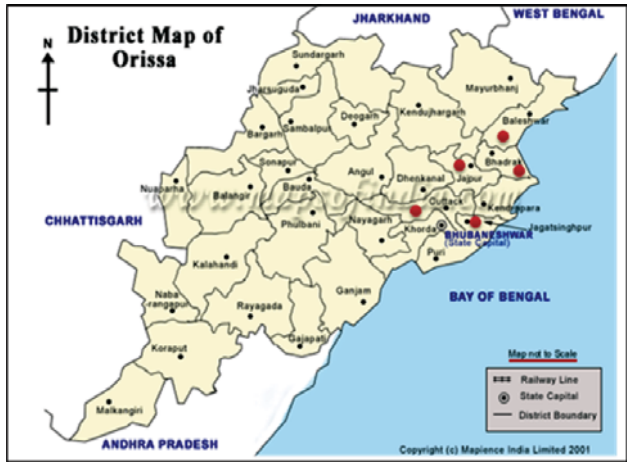


Fig. 2 Catchment area showing majority of cases enrolled with Encephalitis.

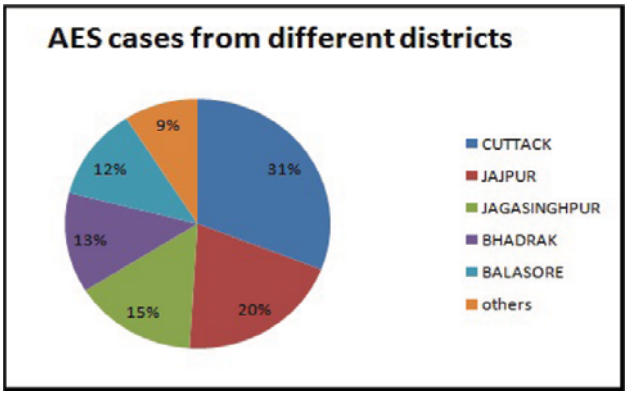


Fig 3. Districts with higher no. of cases.

Table 1. Clinical features of the cases investigated.

CLINICAL SIGNS/SYMPTOMS	VIRAL AGENTS (%)	
	IDENTIFIED	UNIDENTIFIED
Fever	87.3	27
Convulsion	47	45
Altered Sensorium	28.2	32
Meningeal Signs	31	25.2
Paresis	6.6	2
Cranial nerve palsies	9	1
Vomiting	40.6	32

Objective:

1. To identify the causative viral agents of encephalitis.
2. To study the clinical presentation in encephalitis due to different viruses.

Materials and Methods:

1737 patients were enrolled for the study after being physically and clinically diagnosed by the concerned physician. Clinical and demographic information were recorded on predesigned format together with physical examination. Samples (serum / CSF) were collected as per the standard guidelines of venipuncture and lumberpuncture. Samples were aliquoted and stored at -20^{0}C and -80^{0}C for serology and PCR respectively. Samples were subjected to serology and PCR. IgM ELISA was done for HSV I and HSV II, Measles, Dengue, Varicella, EV and JEV.

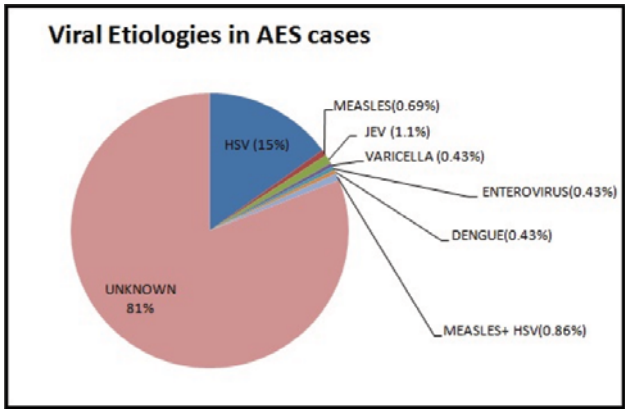


Fig.4 Percentage of Viral agents in AES cases.

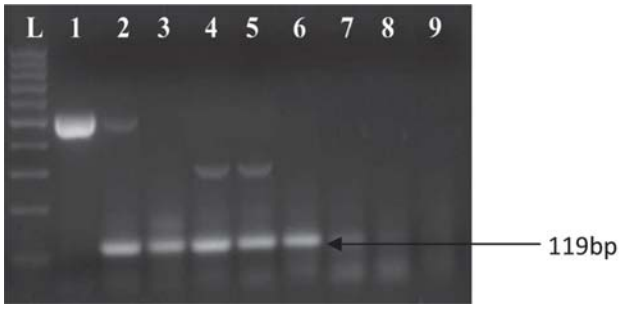


Fig.5 Amplified RNA from serum and CSF (lane 2) samples of Dengue cases. Lane 1 is the first PCR product and lane 2 is nested product at 119bp.

Results:

1737 no of cases from six different hospitals were tested. The study group comprised of patients with mean age of 7 ± 3.1 and male to female ratio of 1.08:1 in the patients below 14yrs while mean age 28 ± 2.9 and male to female ratio 1.8:1 in patients above 14yrs.

The cases were found to be distributed throughout the year and month wise distribution is shown in Fig.1. Higher numbers of AES cases were enrolled during September to December, 2012 that falls on post monsoon and early winter seasons in this region.

Most of the hospital cases of encephalitis have been reported from Cuttack. Jajpur, Jagatsinghpur, Bhadrak and Balasore were other districts from where patients had been reported.

Clinical Features:

The clinical features of the identified and unidentified cases have been shown in table no. 1. Patients suspected with measles encephalitis had rash all over their body. Patients with dengue encephalitis had significantly decreased thrombocytes count**.** The patients with post varicella encephalitis had marked features of chickenpox with vesicular rashes before 0-15 days of hospital admission.

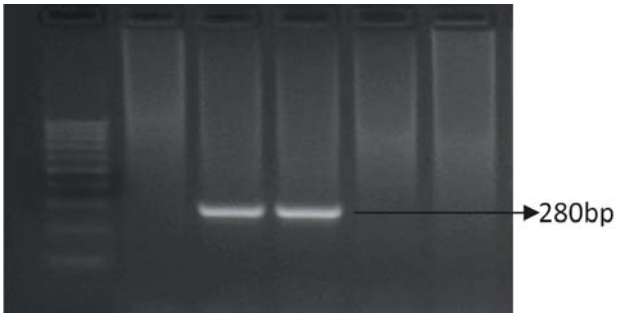


Fig.6 Amplified DNA from CSF samples of HSV encephalitis cases. L (Ladder)1-2 are samples and 3rd is Negative contol.

Viral Etiology:

Viral etiologies were identified in 280(16.1%) patients out of 1737 enrolled patients. The most common etiology was HSV-1 infection (251, 14.5%),HSV-2(49,2.82%), followed by JEV (26, 1.49%) , Measles (19, 1.09%), Enteroviruses (15,0.86%), Varicella zoster virus (7),Dengue(7), EBV(2) and Mumps(2). Thirty encephalitis patients suffering from Measles were also positive for either IgM antibodies or PCR against HSV (20 HSV PCR, 10 HSV I IgM).

Conclusion:

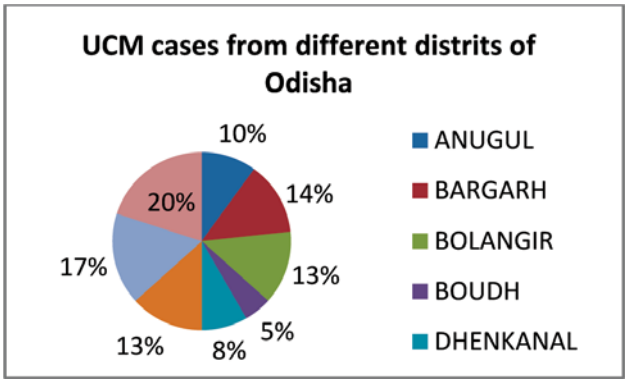
This study reported viral aetiology of AES in 16.1 % cases attending tertiary care hospitals from Odisha and neighbouring states of eastern India and HSV-1 was found to be the major viral agent.Other viral causes identified were HSV-2, JEV, Measles, Enteroviruses, Varicella, Dengue,EBV nad Mumps. Case fatality rate was 10% among viral AES cases while it was 6.2% in AES subjects without viral aetiology. Dual infection of HSV and Measles was observed during the study which is a rare evidence of simultaneous infection of both causing encephalitis. This is the first report on viral aetiology of AES from this region and the findings will be useful for better management of viral AES especially due to HSV and planning of strategies for the preventable infection like vector borne diseases, Measles and Chickenpox. The described clinical presentations will also be useful for syndromic management of AES cases in resource poor settings in the world that lack proper laboratory investigation facility.

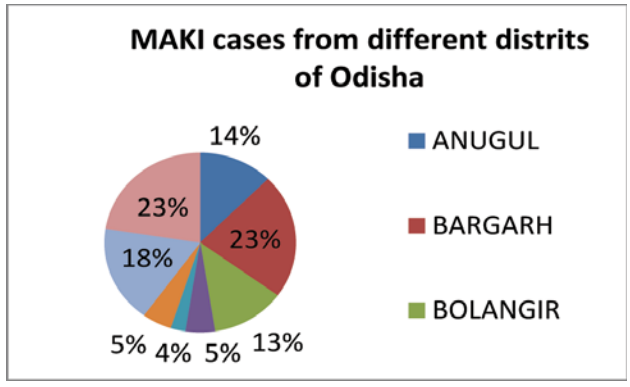
2. Malarial acute kidney injury in Odisha: search for potential risk factors.

Name : Pallabi Pati
Status : SRF(ICMR)
Date : September 2013.
Guide : Dr M R Ranjit, Scientist-E

Introduction:

Malaria is a major public health problem in tropical countries. About 500 million people suffer from malaria, leading to death in 1 to 3 million cases. Acute kidney injury (AKI) is one of the most dreaded complications of severe malaria. As per World Health Organization criteria, acute renal failure (serum creatinine level, > or =3 mg/dL or > or =265 micromol/L) occurs as a complication of AKI in *Plasmodium falciparum* malaria, although its rare occurrence has been reported in *Plasmodium vivax* malaria. It is more common in adults than children. Renal involvement varies from mild proteinuria to severe azotemia associated with metabolic acidosis. It may be oliguric or nonoliguric. AKI may be present as a component of multi-organ dysfunction or as a complication. The prognosis in the latter is generally better. These patients do not progress to chronic kidney disease.





Original aims and objective of the Project:

(i) To study the species and strains of malaria parasites associated with clinical manifestation of acute kidney injury.

(ii) To analyze the APO E, ACE, eNOS and ABCA1 gene polymorphism and their association with development of malarial acute kidney injury.

(iii) To investigate the role of ACT and Nimusilide (NSAID) on the clinical manifestations of malarial acute kidney injury.

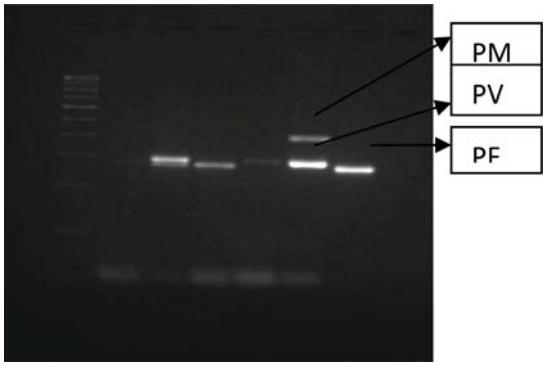
Progress of Work

During this study period a total number of 40 cases with malarial acute kidney injury and 60 healthy controls, 60 cases with mild malaria and 10 cases with non malarial acute kidney injury attending VSS Medical College & Hospital for treatment have been enrolled in the study based on inclusion and exclusion criteria. Clinical and demographic information have been recorded on predesigned format together with physical examination. Blood sample were collected as per standard guidelines of venipuncture. Samples were aliquoted and stored at -20^{0}C for PCR and other analysis. Samples were subjected for PCR (to diagnose the *Plasmodial species* and polymorphism analysis).

