

Annual Report

2015



Regional Medical Research Centre

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



Foundation stone of MRHRU in Tigiria, Cutack



29th SAC Meeting of RMRC, Bhubaneswar

Annual Report

2015



Regional Medical Research Centre (ICMR)

Bhubaneswar-751 023, Odisha, India

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Preface

Regional Medical Research Centre is one of the leading research institute of ICMR and its mission is to carry out innovative, high-quality, biomedical research. The Centre has focussed its research activities in areas of communicable and non-communicable diseases, human resource development programme, communicable research includes lymphatic filariasis, malaria, diarrhoeal disorder, tuberculosis and virology. Non communicable diseases include nutrition, sickle cell disease, hypertension and diabetes and expansion in establishing new field units in both tribal and rural set up in state. Research at RMRC covers a broad spectrum of basic and applied research, translational research has been the major focus of research taken up in operational mode.



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. Translational research activities initiated at Rayagada and Kalahandi address on improving health parameters of under five children focussing diseases of public health importance through strengthening IMNCI program using innovative strategy. The gaps were identified and a training module was developed for ASHA, training has just been initiated.

Effective implementation of DOTS and DOTS Plus strategy is the key component of RNTCP under Central TB Division under Ministry of Health and Family Welfare. For ease of supervision and monitoring The centre has been accredited as National Reference Laboratory for TB and was assigned to look after 10 north eastern states also. The main focus of the NRL includes i) Quality assessment of smear microscopy (EQA) ii) Quality assurance of culture and drug susceptibility testing of laboratories under it iii) Providing support to laboratories for capacity building iv) Train and impart training to state laboratories on technologies v) Providing support to DOTS plus centers with laboratory support. The center has opened a DMC in its OPD for diagnosis of suspected TB patients with pulmonary and extra pulmonary symptoms. BSL III laboratory was established as well as Xenexpert was installed at OPD for providing the diagnosis within two hours.

Department of Health Research, under ministry of Health and Family welfare, Government of India has established six MRHRUs in different states under the scheme of Development of Infrastructure for promotion of health research. The main aim of the project is to development of research project and infrastructure for state medical college for doing research. RMRC is the mentor institute for Odisha region. Tigriria CHC of Cuttack district has been identified as a Unit and construction of the building has been initiated.

Immunization is key to the control of infectious disease but the efficacy of some vaccine is poor in tropical and developing countries. However the reasons for this poor vaccination response are not known. 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. Study on effect of maternal filarial infection on infant's immune response following childhood vaccination has shown, decreased levels of IgG antibodies to

TT were detected in cord samples born from infected mothers compared to uninfected mothers indicating that infection with *W. bancrofti* is associated with an impaired immune response to a vaccine antigen TT, as reflected by relatively impaired antibody responses to TT.

Further, Pregnancy and early childhood are critical periods in determining the disease outcome in older age. A study was undertaken to find out the influence of maternal filarial infection at the time of pregnancy on the susceptibility outcome of children born in a community after implementation of MDA for the first time. Effect of maternal infection on children during their postnatal exposure to filariasis has reflected, Children born to infected mothers 27.2% have acquired filarial infection and became CFA positive in contrast 2.9% of the children born to uninfected mothers have become CFA positive during this period. Significance of the study: To attain the target of eliminating lymphatic filariasis the current MDA programme should give emphasis on covering the women of child bearing age.

Virology Network Laboratory (Grade-I) at RMRC, Bhubaneswar had investigated various Jaundice outbreak, Investigation of suspected Measles virus; Chikungunya outbreak investigation, H1N1 Lab investigation and Samples referral from Medical Colleges and Hospitals from Odisha and other state.

Multiplex PCR assay was developed for pool based screening of identification of vector species of malaria, blood meal identification and vector incrimination which reduce time and man power in monitoring and evaluation programme. The technology was transferred to State Health programme. We have developed an easy Quadruplex PCR Kit that can be easily used by technicians for detection of cholera.

To support the development of our students we offer a wide range of internal training courses covering topics on transmission, immunity, and epidemiology of Malaria, Filariasis, Japanese Encephalitis, Chikunguniya, Dengue, TB and Cholera, and non communicable diseases like Diabetes and hypertension, bioinformatics, statistics, research ethics and scientific communication. Students are also encouraged to attend the extensive range of university courses available. The student seminars and our careers roundtable event continue to form a popular part of the student programme.

The Centre is continuing with 19 ongoing projects and this year total 4 projects have been shown as completed projects out of which 2 intramural and 2 extramural funding. During the year 2014-15, till December 2015 total 38 papers are published with average impact factor of 1.92 for the year 2014. All publications are indexed, published in reputed International Journals. The Centre's library is accessed ICMR E- Journal Consortia for 4 Journals (Lancet, NEJM, Nature, Science) and online subscription of J-Gate Plus through ICMR consortia. The Centre is providing Smart Library solution to its users. Added to that RMRC Library has initiated Institutional publication repository and Daily Article Service to all biomedical scientists of ICMR and Non- ICMR scientists.

Utkal University, Bhubaneswar has recognised RMRC as Nodal Centre for UGC sponsored Pre- Ph.D program on Biotechnology and Life Science discipline. Twenty eight M.Sc. students have undertaken M.Sc. dissertation project work under various scientists. Also during 2015, four Ph.D scholars of RMRC, Bhubaneswar have awarded Ph.D under Utkal University. In publication activities, the Centre published RMRC News bulletins, Library news letter and technical hand books and monographs during this period.

Dr. Namita Mahapatra
Director-in-Charge

On Going Studies



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

Principal Investigator : Dr A.K.Satapathy
Co-Investigator(s) : Dr. M.S. Bal , Dr B. Dwibedi
Duration : Three years
Starting date : Oct 2014
Closing date : Oct 2017
Status : 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.

Back ground

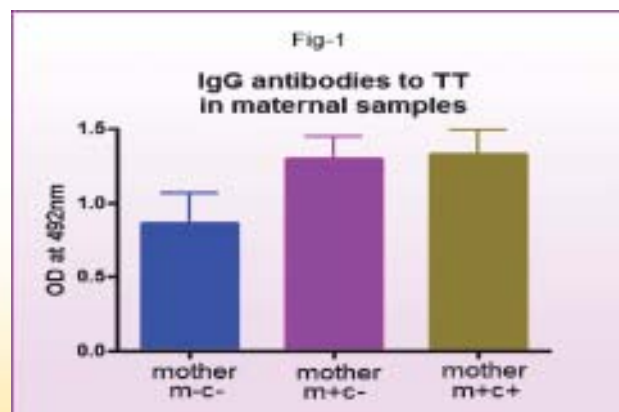
Immunization is key to the control of infectious disease but the efficacy of some vaccine is poor in tropical and developing countries. However the reasons for this poor vaccination response are not known. Clinical evidence suggests that chronic antenatal parasitic infection can significantly alter infant immune response to childhood vaccination. Human harbouring helminths 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.

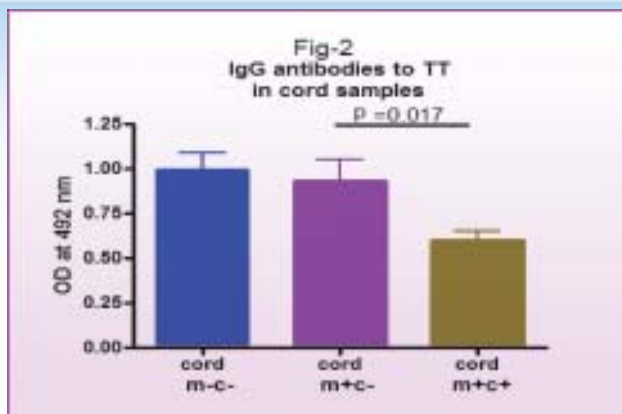
Individuals with asymptomatic microfilariaemia or even circulating filarial antigen have been shown to display weak antigen specific T-cell proliferative response, reduced production of IFN-g and elicit a strong type 2 regulatory immune response. It is possible that filarial infection elicit a strong type 2 and regulatory response, which could inhibit type 1 response and diminished the effectiveness of

vaccination. It is also presumed that sensitization to filarial antigens in utero may also influence the humoral and cellular responses induced by childhood vaccination. Therefore we evaluated 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

Approved by ICMR for funding. Fund not received. By using intramural funds the work has been initiated. Samples from the following categories of filarial patients (1) endemic normals (2) asymptomatic microfilariaemic carriers and (3) chronic patients are being collected. Blood samples of endemic normals, asymptomatic microfilariaemic carriers and chronic patients were collected from a filarial endemic village. Plasma were separated and preserved which will be used subsequently for quantification of antibodies. IgG antibodies to TT were quantified by enzyme linked immunosorbent assay in all three groups of mother and their respective cord blood samples. As shown in Fig-1, although a high level of Ig G antibodies to TT is observed filarial infected mothers, no significant difference was observed in the Ig G antibodies levels to TT among filarial infected and uninfected mothers. Ig G antibodies to TT in children born from filarial infected and uninfected mothers are shown in Fig-2. Decreased levels of IgG antibodies to TT were detected





in cord samples born from infected mothers compared to uninfected mothers indicating that infection with *W. bancrofti* is associated with an impaired immune response to a vaccine antigen TT, as reflected by relatively impaired antibody responses to TT.

2. Effect of maternal infection on children during their postnatal exposure to filariasis.

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

(Note: The title of the project has been changed as suggested by 28th SA(2014). The earlier title was Identification of markers to detect the early onset of infection in children during their postnatal exposure to fillariasis).

Objectives

1. To follow-up the children born to filarial infected and non infected mother for observing parasitological, antigenical and clinical out come
2. To determine the influence of maternal infection on subsequent B cell response (antibody isotype) to filarial antigens among follow-up children
3. To find out the extent of modulation of parasite specific cellular reactivity and cytokine production in children during their natural exposure to infection.

Background

Global Program to Eliminate Lymphatic Filariasis (GPELF) launched by WHO aims to eliminate the disease by 2020. To achieve the goal annual mass drug administration (MDA) with diethylcarbamazine (DEC) plus albendazole (ABZ) has been introduced in all endemic countries. The current policy however excludes pregnant mothers and children below two years of age from MDA. 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. Further, Pregnancy and early childhood are critical periods in determining the disease outcome in older age, the present study was undertaken to find out the influence of maternal filarial infection at the time of pregnancy on the susceptibility outcome of children born in a community after implementation of MDA for the first time. To prove the hypotheses we critically follow-up the children longitudinally born from filarial infected mother and uninfected mother and monitor their immunological and parasitological consequences.

Progress

The children born full-term, healthy and whose mothers agreed to continue participation have been enrolled during follow up. Out of 158 mother-newborn pairs enrolled during 2009-2011, 63.9% (101/158) could be followed up along with their children during house to house visit in 2014. The physical assessment of mothers and children were conducted by a physician and examined for presence of Mf. Blood samples were collected from enrolled mothers and their children along with detailed clinical history.

Out of 158 mother-new born pairs a total of 101 pairs have been examined during the follow-up.

Amongst them 33 children were found to born from mothers who had filarial infection (MF+ve /CFA+ve: 4 and Mf -ve / CFA +ve: 29) at the time of delivery and 68 from filarial uninfected mother(CFA-ve and Mf-ve). Out of 33 infected mothers, 18 mothers are still harbouring filarial infection (CFA +ve but Mf -ve), 5 mothers have cleared CFA but developed acute symptoms of filariasis and 10 have cleared CFA without developing any clinical signs/symptoms of filariasis. The geometric mean (GM) of CFA levels of the mothers at the time of follow-up was 232units (range: 128-7762) compared to 2125 (range: 930 - 16596) at the baseline of the study. Interestingly all 68 uninfected mothers maintained infection free status at the time of follow-up.

Out of 33 children born to infected mothers 9 (27.2%) have acquired filarial infection and became CFA positive (GM: 147, range: 128-230), while 6 out of these 9 children belongs to mothers (n=15) who are CFA negative during follow up. In contrast 2.9% (2/ 68) of the children born to uninfected mothers have become CFA positive (GM: 133) during this period. None of the children had developed either any clinical signs/symptoms of filariasis or Mf in their peripheral blood (Table 1). On comparison of data it was observed that there is an extremely significant association

between infection status of mother and acquiring of infection by the children born to them.

Significance

To attain the target of eliminating lymphatic filariasis the current MDA programme should give emphasis on covering the women of child bearing age. Our study recommends incorporating supervised MDA to Adolescent Reproductive and Sexual Health Programme (ARSH) to make the adolescent girls free from infection by the time of pregnancy so as to achieve the goal.

3. Characterization of post mass drug administration residual microfilaraemics using anti sheath antibodies.

Principal Investigator : Dr. M.S. Bal
Co-Investigator(s) : Dr. B. Dwibedi
Dr. A. K. Satapathy
Starting date : Aug 2015
Closing date : July 2018
Funding : EM (ICMR)

Primary objectives

To evaluate the anti-sheath antibody levels in individuals with or without microfilaraemia after DEC treatment in comparison to the control group.

Table 1: Status of filarial infection among the children born to filarial infected and uninfected mother in a MDA ongoing area of Odisha. *GM: Geometric mean.

Status of Mother								Present status of follow-up children (2014)						
Baseline (2009)				Follow-up (2014)										
CFA status	N	CFA unit GM* (range)	Mf +ve	CFA status	N	CFA units GM* (range)	Mf +ve	N	Mean age (years)	Mf +ve	Clinical symptom	CFA positive	% CFA +ve	CFA GM* (range)
CFA +ve	33	2125 (930-16596)	4	+ve	18	232 (128-7762)	0	33	4.2	0	No	9	27.2	147 (125-230)
CFA -ve	68	0	0	-ve	68	0	0	68	4.3	0	No	2	2.9	133

Secondary objective

To find out the association of anti-sheath antibodies with the expression of cellular responses, T-regulatory cells, and cytokine production (Th1 and Th2) in individuals with or without W bancrofti infection after DEC treatment in comparison to the control group

Background

Lymphatic filariasis (LF) causes an enormous disease burden throughout the tropics and subtropics. The Global Programme to Eliminate Lymphatic Filariasis was begun in 2000 and Odisha has experienced 5 rounds of MDA since 2004. Though majority of the population have cleared microfilariae (MF) due to mass drug effect, some are yet harboring the infection. They are known as “residual microfilariae”. To achieve the goal of GPELF it is very important to know the factors responsible for clearing the MF in some and not in others. As more countries undergo mass drug administration (MDA), the driving need is for development of a highly sensitive and specific antibody assay for detecting ongoing exposure to vector-borne filaria following MDA. We have demonstrated a significant inverse association between presence of anti-sheath antibodies and absence of active filarial infection. So antibodies to the sheath of microfilariae have been demonstrated to play a central role in the elimination of circulating MF in human filariasis. But the specific mechanism that plays this role and gives immunity to the individual is not known in filariasis. According to our hypothesis presence of antisheath antibody in an individual augments the clearance of MF after DEC therapy. So there is a need to evaluate the antibodies to microfilarial sheath and relate it to parasitological and CFA levels in the DEC treated microfilaraemic and amicrofilaraemic individuals. In addition to this cellular and humoral responses will be measured to find out the pathway by which antibodies to microfilaria

sheath modulates the immune response of an individual to give protection against filarial infection. The study will also provide insight into the factors responsible for maintenance of residual microfilariaemia in subjects living in filariae endemic regions. It will further help to understand the skewing of immunological response that takes place during the development of anti-sheath antibody/Circulating filarial antigen clearance. The study will help to assess the diagnostic value of the anti-sheath antibody in filariasis for monitoring infection.

Progress

The funding of the project was received in August 2015. The chemicals and reagents required for this study are under process for procurement. The study villages have been selected; where six round of MDA is completed. After door to door survey the subjects will be identified who had microfilariae (Mf) before MDA. The subjects will be counseled and motivated properly to take part in the study.

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

Principal Investigator : Dr. M R Ranjit
Co-Investigator : Dr. Namita Mahapatra
Period : 1 year
Starting Date : 29th Nov. 2014
Funding : Dept. of Health Research,
Govt. of India (Translational)

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.

Objectives

- (i) To standardize the LAMP assay for detecting malaria infection in direct finger prick blood sample
- (ii) To investigate the repeatability of the test in a laboratory and reproducibility between laboratories (ruggedness)
- (iii) To determine the capability of a CHC level laboratory personnel to perform the assay (proficiency testing)
- (iv) To detect the predictive value of the assay in the field condition

Progress of Work

We have standardized the LAMP assay to perform in fingerpick blood and the internal validation of the test. The efficacy of the test was compared to PCR which was found to be low compared to PCR.

Standardization the LAMP assay for detecting malaria infection in direct finger prick blood sample

Isolation of DNA

About 20 µL of finger prick blood was collected from microscopic positive malaria infected patients. The DNA was extracted by boiling method standardised in our laboratory. Briefly 500µl of ice-cold 5mM sodium phosphate (pH 8.0) was added to 20µl of finger prick blood and centrifuged for 10 min at 8000 rpm after vortexing. After centrifugation (8000rpm) for 10min in a microfuge at room temperature, the supernatant was discarded. The pellet was washed twice with same buffer by repeating the above steps of vortexing and centrifugation. Finally the pellet was suspended in 50 µl of sterile water, vortexed and then kept in a hot bath at 90°C for

20 min followed by centrifugation at 8000 rpm for 10 min at room temperature. After centrifugation the supernatant was collected and used for detection of malaria infection by LAMP assay.