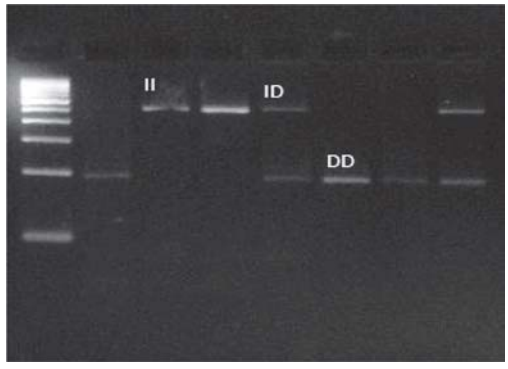
OBERSERVATIONS:

MALARIAL ACUTE KIDNEY INJURY(MAKI):

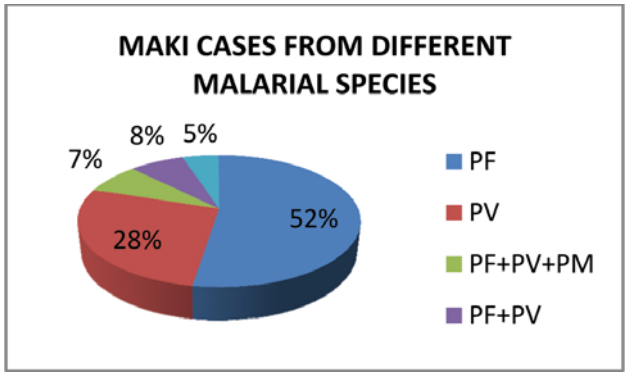
All the patients (n= 40) were admitted to the hospitals with suspected complicated malaria with fever, convulsions, acute kidney injury after occurance of malaria and altered level of consciousness. Vomiting was observed in 77.5% of cases, headache was observed in 70% cases. Among all the MAKI cases pure *Pf* was observed in 21 (52.5%) cases, pure *Pv* was observed in 11 (27.5%) cases, *Pf+Pv+Pm* mixed

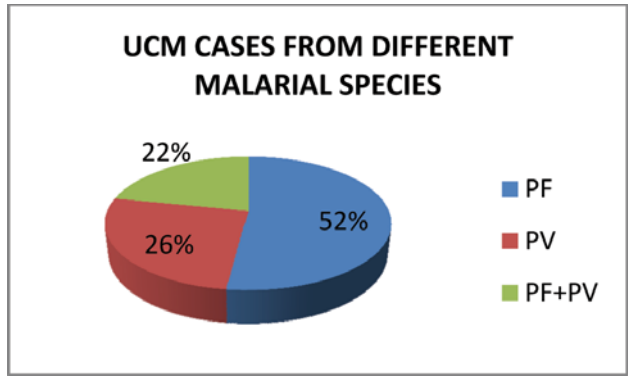


Multiplex PCR



ACE ID polymorphism

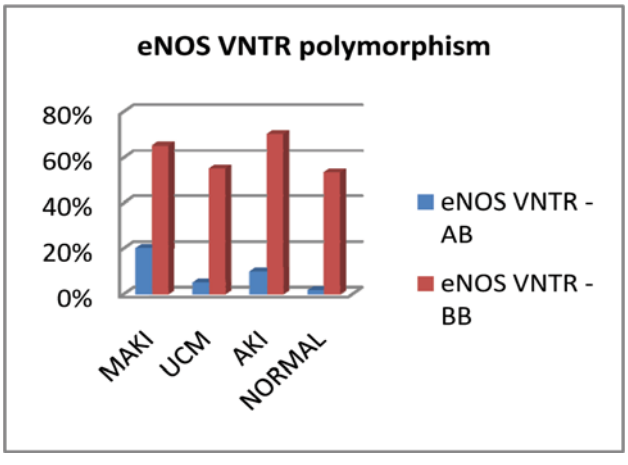




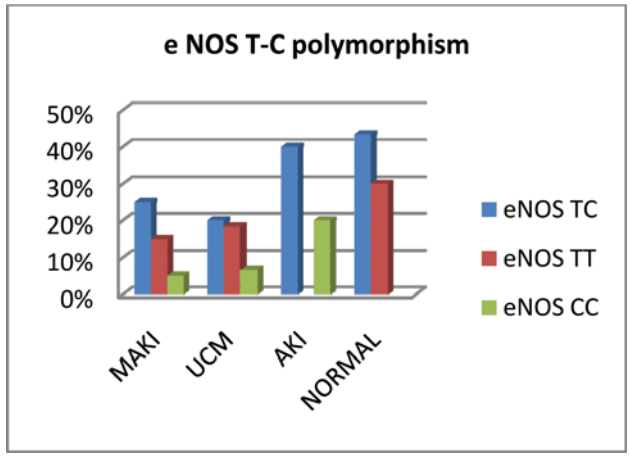
infection were found in 3(7.5%) cases, *Pf+Pm* mixed infection were found in 2(5%)cases and *Pf+Pv* cases were found in3(7.5%)cases. From 40 MAKI cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 8 (20%) cases and BB type seen in 26(65%) cases. For eNOS t-c polymorphism TC type seen in10(25%) cases, TT type seen in 6(15%) cases. CC type seen in 2(5%) cases. For eNOS E-D polymorphism DD type seen in 4(10%) cases, ED type seen in 18(45%) cases and EE type seen in 6(15%) cases. For ACE2 gene polymorphism CC type seen in 10 (25%) cases, CT type seen in 12(30%) cases and TT type seen in 12(30%) cases. For ACE ID polymorphism DD type seen in 26(65%), ID type seen in 4(10%) and II type seen in 5(12.5%) cases.

Table 1: Diagnosis of malaria parasite and polymorphism analysis.

Total no of sample	Pure	Mixed	eNOS VNTR	eNOS TC	eNOS ED	ACE2	ACE ID
MAKI=40 (malarial acute kidney injury)	*Pf*=21 *Pv*=11	*Pf +Pv+Pm*=3 *Pf+Pm*=2 *Pf+Pv*=3	AB=8 BB=26	TC=10 TT=6 CC=2	DD=4 ED=18 EE=6	CC=10 CT=12 TT=12	DD=26 ID=4 II=5
UCM=60 Uncomplicated malaria	*Pf*=31 *Pv*=16	*Pf +Pv*=13	AB=3 BB=33	TC=12 CC=4 TT=11	ED=20 EE=5	CC=12 CT=8 TT=13	DD=22 ID=10 II=6
AKI=10 Acute kidney	-	-	AB=1 BB=7	TC=4 CC=2	ED=3 EE=1	CC=2 CT=2	DD=5 ID=2
NORMAL=60 Healthy people	-	-	AB=1 BB=32	TC=26 TT=18	ED=6 EE=18	CC=23 CT=11 ID=15	DD=13 TT=7 II=11



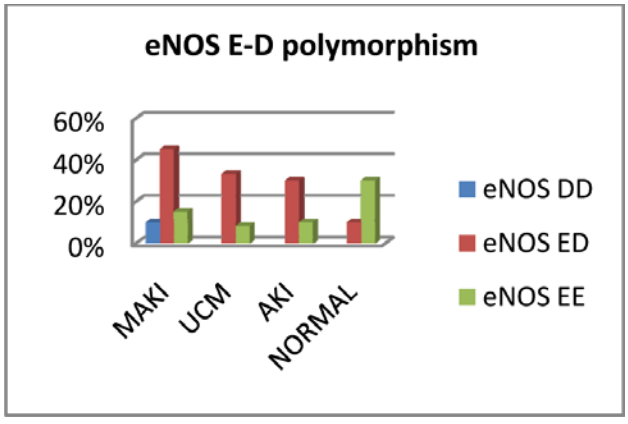
eNOS VNTR polymorphism analysis



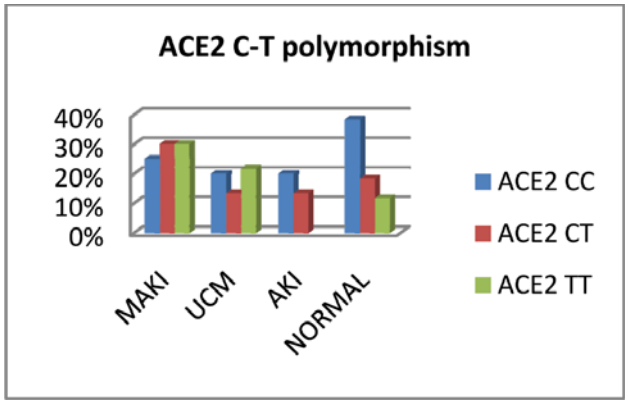
eNOS T-C polymorphism analysis

UNCOMPLICATED MALARIA (UCM):

All the patients (n=60) were admitted to the hospitals with suspected uncomplicated malaria with fever. Vomiting was observed in 41.6% of cases, headache was observed in 61.6% cases. Among all the UCM cases pure *Pf* was observed in 31 (51.6%) cases, pure *Pv* was observed in 16(26%) cases, *Pf+Pv* mixed infection were found in 13(21.66%) cases. From 60 UCM cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 3 (5%) cases and BB type seen in 33(55%) cases. For eNOS t-c polymorphism TC type seen in 12(20%) cases, TT type seen in 11(18.3%) cases. CC type seen in 4(6.6%) cases. For eNOS E-D polymorphism ED type seen in 20(33.33%) cases and EE type seen in 5(8.3%) cases. For ACE2 gene polymorphism CC type seen in 12(20%) cases, CT type seen in 8(13.33%) cases and TT type seen in 30(21.66%) cases. For ACE ID polymorphism DD type seen in 22(36.5%), ID type seen in 10(16.65%) and II type seen in 6(10%) cases.



eNOS E-D polymorphism analysis



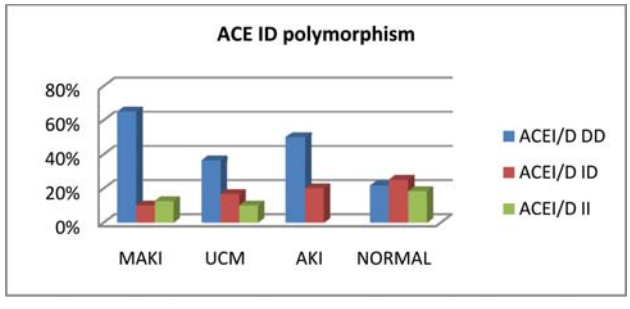
ACE2 C-T polymorphism analysis

ACUTE KINEY INJURY:

All the patients (n=10) were admitted to the hospitals with suspected acute kidney injury. From 10 AKI cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 1 (10%) cases and BB type seen in 7(70%) cases. For eNOS t-c polymorphism TC type seen in 4(40%) cases, CC type seen in 2(20%) cases. For eNOS E-D polymorphism ED type seen in 3(30%) cases and EE type seen in 1(10%) cases. For ACE2 gene polymorphism CC type seen in 2(20%) cases, CT type seen in 8(13.33%) cases. For ACE ID polymorphism DD type seen in 5(50%),ID type seen in 2(20%) cases.

NORMAL HEALTHY CONTROL:

All are healthy blood donors (n=60) without any disease. From 60 cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 1 (1.6%) cases and BB type seen in 32(53.3%) cases. For eNOS t-c polymorphism TC type seen in 26(43.33%) cases, TT type seen in 18(30%) cases. For eNOS E-D polymorphism ED type seen in 6(10%) cases and EE type seen in 18(30%) cases. For ACE2 gene polymorphism CC type seen in 23(38.33%) cases, CT type seen in 11(18.33%) cases and TT type seen in



ACE ID polymorphism analysis

Table 2: Clinical features of patient with malarial acute kidney injury and malaria.

Clinical signs	Percentage			
No of complication	MAKI(Malarial acute kidney injury)=40	UCM(uncomplicated malaria)=60	AKI(acute kidney injury)=10	NORMAL HEALTHY = 60
Fever	40(100%)	60		-
Acute kidney injury	40(100%)	-	10(100%)	-
Headache	28(70%)	37(61.6%)		
Vomiting	31(77.5%)	25(41.6%)		
Convulsion	23(57.5%)			
Altered Sensorium	19(47.5%)			

7(11.66%) cases. For ACE ID polymorphism DD type seen in 13(21.66%), ID type seen in 15(25%) cases and II type seen in 11(18.33%) cases.

The clinical details and molecular analysis result had been recorded for further analysis. The common clinical features in patients have been shown in table 2 and the polymorphism analysis result and malarial diagnosis result shown in table 1.

DISCUSSION

This preliminary study has shown the association of different Plasmodium species with malarial acute kidney injury It was observed that the most prevalent malarial parasite was *Plasmodium falciparum* followed by *Pv* and mixed infection of *Pf+Pv+Pm, Pf+Pv,Pf+Pm.* This study also has given an idea on the possible role of eNOS and ACE gene polymorphisms in the development of MAKI.

3. Role of gut microbiota in type-II diabetes susceptibility.

Name : Ardhendu Bhusan Praharaj
Status : JRF (DST)
Date of Joining : December 2013
Guide : Dr. Santanu Kumar Kar
Co-Guide : Dr. Sapna Negi

Background

Gut microbiota that is present densely in the digestive tract, plays a pivotal role in the normal structure and development of a healthy mucosal immune system and affects uptake of nutrients, regulation of metabolism, angiogenesis, and development of the enteric nervous system. Intestinal microfloras are a healthy and beneficial asset, but some components can become pathogenic, if they cross intestinal barrier. In these circumstances, microflora can contribute to the pathogenesis of various intestinal disorders and have a systemic impact on inflammation, for instances, a specific metabolic state combined with certain gut microbiota may facilitate low-grade systemic inflammation if gram-negative bacteria fragments (endotoxins) are able to cross the intestinal mucosa to enter the circulation. Patients with type 2 diabetes (T2D) are particularly susceptible to increased endotoxin circulation associated with abnormal dietary changes. Numerous risk factors contribute to T2D, including age, family history, diet, sedentary lifestyle, and obesity. Emerging studies are examining how gut microbiota may contribute to T2D risks. If proven to be associated with T2D, probiotic treatments towards diabetes can be developed.

Objectives

1. To study the biochemical and anthropometric data of Diabetes Type II patients.
2. Molecular sub typing and quantification of microbiota from fecal samples of patients and controls.
3. To study association between clinical and anthropometric data with that of gut microbiota strains obtained.

Work progress

From Dec 2013 to Nov 2014, 200 newly detected type 2 diabetes patients within the age group of 30 to

Table 1 Demography data of newly diagnosed type II diabetics individual

Age in yr.	Number (n=120)	Male (n=78)	Female (n=42)	Weight in kg	BMI(Kg/m^2)
30-40	39	27	12	62.78±12.8	25.14±5.02
41-50	40	22	18	64.85±12.85	25.28±6.11
51-60	31	21	10	66.77±11.75	26.45±4.59
61-65	10	8	2	66±12.06	24.96±3.05

Table 2 Co-relation between waist circumference and BMI

		Waist E(Cm)	BMI
Waist CE(Cm)	Pearson Correlation	1	.236**
	Sig. (2-tailed)		.010
	N	119	119
BMI	Pearson Correlation	.236**	1
	Sig. (2-tailed)	.010	
	N	119	119

Table 3 Co-relation between waist circumference and Fasting Insulin

		Waist CE(Cm)	Fasting insulin (mIU/l)
Waist CE(Cm)	Pearson Correlation	1	.238**
	Sig. (2-tailed)		.009
	N	119	119
Fasting insulin (mIU/l)	Pearson Correlation	.238**	1
	Sig. (2-tailed)	.009	
	N	119	119

As evidenced from Table 2 and 3 we found a positive co-relation among BMI and Waist circumference (p=0.01), waist circumference and FBS (p=0.009).

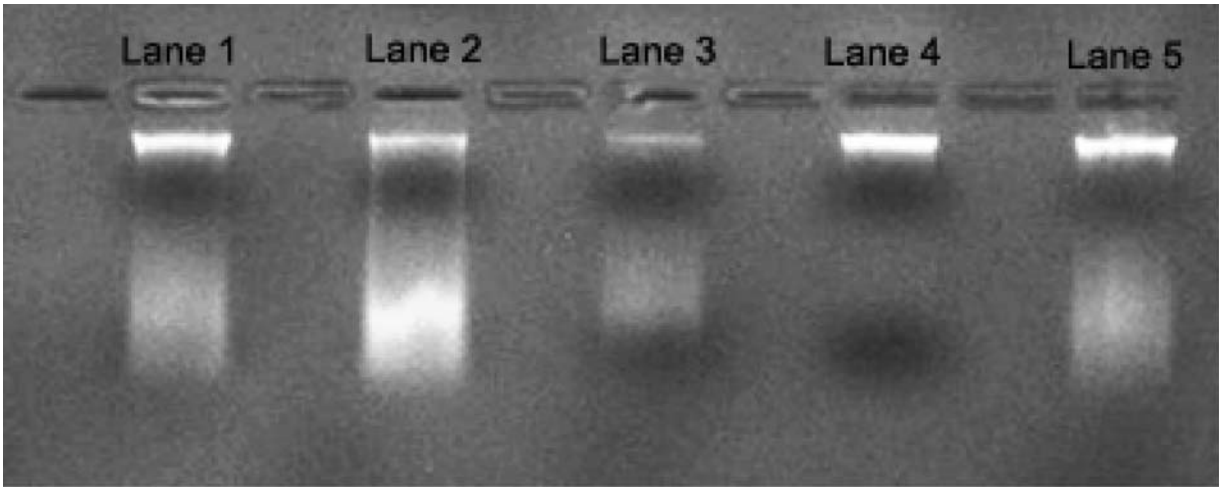


Fig. Gel image showing the presence of DNA from five different fecal samples.

65yr were enrolled in this study from Medicine OPD of IMS & SUM Hospital, Bhubaneswar by the help of Physician. From the community, we enrolled ten healthy control participants of the same age group. 5 ml of fasting blood sample were collected after taking their written consent in Fluoride, EDTA and serum vials. All the demographic data including their age, sex, height, weight, waist circumference, occupation, income status were collected. Data regarding their disease status, family history, dietary pattern, blood pressure also recorded. As of 13th November, 2014, 70 numbers of stool samples were collected from diabetics group. Serum samples were separated and kept at -80°Cfor long time storage. All the blood, serum and stool samples were coded by specific laboratory coding number. Stool samples were kept at-20°C. Level of Triglyceride and Insulin of 120 samples were analysed by using biochemical and by ELISA respectively. Insulin resistance was calculated by using Quantitative Insulin sensitivity check Index (QUICKI). Total bacterial DNA was extracted from 30 fecal samples using the QIAamp® DNA Stool mini kit (Qiagen GmbH, Germany) according to the manufacturer´s protocol.

As of now, a total of 120 newly diagnosed type II diabetic individuals (Male= 78, Female=42) were included in the study. Most of the diabetes cases (33.33%) were in the age group of 40-50 yr and insulin resistance were more in the age group of 30-40yrs, 61-65yrs. Regressive analysis was performed with age and sex adjustment between BMI < 23 and e" to 23 and there was a trend of significance observed in waist circumference (p=0.090) and FBS (p=0.096). Positive correlation was found among BMI and Waist circumference (p=0.01); and between waist circumference and FBS (p=0.009). DNA was extracted from stool samples. Our study concludes that Waist circumference is the major risk factor for predisposition to diabetes and high fasting blood sugar level but no co-significant was found with insulin resistance.

Wok plan for the session 2015-16:

- Collection of targeted blood and stool samples of newly diagnosed type II diabetics and control group.
- Biochemical analysis of stored sample.
- Isolation of DNA from stool samples.
- Standardisation of real time PCR for quantitative assessment of individual gut microbial population.

4. Distribution, antibiogram and virulence study of etiological agents associated with Acute Respiratory Infection among the children below five years age in tribal and coastal areas of Odisha.

Ph.D Scholar : Bhagyalaxmi Biswal
Guide : Dr. S. K. Kar
Co-Guide : Dr B.Diwedi
Date of joining : April 2014

Biography

Children represent the future and their healthy growth and development should be the prime concern of all societies. Particularly care of young children should be taken as they are vulnerable to malnutrition and infectious diseases, many of which can be effectively treated. The child mortality rate in less than 5 years age groups is 74 per 1000 live birth among which acute respiratory tract infections (ARI) contribute 69% of all death followed by Diarrhea. Prevalence of ARI was found to be 52%. It was higher in children with lower socioeconomic status (community medicine and health education) In India infant mortality is 57 and under five mortality rate is 74 per each 1000 live birth. But in Odisha the mortality rate is higher especially in case of people belongs to tribal location.

Objectives

1. Culture, Isolation and characterization of bacterial pathogens causing Acute respiratory infections in under five children.
2. Anti-biograms profile for the identified bacterial pathogens.
3. To identify viral pathogens associated with ARI.
4. To record the seasonal trend of etiological agents of ARI in under five children presenting to hospital setup in tribal and coastal areas.

Work progress

Samples are collected from capital hospital Bhubaneswar and sisubhaban cuttack from hospitalized children below 5 year age group having one or more of the following Symptoms Cough, runny-nose, sore throat, chest pain, breathlessness, noise breathing, Fever has been taken into the study to know the etiological agents of ARI.

From each patient two numbers of samples (throat swab / nasal swab) were collected for bacterial and viral analysis in respective media with the consent of guardian of the patients. For viral analysis samples are stored in -70 at virology lab.

Total 110 samples are collected and inoculated in different media [Blood agar for *S.pneumoniae*, Chocolate agar for *Himophilus influenza,* MacConkey agar for *K.pneumoniae, E.coli* and other gram negative organisms and nutrient agar plates]

Isolation and identification of bacterial isolates was done as per the procedure for identification (Manual of Medical Microbiology, ASM press).

Antibiogram of the different identified organisms was carried out by well and disc diffusion method (Kirby, 1966).

Total 110 samples and organisms identified are as fallows-

Month	Sample No	*E.Coli*	*S.Aureus*	*Moraxilla Spp*	*k.pneumonie*	*Pseudomonas Aure.*	*GABHS*	*S.Pneumoniae*
June	17	1	1					
July	10		3					
Aug	31	3	3	2	2			
Sep	36		1	1	7	3	2	3
Oct	16				1			3
Total	110	4	8	3	10	3	2	6

Samples collected are from various districts of Odisha. But majority are from khurda, puri and Cuttack districts. Few samples are from Kendrapada, Jajpur, Jagatsinghpur, Dhenkanal, Nayagad, Kandhamal, and Baleswar.

Work plan for next six months

1. Samples will be collected from patients below 5 year age group admited in Raygada chif district hospital having the symptoms of acute respiretory infection.
2. The bacterial samples will be inoculated imidiatly at Rayagada field unit in respective plates (blood agar,chocolate agar,maconkey and nutrient agar)for culture of different bacterial pathogens associated with ARI.
3. Then after overnight incubation the identification will be done fallowing the standard protocol.
4. After identification antibiogram sensitivity test will be done for different bacterial etiological agents by using different antibiotics fallowing standard protocol.
5. The samples collected in viral transport media (VTM) will be transported at cooling temperature to virology dipartment of RMRC for analysis of different viral etiological agents associated with ARI by using PCR method.

Expected outcome

1. The study will focus on spectrum of the etiological agents of ARI among the children below 5year in tribal and coastal areas of Odisha.
2. The antibiotic profile will be helpful for the drug sensitivity pattern and will emphasize the better management practices in hospitalized as well as community label ARI patients.
3. This study will also prevent unnecessary antibiotic treatment given to children infected with viral etiological agents.
4. This knowledge will be helpful / instrumental to modulate new strategy to curb the bacterial / viral incidence, in the consequence of which will lead to reduce the morbidity and mortality among the children below 5 yr age group in tribal and costal area.

5. Molecular Characterization of Mycobacterium tuberculosis strains isolated from pulmonary tuberculosis cases of Odisha.

Name : Prakasini Satapathy
Status : SRF (ICMR)
Date of Joining : September 2013
Guide : Dr. D. Das

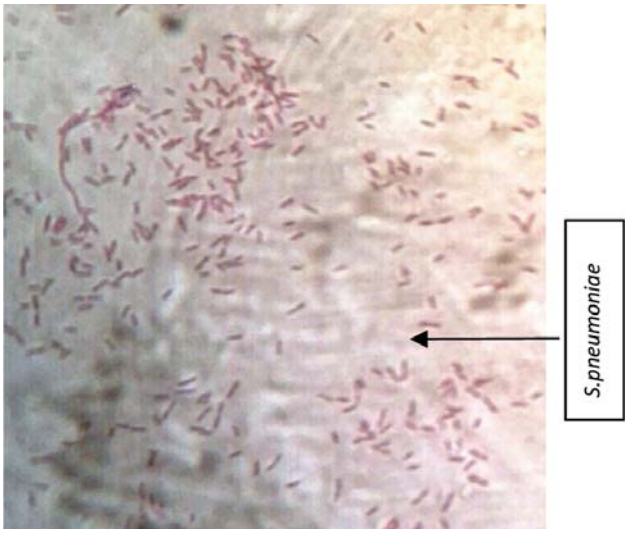
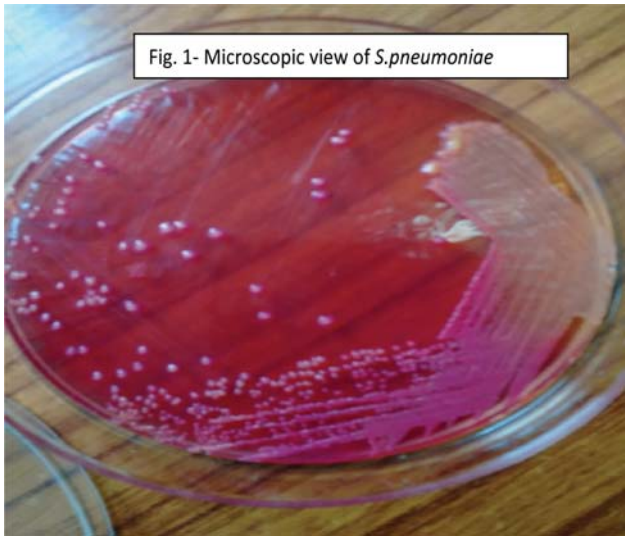


Fig: 1 Microscopic view of S.pneumonioe.