LAMP Assay

The LAMP assay was carried out in our laboratory by following conditions.

Reaction Mixture (25 µl)

2X Reaction mix (Eiken)	: 12.5 µL
Primer mix (FIP&BIP, FLP & BLP,FOP&BOP)	: 1 µL
Bst DNA polymerase	: 1 µL
Fluorescent Dye	: 1 µL
Nuclease free water	: 3.5 µL
DNA Template	: 6 µL

This reaction mix is incubated for 1 hour in dry a bath at 63°C for 1 hour. The LAMP positive tubes can be clearly distinguished from negative tubes by naked eye (Positive: green, Negative: orange red).



Comparison of LAMP assay with PCR

When the sensitivity of the LAMP assay was compared with PCR it was observed that the when the PCR could detect 2 parasites (*P falciparum*) per 20 µl of finger prick blood LAMP could detect up to 10 parasites (*P falciparum*) per 20 µl of finger prick blood. Similarly in case of *P vivax* PCR could detect 5 parasites per 20 µl of finger prick blood LAMP could detect up to 20 parasites per 20 µl of finger prick blood. Hence the sensitivity of the LAMP assay was less compared to PCR (Table 1).

Intra observational

The same blood sample was put to assay for ten times by the same individual and the results of each time result was shown in Table 2. In case of *P falciparum* the repeatability was 90 % and *P vivax* 80%.

Internal Validation of the Test

To investigate the repeatability of the test in a laboratory and reproducibility between laboratories (ruggedness we have conducted the assay by giving

the SOP to the researchers (SRFs and Research Associates) and Lab Technicians working in different laboratories (Molecular Biology, Immunology, Entomology and Virology) of the institute. Besides we have also conducted the test at the field unit of RMRC situated at Raygada and Kalahandi. It was observed that more than 98 % of the individuals are able to perform the test satisfactorily. The study is in progress.

Table 1: Sensitivity of the reaction

<i>Plasmodium falciparum</i>			<i>Plasmodium vivax</i>		
Parasite / μ l	PCR	LAMP	Parasite / μ l	PCR	LAMP
200	+ve	+ve	200	+ve	+ve
100	+ve	+ve	100	+ve	+ve
20	+ve	+ve	20	+ve	+ve
10	+ve	+ve	10	+ve	-ve
5	+ve	-ve	5	+ve	-ve
2	+ve	-ve	2	-ve	-ve

Repeatability of LAMP Reaction

Table 2: Repeatability of LAMP assay.

Reaction number	LAMP Assay for <i>Plasmodium falciparum</i>	LAMP Assay for <i>Plasmodium vivax</i>
	Result	Result
1	+ve	+ve
2	+ve	-ve
3	+ve	+ve
4	+ve	+ve
5	+ve	-ve
6	+ve	+ve
7	+ve	+ve
8	-ve	+ve
9	+ve	+ve
10	+ve	+ve

5. Mapping of Malaria Vectors in Coastal Districts of Odisha.

Principal Investigator : Dr. R. K. Hazra
Co- Investigator (s) : Dr. N. Mohapatra, Dr. Neena Valecha, Dr. P. Jambulingam
Dr M.M. Pradhan,
Dr. G. S. Sonal
Duration : 1 year
Funding : ICMR Task force

Objectives

1. To assess the pattern of disease transmission and distribution of vectors at subcenter levels in Coastal districts.
2. To study the Bionomics and vectorial attributes of malaria vectors in the coastal districts of Odisha.

Background

Odisha between Latitude 19° 3' N to 21° 5' N and Longitude 82° 30' E to 83° 74' E is 16,000 square miles (41,400 square km). Though the malaria data available from NVBDCP, Odisha shows a low API from the coastal districts, death cases are still reported with low transmission of Malaria from these districts (NVBDCP, 2009-11). Therefore, a study is proposed to be undertaken in 7 coastal districts of Odisha to map the mosquitoes responsible for transmission, bionomics, and vectorial attributes of vectors which will help to develop an appropriate demonstrable vector control strategy for further control of the disease.

Work done

The work has been initiated with the intuitional budget. The study was undertaken in two sub Centres amongst three under one CHC. Three villages were selected in each sub Centre for routine entomological studies. During May 2015 to September 2015 a total of 13 villages were surveyed viz. Poipani, Kankadajodi, Dhanurjayadur, Dhatika, Nayagada from Keonjhar district (Northern Plateau), Lulung, Govindpur, Uski,

Thakurguda, Lunjagosana, Routala from Maurbhanj district (Northern Plateau) Coastal belt, and Gopinathpur, Brahampur from Balasore district. In these villages routine collection of mosquitoes by different methods was done and their distribution & density of coastal belt was compared with Northern Plateau.

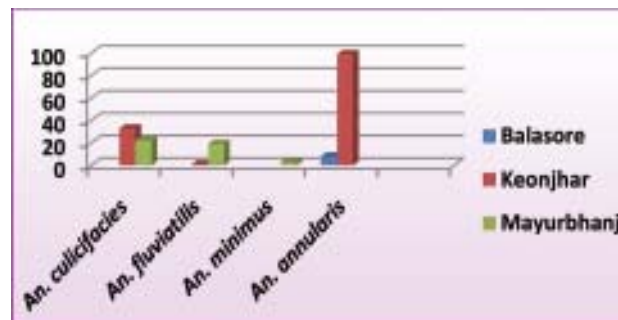


Fig-1: Distribution of different vector species during January 2014-2015.

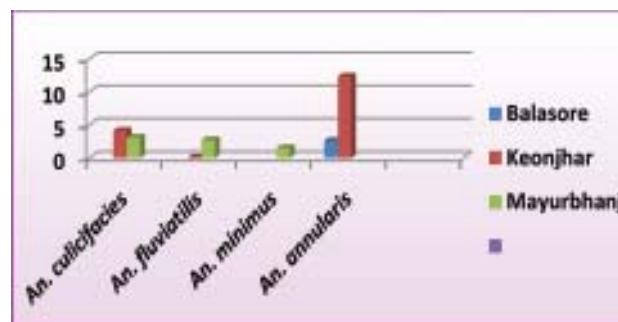


Fig-2: Per man hour density of Vector species.

6. 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 R K Hazra
Co- Investigator : Dr N Mohapatra
Duration : 3 years (2014-2017)
Funding : ICMR Task force (E.M)

Objectives

1. To assess the pattern of disease transmission and distribution of vectors at sub centre levels in Kalahandi district.

2. To study the bionomics and vectorial attributes of malaria vectors for malaria stratification.
3. To Develop situation specific vector control strategy to curtail the transmission of malaria.

Background

Kalahandi district covering an area of 7920 km² is situated in south western region of Odisha between Latitude 19° 3' N to 21° 5' N and Longitude 82° 30' E to 83° 74' E. The State Government data shows that the deaths due to Malaria are increasing in Kalahandi from 2008 to 2012 i.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 transmission, vectorial attributes and bionomics and develop an appropriate demonstrable vector control strategy for further transfer of technology.

Progress of Work

The study has been initiated with the institutional budget. The study was undertaken in three sub centres amongst four under one CHC. Five villages were selected in each sub centre for routine entomological studies. Monthly entomological surveillance was conducted in each selected village. Indoor resting collections were conducted in each selected villages and morphological identification was done. The Anopheline fauna of study villages in Kalahandi district consisted of 16 species of Malaria vectors amongst which *An. culicifacies* species was found throughout the year from indoor resting habitats from both the study sites (Table-1). During September 2014 to 2015 a total of 11 villages were surveyed covering all three ecotype i.e. foothill, riverine and plain. *An. culicifacies*, *An. subpictus* and *An. vagus* was found in all surveyed villages. *An. fluviatilis* was collected in one village of M. Rampur (Table-1). *An. culicifacies* was found with a higher density (Fig-1).

An. culicifacies and *An. fluviatilis* were assayed for the presence of Malaria parasite employing PCR based on 18s rRNA target gene. DNA was isolated and sibling species identification was carried out using D3 conserved region specific primers. Out of total 780 *An. culicifacies* and 52 *An. fluviatilis* collected, 152 *An. culicifacies* and 21 *An. fluviatilis* were examined by PCR assay (Table: 2 and 3).



a. Foothill



b. Riverrine



c. Plain

Table-1: Number of villages showing different type of species.

S. No	PHC	Village	Species name															
			<i>An. fluviatilis</i>	<i>An. hyrcanus</i>	<i>An. vagus</i>	<i>An. subpictus</i>	<i>An. annularis</i>	<i>An. pallidus</i>	<i>An. barbirostris</i>	<i>An. tessellatus</i>	<i>An. maculatus</i>	<i>An. splendidus</i>	<i>Cx. quinifacius</i>	<i>Cx. Vishnui</i>	<i>Cx. jellidus</i>	<i>Armingieris</i>	<i>Ae. albopictus</i>	
1	Deypur	Ichhapur	+		+	+	+	+	+		+			+	+	+	+	+
2	Deypur	Saralangi	+			+	+			+			+		+			
3	Deypur	Sadeikhelaa	+		+	+	+	+						+	+			
4	Dadpur	Dadpur	+				+		+						+	+	+	
5	Jaipatna	Mukhiguda	+			+	+							+	+			
6	Jaipatna	Sastiguda	+		+	+	+								+			
7	Jaipatna	Chandipur	+		+	+	+					+			+			
8	Jaipatna	Dhansuli	+		+	+	+								+			
9	M.rampur	Dumkarlakh unta	+	+		+	+								+			
10	Mohangiri	Deulipada	+			+	+											

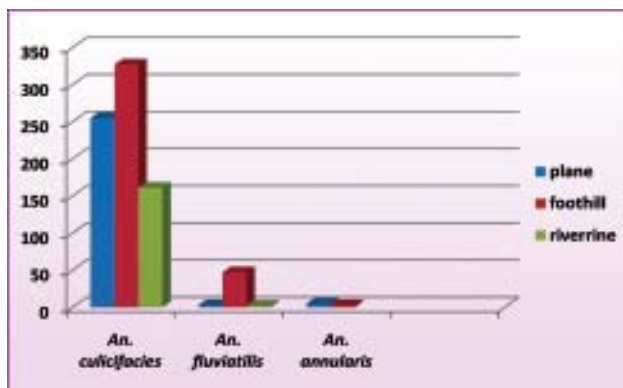


Fig-1: Prevalence of vector species in different ecotypes during September 2014-15 in Kalahandi district.

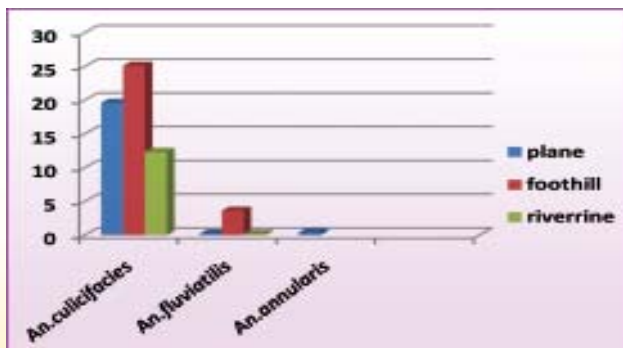


Fig-2: Ecotype wise per man hour density of vector species in Kalahandi district during September 2014-15.

The insecticide susceptibility test conducted for *An. culicifacies* concluded with the former being resistant to 4% DDT and completely susceptible to Cyfluthrin.

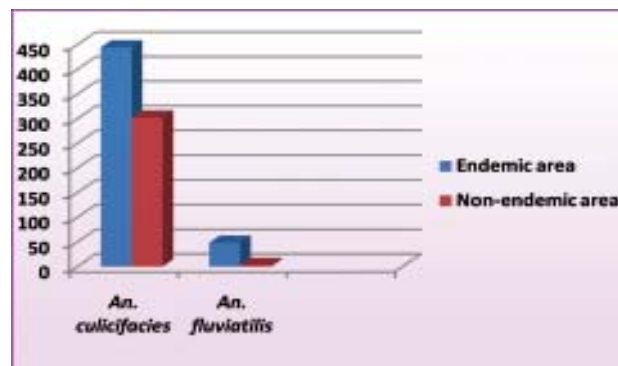


Fig-3: Density of vector species in both Endemic and Non-endemic areas of Kalahandi district during September 2014-15.

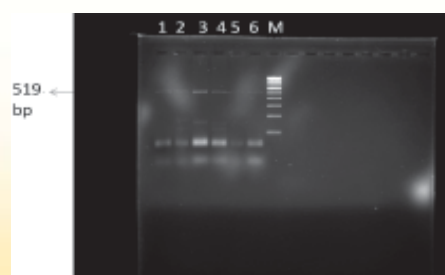


Fig-4: lane 1, 2, 3, 4, 5, 6 showing human blood meal (519 bp) and lane 7 100bp marker.

Table 2: Susceptibility status of vector species in ecological paradigm during September 2015.

PHC	Village	Ecology	Species	Insecticide used	Mosquitoes exposed	Time exposed	Mortality	% Mortality	temp (°c)
Jaipatna	Pondi	Foothill	An. culicifacies	DDT 4%	15	1hr	0	0	34
						24hr	2	13.3	
Jaipatna	Pondi	Foothill	An. culicifacies	OC-CONTROL	15	1hr	0	0	34
						24hr	0	0	
Jaipatna	Pondi	Foothill	An. culicifacies	CY FLUTHRIN	15	1hr	2	13.3	34
						24hr	9	60	
Jaipatna	Pondi	Foothill	An. culicifacies	PY-CONTROL	15	1hr	0	0	34
						24hr	1	6.6	

Table 3: Sporozoite positivity of *An. culicifacies* and *An. fluviatilis* by PCR assay.

	Kalahandi	
	Mosquitoes tested	Total Positive
<i>An. culicifacies</i>	152	0
<i>An. fluviatilis</i>	21	0

Table 4: Blood Meal sources identification of *An. fluviatilis*.

Species	PHC	Village	No. Mosquitoes testedfor	Total positive Human blood
<i>An. fluviatilis</i>	Jaipatna	Pondi	21	6

7. End line house-hold survey in Odisha and Andhra Pradesh.

Principal Investigator : Dr. N Mohapatra
Co-Investigator : Dr. A S Kerketta
Starting date : March 2015
Closing date : December 2015
Status : Extramural (NVBDCP)

Objectives

Overall objective

To track changes / impact over the baseline after interventions carried out by National Malaria Control Program in the selected states of India.

Specific objectives

- Promptness of treatment for fever/malaria
- Sources of treatment for fever (health seeking behaviour)
- Household ownership of mosquito bed nets

- Use of bed nets among the households, particularly by pregnant women and children under five.
- Effective coverage of Indoor Residual Spraying (IRS)
- Whether the malaria programme especially caters to the needs of the vulnerable and marginalized,

Progress

The field survey has been completed as per the scheduled plan in both the study states. In each state 32 interviewers / listers / mappers and 8 supervisor-level field staffs were engaged for data collection, who were imparted three days training including field practice. Eight teams of 5 people each (consisting of 2 listers, 2 mappers and 1 Supervisor) carried out the house listing, mapping and village interviews for actual household survey, last fortnight and today fever

Table-1: District wise house hold under coverage Vs household selected.

Study Districts	Household covered N= 14163	Household selected for detailed interview N=1703 (12.0%)
Sundargarh	1295	170 (13.1)
Keonjhar	929	170 (18.3)
Dhenkanal	1036	168(16.2)
Angul	954	160(16.7)
Ganjam	1277	175(13.7)
Bolangiri	1589	173(10.9)
Kalahandi	1849	176(9.5)
Rayagada	1691	166(9.8)
Nabarangpur	1561	175(11.2)
Malkangiri	1982	170 (8.6)

cases survey, ASHA schedule and village profile of the study village.

Mapping and listing was done to ensure all the households in the clusters covered by list. In selected village or primary sampling unit (PSU) the boundaries were identified, detailed maps were drawn to locate the households with nearer identification land mark, after which the households were listed and all the structures were numbered. The standard size of the village in this survey was having 150-250 households. In case of having more than 300 households, the village was sub-divided into segments and 2 segments were selected randomly. In case of very small village or segment, merging was done. In each clusters from the households list, 22 households were randomly selected using selection interval and random number-R for detailed interviews related to Bed net usage, IRS indicators, awareness and socio-economic status. A responsible adult in each selected household was interviewed for household survey. From the list of 2-week fever cases identified during house listing in each village, 22 cases were selected using similar random selection for a detailed interview, in case of less than 22 fever cases in the village all were selected.

A simple verbal autopsy was undertaken for all deaths occurred during last one year, and was discovered during house-listing. The profile of the village, including information related mainly to the geography and access to health services were noted using a village schedule.

The data collection in both Odisha and Andhra Pradesh has been completed. In Odisha 10 districts namely Sungargarh, Keonjhar, Dhenkanala, Anugul, Ganjam, Bolangir, Kalahandi, Rayagada, Nabarangpur and Malkangiri were included for the study. In each districts 8 villages were covered. Thus a total 80 villages covered in a state. Thus a total of 14163 households were covered in entire 10 districts. In each village 22 households were selected for

detailed household survey which ranges from 160 to 175 based on the presence of interviewee on the day of visit. Thus an average of 12% households was included in household survey. The detailed district wise household coverage is given in table-1. The data has been sent to central data management team, NIMS for further analysis. The data of AP is under review for errors.

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

Principal Investigator : Dr. N. Mahapatra
Co Investigator (s) : Dr. R. K. Hazra
Mr. N. S. Marai
Duration : 3 years
Starting Date : September 2015
Funding : Extramural (ICMR)

Objectives

1. To map the adult and larval distribution of *Culex vishnui* group of mosquitoes in JE affected areas of Odisha
2. To study the adult density, seasonal prevalence, gonotrophic cycle, resting, biting, breeding behavior and susceptibility status to insecticides used in the programme
3. To find out the presence of virus in mosquitoes vector, pig and human population in the affected areas.

JE Transmission in Malkangiri district

Following the JE outbreak in 2012, an entomological survey was conducted to find out the possibility of JE transmission, the team went to four affected villages and blood samples were collected from inhabitants of affected house as well as from their neighbors. Indoor (human dwelling and cattle shed) and outdoor day time resting mosquito collection were done in the villages.

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 were brought to the Malkangiri hospital where serum were separated after centrifuge and were then brought to the RMRC lab and subsequently sent to NIV Pune .The result showed out of 45 samples 5 were found positive for IgG (Communicated by NIV, Pune).

Entomological Survey

Adult mosquito collections were done from indoor and outdoor of the household. Collected mosquitoes were brought to Malkangiri and were identified. The detail vector prevalence has been depicted in.

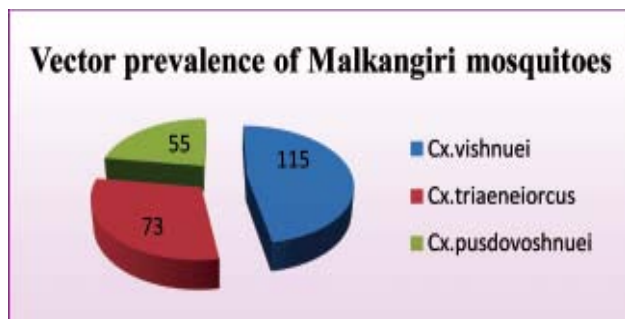


Fig-1. Vector prevalence of Malkangiri mosquitoes.

The identified mosquitoes were kept in -20°C deep freezer. 10 pools of *Cx.vishnui* group of mosquitoes were processed for detection of virus by PCR method. Each pool contained 25 mosquitoes. 3 pools were found to be positive for JEV infection.

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.

Entomological investigation in Potrel village

JE Transmission in Keonjhar district

A total of 84 suspected cases and contacts of the diseased one were enquired. Among theses,79 blood samples were collected and three CSF samples were collected. Out of these 79 sample 61 were from Swampatna village of Patna block. Rest, eighteen samples were from Dehuriposi village of Ghatgaon 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.

Entomological investigation such as seasonal variation of vector population, resting and feeding behavior and human blood index and virus detection were conducted to know the transmission pattern of virus during inter epidemic situation. Fig-2 showed the seasonal prevalence of the vector species of affected area of Keonjhar district.



Fig-2. Month wise PMHD of *Cx.vishnui* gr. of Mosquitoes in Keonjhar District.

Larval collection

Breeding sites: Paddy fields, tanks, ponds, puddles, ditches, ground pools etc. The larval density was calculated as the average number of immature

per dip collected from each habitat.(Fig-3) Larval counts were made carefully and the identification of species done by following standard keys (Barraud, 1934; Sirivanakarn, 1976; Reuben, 1968). Third instars' larvae were taken for categorization and reared until adult emergence for further confirmation of the species

In contrast to Malkangiri it was observed that the pig were not found in the affected villages but some tribal's were having herd of pigs in the forested areas which were 3 to 5 Km away from the main village .Interestingly these pigs come to the village area for feeding purpose in the morning and went back to their habitats in the evening and mosquito which bits them during the day bits the human being in the night thus becomes host for transmission of the diseases. In some of the affected village it was seen most of the houses have pig shed within 5-to 50 meters away from the house.

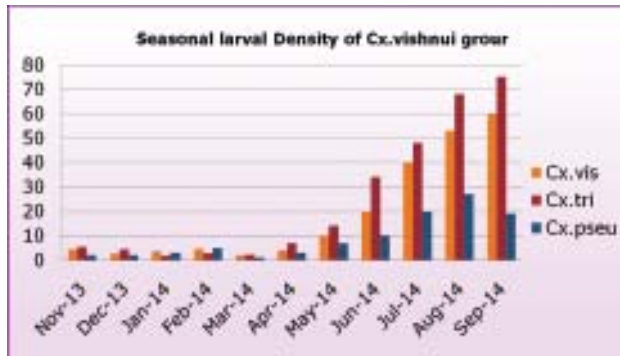


Fig-3. Seasonal larval Density of *Cx.vishnui group*Prevalence of Pig population in Keonjhar district

The above finding suggest in the situation 1 vaccination of the pigs will be help in controlling the transmission. Whereas situation-2 human vaccination/vector control can curtail the diseases transmission.



Pig population of Keonjhar staying outside of the village



Pig and piglet of Keonjhar staying adjacent of the house

Jajpur

After receiving death report from the CDMO Jajpur a team of Doctors & Medical Entomology had visited the affected villages Mathurapur of Jajpur. Onwards than a routing mosquitoes and larval collection was done month wise in that affected areas of villages Mathurapur & adjacent village Mukundapur.

More than 150 HH were surveyed for mosquito collection from the affected villages. More than 1314 different types of mosquito species like *Cx.triaeniorhynchus*, *Cx.vishnui gr. Cx.gelidus*, *Cx.quinquefasciatus*, *Cx.bitanearehynchus*, *An.culicifascies*, *An.varuna*, *An.vagus*, *Armigerius*, *An.annularis*, *An.culicifacies*, *Ma.uniformis* & *Ma.indianna*. *Aedes vittatus* were collected. The mosquitoes were brought to the laboratory and some were processed for detection of JE virus. Out of 1314 samples 100 samples in 4 pool have been processed by RT-PCR method. Each pools contain 25 mosquitoes

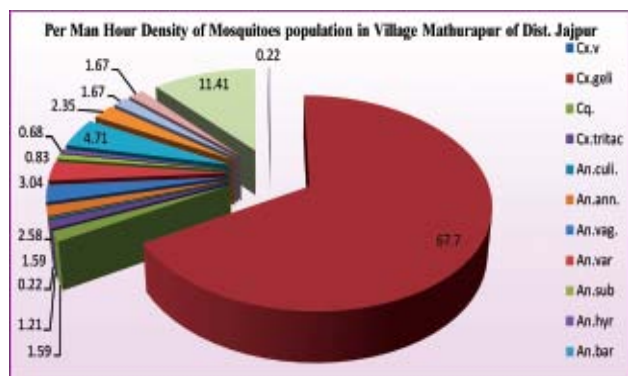


Fig-4 Per Man Hour Density of Mosquitoes population in Village Mathurapur of Dist. Jajpur.

for screening. Out of 4 pool one pool have been found positive for JE.

At the same time Aedes survey were also conducted in the village container like earthen pot, plastic were found positive for aedes breeding. A pig shelter at solopatta village which is about 2-3 k.m. by air distance from the affected village (Mathurapur) was located, photograph and their details were collected. More than 40 number of pig were permanently staying there. The owner of pig were leading both way life i.e they used to kept pig in the shelter and also some time they kept them in open near the river bed just 1.5 km away from the affected village Mathurapur.

Outbreak investigation in Mayurbhanja district

After receiving death report from the CDMO Mayurbhanja a team of Doctors & Medical entomology had visited the affected villages



Blood collection from neighbors



Migratory population of pig shed in Jajpur district



Feeding of pig



Pig house



River bed Pig



Mosquito collection

Mathurapur of Jajpur. 215 Adult mosquitoes were collected from Mayurbhanja area for detection of Japanese encephalitis virus. Among them 185 were *An.hyrcaus*, 28 were *Culex vishnui*, 1 is belonging to *Culex gelidus* and *Ma.uniformis*. We processed 80 sample in a pool basis out of which we got 2 positive sample (*Cx.vishnui* and *Cx.gelidus*).

Conclusion

The above study clearly indicates that the JE transmission is going on in the state. Necessary suggestion for controlling the diseases has been communicated to the state health department.

9. Estimate the burden of TB among the tribal population and develop an innovative health system model to strengthen TB control in the tribal areas.

Principal Investigator : Dr. T Hussain
Co-Investigator(s) : Dr. Dasarathi Das
Dr. A Mohapatra

Duration of
Research Project : 2 Years
Starting Date : March, 2015
Funding : Extramural
(Multi centric) ICMR

Back Ground

TB is a major public health problem in India but the information on TB situation amongst most of the tribal groups is hardly available. Hence, this study is

proposed to assess the tuberculosis situation amongst the tribal groups in the State of Odisha, in terms of prevalence of PTB, the extent of MDR/XDR TB, co-infections with HIV, risk factors for tuberculosis and the health seeking behaviour of chest symptomatics especially with relevance to the RNTCP in these areas.

To obtain reliable epidemiological data on TB in different communities in tribal regions of Odisha, namely Balangir, Kalahandi, Kandhamal and Mayurbhanj, this study aims to assess the burden of TB and the vulnerability of tribal population. In this study, it is planned to study the prevalence of TB among tribal groups, in tribal areas of Odisha. The estimation of the TB is important for monitoring disease progression, risk analysis and transmission which, in turn, would generate baseline data of for planning further research studies and intervention strategies.

Primary objectives

1. To estimate the prevalence of TB amongst tribal groups in Odisha.
2. To find out the health seeking behavior patterns of persons having symptoms suggestive of TB.
3. Develop feasible interventions to improve case finding and compliance for TB treatment through a community based approach.

Secondary Objectives

1. To identify the socio-cultural determinants as risk factors for TB such as socio- demographics (housing, sanitation, occupation), nutritional factors, alcohol, smoking and contact history.
2. To understand the knowledge, attitude and perceptions on TB among Tribals of Odisha.
3. To review the functioning of RNTCP in DMCs, TUs and DTC in tribal areas of Odisha to identify gaps in programme implementation (access, implementation)

Work Progress

Field work has been initiated in the 4 districts of Odisha, namely

1. Bhadua, Kasiabeda and Gandirabeda villages in the Jashipur and Jharpokharia blocks of Mayurbhanj district.
2. Jantaribola village in the Kamakhyanagar block of Dhenkanal district.
3. Maghamara village in the Patnagarh block of Balangir district and
4. Penagabaeri village in the Tikabali block of Kandhamal district.

This included situational analysis of the villages, FGDs and Interviews with village heads, influential people, heads of the tribes, older members of the tribe, TB patients, families of TB patients, Medical Officers and public health providers like STS, STLS, ASHA, AWW, etc.

10. A Prospective Study to determine the Incidence of Tuberculosis among Patients with Type 2 Diabetes Mellitus.

Principal Investigator : Dr. T Hussain
Co-investigator (s) : Dr. Mukesh Kumar
Dr. Soumya Swaminathan
NIRT, Chennai
Duration : 3 years
Starting Date : 2014
Funding : Intramural

Preliminary work has been initiated with intramural funds.

Primary Objective

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

Secondary Objectives

2. To identify risk factors for TB among people with Type 2 Diabetes Mellitus.

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

Progress of Work

In all, 300 patients with T2DM were enrolled after taking informed consent. The socio-demographic and anthropometric profile, reasons for stress, complications at the time of testing, habits, etc. were documented at the time testing. The plasma and sera samples were used for various investigations namely HbA1C, random blood glucose levels, Liver function tests, blood urea, serum creatinine and lipid profile. Signs and symptoms of tuberculosis were recorded by using standardized questionnaires. The results show that there is gender bias in patients attending the Diabetes OPD. In all, 75% male and 24% female patients were enrolled in the study. 28% each of the people were in the age group 41-50 years and 51-60 years. 8% of patients were having habits of all types, namely chewing gutka/tobacco, smoking and alcohol. Around 3% were smokers and about 2% consumed alcohol regularly. 57% were sedentary whereas 42% were active. 23% of patients with Diabetes had familial history, i.e., at least one member in the family was Diabetic. 42% were overweight and 11% were obese. Further, 30% of T2DM patients were having hypertension. RBG levels were high in 68% of T2DM patients. Cholesterol and triglyceride levels were also high among 36% and 39% of the patients, respectively. About 54% of T2DM patients were having metabolic syndrome. In our study, it was observed that only 2 patients had active disease TB. Thus, the incidence of TB among T2DM patients is 0.6% (2/300). This shows that the incidence of TB among patients with Diabetes is less in this region.

11. Virology Network Laboratory (Grade-I) at RMRC, Bhubaneswar.

Principal Investigator : Dr. B. Dwibedi
Co Investigator(s) : Dr. R. K. Hazra
Miss S. Dixit
Co-ordinator : Dr. Namita Mahapatra
Starting Date : March 2010
Closing Date : March 2015
Funding : Extramural (ICMR)

Background

It was aimed at creating regional facilities to be involved in 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

I. Infrastructure development and man power training

The laboratory up gradation has been made according to the requirement of virology laboratory and it was inaugurated on 5th September 2011. Civil infrastructure modification and Procurements of laboratory furniture and equipments were undertaken.

In house training has been given to the recruited staff on serology and molecular diagnosis. One Scientist (Non-medical) and one SRF have undergone short laboratory training at KMC, Manipal and PGI, Chandigarh on molecular diagnostics and cell culture.

II. Networking for information, Sample receipt, Investigation and reporting

Network has been established with the State Health Department, Medical Colleges and Hospitals of the region for referral investigation of sporadic cases and outbreak investigation. 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.

III. Sample collection

A. sporadic/ referred cases

Sporadic/referral cases were received by the centre from different hospitals from different districts. From Jan to Sept, 2015, 3239 numbers of samples were collected 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 of influenza H1N1, Dengue, Chikungunya, and Hepatitis virus infection has been

Table 1: Sample Receipt from different hospitals and Medical colleges (Jan to Sept, 2015).

Source Hospital/ Centre	No. of samples collected
Capital Hospital, BBSR	379
SCBMH, Cuttack	317
SVPPGIP, Cuttack	1171
SUM Hospital, BBSR	166
KIIMS	201
Other hospitals and PHC	675
Outbreak investigation	330
Total	3239

Table 2: Suspected viral diseases investigated.

Sl. No.	Diseases investigated	No. of samples received
1.	Chikungunya	75
2.	Dengue	186
3.	Respiratory infection	26
4.	Influenza A (H1N1)	351
5.	Measles	91
6.	Chickenpox	42
7.	Hepatitis	707
8.	Encephalitis	1338
9.	Viral diarrhea	201
10.	Rubella	94
11.	HPV	107
12.	Others(Mumps, Coxackie, EBV, CMV, Entero, HFMD, Parvo)	78

investigated with immediate reporting to State Health Department with recommendations for timely prevention.

1. AES outbreak Investigation

● Mathurapur village, Korei CHC, Jajpur district

Upon getting information from CDMO, Jajpur District, a team from Virology Lab, RMRC, Bhubaneswar visited village Mathurapur, Korei block to investigate the reported AES cases in the community. Blood samples from 16 individuals (4 symptomatics, 12 asymptomatics) were tested for JE IgM and Dengue IgM. In 5 cases antibody for JE virus was detected. These include one symptomatic, 4 asymptomatics of which 2 were house hold contacts. One positive case is of 9 year old whereas remaining 4 belonged to 30-60 yrs of age group. All were found negative for Dengue IgM. Report was given to the concerning authority.

- **AES outbreak investigation in Mayurbhanj**

Cases of AES were investigated in Mayurbhanj district in the last week of Sept, 2015. During the investigation the team visited district head quarter hospital at Baripada and examined nine hospital admitted cases whose samples (n=9) were collected by DHH, Baripada and sent to RMRC for virological examination. The team also visited Begunadiha under CHC Kostha for further investigation. It was observed that the cases appeared during the last week of September, 2015. The patients were having sudden onset of fever with convulsion and loss of consciousness, clinically diagnosed as AES. The team also collected 6 blood samples from house hold contacts of the affected case and neighbouring households for lab investigation. The blood samples (n=15) were tested for JE IgM through ELISA and found four positive for IgM antibody. The report was communicated to the concerned authority.

2. Jaundice Outbreak Investigation

- **Investigation On suspected jaundice cases in cuttack district**

An outbreak of Jaundice was investigated in Joda, urban area of cuttack district during second week of February, 2015. A total of 24 individuals were clinically examined to know the cause of jaundice and 6 blood samples were collected. Samples were tested for HEV IgM and all were found positive. Report was given to the concerning authority.

- **Outbreak investigation of Jaundice at Kalampur and Bhawanipatna of Kalahandi district** Suspected jaundice outbreak was investigated in Mandal and Bijmara villages of Kalampur CHC, Kalahandi district, Odisha. In Mandal village one case of severe comatose jaundice was reported during 1st week of June

and was referred to DHH, Bhawanipatna. It was the single case and there was no spreading. In a neighbouring village named Bijmara four cases of jaundice appeared in the 2nd week of June within age range of 3-9 yrs. These patients were severely affected with jaundice with yellow discoloration of urine, eye and sclera. Four blood samples were collected with the help of the CHC medical team and were transported to RMRC, VDL for virological investigation. The samples were tested for Hepatitis A virus antibody and three were found positive for the same. The source of infection was due to breakage of pipelines that allowed mixing of sewerage water into domestic water supply. The laboratory investigation report along with recommendations was sent to the concerned health authority.