Isolation of *K.pneumoniae* from throat swab

Introduction

Tuberculosis is a major public health problem all over the world including India. Annually 8 million people become ill with tuberculosis and 2 million people die from the disease. However the progress of TB control has suffered due to emergence of Multi Drug Resistant (MDR) and Extensively Drug Resistant (XDR) TB. The introduction of molecular techniques in the field of tuberculosis has opened new avenues in studying transmission dynamics and epidemiology. These techniques usually exploit various repetitive DNA elements as marker for strain identification of *Mycobacterium tuberculosis*.

Objectives

- To assess the Drug resistance profile of MTB isolates from clinically infected TB patients in Odisha.
- To correlate the phenotypic drug resistance using genotypic methods.
- Molecular characterization of MTB isolates using spoligotyping.

Work progress

Sample collection and Specimen culture

The sputum samples were collected from the Capital Hospital Bhubaneswar and processed by NALC-NaOH method.

Briefly the freshly prepared NALC solution (0.5gm NALC powder added to 100ml of equal proportion of 4% NaOH and 2.9% sodium citrate) was added to collected sputum samples in a 50ml sterile plastic centrifuge tube. Specimens were Vertex and allowed to stand up to 15 minutes. The tubes were filled up to 50ml with sterile phosphate buffer (pH 6.8) and centrifuged for 15 minutes at 3000rpm. The supernatant discarded and the deposit was inoculated in to two LJ and one LJ containing PNB slants. The slants were incubated at 37^0C and growth was observed up to 8 weeks.

Drug Susceptibility Testing (DST)

The drug susceptibility testing of the first line drugs was carried out by Proportion Sensitivity Test (PST) method. The drug concentration used was Isoniazid (H) 0.2 ìg/ml, Ethambutol (E) 2 ìg/ml, Streptomycin (S, dihydrostreptomycin sulfate) 4 ìg/ml, Rifampicin (R) 40 ìg/ml.

Line Probe Assay for rapid drug resistance testing for Isoniazid and Rifampicin

The Genotype MTBDR*pius* line probe assay (Hain Lifescience GmbH, Nehren, Germany) was carried out according to the manufacturer's instructions. Smear positive sputum sample (based on RNTCP guide line) was taken for LPA.

The test is based on DNA strip technology and has three steps: DNA extraction, multiplex polymerase chain reaction (PCR) amplification, and reverse hybridization.

- A 500-µl portion of the decontaminated sediment was used for DNA extraction that included heating and centrifugation.
- The amplification procedure that consisted of preparation of the master mix and addition of the DNA. These steps were carried out in separate rooms with restricted access and unidirectional workflow.
- Hybridization was performed with the Twin incubator (Hain Lifescience)
- After hybridization and washing, strips were removed, allowed to air dry, and fixed on paper.
- Each strip consists of 27 reaction zones (bands), including six controls (conjugate, amplification, M. tuberculosis complex, rpoB, katG, and inhA controls), eight rpoB wild-type (WT) and four mutant (MUT) probes, one katG wild-type and two mutant probes, and two inhA wild-type and four mutant probes (Figure 1).
- Results were interpreted according to the manufacturer's instructions.

PCR targeting IS6110 and MPB 64 sequence for detection of *Mycobacterium tuberculosis*.

The genomic DNA was isolated by Qiagen Kit Method. The polymerase chain reaction was performed using the IS6110 primer sequences 5'-CCTGCGAGCGTAGGCGTCGG-3' 5'-CTCGTCCAG-CGCCGCTTCGG-3' and MPB64 primer sequence 5'-

ACCAGGGAG-CGGTTCGCCTGG-3' 5'-GATCTGG-GGGTCGTCGGAGCT-3' (GeNei, Bangalore, India). The PCR condition for the amplification were as follows: initial denaturation at 95°C for 30 seconds, 40 cycle of denaturation at 94°C for 30seconds, annealing at 68°C for 30seconds, extention at 72°C for 30seconds and a final extension at 72°C for10 minutes. The detection of PCR amplified products was determined using agarose gel (1.5%) stained with ethidium bromide (0.5µg / ml) and subsequently recorded on gel documentation system.

Result

- Total 480 sputum samples from 288 patients were collected, among 480 sputum samples 77 showed culture positive from 57 patients.
- Drug susceptibility testing was attempted in 19 samples and the results are awaited.

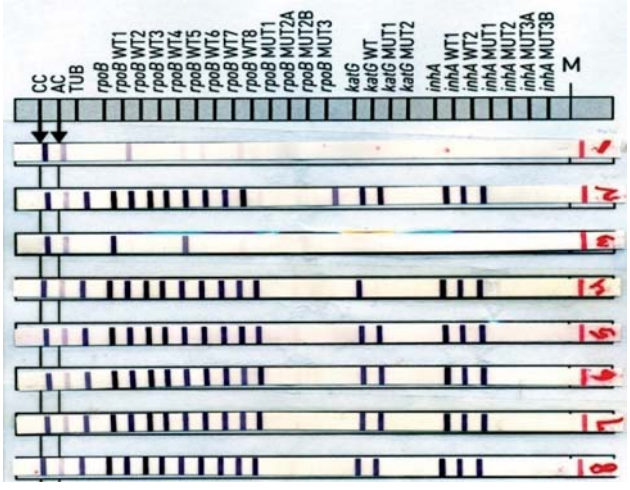


Fig. 1. GenoType MTDBRplus strips (Hain Lifescience, Nehren, Germany). Lane-1 no *M. tuberculosis* complex , Lane-2 rifampicin mono resistance, Lane -3 no *M. tuberculosis* complex, Lane-4 isoniazid mono resistance, lane 5, 6, 7 and 8 *M. tuberculosis* susceptible to isoniazid and rifampicin.

Table 1. Result of drug resistance to Rifampicin(RIF) and Isoniazid (INH) by LPA (Genotype MTBDR*plus* method).

Total no sputum sample Done for LPA	MDR	RIF mono resistance	INH mono resistance	RIF and INH susceptible	NTM
39	1	1	3	28	6

Total 39 samples were tested with LPA. Out of 39 samples only one is found MDR with H526V mutation in 81bp *rpoB* gene for rifampicin resistance, S531L mutation in *katG* gene for isoniazid resistance. One rifampicin mono resistance showed S531L mutation in 81bp *rpoB* gene and three isoniazid mono resistances are found with S351T1 mutation.

- By using IS6110 primer for the PCR detection of *M tuberculosis* total 6 sputum samples were tested among which 5 samples were found positive. Multiplex PCR by using IS6110 and MPB64 has been standardized.

6. Characterization of Rota virus strains affecting the eastern part of india based on VP8 region which may be a possible additional candidate as new rota virus vaccine.

Research Scholar : EileenaMohanty
Guide : Dr B.Dwibedi
Status : SRF (ICMR)

Introduction

Of the estimated half-million deaths from rotavirus globally each year, approximately one-third occur in the Indian subcontinent. As per a 2009 study by the Centers for Disease Control and Prevention, Atlanta, rotavirus annually causes an

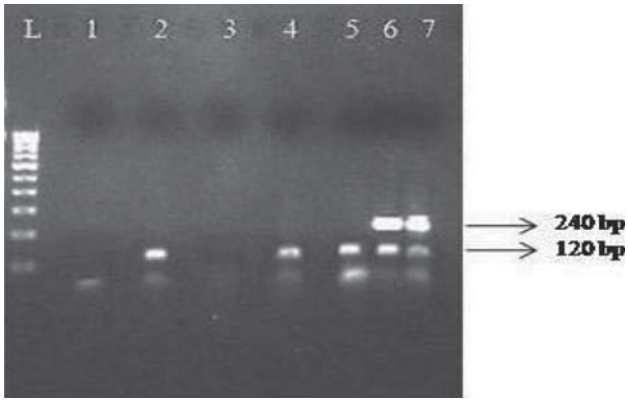


Fig 2. PCR based detection of the *M tuberculosis* from sputum samples targeting IS6110 MPB64. Lane L represents 100-bp ladder, lane 1 represents negative controle, lane 2 represents positive controle (H37RV), lane 3 represents negative for *Mycobacterium tuberculosis*, 4 represent PCR product amplified with 120bp IS6110 primer and lane 6, 7 represent PCR product amplified with primer IS6110 and MPB64 (240bp).

estimated 1,22,000-1,53,000 deaths and 4,57,000-8,84,000 hospitalisations. Thus, as per findings of IJMR study, the infection could annually cost over Rs 250 crore, exclusive of expenses of outpatient treatment. Diarrheal diseases continue to be an important cause of morbidity and mortality in under-fives in India despite various preventive and standardized case management strategies. Based on the etiology studies conducted in the country, it is estimated that approximately 40% of cases of diarrhea among hospitalized children are due to rotavirus. Based on the etiology studies conducted in the country, it is estimated that approximately 40% of cases of diarrhea among hospitalized children are due to rotavirus. The rotavirus serotypes prevalent in the country appear to be different from that in the West. In a multi-center study enrolling 4243 children with diarrhea (39% tested positive for rotavirus), the most common types of strains were G2P(4) (25.7% of strains), G1P(8) (22.1%), and G9P(8) (8.5%). Rotavirus isolates from India are genetically heterogeneous. Such genetic diversity is characteristic of Asia as a whole and phylogenetic analyses of the VP7 (G) and VP4 (P) genes from India show >95% homology with Asian reference strains for most isolates suggesting that rotavirus strains circulating in India are part of a larger Asian transmission pool. Clinical trials have indicated that the vaccines are much less efficacious in some low income countries, for reasons that are not fully understood. Hence, in addition to the need for phenotypic identification of the virus it is becoming increasingly important to investigate presence of certain conserved epitopes which could serve as better vaccine candidates.

Two currently licensed live oral rotavirus vaccines (Rotarix ® and RotaTeq ®) are highly efûcacious against severe rotavirus diarrhea. However, the efûcacy of such vaccines in selected low-income African and Asian countries is much lower than that in middle or high-income countries. In developing countries, human Rotavirus strains with uncommon G / P type combinations, due to reassortment with animal Rota viruses, can be a frequent cause of disease in young children.Hence if this VP8 domain of the rota strains affecting Odisha population does contain a conserved region and also does not mutate and is highly stable.It will show that the recombinant VP8 protein vaccine candidate would be effective for the Odisha population.

Table 1. Distribution of enrolled patients as per residential districts:

Districts	No of cases enrolled
Bhadrak	3
Bolangir	1
Balesore	2
Cuttack	21
Dhenkanal	1
Ganjam	3
Jajpur	1
Jagatsinghpur	3
Khorda	226
Keonjhar	1
Kendrapada	2
Nayagarh	23
Puri	78
Kandhamal	2

Table-1 Age group distribution among the rotavirus antigen positive cases:

Age group	Rota antigen positive cases		
	Male	Female	Total
1-6 months	19(13.01%)	6(10.9%)	35(17.41%)
7-12 months	132(52.05%)	28(50.90%)	104(51.74%)
13-18 months	57(25.34%)	30(30.9%)	54(26.86%)
19-24 months	29(3.42%)	11(1.81%)	6(2.98%)
Above 2 years	19(6.16%)	8(5.45%)	12(5.9%)
Total	146(72.63%)	55(27.36%)	201(100%)

Table-2: Clinical presentation of cases showing rota antigen positivity:

Clinical features		Number reported(%)
(1) Fever		181(88.72%)
(2) Vomiting		185(92.03%)
(3) Excessive crying		175(85.78%)
(4) Abdominal pain		104(50.98%)
(5) Signs of dehydration		
(a) Thirst	Drinks eagerly	80(39.21%)
	Drinks normally	119(58.33%)
	Drinks poorly	5(2.45%)
(b) General Condition	well alert	123(60.29%)
	lethargic	42(20.58%)
	restless	39(19.11%)
(c) Eyes	Normal	113(55.39%)
	sunken	90(44.11%)
	Very sunken	1(0.49%)
(d) Skin pinch	goes back quickly	172(84.31%)
	goes back slowly	32(15.68%)
(6) Required IV fluid		195(95.58%)

Objectives

1. To Genotype Rotavirus strains isolated from Orissa.
2.. Sequence the VP4 region of each of the different VP4 genotypes to analyze the complete gene of the strains affecting the region.
3. Determine whether sequence mutations that lead to different genotypes are present within the VP8 region or some other region of the VP4 gene and presence or absence of conserved region within the VP8 region.
4. Association of severity of disease with mutations present within the VP8 region. Efficacy studies:In case of conserved region being determined, peptide will be used to check for immune response in mice models.