- **Investigation of Jaundice Outbreak At Bolangir Municipality**

An outbreak investigation of Jaundice was carried out in the months of May and June, 2015 in Sudpada and Tikrapada wards of Bolangir town, Odisha. The team visited 20 affected households and 109 individuals were examined. Blood samples (n = 64) and stool samples (n = 4) were collected. It was noted that during last week of April the cases appeared and it was declared as an outbreak by State Govt. on 1st May. Maximum numbers of cases were observed during 1st week of May. The team found that these cases were mostly adults, within the age range of 16-75 yrs. In 13 cases out of a total 17 no. of cases HEV IgM was detected (76%). Virus was detected in one stool sample through PCR. The source of infection was due to breakage of pipelines that allowed mixing of sewerage water into domestic water supply. The laboratory investigation report along with

recommendations was sent to the concerned health authority.

- **Jaundice outbreak investigation in Puri district**

The outbreak was started during the month of January affecting 13 individuals. Maximum numbers of cases were reported during the month of April and May. Till the 1st week of July, 402 cases were clinically diagnosed for jaundice. The blood samples collected from 3 individuals were tested for Hepatitis E virus IgM antibody and all were found positive. The report has been communicated to CDMO, Puri.

- **Jaundice outbreak investigation in Anugul, Talcher**

Investigation was done in one ward namely Remuan (ward no.12) of Talcher town for suspected jaundice outbreak. Mostly adults were affected. Twenty three blood samples were collected. HEV IgM was detected in 10 (43.4%) samples through ELISA. The report has been communicated to the concerned authority.

- **Jaundice outbreak investigation in Damana, Bhubaneswar during last week of Aug, 2015**

Investigation was done in one municipality area of Bhubaneswar namely Damana for suspected jaundice outbreak. Mostly adults were affected. A total of 33 blood samples were collected by the investigating team. HEV IgM was detected in 5 (15.6%) samples through ELISA. The report has been communicated to the concerned authority.

3. **Chickenpox and Measles outbreak investigation**

- **Chickenpox outbreak investigation in Puri**

In 2nd week of March, 2015, investigation was done in one village namely Pahilundi of Kanasa block of Puri district for suspected Chickenpox outbreak. Cases (n=11) were examined and 6

blood samples were collected and transported to the lab in cold chain. The cases include children <15 yrs of age (n=3) and adults >15 yrs (n=3) of age. The samples were tested for Varicella IgM. Out of the 6 samples tested, all were varicella IgM positive. The report has been communicated to the concerned authority.

- **Investigation On Measles Cases In Raygada District**

During 2nd week of March, 2015, investigation done in 2 villages namely Lekapai (total population 410) , block K. Singhpur and village J. Totaguda (Total population 80) , block Derigaon of Raygada district for suspected Measles outbreak. Cases(n=29) were examined, blood, urine and throat swab samples were collected and transported to the lab in cold chain. All the cases were children < 15yrs of age. The samples were tested for Measles IgM and PCR looking at the duration of illness. Out of the 29 samples tested 11 were Measles IgM positive and 5 samples were PCR positive (3 throat swab and 2 urine samples). The report has been communicated to the concerned authority.

- **Investigation of suspected Measles virus infection in Ganjam District**

Investigation of Measles outbreak was done in Badaunchapa village of Patrapur block in Ganjam District of Odisha on 19th and 20th May, 2015 which is situated at around 1501 meters above sea level. The cases with the history of fever and rash were reported before two weeks, mostly affecting children. Blood and throat swabs were collected from twelve children out of whom six children were presented with fever and rash. Blood samples were tested for Measles and Rubella IgM antibody by ELISA. Two (16%) out of the twelve blood samples were found positive for Measles IgM antibody and no sample

was positive for Rubella IgM tested by ELISA. Five throat swabs having the history of only fever and cough were tested for Flu A, Flu B, H1N1, Para influenza 1,2,3, HMPV, RSV and other respiratory viruses, but in no case these viruses were detected. The report has been communicated to the concerned health authority and state govt.

4. Chickungunya outbreak investigation

● Investigation in Shantinagar, Bhubaneswar

Investigation was done in slum area (Shantinagar) of Bhubaneswar for reported fever and rash cases, the cases were mostly from adults, within the age range of 28-80 yrs. Blood samples from 8 individuals were collected by the investigating team. The samples were tested for Chick IgM antibody and 4 samples were found positive through ELISA. The report has been communicated to the concerned authority.

5. H1N1 Lab investigation

During this period 348 samples were received from 23 health facilities across the state and the patients were admitted in these hospitals from 27 districts. Out of 348 samples tested through Real Time PCR 72 were positive for H1N12009.

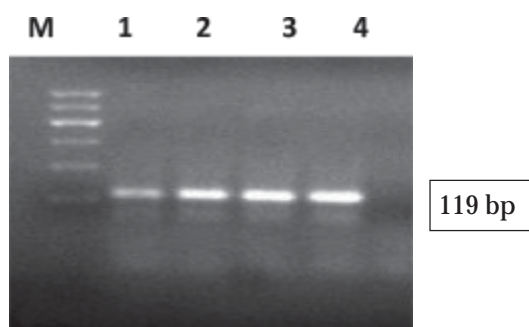
6. Sample referral from Andhra Medical College, Visakhapattanam

Andhra Medical College, Visakhapattanam referred 229 blood/CSF samples for lab investigation from patients presenting with fever & rash, jaundice, and encephalitis.

IV. Laboratory Investigation

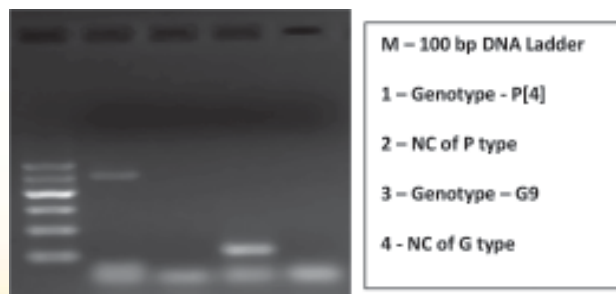
Laboratory investigation was done for the samples collected from outbreak areas as well as on the samples collected on sporadic hospital based cases by or referred to the centre. Case referral to the virology laboratory of the centre

was increased covering the major viral diseases/ syndrome i.e. shown in figure 1. Among vector borne diseases Dengue antigen (NS1) was detected in 10 out of 40(25%) cases where as in 15% cases (33/220) dengue IgM was detected. All NS1 positive samples were tested through PCR and **dengue serotype II (3/13)** was identified as the serotype. Chik IgM was detected in 11% (8/75) of cases. 25% of the positive samples were subjected for genotype analysis and **Genotype-ECSA** was found in 25% of the cases.



Lanes 1, 2, 3 and 4- type II dengue virus(119 bp) in human infected with Dengue virus infection.

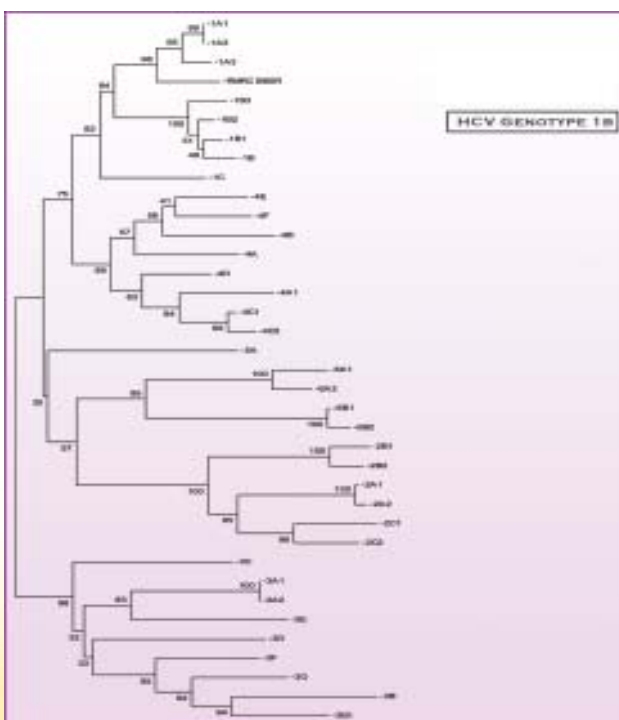
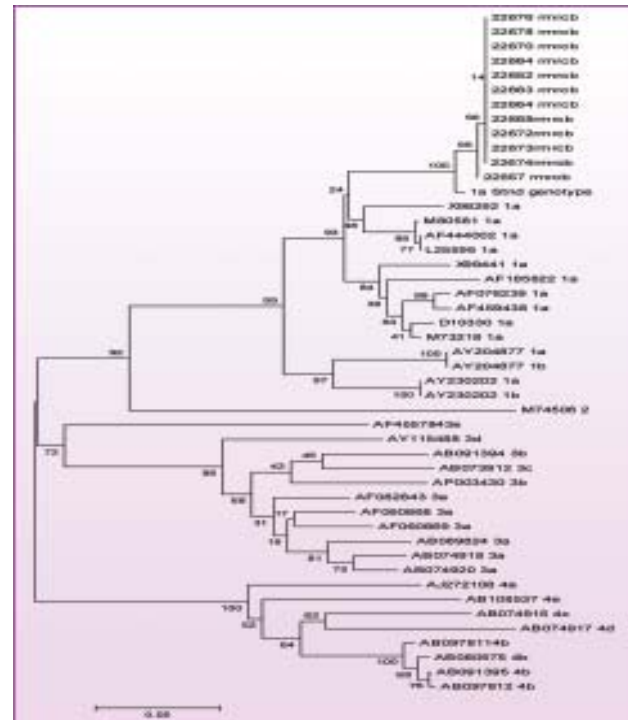
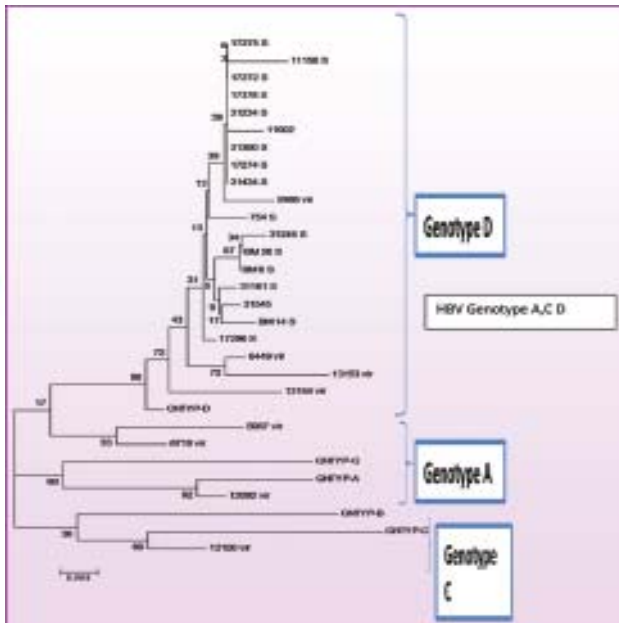
Among enteric viruses Rota antigen was detected in 40% (70/175) of cases out of which 26.5% of cases were confirmed by Real Time PCR. **Genotype G1, G2, G4 and G9 (G Type) and P4 and P8 (P Type)** were detected as the predominant genotypes. Other enteric viruses detected were Noro G1 (3.7%), Noro G2 (1.5%), Astro (1.2%), Adeno (22.3%).



Rotavirus P and G genotype for Sample ID 1404 - P [4] G9.

Among the cases of jaundice screened for hepatitis virus infection, HBV and HCV were detected serologically in 14.2%(28/197) and 1.2%(2/155) respectively and genotyping was done in 20% and 3% of cases respectively where **HBV genotype A,C,D** and **HCV genotype 1b** were identified as the genotypes circulating in this region.

HAV was detected in 45% (179/400) of cases and HEV in 31.4% (143/455) cases. Sequencing and genotyping for HEV was performed on blood samples collected from Sambalpur and Cuttack district jaundice outbreaks. Six samples were subjected to genotyping and sequence analysis and all belonged to genotype 1a.



Viral respiratory infection was another important disease which was covered for laboratory diagnosis. Through Real Time PCR assay, many respiratory viruses were identified including some emerging viruses. The viruses those detected were Flu A 25%, H1N1 20%, Rhino 13%, Para influenza 22% and Adeno in 31% of cases. Emerging viruses like Boca, HMPV and Parecho viruses were detected with low prevalence.

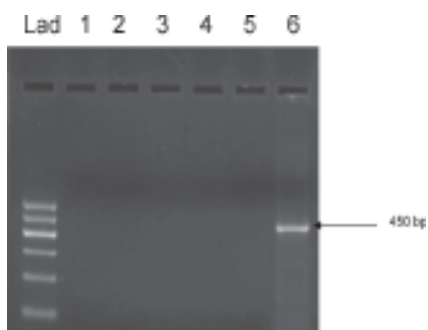
Among air borne diseases Measles IgM was detected in 38.5% (44/114) of the cases and Varicella IgM was detected in 30.4% (21/69) of cases.

Viruses that cause encephalitis were also investigated. Herpes simplex virus I was detected in

7% (15/213), Herpes Virus II in 5.6% (12/213) and Japanese encephalitis was detected in 9.3% (19/203) and Enterovirus IgM in 12.5% (3/24). PCR amplification was attempted to detect Enterovirus, HSV 1, HSV 2, JEV and WNV from CSF collected from cases of encephalitis. 1096 samples were tested and 3 samples were found positive.

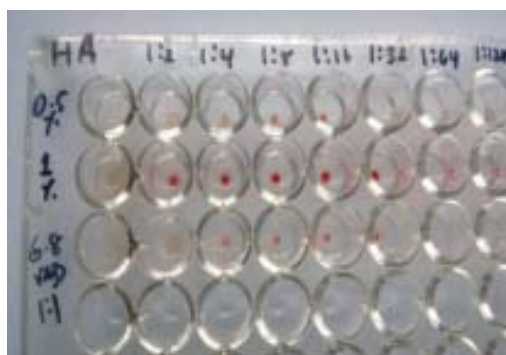
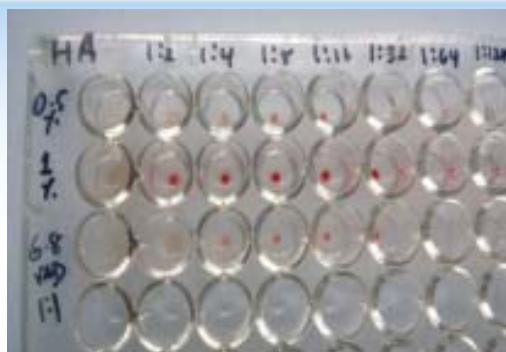
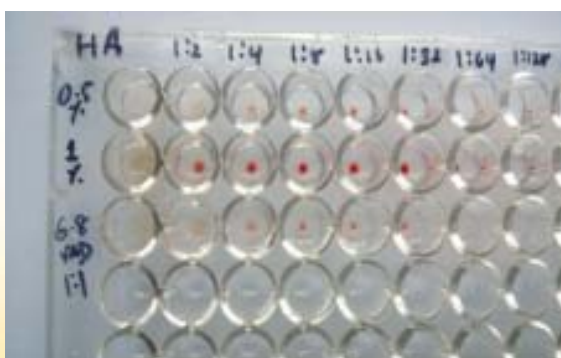
HPV infection in Women

74 no. of cases with chronic cervicitis or suspected cervical discharge were enrolled during this period. Out of 74 cases, in 14 cases HPV was found to be present. Among 36 subjects of age group between 20-50 yrs, 5 cases were associated with HPV infection. Out of 38 enrolled cases of Age group 50-85yrs, 9 cases are associated with HPV infection. Other genotypes detected were 16, 18, 39, 66, 51.



HA/HI for JE

Titration of HA antigen from JE extracted from mouse brain and HI for JE antibody in samples were done by using one day old chick blood.



Haemagglutination Assay and Haemagglutination Inhibition Assay for JE antigen extracted from mouse brain.

Haemagglutination Assay and Haemagglutination Inhibition Assay for JE antigen extracted from mouse brain

HRD Activity

- Training program on sequence analysis and interpretation at NIV, Pune from 23rd to 26th Feb, 2015 was attended by one senior research scientist and one Research Assistant.
- Training program was conducted for 22 laboratory technicians from 10 district head quarter hospitals and NVBDCP on ELISA based Dengue virus detection (IgM and NS1).
- Training was provided on 14th July, 2015 to four laboratory technicians from the district sentinel site lab of Koraput and Keonjhar district on "ELISA based laboratory diagnosis of JE".
- Lab technician & project assistants at Field units

trained on Serology – Dengue, Chik, HBV, Measles, PCR- HPV, HBV.

Subsequent Plan

The above activities will continue for the next year. More emphasis will give on creating multiskill paramedical and health professionals to deal with viral disease surveillance and timely investigation/management of outbreaks. Periodically training will be provided to the technical and supportive paramedical staff for laboratory diagnosis of some of the important disease of public health concern which will support state public health system.

Cell culture will be established for Chik, Dengue, HSV and Measles Viruses, sequencing and typing will be established for Measles, Varicella and Influenza H1N1 viruses. Outbreak 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.



12. 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 randomized controlled trial.

Principal Investigator : Dr. B. Dwibedi
Co Investigator(s) : Chief District Medical Officer, Kalahandi, Odisha
Date of start : December 2013
Duration : 3 years
Funding : EM (ICMR)

Objectives

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 Non-communicable Disease (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 the Work

Methodology

Study design: Cluster randomised controlled trial

Study population: Randomly selected tribal population of Kalahandi District of Odisha.

Sampling and sampling strategy

The required sample size in each arm of the trial is 1750. Each AWC jurisdiction area was taken as the cluster. The present study was carried out in 12 randomly selected clusters in the Kalahandi District of Odisha. Each selected cluster was at least 10 km away from any other selected cluster to minimise the risk of contamination. Six each clusters included in intervention and control arms after randomisation. Subjects aged 18 and above, residing in every other household in each of these clusters was subjected to investigations to capture the NCD/hypertension risk (around 300 subjects in each cluster). This sampling strategy will meet the required sample size of 1750 in each arm of the trial.

The sequence of study

- (1) The base line population based survey in intervention and control communities

All the subjects aged 18 and above will be included in the study after taking consent or

assent. It has following components.

Interview

- Name, age, sex, socio-economic, and other core demographic details of the individuals
- Knowledge, Attitude, Practice in relation to NCD risk factors and NCDs: A structured and pre-tested questionnaire will be used.
- Knowledge, Attitude, Practice in relation to physical activity (Yoga, non-yoga exercises)
- Physical activity: For assessing the physical activity WHO STEPS questionnaire will be used (G-PAQ).
- Tobacco use frequency and pattern: Tobacco use frequency and pattern will be collected through structured questionnaire.
- Alcohol consumption: quantity and frequency

From the consumers of alcoholic beverages, the quantity of alcohol drunk on typical drinking occasions and the frequency of typical drinking will be collected. From this Quantity, Frequency product (QF value) consumed per year per person will be collected. The strength of alcohol in locally brewed beverages will be measured and it will be translated into local measurements [12 gm of absolute alcohol = one standard drink].

- General Health Questionnaire (GHQ 12): to assess the mental health status of the individual.

Despite its title GHQ is designed to assess mental health, not "general health". It is a measure of current mental health extensively used in different settings and different cultures. It has been extensively used in epidemiological studies in India & developed for use as a screening instrument in community settings, primary care, and medical out-patients; it focuses on breaks in normal functioning, rather than lifelong traits and concerns itself with two major classes of phenomenon.

Measurements

- **Weight:** Weight of the subjects will be measured by lever activated electronic weighing scale with accuracy of 100 gm.
- **Height:** Height of the subjects will be measured by anthropometry rod with accuracy of 2mm.
- **Waist circumference:** Waist circumference of the subjects measured by non-stretchable inch tape by adopting proper technique as suggested in WHO STEPS protocol.
- **Body fat percentage:** Body fat percentage of the subjects measured by bio-impedance machine.
- **Diet survey:** Diet survey conducted in the 30% (i.e., 75 households in each cluster) of the households in each cluster by following 24 hour recall method for single day (as followed by National Nutritional Monitoring Bureau (NNMB), India). i.e., every third household surveyed 30% of the households selected randomly (Systematic random sampling, first household being a random choice). Along with diet survey the details of frequency of consumption of different food groups documented.
- **Blood pressure:** Blood pressure measured by digital automatic blood pressure monitors, which have been validated and approved by International agencies such as WHO, British Hypertension Society and International Hypertension Society. Three blood pressure readings taken and WHO STEPS guideline will be followed.

Blood test

- Fasting glucose, total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides **5ml of venous blood will be taken:** The fasting glucose estimated by glucose oxidase method in

the field conditions at centre for nutrition, ICMR, New Delhi.

For rest of the parameters, serum will be separated in pre-labelled eppendorf vials indicating the sample ID and the date of collection and transported in dry ice to at least maintain a temperature of -20°C to NABL accredited laboratory at ICMR “Centre for Promotion of Nutrition Research and Training with special focus on North-East, Tribal and Inaccessible population”, New Delhi for analysis of total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides and glucose on automatic Chemistry Analyzer (Roche Hitachi 902).

- **Haemoglobin estimation** 20 µl of blood taken in the pipette and spotted on the filter paper from each participant and the dried filter papers will then be sent to ICMR “Centre for Promotion of Nutrition Research and Training with special focus on North-East, Tribal and Inaccessible Population” in New Delhi within one week of collection. The analysis carried out by cyanomethemoglobin method using spectrophotometer.

All materials used in sample collection discarded using appropriate color coded bins/ bags following WHO guidelines. All needles used destroyed using needle destroyer

(2) Intervention

In both the groups the standard regimen for the control of hypertension, diabetes, and dyslipidemia including counselling for life style modification will be followed as medically indicated.

In the intervention group IEC campaign will be launched for hypertension/NCD risk reduction. All the risks will be targeted like overweight/

obesity, physical inactivity, psychological stress, alcohol and tobacco consumption, dietary fibre, saturated fat and t-fat in the oil, dietary salt consumption etc. An earnest attempt will be made to disseminate available scientific knowledge to the community for hypertension/ NCD risk reduction. One of the investigators with ASHA or equivalent will visit each house hold in all the intervention clusters (about 200-250/cluster) and make an approximate assessment of dietary oil, dietary salt, and dietary fibre consumption and physical activity level. Our targets will be the following.

- (i) Based on the base line data if the community consumes oils rich in saturated fats our IEC will aim to change the consumption by oils rich in MUFA & PUFA at least in 50% of the households.
- (ii) The IEC will target an increase of 50% in the amount of dietary fibre consumption up to a maximum of 20gm/day/individual (or in other words try to increase the population mean by 50-100%).
- (iii) It will also aim for dietary salt consumption of less than 9gm/day/individual at least among 50% of the population in intervention community (or in other words try to decrease the population mean by 50-100%).
- (iv) The IEC will also target to increase physical activity level in rural areas where ever sedentary behaviour is observed and in urban areas to increase the population mean of the physical activity by 50% in urban areas.
- (v) The IEC will also target to decrease the mean consumption of tobacco and alcohol by 25% .

Repeat population based survey in intervention and control groups will follow

1. Interim modification of objectives/ methodology (with justifications):

No modification has been made

2. Summary on progress:

- **Recruitment of project staff and man power development:** The project staffs were recruited. They were trained at Centre for chronic disease control, New Delhi.
- **Purchase of equipments:** Equipments to be used in the project work were purchased and some could not be purchased in 1st year and aimed for permission to procure in the 2nd year.
- **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 survey in households were listed and adult's ≥ 18 years enumerated which is given below:

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 information was 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.

Measurement of Blood pressure for hypertension and other parameters were collected. Measurements included Weight, Height, Waist circumference & Body fat percentage. Blood sample collected for tests like Fasting glucose, total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides and Haemoglobin estimation.

- Demographic Details:**

Till December 2014, demographic details of 2073 individuals covered from nine clusters (Badfurla, Dangapata, Dedar, Hirapur, Kandagarh, Mahima, Mukundpur, Pabli and Urladani) have been completed. The following table shows the demographic details:

Age Group	Male	Female	Total
18-30	253	338	591
31-45	347	396	743
46-60	248	275	523
>60	105	111	216
Total	953	1120	2073

- Prevalence of Hypertension in study group:**

Among these 2073 individual studies, 47.17% of individuals were found to be hypertensive. Hypertension is calculated from blood pressure

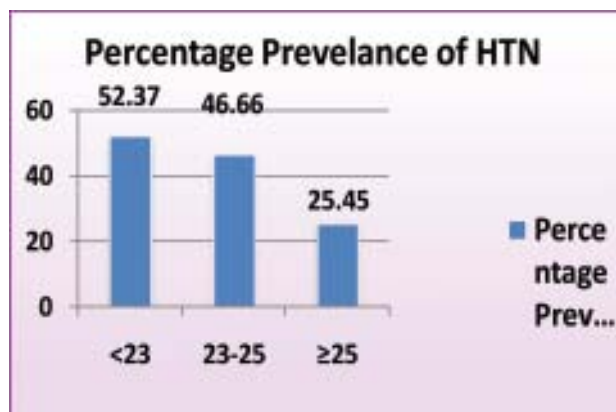
data. A person is said to be hypertensive if SBPe”140 or DBPe”90 or both. Blood pressure was measured thrice at intervals and average was taken. From percentage-wise data, hypertension was found to be more prevalent among female than male. The prevalence of hypertension was found to increase with age and almost 50% of the individuals after 45 years of age were found to be hypertensive.

Age group	Male%	Female%	Total%
18-30	38.33	41.42	40.10
31-45	44.38	50.75	47.77
46-60	46.37	54.18	50.47
>60	54.28	58.55	56.48
Total	44.38	49.55	47.17

- Body Mass Index (BMI) among study group:**

BMI of individuals were calculated as previous reports have proven that individuals having high BMI are prone to hypertension. The analysis suggests that 18.37% of individuals included in

this study have BMI more than 25 and hence they are at risk of developing hypertension in future. This increases with age as in 18-30 age group 7.61% of individuals have more than 25 BMI whereas it increases to 35.64% in more than 60 years of age.



- BMI and Hypertension:**

An analysis was done to observe relationship between BMI and hypertension among the studied population and it was found that hypertension is also prevalent in BMI < 25.

Age group	BMI < 23			BMI 23-25			BMI ≥ 25		
	Male	Female	Total(%)	Male	Female	Total(%)	Male	Female	Total (%)
18-30	227	301	528 (89.34)	05	13	18(3.04)	21	24	45 (7.61)
31-45	283	320	603(81.15)	20	23	43 (5.78)	44	53	97 (13.05)
46-60	168	168	336 (64.24)	06	19	25 (4.78)	74	88	162 (30.97)
>60	66	69	135 (62.5)	01	03	04 (1.85)	38	39	77 (35.64)
Total	744	858	1602 (77.27)	32	58	90 (4.34)	177	204	381 (18.37%)

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	14.0	24.07	19.78	46.86	40.2	43.06	8.55	8.30	8.41	2.35	1.73	1.99
31-45	15.3	24.75	20.33	40.76	36.4	41.25	7.87	6.77	7.28	3.72	2.44	3.04
46-60	14.6	24.38	19.77	44.79	37.5	40.96	7.88	7.61	7.74	4.13	2.96	3.52
>60	14.7	24.75	19.88	44.71	37.0	40.85	7.76	7.35	7.53	5.37	3.38	4.35
Total	14.7	20.45	19.99	46.05	37.9	41.65	8.04	7.50	7.75	3.65	2.45	3.00

- **Distribution of various physical parameters: Related to CVD risk.**
- **Community risk behavior of Hypertension**
Of the studied population various community risk behaviour of hypertension was calculated.

Parameters	Prevalence (%)
Tobacco Consumption	58.33
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

Hematological Investigation

In the first phase, 230 blood samples were collected from individuals enrolled in the study and aliquots (plasma, serum etc) were sent to CNRT, ICMR, New Delhi for blood parameter analysis.

Details of work as on September 2015

Cluster Name (Village)	Cluster ID	No. of Questionnaire	No. of Anthro pometrics	No. of Blood Sample Collected	No. Addl. Diet & Nutrition form fill up	No. of 24 hour Diet recall
Sargiguda	0601	300	280	241	00	00
Mahima	0602	299	290	262	00	00
Khaliabhata	0603	300	280	222	00	00
Urladani	0604	299	255	237	281	10
Dedar	0605	300	240	241	260	10
Makundpur	0606	300	290	00	128	00
Badfurla	0607	300	200	00	00	00
Badbasul	0608	300	250	00	00	00
Kandagarh	0609	300	280	41	00	00
Dangapata	0610	300	270	192	222	10
Pabli	0611	275	250	208	280	10
Hirapur	0612	300	250	00	298	10
Total		3573	3155	1640	1469	50

Applied value of the project

The study gives an idea on prevalence of hypertension in Tribal population along with risk factors. This will be useful in developing a community intervention strategy for use in the National program especially for Tribals.

Future Plan

The baseline survey is planned to be completed within next 6-7 months, which will follow formative strategy and IEC materials development. Interventions will be given as per plan in the 2nd Year and evaluation will follow.

13. Determinants of dietary acculturation, nutrition transition and lifestyle changes among scheduled tribes: strategies to control diet-related non-communicable diseases.

Principal Investigator : Dr.G.Bulliyya
Co-Investigators : Dr.A.S.Kerketta, Mr.R.KDas
Starting date : October 2015
Closing date : September 2018 (Ongoing)
Status : Extramural (ICMR Adhoc project)

Objectives

- To study the determinants of dietary acculturation, nutrition transition among scheduled tribes in different settings;
- To estimate the burden of DR-NCDs, including hypertension, type-2 diabetes and dyslipidemia; and
- To develop and evaluate evidence-based dietary and lifestyle advocacy interventions to prevent central obesity and DR-NCD risk factors.

Background

The Scheduled tribal (ST) population is generally known at risk for undernutrition and infectious diseases owing to their dependence on primitive agricultural practices, poverty, illiteracy and poor personal and environmental hygienic practices. In addition, lack of access to healthcare, poor communication, traditional beliefs and customs aggravate the situation. However, ST are now experiencing with lifestyle diseases (Kshatriya 2014). Acculturation due to marginalisation or migration affected their lifestyle (alcohol, tobacco) and traditional food habits (high in fats, sugar, salt) and has made them vulnerable to NCD (NNMB 2012). The life-style changes, hunter-gatherer communities became more settled, and traditional food gathering methods have been changed. Consequent nutrition transition is evident due to social welfare activities, urbanization, communication and transport, and their economies are shifting away from physically active farming, mining, forestry, to more sedentary, often office-based occupations. Overall, nutritional status of STs improved over a period attributed mainly due to non-nutritional factors. The proportion of underweight has declined over the years and the pace of decline is relatively slow with a considerably high underweight population. On the other hand, overweight is increased giving way to the paradoxical coexistence

of both underweight and overweight together in the same population (NFHS-3 2007). The nutrition transition is the shift in dietary consumption and energy expenditure implicated in the rapid rise of overweight and obesity resulting with socioeconomic development, people choose to follow a more palatable diet highly refined carbohydrates from polished white rice that enhance overall energy intake than their traditional staple foods, once rich in whole grains and dietary fibre (NNMB 2009). Per capita vegetable oil and meat intake increased significantly. One-third of STs have access to an affluent diet that is energy dense and rich in fat/ saturated fat, salt, and refined sugars. These unhealthy lifestyles are associated with risk for hypertension, diabetes, dyslipidaemia and obesity. Tribal population had 16-50% burden of hypertension (Manimunda 2011).

Odisha is home to maximum STs (62) and primitive tribal (13) groups accounting for 22.6% (8,145,081) of the state (41,947,358) and 9.7% of the country's total ST population (Census 2011). The STs are experiencing nutrition transition and consequent double burden of malnutrition. Although overweight/obesity is 3.5%, while abdominal obesity according to waist to hip ratio (>0.8) is very high among ST in Odisha (62.5; males 52 and females 73%) in comparison to national (57.2, males 38 & females 73%) average (NNMB 2012). Moreover, prevalence of hypertension among STs reported to be highest for Odisha (men 53.8; women 48.8%). Hypertension among the rural adults was 22% during 2004-2005, it was 25% for ST population associated with central obesity. In view of increasingly imbalanced diets, higher burden of NR-NCD with advancing time is influenced by migration, acculturation, modern lifestyle, several unmeasured factors that needs in-depth understanding. There is paucity of data on NR-NCD and double burden of malnutrition among tribals in nutrition transition, hence a research proposal designed to determine the dietary and

modern lifestyle changes influence on overweight, obesity and NR-NCD in order to support health-promotion and disease-prevention efforts.

Rationale

The study is based on the hypothesis that acculturation accompanied by dietary and nutrition transitions influence central obesity and DR-NCD among ST populations. Moreover, provision of implementing evidence-based dietary, lifestyle

promotion approaches are effective in reducing abdominal obesity and DR-NCD.

Progress of work

A community-based cross-sectional study is being conducted among the Kondh, a dominant ST inhabiting in diverse settings in Rayagada district. Villages and urban wards are the sample units selected by multistage random sampling. A total of 20 villages were randomly selected from 45 villages

Table 1: Mean (+SD) anthropometric characteristics among Kondh tribe in Rayagada district.