Work progress:

1) Subject enrollment :

369 subjects having diarrhea satisfying case definition admitted to hospitals were enrolled into the study. Stool samples (n=369) were collected from patients admitted to the major referral hospitals SishuBhavan (SVPPGIP, Cuttack) (n=16); Capital Hospital (Bhubaneswar) (n=313); Puri pediatric hospital (Puri)(n=7); High tech hospital Bhubaneswar (n=4); Sum hospital Bhubaneswar (n=26); KIIMS Bhubaneswar (n=3), covering the coastal region (eastern and northern Odisha).

Age distribution among enrolled diarrhea cases: Cases that were enrolled were within age group of1 month to 9 years .Mean age of enrolled cases was 13 months**.**Table 2 shows the distribution of enrolled cases in different age groups.

4. Laboratory confirmation of rota infection:

The 369 cases enrolled in the study were tested for rota antigen by ELISA out of which 201(54.47%) tested positive.

Age distribution among enrolled rota antigen positive cases: Rota antigen positive cases that were enrolled were within age group of1 month to 9 years. Mean age of enrolled cases was 13 months. Table 4 shows the distribution of cases in different age groups.

Clinical presentation of the cases were recorded in the designed format. Fever and vomiting were the major associated clinical features. Table 2 describes the clinical features at presentation.

5. Genotyping-

40 samples were successfully genotyped. The most common P genotype obtained were P[8] and P[4]. The most common G genotype obtained were G[9], G[10], G[1].

Work to be done in the next 6 months:

(a) More subjects will be enrolled**(around 200)** in the next 6 months which will also include samples fromDistrict headquarters hospitals of Kalahandi and Rayagada representing the tribal areas, included in the study. This will complete the required sample size for the study.

(b**)** Genotyping of the further collected samples

(c) Nucleotide Sequencing of the VP4 gene

(d) Correlation of genotype with disease severity

7. Study on HPV genotype distribution in Odisha and association of viral integration into host genome with cervical carcinoma

Name : Rashmirani Senapati
Status : SRF(ICMR)
Guide : Dr.B.Dwibedi

Introduction

Cervical cancer is the fourth most common cancer in women and seventh most common cancer among all the known group of cancers found worldwide. Human papillomavirus (HPV) is the primary cause for cervical carcinoma has been well established. Most of the high risk HPV (HR-HPV) infections (90%) regress spontaneously and only in about 10% cases the infection persists and progresses to high-grade cervical intraepithelial neoplasia. This generally occurs through integration of the HPV genome into the host chromosome with associated loss or disruption of E2 gene [Wentzensen etal, 2004].

As reported by WHO the annual number of cervical cancer cases in India is 134420 and the projected number of new cases in 2025 is 203757 (WHO/ICO-HPV informative center, third edition, 2010). This high disease burden indicates to gear up screening and immunization programme in the country. There is lack of data regarding the prevalence and genotype distribution in many parts of the country especially in the state of Odisha. Hence this study is aimed to determine the pattern of HPV infection associated with cervical carcinoma in this region which is not known at present and will be useful while undertaking screening and vaccination programme to prevent cervical cancer.

There is a need of potential predictive marker which could identify the high risk group among the HPV infected subjects in early stage for conducting timely intervention to prevent progression of disease or increase survival period. Virus integration into human genome is being associated with most of the cases of advance carcinoma. However, the role of physical state (integral and episomal) of virus in disease progression and its association with treatment prognosis is unclear and less well studied in Indian population. The available evidences indicate variable opinion on the association of viral physical form with progressive disease and treatment prognosis.

Investigation to create evidence on the association of viral physical form with disease prognosis and treatment outcome is required to validate viral integration event as a prognostic marker.

Objectives

1. To determine the HPV genotype distribution in the cases attending hospital with different grades of cervical malignancy.
2. To study the viral integration into the host genome relating to the stage of carcinoma and treatment out come.

Work progress

Suspected cancer and precancerous cases attending at the OPD of O& G department of Acharya Hari Hara Regional Cancer Center, Cuttack has been enrolled in this study. A total of 165 cases were enrolled during the period from September 2013 to October 2014. Cervical swab sample specimen, socio demographic and clinical data were collected from all the subjects. Socio demographic data includes age, education, economic status, age at marriage, age of menopause. Clinical data including Signs and symptoms, Pap test and biopsy report were collected.

Detection of HPV was done by PCR amplification of the L1 region using MY09/11primers.HPV positive samples were subsequently subjected for genotyping of HPV 16 and HPV 18.

The mean age of the patients was 51.4 with age range of 20 to 85 years. Mean Parity was 3.8 with a range of 1-10 and 88(53.33%) cases were having a parity of e"3. All the subjects were married woman and the age of marriage varies from 20 to 36 years. Out of all the cases 105 cases were illiterate /just literate and101 cases belongs to below poverty line.

Table:1 Pattern of cervical cytology in HPV infection.

Cytology pattern	Cytology pattern					total
	normal	inflammatory	CIN1	CIN3	INVASIVE	
Total no of cases	80	20	2	1	62	165
No of HPV positive cases	1	1	0	0	54	56
No of HPV 16 cases	0	0	0	0	26	26
No of HPV18 cases	0	0	0	0	0	0
Other than HPV16/18	1	1	0	0	28	30

Basing upon the cytology the study population were divided as normal (n=80), inflammatory (n=20), CIN1 (n=2), CIN2 (n=0), CIN3 (n=1) and invasive squamous cell carcinomas (n=62). Invasive carcinoma cases included different stages as per the FIGO staging norms. Histopathological stage wise distribution of all invasive cancer cases have been shown in table 3.

The common clinical features were observed among the study population were Post menopausal bleeding (64.24%), Abnormal discharge with or without blood stain (60%),Lower abdominal pain (40.6%), Contact bleeding (32.12%), Intermenstrual bleeding (29.09%),Pain during coitus 37(22.4%) and Swelling abdomen (12.12%).

Out of all 165 samples, 130 were positive for beta globin gene amplification and both beta globin and HPV L1 gene was amplified in 56 samples. All the 56 HPV positive samples were subjected to genotyping for the detection of HPV16 and HPV18. HPV16 was being detected in 26 samples while HPV 18 was detected in none of the sample and 30 cases were infected with genotypes other than HPV16/18.

HPV infection in different group based on the cervical cytosmear has been shown in table-4. One case from each of normal cytology and inflammatory cytology showed HPV infection. Prevalence of HPV infection among the women without cancer or precancerous lesion was 2% and infected with genotypes other than HPV 16/18.

HPV was not detected in the group of mild and moderate dysplasia.HPV was detected in 54 cases out of all 62 invasive squamous cell carcinoma. Among all invasive carcinoma 26 cases were infected with HPV 16 genotype and 28 cases were infected with other than HPV16/18 genotype while none of the cases infected with HPV18 genotype.

Future work plan

Laboratory investigation

1. Standardization of multiplex PCR for genotyping of other high and low risk genotypes.
2. Standardization of integration protocol.
3. Standardization of viral load, and E6/E7 mRNA expression protocol.
4. All the collected samples to be tested for genotyping, viral integration, viral load, E6/E7mRNA expression level.

Publications and Information

Publications

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3. Dwibedi B, Panda M, Sabat J, Pati S, Panda S, Thakur B, Rathore S.K, Kar S K. Epidemiological and clinical features of rotavirus among children hospitalized with acute gastroenteritis in Odisha, India. *Epidemiology & Infection*.2014. (Communicated)

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5. Negi S, Dixit S, Rout D and Kar SK. Cord blood hematological comparison of rural and urban population of India indicates differences in genetic and immunity status. *Turkish journal of Medical Sciences. 2014 (Communicated)*

HRD Activities

Ph.D Awarded:

- Mrs Buli kumari Panigrahi has been awarded Ph.D degree on "Risk Factors associated with the spread of malaria in Rengali left bank Canal system of Orissa" under the guidance of Dr. N. Mahapatra, Sc-E under utkal University, Bhubaneswar on 12th July, 2014.
- Mr. Biswadeep Das , SRF (ICMR) , awarded Ph.D degree on " Bionomics and Molecular studies of Aedes mosquitoes prevalent in various parts of orissa with reference to arboviral Disease" under the guidance of Dr. R.K.Hazra, Sc-D, Bhubaneswar on 12th Sept. 2014.

Ph.D Submitted:

- Miss Swati Kumari has submitted her Ph.D thesis on "Molecular Identification of Anopheles

subpictus and its role in malaria transmission in different ecozones of Orissa, India" under the guidance of Dr. N. Mahapatra, Sc- E.

- Mr.P.G.S.Sethy has submitted his Ph.D thesis on "Protein-energy and micronutrient malnutrition among preschool children in Bhubaneswar block of Orissa" "under the guidance of Dr. G.Bulliyya, Sc- E .in 2013
- Miss. Shuchismita Behera has submitted her Ph.D thesis on "Study on micronutrients malnutrition with special reference to vitamin A and its associations with other major trace elements among children in Orissa" under the guidance of Dr. G.Bulliyya, Sc- E.in Aug.2013.
- Mrs. Rashmi Mishra has submitted her Ph.D thesis on "Role of B-1 lymphocytes and autoantibodies in human lymphatic filariasis" under the guidance of Dr. A.K Satpathy, Scientist-E in June 2014.

Pre Ph.D Program

The Pre Ph.D examination for enrollment of Ph.D under utkal University in the subject areas of Life Sciences and Biotechnology was held in RMRC, Bhubaneswar Nodal Centre of Utkal University on 14th Feb. 2014.Total 8 pre Ph.D students have joined for pre Ph.D course work.

M. Sc. Dissertation program: During this period total 31 M.Sc. dissertation students from various universities have undertaken 6 month M.Sc. dissertation program under scientists.

Training imparted:

- Training was provided to 6 (1 SRF, 1 RA, 4 LTs) field unit staff recruited for Kalahandi and Raygada district on ELISA and PCR for Dengue and Chikungunya.
- Training imparted to 22 laboratory technicians from 10 district head quarters and NVBDCP on ELISA based Dengue virus detection (IgM and NS1) on 25th July 2014.

FACILITIES:

1. Out patient department services of RMRC at Capital Hospital Bhubaneswar

(Dr. B. Dwibedi, Dr. A. S. Kerketta, Dr. N.M. Somalkar, Dr. B.N. Sethi, Mr. B. Kanhar)

This centre is continuing its specialized OPD facility, twice a week (Monday & Thursday) at the designated space provided at state Capital Hospital, Bhubaneswar. Patients from different parts of the state and outside the state attend the facility for consultation on Filariasis, Hemoglobinopathy and viral diseases. During the year 2014, 294 cases of chronic filarial diseases (Unilateral/ bilateral lymphedema) and 168 cases of ADL/ADLA got treated at the biweekly clinic. Decompression therapy for lymhedema was provided to 102 patients of grade II / III edema. Hemoglobinopathy cases (n=111) referred to the OPD were provided with confirmatory diagnosis (Beta thal major: 3, Beta thal trait : 23, Sickle cell trait : 24, sickle cell anemia : 21) that helped management. A total of 736 patients subjects were referred to the facility with suspicion of different viral diseases (diarrhea: 337, VBDs: 25, ARI: 86, Febrile rash: 205, Hepatitis: 83) that were provided diagnostic service by the VDL of this center. The diagnostic and consultation sources were rendered free of cost and benefitted the patients for morbidity management.

2. Insectorium

At Present the centre has one insectorium which was developed before 19 years. Here cyclic colony of three genus of mosquitoes i.e. *Aedes aegypti* (LV strain), *Anopheles stephensi* and *Culex quinquefasciatus* maintained. The reared mosquito species were used in insecticide susceptibility status test, larvicidal bioassay plant extract bioassay test.The different plant extract having larviciding properties tested in our insectorium by our scientist and scientist from other Institute also send their material for testing. Cyclic development of Brugia malayi L3 developed and different aspects of and immunological studies were

carried out by our scientist of the Institute. The insectorium was used for giving training to different persons time to time.

Now we are proposing for conducting virology work ie on Chikungunya, Dengue, West Nile and JE so proper maintenance of *Aedes aegypti, Ae.albopictus* and *Culex vishnui* group of mosquito will be maintained. Therefore a special infected room will be maintained with utmost care so that a single mosquito can not be escaped.

To investigate the interaction between parasites and mosquito under natural conditions, An. stephensi will be fed on infected human blood, using the artificial membrane feeding technique. Gene expression will be monitored at 14, 24, 48 h and 10 days post infected blood meal, corresponding to the transformation of zygote into ookinetes, to the interaction of ookinetes with the peritrophic matrix and mid gut cells, and to the migration and early differentiation of ookinetes into oocysts, and sporozoites stages respectively.