Study indicator	Gender	Setting		t-value	P-value
		Rural	Urban		
		N=180	N=202		
Age in years	Male	35.9 ± 9.71	40.2 ±11.35		
	Female	36.1± 10.39	41.5 ±12.07		
	Total	36.0± 9.92	40.9 ±11.76	2.826	.094
Weight (kg)	Male	48.6± 6.79	57.1 ±10.68		
	Female	41.1± 6.37	46.9 ±11.78		
	Total	45.7± 7.54	51.0 ± 12.39	15.966	.000
Height (cm)	Male	159.1± 7.75	162.0 ±8.02		
	Female	148.8± 4.45	148.7 ±5.30		
	Total	155.1± 8.33	154.0 ±9.21	2.619	.107
Body mass index (kg/m ²)	Male	19.2±2.14	21.7±3.35		
	Female	18.6±2.79	21.1±4.96		
	Total	18.9±2.41	21.3±4.39	13.710	0.000
Mid upper arm Circumference (cm)	Male	23.2± 3.13	25.3 ±4.07		
	Female	21.9± 2.08	23.9 ±3.87		
	Total	22.7± 2.83	24.4 ±3.99	11.251	.001
Waist circumference (cm)	Male	70.4± 6.01	78.0 ±9.40		
	Female	70.7± 9.54	72.7 ±10.40		
	Total	70.5± 7.50	74.8 ±10.32	18.421	.000
Hip circumference (cm)	Male	81.9± 6.43	88.0 ±7.61		
	Female	84.3± 5.69	88.3 ±7.94		
	Total	82.8± 6.23	88.2 ±7.79	18.421	.000
Triceps skinfold thickness (mm)	Male	8.5± 5.33	10.5 ±4.93		
	Female	8.9± 3.50	15.0 ±6.21		
	Total	8.6± 4.69	13.2 ±6.13	10.490	.001
Biceps skinfold thickness (mm)	Male	9.6± 6.59	8.5 ±4.59		
	Female	11.1± 6.74	12.3 ±5.97		
	Total	10.2± 6.65	10.8 ±5.75	13.271	.000
Subscapular skinfold thickness(mm)	Male	10.9± 6.65	13.4 ±4.80		
	Female	10.3± 5.16	14.1 ±5.98		
	Total	10.7± 6.09	13.9 ±5.54		
Suprailiac skinfold thickness(mm)	Male	8.8± 6.18	11.5 ±4.84		
	Female	8.1± 3.84	12.3 ±5.52		
	Total	8.6± 5.38	12.0 ±5.26	10.825	.065

with a population of approximately 12,000 aged above 20 years. Around 200 individuals (both male and female) adults aged 20-55 years of Kondh ST population covered from native rural (180) and urban (202) areas. A pre-structured questionnaire was used to collect household particulars, socioeconomy and demographic characteristics (age, sex, marital status, education, occupation and income), dietary and lifestyle characteristics (smoking, alcohol, and physical

activity), knowledge and awareness on health and nutrition and signs and symptoms of NCDs such as overweight, obesity, diabetes, hypertension, cancers etc. A food frequency questionnaire (FFQ) was used to assess foods and beverages with a frequency response section for subjects to report how often each item was consumed over a specified period of time. The data analysis is based on 382 participants from rural (71 male and 109 female) and urban (88 male

Table 2: Mean blood pressure, blood sugar and lipid profiles among Kondh tribe in Rayagada dist.

Study indicator	Gender	Setting		t- value	P- value
		Rural (n=180)	Urban (n=202)		
		Mean ±SD	Mean ±SD		
Systolic blood pressure (mmHg)	Male	114.7 +14.20	126.5 +21.85		
	Female	108.3+ 17.28	131.7 +26.31		
	Total	112.3+ 15.64	129.6 +24.66	16.729	.000
Diastolic blood pressure (mmHg)	Male	73.0+ 9.87	79.5 +13.32		
	Female	68.4+ 12.01	81.3 +13.48		
	Total	71.3+ 10.88	80.6 +13.41	3.458	.044
Pulse rate (min)	Male	85.0+ 10.75	75.9 +11.21		
	Female	85.1+ 12.98	80.1 +10.40		
	Total	85.0+ 11.57	78.4 +10.90	1.152	.284
Fasting Blood Sugar (mg/dl)	Male	97.3 +37.96	118.1+ 26.99		
	Female	92.9 +17.49	119.7+ 30.98		
	Total	95.2 +29.86	118.6+ 28.16	4.864	.001
Total cholesterol (mg/dl)	Male	-	126.6 +39.01		
	Female	-	146.8 +42.82		
	Total	-	134.4 +41.05		-
Triglycerides (mg/dl)	Male	-	117.7 +94.3 6		
	Female	-	105.6 +55.44		
	Total	-	112.9 +80.14		-
HDL -cholesterol (mg/dl)	Male	-	25.3 +10.91		
	Female	-	28.6 +8.08		
	Total	-	26.6 +9.90		-
LDL -cholesterol (mg/dl)	Male	-	78.5 +35.74		
	Female	-	112.5 +34.94		
	Total	-	92.1 +38.49		-
Non -HDL (mg/dl)	Male	-	114.1 +44.99		
	Female	-	130.8 +39.95		
	Total	-	121.6 +42.54		-
LDL to HDL ratio	Male	-	3.1 +1.50		
	Female	-	3.8 +1.64		
	Total	-	3.4 +1.56		-

and 114 female) for whom all the variables were available. Differences between the groups of means were tested by t-test. SPSS package was used for statistical analysis.

The anthropometric measurements were taken by using standard equipment and procedures (Table 1). Nutritional status of adults was assessed based on Asian-specific definition to define the prevalence of general and central obesity (body mass index (BMI=kg/m²). The mean height, weight and body mass index of adult Kondh ST were significantly higher in urban settings than their respective rural counterparts. Overweight and obesity (BMI>23) is 4.3% in Kondhs living rural as compared to 28.9% in Urban setting. Central or abdominal obesity following waist circumference (>90/80 cm), wasit-hip ratio (>0.90/0.80) and waist to height ratio (>0.5) are more in urban than rural and similar is the case for mean skinfold thickness at biceps, triceps, subscapular and suprailiac regions.

Systolic and diastolic blood pressure for all the adults covered for nutrition assessment was measured with an interval of 5 minutes by using Omron Digital BP apparatus. The mean blood pressure among the ST in urban population is significantly higher than their rural counterparts. Fasting blood glucose levels assessed using one touch glucometer (CodeFree) from each of the selected subject. The mean level of fasting blood sugar is significantly more in urban population in comparison to Kondhs in rural settings (Table-2). Lipid profile (total cholesterol, triglycerides, LDL HDL, etc.) were measured on 202 urban adults in each sex by using Cholestech LDX equipment.

Knowledge & Practices in relation to hypertension, diabetes and lifestyles carried out by using pretested and validated questionnaire among all the adults covered for blood pressure measurement. Majority of people from rural (98%) and urban (94%) settings not having the knowledge and practices on overweight, obesity, hypertension,

Table 3: Prevalence of hypertension among Kondh in rural and urban settings of Rayagada district.

Hypertension	SBP	Rural	Urban	DBP	Rural	Urban
Normal	<120	69.8 (67)	40.2 (76)	<80	71.9 (69)	47.1 (89)
Pre-hypertension	120-19	14.6 (14)	33.9 (64)	80-89	10.4 (10)	30.7 (58)
Stage 1 Hypertension	140-159	8.3 (8)	13.8 (26)	90-99	6.3 (6)	15.3(29)
Stage 2 Hypertension	>160	7.3 (7)	12.2 (23)	>100	11.5 (11)	6.9 (13)
	Total	100 (96)	100 (189)	Total	100 (96)	100.0 (189)

Table 4: Prevalence of diabetes among Kondh in rural and urban settings of Rayagada district.

Fasting blood glucose(mg/dl)	Rural		Urban	
	N	Percent	N	Percent
Normal (<110)	88	83.0	106	59.6
Pre-diabetic (110-125)	9	8.5	24	13.5
Diabetes (>126)	9	8.5	48	26.9
Total	106	100.0	178	83.3

blood sugar. The proportion of people suffering from hypertension (stage 1 and 2) is 15.6% and 26% for rural and urban Kondhs by systolic, while it is 17.8% and 22.1% respectively for diastolic blood pressure (Table-3).

The prevalence of pre-diabetes and diabetes is significantly higher for both male and female Kondh in urban setting as compared to those stay in rural settings (Table 4).

Future plan

The study will continue to cover the sample as per plan and specific formative strategy development for intervention. The intervention will be implemented with existing local health system and community health workers, monitoring lifestyle and disease prevention efforts and evaluated for effectiveness.

14. Improving Health of under five children in Rayagada Dist, Odisha.

Coordinator	: Dr. N Mohapatra Director-in-charge
Principal Investigator	: Dr MR Ranjit
Co Investigator(s)	: Dr B Dwibedi, Dr G Bulliya Dr A Mohapatra Dr AS Kerketta
Collaborator (s)	: Dr AK Padhi CDMO Dr P Subudhi, DSMO Raygada
Duration	: 3 years
Starting Date	: 1st March 2014
Funding	: Intramural (Translational)

Background

Raygada district is located between 82° 54' to 82° 2' east longitude and between 19° 0' to 19° 58' north latitude. The total geographical area of the district is 7,584.7km². As per the 2011 census the total population of the district is 961,959 and 55.8% of them belongs to scheduled tribes. The population of children up to the age of 5 years is 14.67% and the child sex ratio is 955 females per thousand males. As per the Annual Health

Survey Report 2011-12 the IMR in Raygada is 61 and U5CMR is 103, while in Odisha it is 59 and 79 respectively. The present activity has been planned in the context of the MOA reached between Government of Odisha 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 behavior.
- (iv) To strengthen the maternal and child health services (antenatal checkup, 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 of Work

Action Taken

Selection of Study Area

There are 12 CHCs, 3 hospitals, 7dispenseries and

200 sub-centers in the districts. Two Sectors of **Gunupur block (Jagannathpur and Putasing)** and two Sectors of **Jamadeipentha /Raygada block (Kumbhikota and Jangili)** have been selected as intervention/study area for implementation of the strategy, while two sectors of **Kolnara block (Therubali and Rekhapadar)** and two sectors of **Kashipur block (Kashipur and Tikiri)** have been selected as control area, where no intervention will



Fig 1:

Table 2: Demography of the sampled units.

Block	Sector	Sub center	No of Villages	Total Population (M/F)	Under 5 Children Total (M/F)	No of Pregnant Women (ANC/PNC)
Kashipur	Kashipur Tikiri	Siadimal Sankarda	19	4372 (2123/2249)	669 (324/345)	149 (77/72)
			19	4371 (2122/2249)	546 (251/295)	152 (48/104)
Kolnara	Therubali Rekhapdar	Dumuriguda Bhoimoda	8	2826 (1360/1466)	212 (104/108)	149 (73/76)
			13	2861 (1377/1484)	317 (150/167)	147 (64/83)
Jamadeipentha/ Raygada	Kumbhikota Jangili	Gumma Dangalodi	14	2853 (1375/1478)	266 (138/128)	66 (22/44)
			10	3236 (1559/1677)	259 (109/150)	149 (74/75)
Gunupur	Jagannathpur Putasing	Marama Putasing	19	2290 (1124/1166)	309 (154/155)	102 (39/63)
			10	3814 (1872/1942)	397 (190/207)	157 (78/79)
Total			112	26623 (12912/13711)	2975 (1420/1555)	1071 (475/596)

Table 1: Study area and population.

Study area (High tribal density)				
Block	Sector	SC	No. of Village	Population
Gunupur	Jagannathpur	4	81	14952
	Putasingh	5	80	21782
Study area (Low tribal density)				
Raygada	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)				
Kolnara	Therubali	6	60	22319
	Rekhapadar	4	49	11598
Total		25	276	99264
Grand Total		49	611	191285

be given (Fig 1). The salient features of the study area have been depicted in Table 1.

Baseline survey

Out of 44 sub centers in 8 sectors of the 4 blocks identified for the study, 8 sub centers (one sub center from each sector) have been randomly selected for collecting baseline information on health status and

health system of the study area. The demography and salient feature of the sampled area has been depicted in Table 2. In the sampled area the female population is 1061 per 1000 male and in case of children 1095 per 1000 male. The under 5 children population is 11.5% of the total adult population and proportion of female children is higher than the male as the adult population.

Health structure and routine functioning

A Block Programme Management Unit (BPMU) has been formed at block level in Kashipur, Kolnara,

Muniguda and Jamadeipentha/Raygada blocks for preparation of block and village level plans, monitoring and implementation of Government programmes, training of ASHA, inter-sector co-ordination, and developing public private partnerships for health care service. It was observed that in each selected revenue village a Gaon Kalyan Samiti (GKS) has been constituted by the community for improvement of health and sanitation standard of the villages. As per the guidelines of NRHM, one ASHA has been selected / appointed in each village to act as bridge between the community and the health

Table 3a: Health structure in sampled sectors and sub.

Name of the Block	Name of the Sector	Name of the Sub centre	No. of Village	Sector			Sub center	
				Doctor	Pharmacist	ANM	MPHW(M)	ASHA
Kashipur	Kashipur	Siadimal	19	Vacant	1	1	Vacant	19
	Tikiri	Sankarda	19	1	1	1	Vacant	11(villages tagged)
Kolnara	Therubali	Dumuriguda	8	2	1	1	Vacant	8
	Rekhapdar	Bhoimoda	13	1	1	1	1	12 +1(vacant)
Jamadei pentha	Kumbhikota	Gumma	14	1	1	1	1	10 (villages tagged)
	Jangili	Dangalodi	10	Vacant	1	1	1	10
Gunupur	Jagnathpur	Marama	19	2	1	1	1	19
	Putasing	Putasing	10	1	1	1	1	10

Table 3b: No Anganwadi centers and Anganwadi workers (AWW) in the studied areas.

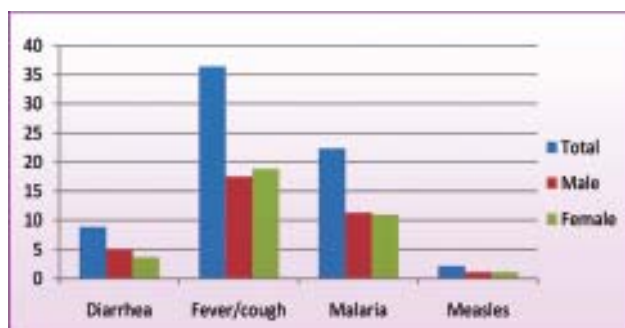
Block	No of AWW Sanction	No of AWW Position	No of AWW Vacant
Kashipur	316	304	7
Gunupur	204	196	8
Rayagada	294	290	4
Kolnara	164	164	0

facilities and to provide preliminary health services to the needy health care seeker. But it was observed that about > 90% of ASHAs in sampled villages are not trained on activities of IMNCI programme and most importantly > 5% of them are staying almost 2 km away from the village.

Morbidity pattern of the under 5 children

The morbidity survey using the designed questionnaire was undertaken by door to door visit. The disease pattern and prevalence in the one year were recorded analyzed. In the selected areas about 263 (8.8%) children suffered from diarrhea, 1081 (36.3%) had fever and cough, 664 (22.3%) had malaria and 67 had measles (Fig 2). Out of 664 children who had malaria, 22.78% children were taken medicine from the Govt. health system. Amongst 2975 children 75 (2.5%) are malnourished and 66 (2.2%) were suffering from different skin diseases.

Table 2: Morbidity Pattern in children observed during one year of study.



Delivery and Under-five child feeding practices

From the IMNCI records available with the ANM at the sub center level it was observed that more than > 65 % of the delivery has been conducted in the home and about 24% were conducted at the hospital in the selected sub centers. **Amongst all the delivery 6.6% had experienced complications. About 96.7% babies cried immediately after birth and 26.6 % had low birth weight.** Infant and young child feeding practices

were recorded from mothers and care takers of under five children (Fig. 3) a considerable proportion of children had initiated early breast feeding. Around 2677(90.1%) children practice breast feeding up to one year of age while 1844 (62.5%) continuing breast feeding up to two years of age and 1408 (47.3%) continuing till five years of age.

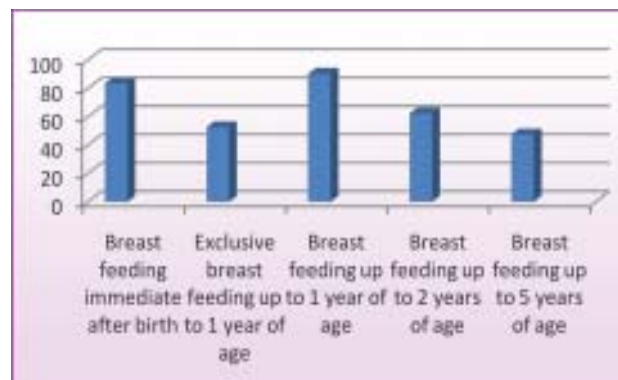


Fig 3: Breast feeding practices of the children of the study area.

Immunization coverage

Immunization coverage was recorded by review of the IMNCI records and enquiry from the mother and health staff at the sub center level. Coverage is described in Fig 4. From the data it is evident that the coverage is around 60% which is below the desired levels. Similarly the coverage of Vit A supplementation is very poor (around 60%) in the these areas (Fig. 5).

An interview was conducted taking 1062 mothers to know about their knowledge immunization it was

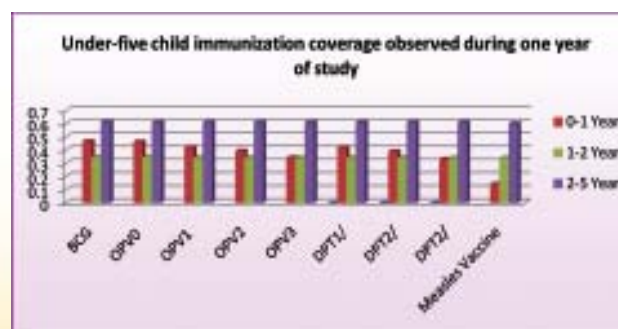


Fig 4: Level of Immunization Coverage.



Fig 5: Percentage of children in different age group received Vit-A supplementation.

observed that around 50 % of the mothers know at least some aspects of immunization (Table 4).

Community perception about the complications and immediate treatment.

Out of 181(100 female and 81 male) individuals interviewed randomly it was observed that very few of them perceived that Not able to breast fed, Sick child, Fever, Fast breathing, Difficulty in breathing, Dysentery, Drinking poorly, Diarrhea and vomiting are danger signs of some diseases and they need immediate treatment.

Nutritional status of the under 5 children

The mean weight and height of children were

Table 5: Tables shows that the people knows about emergency treatment.

Illnesses	NoN=181	Percentage
Not able to breast fed	5	2.76
Sick child	51	28.18
Fever	62	34.25
Fast breathing	14	7.73
Difficulty in breathing	12	6.63
Dysentery	13	7.18
Drinking poorly	8	4.42
Other (Diarrhea, vomiting)	16	8.84

computed to age and gender and compared with median value of WHO reference values or growth standards (Table 6). The proportion of underweight children (<-2SD, indicative of acute and chronic malnutrition) was around 40 % of which 10.4% had severely underweight (<-3SD) and Height-for-age, an indicator of linear growth retardation and cumulative growth deficits (chronic) was around 46%. Similarly, the prevalence of wasting, which measures body mass in relation to body length and describes current (acute) nutritional status was 18 %. About 10% of these children had severely wasting or suffering from severe acute malnutrition (SAM). The prevalence of

Table 4: Awareness among mothers on immunization program.

Mother of children awareness of mother.		Vaccination to be given in a national immunization day?	BCG vaccination against Tuberculosis is an injection in the left shoulder that caused a scar?	Vaccination injections given in the thigh/buttocks to prevent from getting tetanus, whooping cough, diphtheria.	Vaccination injection" shot in the arm at the age of 9 months or older - to prevent him/her from getting measles?
Age group	Number				
0-1 Year	280	72	119	106	64
1-2 Year	211	62	113	108	105
2-5 Year	571	237	408	399	380
Total	1062	371 (34.9%)	640 (60.2%)	613 (57.7%)	549 (51.6%)

underweight and wasting was found to be lower among girls as compare to boys, while stunting was higher among female children. The extent of under nutrition in terms of acute (wasting) and chronic (stunting) and underweight, reflecting as severe public health problem among study population as per WHO.

Skill assessment of the ANM, MPHW (M), ASHA and AWW

A survey was conducted to assess the skills of the health work force on assessment, classification and management of sick neonates/children by using the advocate format on IMNCI of the state health department. It was observed that the skills of ANM and MPHW (M) on assessment ranged from 45-87%, classification aspect >80% respondents had correct skills while on effective management skill it ranges from 40-74%. In case of ASHA and AWW the assessment, classification and management skill was found to range from nil to 4%. Around 58.1% of the health work forces know the correct procedure to operate the RDT test. No ASHA /AWW could tell about breathing rate, or bout the 5C of delivery.

Availability of Logistics

With respect to the availability of various logistics on IMNCI at the sub centre and AWC, it was found that in 96% of sites it was available.

PLA for development of IEC/BCC

A PLA study was conducted to assess the behavior of these communities towards the targeted diseases of IMNCI. During the study three indicators have been used for assessment of people's knowledge towards health, behavioral practice and accessibility of different health facilities. These are Program Indicator, Process Indicator and Result Indicator. According to the observations IEC materials have been developed and activities have been planned for BCC through demonstration and one act play. Here the school children would be the vehicle to spread the message.

Social Map

For the PLA a Social Map of each selected was prepared. This includes the settlement pattern, physical infrastructure, social, cultural and religious institutions and similar other information.



Fig 6: Social Map of Kumango Village.

Table 6: Nutritional status of Under-5 Children in studied area.

	High Tribal Area			Low Tribal area		
	Boys	Girls	Total	Boys	Girls	Total
N	226	262	488	271	309	580
Underweight \leq -2D (Weight-for-age)	43.8%	42.9%	43.3%	40.4%	41.2%	40.6%
Stunting -2D (Height-for-age)	17.5%	52.0%	49.9%	45.4%	46.2%	46.0%
Wasting -2D (Weight - for-height)	20.4%	18.8%	19.5%	18.8%	18.0%	18.1%

Focus Group Discussion (FGD)

We have carried focus group discussion (FGD) with community peoples of three selected villages. At the time of focus group discussion (FGD) all groups and different age groups have participated in the discussion. Our main objectives of this FGD program is to know the awareness of peoples on IMNCI child health program and other health programs like, Janani Shishu Surakhaya Karyakaram (JSSK), Rashtriya Bal Swasthya Karyakram (RBSK), Rashtriya Kishor Swasthya Karyakram (RKSK), Mission Indradhanusu, Swachha Bharat Abhiyan, 108 Ambulance Service, 102 National Ambulance Service. After discussion they give opinion towards health and diseases in his area. At the time of discussion about health and illness one interpreter help us to completed FGD. Till today this village peoples are depending on traditional health practice for health cure. They take their child to traditional healer then local quacks and finally check up in Hospital.



Fig 7: Focus Group Discussion (FGD) in Jadighati Village of Gumma Sub-Centre.

Participation Observation

Household Schedules used for obtaining information about household family member, head of the family, type of health facilities are access this household. Community participation in primary health care and rural health service development has

been argued to result in more accessible, relevant and acceptable services.



Fig: 8 Participation Observation in Ladda Village School at the time of Hand Washing Practice.

Key observation at the time of PLA study

According to community peoples and health workers view towards child health issues and solution is

(a) Child Health Issues

1. Fever
2. Cold & Cough
3. Acute Respiratory Infection (ARI)
4. Under nutrition
5. Diarrhea

(b) Child Health Solution

1. They want to know about child health programme information in their local language.
2. They want to know about health programme and need a trained person of this particular village to inform and share health practice information with village peoples.
3. They need health worker should stay at village level and she aware to the villagers about the health facility given by Govt. in their local language.
4. They want free medicine, free ambulance and free health check up at village level

5. They want water facility into their toilet

Taking in to account the social factors and role of other sectors such as housing, education, health infrastructure and communication, a generalized plan will be made so that peoples will be ready to accept modern health practice provided by the Govt. health program. Based on our PLA action will be taken on planning for, creating access to and providing all types of community-based health services and programs including health promotion, health planning, priority setting, evaluation and community capacity building.

Future action plan for child health improvement

1. To improve their knowledge on child health issues and increase acceptance of health services provided by the Govt local trained volunteers may be involved to motivate them in local languages
2. To improve behavioral practices regarding cleaning, sanitation and hygiene
3. To improve behavioral practices of toilet use
4. To improve behavioral practices of using safe drinking water
5. To improve audio-visual material for child health programme

The work is in progress and the following action plan has been proposed for the for the 2nd Year.

1. Training courses (One day) will be arranged for ASHA and AWW at sub center (total 24 sub centers) level on IMNCI guidelines (assessment, classification and treatment / referral) in two intervention sectors
2. A Community volunteer from among the SHG or GKS members will be selected in each village and will be trained on IMNCI guidelines to act as a bridge between the community and service provider.

15. Improving Health of under five children in Kalahandi District, Odisha.

Principal Investigator : Dr. B. Dwibedi
Co-ordinator : Dr N Mahaptara
Co-Investigators : Dr. M. R. Ranjit, Dr. G. Buliyya, Dr. R. K. Hazra, Dr A.S. Kerketrta, Dr. A. Mahapatra, Dr. B. B. Pal, Dr. A. S. Acharya
Duration : 3 years
Starting date : March' 2014
Funding : Intramural (Translational)

Aim & Objectives

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

Objectives

- To train and improve the skills of grass root level health workers for early detection and management of diarrheal discuss, acute respiratory infections, malaria, measles, diphtheria and under nutrition.
- To develop communication techniques for effective delivery of family and community interventions.
- To educate and raise awareness among the community on the preventive health care related to diarrheal disease, acute respiratory infections malaria, diphtheria, measles and under nutrition through innovative approach and increase health seeking behavior.
- To strengthen health management information system for effective monitoring & evaluation.
- To optimize the procurement and flow of logistic relevant to MCH services.

Background

Kalahandi is placed at south western part of

Orissa. As per the 2011 census, the total population of the district is 1,537,054 which is 3.75% of the state population and comprises of 785,179 males and 787,875 females (Table 1) indicating an increase of 15.10 % in the population compared to population as per 2001. However in the previous census of India 2001, Kalahandi district recorded an increase of 18.09% in its population in comparison to 1991. The density of population in Kalahandi district as recorded in 2011 is 199 people per sq.km.

With regards to sex ratio in Kalahandi, it stood at 1003 per 1000 male in comparison to 1001 as recorded in 2001 census. The average national sex ratio in India is 940 as per latest reports of census 2011 directorate. In 2011 census, child sex ratio is 947 girls per 1000 boys compared to 984 girls per 1000 boys in 2001 census data. Children under 0/6 formed 13.61% (Total: 214, 111 Male: 10,9977, Female: 10,4134)

of population in Kalahandi district it will as compared to 16.32 percent of 2001, indicating a net change of - 2.71 percent. Out of the total Kalahandi population in 2011 census, 7.75% lives in urban areas (Total: 121,924, Male: 62,437, Female: 59,487) and 92.25% (Total: 145, 1130, Males: 722,742, Females: 7283,88) in 2667 rural villages of the district. The literacy rate of the district is 60.22%. Of the total population, around 28.65% belong to tribal communities. The Kondhas and its subsection constitute the major percentage of tribal population in the district followed by Souras & Saoras. The Saoras are known by various names such as “Savara”, “Sabara”, “Sora” and “Souara”) The Scheduled Caste population of the district constitutes 17.67% of the population and among them the major caste groups are Dom (201,234), Ghasi (5,284) and Generic castes etc (5,700).

Table 1. Population of Kalahandi at a Glance.

Description	2011 census		
	Total	Rural	Urban
Population	15,73,054	14,51,130	1,21,924
Male	785,179	722,742	62,437
Female	787,875	728,388	59,487
Sex Ratio (Per 1000)	1048	1008	953
Population Growth	17.79%		
Density/Km2	199		
Child Population (0-6 Age)	214,111	201,071	13,040
Male Population (0-6 Age)	109,977	103,154	6,823
Female Population (0-6 Age)	104,134	97,917	6,217
Child Sex Ratio (0-6 Age)	947	949	911
Child Proportion	13.61 %	13.86%	10.70%
Average Literacy	60.22%	58.30%	82.28%
Male Literacy	73.34%	71.89%	89.46%
Female Literacy	47.27%	44.95%	74.79%

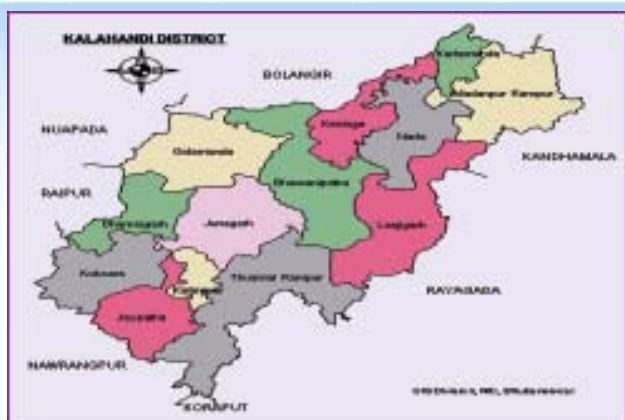


Fig. 1: Showing the study area Kalahandi District.

According to Annual Health survey data 2010-11 the under 5 child death rate in Kalahandi is 77. Infant Mortality Rate (IMR) is 59/1000 live births and neonatal death rate is 32. As per WHO the cause of child mortality in the age group of 0-5 years in India are neonatal causes (55%), pneumonia (11%) diarrheal disease (11%), measles (4%), injuries (3%) and others (6%). According to NFHS III data the high under 5 mortality rate are mostly due to acute malaria, diarrhea, and under nutrition or a combination of these conditions.

Study area and population

Table -2. Study area

Block	Sector	Sub Centre	No. Of village	Population
Kesinga	Utkela	3	26	14952
	Kandel	5	40	21782
Th.rampur	Gunpur	7	117	26858
	Mahulpatna	4	59	28429
Lanjigarh	Biswanatpur	6	126	26118
	Lanjigarh	6	85	39229
Junagarh	Chiliguda	5	52	22319
	Nandol	5	48	11598
Grand total		41	553	191285

Out of 4 blocks T. Rampur & Lanjigarh have high (more than 70%) population density of tribal population.

The three components of the IMNCI through this translational activities strategy i.e. improving case management skills of the health workers, strengthening the health system and addressing the family and community practices will be implemented simultaneously. As per plan RMRC will be undertaking capacity building, development of communication technology, monitoring and evaluation activities, while the State Health Department will be undertaking the activities like awareness campaign, community mobilization, management of illnesses, procurement of drug and logistics support. The strategy will be implemented in two sectors each from two blocks i.e. one with high density (>70%) of tribal population and other with low density (<60%) of tribal population. This co-ordination will involve the activities to develop technical strategy; undertake planning and monitoring of programme in close collaboration with the state health department.

The study area has been identified and the population census has been identified (Table-2). The total population of study area is 1,91,285 covering 4 blocks with 553 villages. The area will be randomized

in two intervention and control blocks before implementation of innovative strategy.

Activities

The activities are being undertaken in the selected area. The baseline assessment of health status and health system is undertaken to identify gap at macro & micro level in the system and to work out a strategy for implementation of the activities.

Baseline survey

The information regarding baseline survey was collected through individual questionnaire, key informant interview and group discussion at community level & grass root health functionaries.

Baseline Survey has been undertaken in a subset of the population covering following aspects:



- Census enumeration
- Village level information
- Health status of Under five children including Immunization and Anthropometry
- Health status of women in Ante natal and post natal period
- Knowledge and Training skill of ASHA/AWW/ANM on IMNCI.



A. Census Enumeration:

A total population of 11,625,890 are covered in 57 villages of 6 sectors of 4 blocks of Kalahandi dist out of which 12675 (48.96%) are male and 13215 (51.04%) are female (Table 3)

Age group	M	%	F	%	Total	%
0-5	1341	47.76	1467	52.24	2808	10.85
6-15	2612	48.38	2787	51.62	5399	20.86
16-30	3531	49.13	3656	50.87	7187	27.76
31-45	2358	48.08	2546	51.92	4904	18.95
46-60	1785	50.77	1731	49.23	3516	13.58
>60	1048	50.48	1028	49.52	2076	8
Total	12675	294.6	13215	305.4	25890	100

The distribution of under five children is shown in table-4

Age Group	Male	(%)	Female	(%)
0-1 Month	218	8.9	149	6.09
1M - 1 Year	143	5.84	151	6.16
1 - 2 Year	188	7.69	199	8.12
2 - 5 Year	708	28.92	692	28.28
Total	1257	51.35	1191	48.65

B. Morbidity of under five children

The morbidity survey using the designed questionnaire was undertaken by door to door visit. Parents were interrogated and morbidity records available with the field level health worker were reviewed. The disease pattern and prevalence during one year were recorded & analyzed.

In tribal density the children suffered from diarrhoea (M-12.3%, F- 13.4%), fever (M-41.9%, F - 42.9%), cough (M-33.8%, F - 34.8%) and malaria (M- 11.7%, F - 12.08%). Similarly in high tribal density area children mostly suffered from diarrhea (M-14.9%, F- 17.1%), followed by fever (M-47.3%, F-49.0%), cough (M-55.0%, F - 51.5%) malaria (M-20.7%, F-17.1). It was

Area	Total Children		Diarrhoea		Fever		Cough		Malaria	
	M	F %	M %	F %	M %	F %	M %	F %	M %	F
Low Tribal density- Kesinga	311	345	12.5	13.93	41.91	43.46	33.82	34.89	11.76	12.08
High Tribal density- T. Rampur	207	163	14.98	17.18	47.34	49.08	55.07	51.53	20.77	17.18
Low Tribal density- Junagarh	349	336	6.01	0.89	8.02	11.01	1.71	1.19	0.28	0.89
High Tribal density- Lanigarh	201	189	1.99	4.23	22.88	23.8	7.46	11.11	1.49	1.05
Total	1068	1033	35.48	36.23	120.15	127.35	98.06	98.72	34.3	31.2

Danger sign	Low Tribal Density - Kesinga		Low Tribal Density - T. Rampur	
	Present	%	Present	%
Fast breathing	0	0	184	49.46
Convulsion	0	0	40	10.75
Pus discharge from ear	1	1.52	36	9.68
> 10 skin pustule	3	4.55	71	19.09
Lethargic/Unconscious	0	0	24	6.45

observed that children were affected more in high tribal density area than low tribal density area. (Table 5).

D. Institutional delivery

Out of the total 1868 deliveries, 1534 (82.11%) were institutional and 289 (15.47%) were home

delivery and others 45 (2.40%) (Table-8). Complication was reported in one of the case.