We are now planning for modernization of the insectorium which is required for the centre for conducting future work. In our plan we divided the entire facility into three section i.e. larval rearing space, adult rearing room and infected mosquito room. Necessary required equipment s for each space is mentioned in the planning.

3. NNMB Unit

The National Nutrition Monitoring Bureau (NNMB) run by NIN/ICMR, Hyderabad at Regional Medical Research Centre, ICMR, Bhubaneswar continued its field activities as well as monitoring the diet & nutritional status of rural, tribal and urban populations in the state.

The NNMB Odisha unit is conducting the urban survey with a general objective to assess the diet & nutritional status of urban population & prevalence and determinants of hypertension, diabetes mellitus and dyslipidemia among urban adults.

Specific objectives

a. To assess the current status of food & nutrient intake among different age/ sex/ physiological groups of urban populations.

b. To assess the current nutritional status of all available individuals in the selected house hold in terms anthropometry & clinical examination.

c. To assess the history of morbidity during previous fort night among all individuals covered for anthropometry.

d. To assess the prevalence & determinants of overweight & obesity hypertension diabetes mellitus & dyslipidemia among urban adults men & women above 18 years.

e. To assess body composition using Bio-electric impedance assessment (BIA)/ skin fold thickness at four sites among adults covered for anthropometry.

f. To assess knowledge & practices about obesity hypertension diabetes mellitus & dyslipidemia among urban adults.

g. Assessment of lifestyle pattern & risk behaviors of adults.

Study Design: A community based cross sectional study with multistage random sampling procedure c**overing five** cities in the state.

Study Setting: 15 municipal wards selected from each of 5 selected cities/ towns having more than 1 lakh population (Balasore, Baripada, Bhubaneswar, Rourkela and Berhampur).

Investigations

The study investigations in the selected household or individuals include household socio-demographic particular, 24 hour recall method of diet survey, food frequency questionnaire, collection of fasting blood glucose (FBG) for adults above 18 years, measurement of blood-pressure, knowledge & practices of adults about their health nutrition & lifestyle, infant & young child feeding practices (IYCFP

<3 years child) and nutritional assessment of all the individuals.

Work Progress

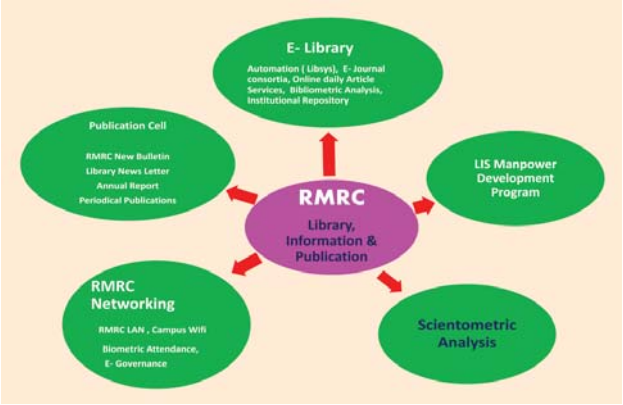
The NNMB Odisha unit being carried out the ongoing urban survey during the period from September 2013 and completed 15 municipal wards in the following cities in Odisha.

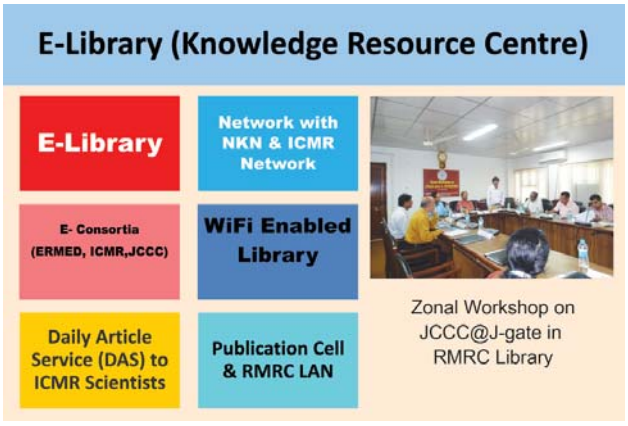
4. Animal House

Animal facility provides animal care, breeding and maintenance of experimental animals for ongoing research projects of the centre. Currently Rabbits, M. Coucha, Balb/c mice, and G pigs are available for experimentation. This animal facility has been registered with CPCSEA. All the projects concerning animal use/ experimentation are discussed in Animal ethical committee of the center. The facility is well maintained by animal house attendants. Staff has maintained periodic records of animal house. Pelleted feed procured from NIN, Hyderabad has been provided to the animals. Staff has maintained periodic records such as Form-C, Form-D etc of animal house as per provision of CPCSEA. This facility is maintained regularly with periodic inspection and health monitoring by veterinarian.

5. E-Library (Knowledge Resource Centre)

The RMRC Library & Information System consists of RMRC Library (renamed as Dr. Laxmi Narayan Memorial Library), RMRC LAN system, Publication Cell and HRD activities of the Centre. It collectively support the scientists, students and staff as extension program of the Institute. All students, scientists and employees of the Institute are entitled to make use of the central facilities having a very good collection of books on Biomedical sciences along with e- resources with ICMR E- journal consortia, ERMED consortia, J-Gate plus @ICMR. Library is WiFi enabled and provides a lot of e- services like Online literature search, Daily article Services to scientists & doctors, Biometric attendance system of the Institute, LAN & WAN services & administration, E- Office & digital India program of ICMR. The details are depicted as follows:





Dr.V. M. Katoch, Secy, DHR & DG ICMR is inaugurating the Laxminarayan Memorial Library in the name of Dr. L.N.Mohapatra, first Director of RMRC, Bhubaneswar on 25th March 2014

Meetings/Seminars/Symposia organized (2013-2014)

1. Regional Medical Research Centre, Bhubaneswar organized Human Ethical Committee meeting on 24th May 2013 and 20th Jan 2014 and animal ethical committee meeting on 11th June 2013 for discussing ethical issues relating to new proposals to be undertaken at RMRC, Bhuabneswar.
2. Pre SAC meeting of the Centre was organized on 13th-14th Sept. 2013 for discussing the ongoing and new proposals of the scientists. The

Pre SAC meeting was chaired by Dr P. L. Joshi, formoer Director, NVBDCP.

3. Centre organized the 27th SAC Meeting on 6th-7th Nov. 2014 under the chairmanship of Prof. D. S. Agarwal. During the 2 days SAC meeting total 19 ongoing projects and 7 completed projects were discussed. Besides that 17 new proposals were reviewed by SAC members.
4. A bust of Prof. L.N.Mohapatra, first Director, RMRC, Bhubaneswar was unveiled by Dr. V.M Katoch, Secretary, DHR & DG, ICMR on 25th Jan 2014 in the RMRC Library & Information Division and library is named as "Laxmi Narayan Memorial Library" by Honble D. G, ICMR, New Delhi..
5. A Symposium on "Biomedical Research in Medical Institutions" was organized by RMRC on 25th March 2014 in RMRC chaired by Dr. V. M. Katoch, Secretary, DHR & DG ICMR, New Delhi.
6. Regional Medical Research Centre, Bhubaneswar Conducted a two day training of VVD consultant of NVBDCP on 27th to 28st June 2014 at RMRC seminar Hall. Dr. R.K.Hazra, Scientist-D was the resource person of the training program.

Meeting Seminar attended by Scientists:

Dr. S. K. Kar

1. Participated in Tribal Health Research Forum Meeting at VCRC, Pondicherry on 15th April 2013.
2. Participated in a Meeting " Medicine up to date 2013" at SUM Hospital, Bhubaneswar on 20th April 2013.
3. Participated in 24th Parasitology Congress at RMRC, Jabalpur on 27th-29th April.2013
4. Participated in Malaria Group Meeting at NIMR, Delhi on 3rd May.2013.
5. Participated in Meningitis Meeting at Chennai on 6th May 2013.
6. Participated in 2nd National Workshop on Lymphatic Filariasis at CRME, Madurai on 5th June 2013.
7. Participated in Meeting on Prevention and Management of water born & vector borne deceases in the state Secretary office Chamber on 12th July 2013.
8. Participated in Oral Cholera vaccine in Kasipur block of Rayagada meeting in the Chamber of Hon'ble Health Minister on 16th July 2013.
9. Participated in CME on Ethical "Drug Development" at AIIMS, Bhubaneswar on 20th July 2013.
10. Participated in Review meeting on Malaria Control Activities NVBDCP Conference held on 20th July 2013.
11. Participated in Dengue Conference at CRME, Madurai on 25th-26th July 2013.
12. Participated in Workshop on TB & Diabetes at Delhi on 2nd-3rd Aug 2013.
13. Participated in Translational Research meeting on Rayagada & Kalahandi Projects on 3rd Sept 2013.
14. Participated in Ethics committee meeting of Apollo Hospital, Bhubaneswar on 4th Sept 2013.
15. Participated in Translational Research Meeting at ICMR on 3rd Sept 2013.
16. Participated in Ethics Committee Meeting at 4:30P.M. At Apolo Hospital on 4th Sept 2013.
17. Participated in Workshop on "Research Methodology Scientific Writing" at KIIMS, Bhubaneswar as a Resource Person on 6th Sept 2013.
18. Participated in National Seminar on Incidence & prevelance of mendilian traits & diseases in people of Orissa at Adaspur, Cuttack at 16th Sept.2013.
19. Participated in Hands on workshop on DNA Diagnostics 2013 at SGPGI, Lucknow on 28th-30th Nov 2013.
20. Participated in 33rd APICON, Odisha at VSS Medical College Burla, Chaired Scietific session on 9th-10th Nov.2013.

21. Participated in DISHA Study Centre Training Workshop at Delhi on 27 Jan 2014.
22. Participated in Asian Congress of Tropical Medicine & Parasitology (ACTMP) at Kualalampur, Malaysia on 5-7 Mar 2014.
23. Participated in THRF meeting at Bangaluru on 05 April 2014.
24. Participated in Symposium on "Hypertension Submit" by API Odisha Chapter Branch on 12th July 2014 at Mayfair, BBSR.
25. Attended in NRL meeting at Assam & Meghalaya on 23rd – 27th July 2014.
26. Participated in National Rotavirus survival network meeting at ICMR hqrs on 2nd Sept 2014.
27. Participated in 11th International Rotavirus Symposium at Taj palace Hotel, New Delhi on 3rd -5th Sept 2014.
28. Participated in 25th National Congress of Parasitology at CDRI, Lucknow on 16th-18th Oct 2014.

Dr. G. Bulliyya

1. Attended as Consultant Evaluation Committee Member of technical presentation by the qualified bidders on their technical proposal for 'Concurrent Monitoring of Mid Day Meal in the Odisha' at Conference hall of State Project Management Unit (MD) & School & Mass Education Department, Bhubaneswar on 24th & 26th February, 2014.
2. Attended Research & Ethical Committee Meeting on 'Burden of disease among patients attending public health care settings of Odisha' submitted by IIPH, Bhubaneswar' at Conference hall of Health & Family Welfare Department, Secretariat, Bhubaneswar on 20th March, 2014
3. Conducted 5th Batch of Training programe for Health Supervisors and Health Investigators on Clinical, Anthropometric and Biochemical (CAB) component of Annual Health Survey (AHS) held at RMRC, Bhubaneswar from 09th to 12th April 2014.
4. Attended a zonal workshop on J-gate Plus & JCC@ICMR organized at by RMRC Conference hall of Bhubaneswar on 21st April, 2014.
5. Attended Technical Committee Meeting for 'Establishment of State Art Laboratory' at Conference hall of DHS, Bhubaneswar on 29th May, 2014.
6. Attended Research Ethical Committee Meeting on 'Community based management of severe acute malnutrition in children aged 6-59 month in the district of Kandamal at Conference hall of Health & Family Welfare Department, Secretariat, Bhubaneswar on 02nd June, 2014.
7. Attended 2nd Technical Committee Meeting for 'Establishment of State Art Laboratory' at Conference hall of DPH, DHS, Bhubaneswar on 7th June, 2014.
8. Conducted 6th Batch of Training programe for Health Supervisors and Health Investigators on Clinical, Anthropometric and Biochemical (CAB) component of Annual Health Survey (AHS) held at RMRC, Bhubaneswar from 04th to 07th June 2014.
9. Attended Expert Group Meeting on Improving Maternal and Child Health Indicators among Scheduled tribe population and to identify gaps and strategies for covering evidence-based interventions' organised by RCH Division, ICMR, New Delhi on 25th July, 2014.
10. Attended as a resource Person for the Orientation Training Programme for the project 'Tackling Agriculture Nutrition Disconnect" at National Institute of Nutrition, Hyderabad from 8thto 11th October, 2014.
11. Attended Knowledge and Technology Partners Meeting on 'Leveraging Agriculture for Nutrition organized by MSSRF at Hotel Swosti Premium, Bhubaneswar on 17th November, 2014.
12. Workshop for Grand Challenges India call on All Children Thriving organized by DBT-BIRAC-

BMGF Partnership at KIIT University, Bhubaneswar on 18th November, 2014.

Dr. N. Mahapatra

1. Attended trainers training of phase 1 endline survey from 15thto17th july 2013 at NIMR, Delhi
2. Attended Workshop on Transmission Assessment Survey (TAS) on 12/9/2013 at Bhubaneswar.
3. Attended Review meeting on NVBDCP activities on 24/12/2013 at Bhubaneswar.
4. Attended Purchase-cum-Technical Committee meeting for setting State Entomological Unit of NVBDCP on 16/1/2014 at Bhubaneswar.
5. Attended Lymphology Conference at RMRC, Bhubaneswar on 13th-14th Dec. 2013.
6. Attended Joint meeting RMRC,VCRC and NIMR on malaria vectors and their control on29th and 30th of March 2014 at RMRC, Bhubaneswar.
7. As a SRC member attended Subject Research Committee meeting of life science of Utkal University.
8. Delivered a talk on vector Borne Diseases in zoology department of Utkal University on 24.2.14.
9. Attended a meeting at council on Affordable technologies for public health use under translational research on 22.5.14 at ICMR head quarter.
10. Training programme was conducted on " Prevention,control and management of Gengue and chikungunya outbreak" for VBD consultant and MTS of State NVBDCP on 27.6.14 and 28.6.14.
11. Attended space technology meeting at ICMR on 21.10.14.

Dr. R. K. Hazra

1. Attended a Task Force meeting on "Insecticide resistance monitoring in vectors of malaria, dengue/chikungunya, JE, filariasis and cutaneous and visceral leishmaniasis" under Vector Science Forum to review protocols received under Task Force on Insecticide Resistance Monitoring in different disease vectors on 10th May, 2013 at NIMR, Sector – 8, Dwarka, New Delhi.
2. Attended as an Invited speaker in a meeting on "**Brain storming conference on dengue scenario in India: Disease burden, surveillance and control**", and presented a paper entitled "**Entomological investigations of dengue virus outbreaks with respect to pupal indicators in Odisha, 2012"** from 25th to 26th July, 2013 at Madurai.
3. Attended an International conference as an Invited speaker on "**Challenges in 21st century: Their global impact & strategic management"**, and presented a paper on "**Present and future arboviral threats**" in the XII International conference on vector & vector borne diseases from 16th to 18th September 2013 in Udaypur, Rajasthan.
4. Attended an 11th annual conference of Lymphology society of India "**Overcoming Challenges Towards Elimination Of Filariasis"**, and presented a paper on **"Brugianfilariasis: The distribution and epidemiology in Odisha, India"** from 13th to 14th December 2013.
5. Attended the**"Expert Group Meeting to review proposals on insecticides, larvicides."** on 20/12/2013 at ICMR Hqrs. Participated and delivered a brief presentation.
6. Attended the meeting on assessment and review the programme management of NVBDCP **by WHO-GoI Joint Monitoring Mission (JMM)** on 2nd March 2014 at Indian Medical Association (IMA) conference hall, Bhubaneswar. Presented the findings of the vector and drug resistance studies carried out by RMRC, Bhubaneswar.
7. Attended the "Expert Group Meeting to review proposals on insecticides, larvicides." presented the project proposal submitted on insecticides to be held on 24th June 2014 in ICMR Hqrs.at ICMR Hqrs. Participated .

Dr. B. B. Pal

1. Dr B. B. Pal attended the 11th Annual Conference of the Lymphology Society of India organized at RMRC, Bhubaneswar from 13.12.2013 to 14.12.2013 and presented the paper entitled "Incidence of different bacterial pathogens associated with Filarial patients from coastal areas of Odisha".

2. Dr B.B. Pal attended the3rd International Colloquium on Health Systems and control of Neglected Diseases in Asia from21.11.2013 to 23.11.2013 at Institute of Public Health, Bengaluru and presented the paper "Reemergence of El Tor variant V. cholera O1 causing cholera epidemic during 2010 in the tribal areas of Odisha".

3. Dr B. B. Pal addressed the lecturers of collages in a refreshers' course programme "Cholera present scenario" on 06.03.2014 at Post graduate department of Zoology, Utkal University, Vani Vihar, Bhubaneswar.

4. Dr B.B. Pal acted as technical expert for the purchase of instruments, chemicals, etc for State FSL, Bhubaneswar during Jan-2014 and April-2014.

Dr. M. S Bal

1. Dr. M. S. Bal presented a paper on it Immunoevaluation of lymphatic filariasis using hydrocele fluid. "11th Annual conference of the Lymphology Society of India" held at RMRC, Bhubaneswar.

A. K. Satpathy

A. K. Satpathy attented the 11th Annual Conference of the Lymphology Society of India 13-14-2014 organised by RMRC Bhubaneswar "Bancroftian filariasis:circulating B1 cells decreasing inn microfilaria carriers and correlate with Igm levels".

Dr. N. M Somalkar

1. Training of trainers on End line Malaria survey at NIMR Delhi on 15-17 July 2013.
2. Workshop on TB and Diabetes Mellitus at National Institute of Genetics, Delhi on 2-3 August 2013.
3. Workshop on Transmission Assessment Survey-LEF at Bhubaneswar on 12-13 September 2013.
4. WHO sponsored workshop on Leptospirosis at RMRC Port Blair on 19-26 November 2013.
5. MRHRU meeting at Secretariat, State Public Health, Odisha on 5 February 2014.
6. Attended State level DTO meeting at DHS, Bhubaneswar as a NRL representative for TB review.
7. PMDT meeting for North East states at Guwahati, Assam as NRL representative for TB review on 26-28 February 2014.
8. Attended NTF meeting at Bhubaneswar on 3-4 March 2014.
9. Attended THRF meeting at RMRC Belgaum on 5th April 2014.

Dr. A. Mahapatra

1. Organised "LymphoCon-XI" The Official Annual Meeting of the Lymphology Society of India, during Dec 2013 at RMRC Bhubaneswar, as Organising Secretary**.**

Dr. T Hussain

1. Workshop on Tuberculosis and Diabetes Mellitus (Funded by Department of Biotechnology) in ICGEB, New Delhi on 2nd-3rd Aug., 2013.
2. 1st Annual Conference of Research Society for the Study of Diabetes in India (RSSDI) - Odisha State Branch held on 18thAugust,2013 at Pramod Convention & Club Resort, Cuttack.
3. Attended 1-day workshop on *"Developing an innovative Tribal Health System Model to estimate the burden of TB, co-infections, and improve the effectiveness of RNTCP in India- a multi-centric study"* at National Institute for research in Tuberculosis (NIRT), **Chennai** on 4thOct., 2013.
4. Attended XI conference on *"Lymphology Society of India* at Regional Medical Research Centre, Bhubaneswar on 13th - 14th Dec., 2013 and presented a paper entitled, "HIV-Filariasis co-infection : review of studies".

Dr. A. S. Kerketta

2. Attended PIs meeting of multi centric Task Force study "Migration, poverty and access to healthcare: a multi-centric study on people's access and health system's responsiveness in fast-growing city Bhubaneswar" on 25th February 2014 at ICMR Head quarter.
3. Attended PIs meeting on 7th-8th January 2014 at ICMR Head quarter.
4. Attended PIs meeting on 16th April 2014 at ICMR Head quarter.
5. Attended Tribal Health Forum meeting at VCRC Pondichery during 15th April 2013.
6. Attended Tribal Health Forum meeting at DMRC, Jodhpur during 9th and 10th August 2013.
7. Attended workshop0 on the use of SPSS fax data analysis at NIE, Chennai from 8th-10th October 2014.

Dr. M. R Ranjit

1. Attended the XII International Conference on Vector and Vector Borne Diseases held at Mohanlal Sukhadia University, Udaipur, Rajasthan from 16th to 18th September 2013 and delivered a guest lecture on "Malaria in Odisha and Future Perspectives".
2. Delivered an invited lecture on "Pathogenesis of Cerebral Malaria: Our observations" in the National Symposium on "Emerging trends in Biotechnology: present scenario and future dimensions" organised by PG Department of Biotechnology, Utkal University, Bhubaneswar on 30th March 2014.

Dr. D Das

1. Attended Joint SAC of NIRT,NJILOMD, RMRC, Bhubaneswar, RMRC, Jabalpur, RMRC, Dibrugarh from 10-11, Jan 2014 at, NIRT, Chennai.
2. Attended the NRL coordination meeting from 6th to 7th February 2014 at Nirman Bhawan, New Delhi.
3. As a part of National Reference Laboratory activity I had conducted onsite evaluation visits to IRL, Cuttack from 17-19, February 2014.
4. Attended Regional Review Meeting of North East states organized jointly by Central TB Division, Govt. of India and Foundation for Innovative and Newer Diagnostics, 26-27th February 2014.
5. Attended Programmatic Management of Drug Resistant TB (PMDT) Regional Review Meeting for East zones organized jointly by Central TB Division, Govt. of India and Foundation for Innovative and Newer Diagnostics at Patna, Bihar on 3rd April 2014.
6. Attended the review meeting on proposal for university of excellence of ICMR at National Institute of Pathology, New Delhi on 28th May 2014 for finalization of tender document for selection of consultancy agency to prepare a document for making ICMR as University of excellence.
7. As a part of National Reference Laboratory activity onsite evaluation visits were made to the states of Sikkim and West Bengal, NBMC, Silliguri from 16.6.2014 to 21.6.
8. As a part of National Reference Laboratory activity were made onsite evaluation visits to the states of Sikkim and West Bengal, NBMC, Silliguri from 16.6.2014 to 21.6.
9. Attended Dissemination workshop at NIRT, Chennai on 2nd and 3rd September 2014.
10. Visited Arunachal Pradesh as a part of NRL activity and correct act on site evaluation on 24th and 25th November 2014.
11. Attended training programme of master trainers for 2nd line DST at ICELT (NTI), Bangalore from 15.12.2014 to 19.12.2014.

Dr. B. Sahoo

1. Participated 2nd National Knowledge Network Workshop being held at IISc., Bangalore from 17-19th Oct. 2013 organised bi NIC, New Delhi and IISc, Bangalore.
2. Participated Librarian's Development Program (LDP) organized by KIIT University, Bhubaneswar on 11-12 April 2014.

28th Scientific Advisory Committee

1	Dr. D. S. Agarwal B-24, Swasthya Vihar Delhi 110 092	Chairman
2.	Dr. P. L. Joshi Former Director, NVBDCP580, Metro View Aptt.Sector 13B, DwarakaNew Delhi 110 075	Member (VBDSF)
2.	Dr. P. K. Shrivastava Joint Director NVBDCP, 22 Sham NathMarg DELHI 110 054	Member (VBDSF)
3.	Dr. A. C. Mishra Ex-Director National Institute of Virology MCC Campus, Pashan Pune 411 021	Member (VBDSF)
4.	Dr. Sarala K. SubbaRao Consultant, ICMRAnsari Nagar, New Delhi 110 029	Member (VBDSF)
5.	Dr. Nikhil Tandon Deptt. Of Endocrinology & MetabolismAIIMS, Ansari Nagar, NEW DELHI 110 029	Member
6.	Dr. A. C. Dhariwal Director NVBDCP, 22 Sham Nath Marg DELHI 110 054	Member
7.	Dr.V. Rama Baru Prof. of Social Sciences Centre of Social Medicine and Community Health Jawaharlal Nehru University New Delhi	Member
8.	Dr. N. K. Mehra Dept of HLA, AIIMS, Ansari Nagar NEW DELHI 110 029	Member
9.	Dr. R. M. Pandey Deptt. Of Biostatiscs AIIMS, Ansari NagarNew Delhi 110 029	Member
10.	Dr. B. Sesikeran Ex-Director National Institute of Nutrition P.O: Jamai Osmania Hyderabad 500 007	Member
11.	Dr.J. Mahanta Director	Member

	Regional Medical Research Centre N.E. Region, Post Box 105 Dibrugarh 786 001	
12.	Dr. P. Jambulingam Director Vector Control Research CentreIndira Nagar, Pondicherry 605 006	Member
13.	Dr. Soumya Swaminathan Director National Institute for Reseearch in TB Mayor V.R. Ramanathan Road Chetput, Chennai 600 031	Member
14.	Dr. S. P. Tripathy Director, NJIL & OMD Post Box No:1101, Taj GanjAgra 281 001	Member
15.	Dr. S. Chakrabarti The Director National Institute of Cholera & Enteric Diseases, P-33 CIT RoadScheme XM, Beliaghata, P.O. Box 177 Kolkata 700 010	Member
16.	Dr.Neeru Singh Director Regional Medical Research Centre for Tribals, Nagpur Road, P.O. GarhaJabalpur (M.P.) 482 003	Member
17.	Dr.NeenaValecha DirectorNational Institute of Malaria Research Sector-8, Dwaraka, New Delhi 110 077	Member
18.	Dr. Rashmi Arora Chief, ECD, ICMR Ansari Nagar, New Delhi 110 029	ICMR Representative
19.	Director of Health Services, Directorate of Health Services Govt. of Odisha, Heads of the Deptt. Building Bhubaneswar	Govt. of Odisha Representative
20.	Dr. S. K. Kar Director, RMRC, BBSR	Member Secretary

Human Ethical Committee

1	Prof. J. P. Dash Sr. Cardiology Consultant Cuttack	Chairman
2	Prof.Aruna Mishra Laxmi Vihar PO: Sainik SchoolBhubaneswar	Co-chairperson

3	Dr. P. K. Dash Director, Medical Education & Training Heads of the Dept Building Govt. of Orissa Bhubaneswar 751 001	Member
4	Mrs Kasturika Pattanayak Ex-Chair Person, Social Welfare Board Govt. of Orissa, 1, Lewis Road Bhubaneswar.	Member
5	Dr P. K. Acharya N-1 A / 10 IRC Village Near CRP Square, Bhubaneswar 751 015	Member
6	Dr.Sisir Kumar Mahapatra Sr. Consultant Physician Surya Nivas, Plot No:B-1 / 91Lingaraj Vihar, Pokhariput, Bhubaneswar 751 002	Member
8	Prof. Rita Ray HoD Sociology Utkal University Vani Vihar, Bhubaneswar 751 004	Member
9	Dr. S.K.Kar Director Regional Medical Research Centre Bhuabneswar	Member- Secretary

Animal Experimentation Ethical Committee

1.	Dr S. K. Ray, Ex-Principal Orissa Coll. of Anim. Husb. & Vet. Sc. Qr.No. M-109, Baramunda H.B. Colony Bhubaneswar 751 003	Chairman
2.	Prof. Sachidananda Das PG Dept. of Zoology Utkal University Bhubaneswar.	Member
3.	Mrs Kasturika Pattanayak Ex-Chair Person, Social Welfare Board Govt. of Orissa, 1, Lewis Road Bhubaneswar.	Member
4.	Dr. M. R. Ranjit Scientist-E Regional Medical Research Centre Bhubaneswar	Member
5.	Dr R. C. Patra Prof. & Head, Dept. of Veterinary Medicine OUAT, Bhubaneswar – 751 003	Member
6	Dr R. K. Hazra Scientist-D	Member

	Regional Medical Research Centre Bhubaneswar	
7	Dr. Kishore Chandra Mohapatra Plot No:17, Gautam Nagar PO: BJB Nagar, BBSR 751014	Member (CPCSEA)
8	Dr. Dwarikanath Mohanty Plot No:1215/1654, Khandagiri BariBhubaneswar 751 030	Member (CPCSEA)
9	Dr A. K.Satapathy Scientist-E Regional Medical Research Centre Bhubaneswar	Member-Secretary
10	Dr S. K. Kar Director, Regional Medical Research Centre, Bhubaneswar.	Convener

Technical Equipment Purchase Committee

1.	Dr. A. K. Sahoo Principal Scientist CIFA, Kausalya gang Bhubaneswar-751 002	Chairman
2.	Dr. P. Das Sr. Scientist CIFA, Kausalya gang Bhubaneswar- 751 002	Member
3.	Dr. N. K. Debata Prof. Microbiology SUM-Hospital, Bhuabneswar	Member
4.	Dr. M. R. Ranjit Scientist- ERMRC, Bhubaneswar	Member
5.	Dr. B. Dwibedi Scientist-CRMRC, Bhuabneswar	Member
6.	Mr. G. Behera Accounts officer RMRC, Bhubaneswar	Member
7.	Dr. A. K.Satapathy Scientist_DRMRC, Bhubaneswar.	Member–Secretary

Budget & Resource Generation (2013-14)

Grant in aid Salary	Rs. 5,46,30,000.00
Grant in aid General	Rs. 3,15,82,000.00
Equipment	Rs. 96,23,000.00
Capital	Rs. 2,51,96,000.00
Resource Generation (2013-2014) : Rs. 2,51,96,000.00	

Staff position

(As on 1st November 2014)

Scientists:

1.	DR. S.K. Kar, MD, Dip. Clin. Epid.	Scientist-G & DIRECTOR
2.	Dr. (Mrs.) N. Mahapatra, M.Sc., Ph.D.	Scientist-E
3.	Dr. M.R. Ranjit, M.Sc., Ph.D.	Scientist-E
4.	Dr. A. Mahapatra, M.Sc., M.Phil., Ph.D.	Scientist-E
5.	Dr. G. Bulliyya, M.Sc., Ph.D.	Scientist-E
6.	Dr. A.K. Satapathy, M.Sc., Ph.D.	Scientist-E
7.	Dr. B. B. Pal, M.Sc., Ph.D.	Scientist-E
8.	Dr. Taziba Hussain, M.Sc., Ph.D	Scientist-E
9.	Dr. (Mrs.) A.S. Kerketta, M.B.B.S.	Scientist-D
10.	Dr. Dasarathi Das, M.Sc. Ph.D	Scientist-D
11.	Dr. R.K. Hazra, M.Sc., Ph.D.	Scientist-D
12.	Dr. Sapna Negi, M.Sc., Ph.D	Scientist: D
13.	Dr. Bhagirathi Dwibedi, M.B.B.S, M.D	Scientist-C
14.	Dr. Madhusmita Bal, M.Sc.M. Phil, Ph.D	Scientist-B
15.	Dr. Nilam M. Somalkar,MBBS ,MD	Scientist-B

Research & Technical Staff:

1.	Mr. P.K. Jangid, M.Sc.	Technical Officer-A
2.	Mr. R.K. Das, M.Sc.	Technical Officer-A
3.	Dr. A.S. Acharya, M.Sc., M.Phil, LL.B.,Ph.D	Technical Asst.
4.	Mr. R.C. Parida, M.Sc.PGDCA	Technical Asst.
5.	Mrs. G. Mallick, M.Sc.	Technical Asst.
6.	Mr. N.S. Marai, M.Sc., LL.B.	Technical Asst.
7.	Mr. D.P. Hansdah, M.Sc.	Technical Asst.
8.	Mr. B. Murmu, M.Sc., M.Phil.	Technical Asst.
9.	Mr. H.K. Tripathy, B.Sc, PGDME	Technical Asst
10.	Dr. H. K. Khuntia, M.Sc. Ph.D	Technical Asst.
11.	Miss. Sujata Dixit, M.Phil, M.Sc	Technical Asst.
12.	Mr. R. N. Nayak, B.A.	Technical Asst.
13.	Mr. B. N. Sethi, Dip. MLT	Technical Asst.
14.	Mr. H. S. Naik, Dip. MLT	Technician-C
15.	Mr. S. C. Rout ,ITI	Technician-C
16.	Mr. T. Moharana	Technician-C
17.	Mr. C. R. Samantray	Technician-B
18.	Mr. K. C. Dalai, B.A., ITI	Technician-B
19.	Mr. B. K. Kanhar	Technician-B

20.	Mr. G. D. Mansingh	Technician-B
21.	Mr. B. Pradhan	Technician-A
22.	Mr. C. S. Tripathy, B.Com. LL. B.	Technician-A
23.	Mr. S. S. Beuria	Technician-A
24.	Mr. G. Simhachalam	Technician-A
25.	Mr. K. C. Parichha	Technician-A
26.	Mr. Chakradhar Naik	Technician-A
27.	Mr. K. C. Jena	MTS (Lab. Technical)
28.	Mr. S. K. Mallick	MTS (Lab. Technical)
29.	Mr. Banamali Nayak	MTS (Lab. Technical)
30.	Mr. K. G. Samal	MTS (Tech. Maintenance)

Library & Information

1.	Dr. B. Sahoo, M.L.I.Sc., Ph.D.	Library & Information officer
2.	Miss. Priyanka Jee, M. Lib & Inf. Sc.	Apprentice Library Trainee
3.	Miss. Lipika Sharma, M.Lib & Inf. Sc.	Apprentice Library Trainee
4.	Mr. Rajim Sur Rai	MTS(General)

Administration & Accounts

1.	Mr. R.C. Muduli, B.A.	Administrative officer
2.	Mr. G. Behera, M.A	Accounts Officer
3.	Mr. B. Sutar, M.Com	Section officer
4.	Mr. P.C. Nayak, B.A.	Personal Assistant
5.	Mr. A.P.Parida, B.A	Assistant
6.	Mrs. R. Varghese	Personal Asst
7.	Mr. B.S. Rao	Assistant
8.	Mr. S.K. Satapathy	U.D.C.
9.	Mr. R. Rath	UDC.
10.	Mr. D.K.Mohanty, B.A	Stenographer
11.	Mr. S. Nayak	U.D.C
12.	Mr. S.K. Das, B.Com.	L.D.C.
13.	Mr. S.K. Majhi, M.A., LL.B.	L.D.C.
14.	Mrs. S. Beuria, M.A	L.D.C
15.	Mr. R.C. Dash	MTS(General)
16.	Mr. Sankar P Sharma	MTS(General)
17.	Mr. M.B. Thappa	MTS(General)
18.	Mr. T. Bahadur	MTS(General)
19.	Mr. D.C.Rao	MTS(General)
20.	Mr. Sankar Bisoi	MTS(General)
21.	Mr. Baburam Behera	MTS (General)
22.	Mrs. Triveni Nayak	MTS(General)

Director's Office

1.	Mr. L. S. Rao, B.A.	PS to Director
2.	Mr. K. C.Nayak	MTS(General)
3.	Mr. R. K. Hembram	MTS(Lab. Technical)
4.	Mr. Pandaba Sahoo	MTS(Lab. Technical)
5.	Mr. H. K.Jena	MTS (Lab. Technical)

Workshop & Maintenance Staff

1.	Mr. B.K. Biswal	Technician-A
2.	Mr. S. Sutar	Technician-A
3.	Mr. J. Behera	MTS (Tech. Maintenance)
4.	Mr. B. K. Moharana	MTS (Tech. Maintenance)

Animal House Staff

1.	Mr. A. Senapati	MTS (Lab. Technical)
2.	Mr. S.K. Das	MTS (Lab. Technical)
3.	Mr. Jaladhar Naik	MTS (Lab. Technical)
4.	Mr. Banamali Sahoo	MTS(General)

Transport Staff

1.	Mr. Sibaram Patra	Driver
2.	Mr. Anakar Nayak	Driver
3.	Mr. A. R. Khan	Driver
4.	Mr. P. K. Behera	Driver

Staff of NNMB Unit

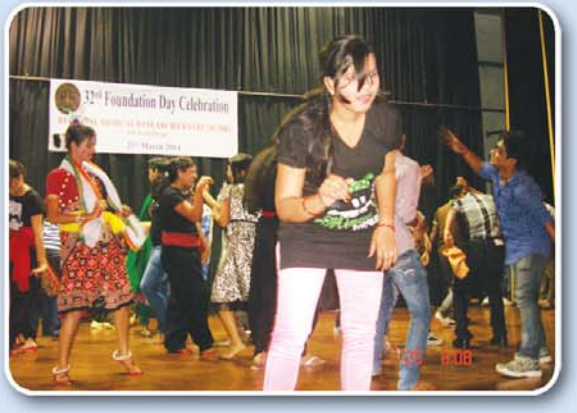
1.	Mrs. S. Paikray	Asst. Research Officer
2.	Dr. A. R. Mohanta	Asst. Research Scientist
3.	Mrs. Haraprava Sahu	Social Worker
4.	Miss. Kanakalata Swain	Lab. Technician
5.	Mr. R. K. Sahoo	Driver
6.	Mr. Santosh K Juharsing	Field Attendant

Ph.D Scholars:

JRF / SRF		Guide
1.	Sushil Kumar Rathore	(Guide: Dr. B. Dwibedi)
2.	Pallavi Pati	(Guide: Dr. M. R. Ranjit)
3.	Eileena Mohanty	(Guide: Dr. B. Dwibedi)
4.	Rasmi Senapati	(Guide: Dr. B. Dwibedi)
5.	Bhagyalaxmi Biswal	(Guide: Dr. S. K. Kar)
6.	Ardhendu Praharaj	(Guide: Dr. S. K. Kar)
7.	Prakasini Satapathy	(Guide: Dr. D. Das)
8.	Ipsita Mohanty	(Guide: Dr. R. K. Hazra).

Rastriya Ekta Divyas Celebration in RMRC

Foundation Day Celebration in RMRC



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