E. Drinking water and Toilet facility in 10 sub centres.

Drinking water facility was available to the entire household in low tribal density area (Keinga &

Table - 6-1: Severe clinical presentation in U5 children according to presence of danger signs				
Danger sign	Low Tribal Density - Junagarh		Low Tribal Density - Lanjigarh	
	Present	%	Present	%
Fast breathing	8	1.16	36	9.23
Convulsion	3	0.43	2	0.51
Pus discharge from ear	0	0	0	0
> 10 skin pustule	1	0.14	4	1.02
Lethargic/Unconscious	0	0	0	0

C. Feeding practices and primary prophylaxis for under five.

FEEDING PRACTICE & PROPHYLAXIS IN INFANTS																			
Sl No.	Village Name	Total Children				Breast Feed			Bottle Feed			Vitamin-A				Immunization			
		M	F	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%	M	M%	F	F%
1.	Low Tribal Population-Kesinga	311	345	310	99.67	342	99.13	5	1.6	6	1.73	192	61.73	205	59.42	304	97.74	337	97.68
2.	High Tribal Population-T. Rampur	207	163	200	71	162	58	7	64	4	37	162	61	105	39	206	56	159	44
3.	Low Tribal Population-Junagarh	349	336	349	100	335	99.70	0	0	1	0.29	248	71.06	252	75	303	86.81	287	85.41
4.	High Tribal Population-Lanjigarh	201	189	201	100	189	100	0	0	0	0	86	42.78	89	47.08	166	82.58	153	80.95

D. Institutional delivery.

Table - 8: Practice of Delivery			
Institutional Delivery	Home Delivery	Others	Total
1534 (82.11%)	289 (15.47%)	45 (2.40%)	1868

Junagarh) where as it was 100% and in high tribal density area (T. Rampur & Lanjigarh) was 93.86% toilet facility was available in 15.86% and 10.75% of household in low & high tribal density and areas respectively.

IMMUNISATION COVERAGE AND AWARENESS AMONG MOTHERS

G. Gaps in training needs assessment

Out of Sixty three health workers (ANM-02, AWW-41 & ASHA-20) undergone training, 10 were

0-7th class (15.87%), 43 were 8-10th class (68.25%) and 10 were above 10th or 10th-Graduate (15.87%) health staff were educated.

- Knowledge regarding Malaria : correct symptoms – 65.92 %
- Knowledge regarding ARI: correct symptoms – 44.35 %
- Knowledge regarding Nutrition : correct symptoms – 88.71 %.

Table- 9. Post Natal Card

Any Complication in Post Natal Period like Fever, Septicemia, Heommorrhage?	Baby cried immediately after birth?
16 (2.13%) out of 749 mothers	1810 (97.73%) out of 1852

Table – 10: Drinking water and Toilet facility in 4 Blocks.

Area	Drinking water facility	Toilet facility
	Present in Households (%)	Present in Households (%)
Low Tribal Density Kesinga (n=7928)	100%	8.33%
Low Tribal Density- Junagarh (n= 8451)	100%	7.53%
Total	200 %	15.86%
High Tribal Density T.Rampur (n=6062)	94.57%	5.94%
High Tribal Population- Lanjigarh (n= 3449)	93.16%	4.81%
Total	187.73%	10.75%

F. **Nutritional status of under five children** was assessed by anthropometric measurement and compared with standard growth curve.

Table -11. Nutritional status of under five children.

Nutritional indicator	Boys	Percentage	Girls	Percentage	Total	Percentage
N (Total No. of Child)	1207	50.24	1195	49.76	2402	100
Children under weight (Yellow)	226	18.72	262	21.92	488	20.31
Children severe under weight (Red)	50	4.14	75	6.27	125	5.20
Children under server acute malnutrition (SAM)	40	3.31	42	3.51	82	3.41

- Knowledge regarding Breast Feed : correct symptoms – 55.10 %
- Knowledge regarding Immunisation : correct symptoms – 83.87 %
- Knowledge regarding Diarrhea : correct symptoms – 68.64 %
- Knowledge regarding Ante Natal Care (ANC) : correct symptoms – 74.91 %.

H. Training of health staff (Technology transfer) :

The lab technicians at district level were trained by RMRC staff. They were trained about sample collection storage of sample, transportation for tests and diarrheal culture.

Subsequent plan of activity

- Completion of baseline gap assessment analysis- one month

As per plan, format has been prepared to collect information on gaps and morbidity or nutritional status & IMMCI programme implementation status using a structured questionnaire. This information will be collected from village level

health works from the registers or records. Additionally the information will be collected through PLA (participate learning approach).

- Formative strategy development- 3 months
- Meeting with district and state health officials



Table- 12. Immunisation Coverage and awareness

	No. of cases	Total Cases	Percentage
BCG	1265	1446	87.48
OPV0	1269	1446	87.75
OPV1	1423	1446	98.40
OPV2	1401	1446	96.88
OPV3	1376	1446	95.15
Hepatitis at Birth	1028	1446	71.09
DPT1	1422	1446	98.34
DPT2	1409	1446	97.44
DPT3	1381	1446	95.50
HBV 1	1407	1446	97.30
HBV 2	1389	1446	96.05
HBV 3	1365	1446	94.39
Measles	1235	1446	85.40
Vitamin-A	1252	1446	86.58
Awareness on Oral Vaccine for Polio	1269	1446	87.75

- iv. Sharing information with ICMR experts and feedback
- v. Preparation of IEC modules, HMIS formats, training modules
- vi. Intervention and concurrent evaluation-2 years

16. Identify the high risk behavior among the Primitive Tribal Groups (PTG) and work out a Socio-Cultural Strategy to bring in a reduction of Parenteral Hepatitis virus (HBV & HCV) infection.

Principal Investigator : Dr. Amarendra Mahapatra
Co-Investigator(s) : Dr. T. Hussain
Dr. B. Dwibedi &
Mr.D.P. Hansdah

Duration : 3 Years (Dec.2015-Nov. 2018)
Funding : ICMR (Translational)

Objectives

- 1. To develop a Socio-cultural strategy developed for the prevention of Parenteral Hepatitis virus (HBV & HCV) infection among the PTG.

- 2. To implement the Socio-cultural strategy for the control of Hepatitis virus (HBV & HCV) infection among the PTG.

The present study is a translational study to bring in a change in the HBV & HCV load reduction in the PTGs; which was observed to be very very high as per the earlier study results of a RMRC, Bhubaneswar. This was also a priority area of research in the 12th - 5 yr plan document. Odisha occupies a unique position in the ethnographic map of India for having the largest variety of 62 tribal communities, constituting 22% of the State's population. Thirteen(13) tribal groups, namely Birhor, Bondo, Didayi, Dongria-khond, Juangs, Kharias, Kutia, Khond, Lanjia Saoras, Lodhas, Mankidias, Paudi Bhuinyas, Soura and Chuktia Bhunjia, having pre-agricultural level of technology and extremely low level of literacy have been scheduled as the Primitive Tribe Groups (PTG) of Odisha due to their dwindling population too. These tribal people express their cultural identity and distinctiveness in their social organization, language, rituals and festivals and remain away from the modern

Table- 13 . Training needs assessment.

Training Needs Assessment of coverage area							
Block name	Name of health worker	0-7th class	Education 8th-10th	10th-Graduate	Skill Assessment Covered	IMNC Trained	Untrained
Kesinga	ASHA	1	5	0	6	1	5
	AWW	1	3	3	7	3	4
	ANM	0	0	0	0	0	0
Th. Rampur	ASHA	3	0	0	3	1	2
	AWW	0	11	2	13	8	5
	ANM	0	0	1	1	1	0
Junagarh	ASHA	2	3	1	6	3	3
	AWW	0	14	0	14	12	2
	ANM	0	0	0	0	0	0
Lanjigarh	ASHA	3	2	0	5	4	1
	AWW	0	5	2	7	6	1
	ANM	0	0	1	1	1	0
	Total	10	43	10	63	40	23

developments. It has been observed that the tribals suffer disproportionately from malaria, sexually transmitted diseases, tuberculosis, genetic disorders like G6PD deficiency, sickle cell anemia and also from nutritional deficiency diseases. The primitive tribes also have high rates of mortality and low life expectancy. But the cause of death has not been looked into.

Recently RMRC, Bhubaneswar has undertaken a Primitive Tribal Group study (during 2005-09) and has shown that hepatitis infection is widely prevalent among these tribes of Odisha. Hepatitis A and E virus infection was found to be around 75-85% and 18-49% respectively. Parenterally transmitted Hepatitis B was found to be 1-3% (HBsAg positivity). Hepatitis C infection was noted to be quite high (1-13%) in comparison to the national average of (< 1%). In Mankidia PTG and Juanga PTG, prevalence of HCV was found to be around 10%, which is alarmingly high.

The above observations has indicated that some of the primitive tribes are at a higher risk for parenterally acquired infection like HBV and HCV, thereby at the danger of facing the consequences of the chronic diseases, which might be further aggravated by super imposed alcoholism which is a common habit in many of this tribes. Moreover, it may be noted that, the PTG Mankidia tribe population is very low i.e <1000 in the state. The community seems to be at the verge of extinction if not properly dealt.

It is assumed that, the Socio-cultural behaviors and customs, coupled with low level of education in these tribes' might be favoring the spread of the infection, in the PTG. Probably an in-depth Anthropological ethnological study can answer these queries.

There may be certain common practices and behaviours prevailing in the community, responsible for the spread of and warranting necessity for

prevention from HBV & HCV by adopting a standard improved behaviour. Distributions of possible risk factors for parenteral transmission were also looked for, in these tribes by the previous RMRC study. These are narrowed down to like Tattooing, Body piercing, H/O Multiple injection and Sharing of razor (Shaving in barber shop/by village barber) etc.

However, more detailed study of the risk factor is warranted, so as to initiate any steps based on these findings. Hence, an In-depth Anthropological approach will also be adopted in this proposed study to know the details in this regard; the points emerged there off will be adopted for the development of the Behavioral Communication Change package.



Progress

In this project three visits were completed. All the concerned Tribal Developmental agencies were contacted and the secondary data were obtained. These agencies were also coordinated to cooperate

during in the field work, as a partner. In this regard the Khadia, Mankirdia and Lodha Tribes were contacted and 7 villages were visited. The base villages have to finalized soon to start the in-depth Anthropological study, in these base villages. So as to carry out the activities of the project in a mission mode.



FOCUS ACTIVITY

Change Maker : The focus activity is to identify

the Change Maker in a community. A decision maker who can be influenced after proper training and education to him / her; so as to advocate our change model and spell out the benefits to the community.

Secondly identifying the Influential Groups

The Influential groups can be School students, adolescent Peer Groups & Mahila mandals etc.

17. National Hospital based Rotavirus Surveillance Network at RMRC, Bhubaneswar.

Principal Investigator : Dr. B. Dwibedi

Co-Investigator : Dr. S. S. Satapathy, Capital Hospital, Bhubaneswar

Date of start : January' 2014

Duration : 3 years

Status : Extramural (ICMR)

Objectives of the proposal

- 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 inpatient facilities.
- To determine age, seasonal distribution and outcome of rotavirus associated disease among the population under surveillance, including monitoring trends over time.
- to characterize (G and P typing) prevalent strains of rotavirus in the population under surveillance

Table-1 Month wise hospitalization, enrollment, sample collection and positivity for Rotavirus.

Month & Year	No. of Children Admitted	No. of Children Enrolled in Study	No. of Stools Specimen Collected	No. of Positive Cases (%)
Jan-15	118	74	47	37
Feb-15	59	56	38	25
Mar-15	57	43	21	11
Apr- 15	47	32	18	10
May- 15	92	52	26	6
June- 15	71	45	25	3
July-15	125	78	40	3
Aug-15	80	46	26	8
Total	649	426	241	103

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

Progress during the period

During this period of surveillance subjects were enrolled based on their inclusion criteria from the peripheral site (Capital hospital, Bhubaneswar) regularly by visiting the peripheral sites every day. The month-wise hospitalization, enrollment, sample collection and positivity for Rotavirus are given in table 1.

The age-wise and sex-wise prevalence of Rota infection among children with diarrhea are presented in table 2 and 3 respectively. The result suggests that children of 7-12 month age are most susceptible to rotavirus infection and there is no such difference in the prevalence of rota infection among male and female child.

Genotyping

Every third Rota antigen positive samples was

subjected for genotyping in laboratory. For this purpose, RNA was extracted by Qiagen viral RNA extraction kit. Complementary DNA was synthesized by reverse transcriptase enzyme (Invitrogen) using random primers. All the cDNA were subjected to VP6 PCR to confirm presence of rotavirus genome. Genotyping for G and P genotype was carried out by using PCR conditions prescribed in the NRSN manual. Till 30th August 2014, 103 rota antigen positive samples were genotyped and G1, G2, G9 genotypes were obtained. Similarly, P[4], P[6] and P[8] type were obtained. The result suggested that G1P [8] is the most prevalent genotype circulating in Odisha followed by G9P[4]. Around 17 % of cases were untypable for any genotypes of Rotavirus whereas 14% were untypable for only G genotype.

Inference

- Rota virus prevalence among children was found to be 43%.
- Children among 7-12 month age group are most susceptible to rotavirus infection.

Table-2 Age wise distribution of hospitalization, enrollment and rotavirus positivity.

Age Group	Hospitalization cases	Total Enrolled cases	Total no. of Speciment collected	Positive cases(%)
0-6 month	60	41	41	9(8.7%)
7-12 month	229	167	167	46(44%)
13-24 month	208	153	153	39(37.8%)
25-36 month	71	41	41	7(6.7%)
37-48 month	19	15	15	0
49-60 month	22	9	9	2(1.9%)
> 60 month	35	0	0	0
Grand Total	644	426	426	103

Table-3 Sex wise distribution of Rota positives (January' 2015-August' 15).

Sex	Number of cases enrolled	No of sample positive for Rota antigen	Percent positivity
Female	150	85	56.66%
Male	276	155	56.15 %
Total	426	240	56.33 %

3. Rotavirus prevalence is more in winter season.
4. Common genotypes circulating in this region is G1P8 followed by G9P [6].
5. Many of the cases were untypable for either G or P genotypes or both.

Future Plan

The above activities (subject enrollment, screening of samples by ELISA and genotyping of positive samples) will continue for next year. The samples positive in ELISA and VP6 PCR and untypable in genotyping will be subjected for sequencing to determine the novel genotype.

18. Quadruplex PCR for diagnosis of *V. Cholera* O1 and/or o139 Sero Group causing Cholera : A novel Technique.

Principal Investigator : Dr. H. K. Khuntia

Objectives

1. (a) To optimize, inter and intra observer variations of the Quadruplex PCR assay will be checked for detection of *V. cholera* O1 and O139

Genotypes	Numbers
G1 P[4]	1
G1 P[8]	38 (51.3%)
G1 P[nt]	1
G1,G9 P[8]	1
G1P[4],[8]	1
G2 P[4]	1
G2 P[6]	1
G2 P[nt]	1
G9 P[4]	4 (5.4%)
G9 P[6]	1
Gnt P[4]	6 (8.1%)
Gnt P[8]	5 (6.7%)
Gnt P[nt]*	13 (17.6%)
Grand Total	74

serogroups.

- (b) An easy Quadruplex 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. cholerae* 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 serogroup that matched with their respective actual serogroups showing positive for other genes *ctxA*, *tcpA*, and *ToxR* (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°C 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 *ctxA*, *tcpA* (El Tor) and *ToxR* genes.

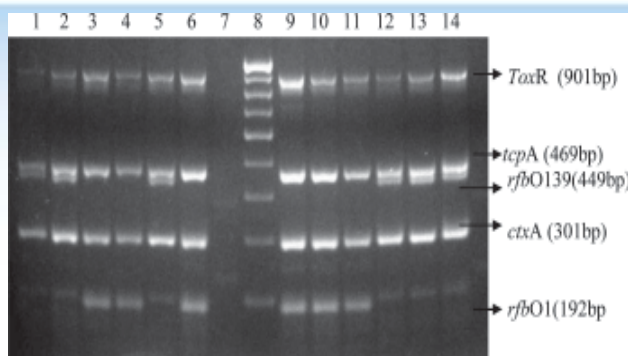


Fig. 1. shows results of in-house validation of Quadruplex PCR assay of *V. cholerae* O1, O139, positive control (*V. cholerae* O1 and O139) and negative control (*Salmonella* spp.)

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°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.

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

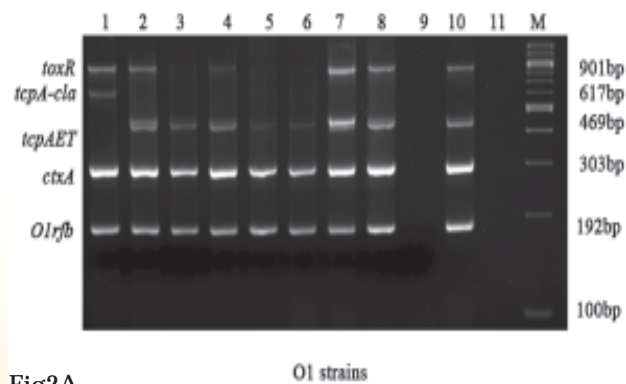


Fig2A

O1 strains

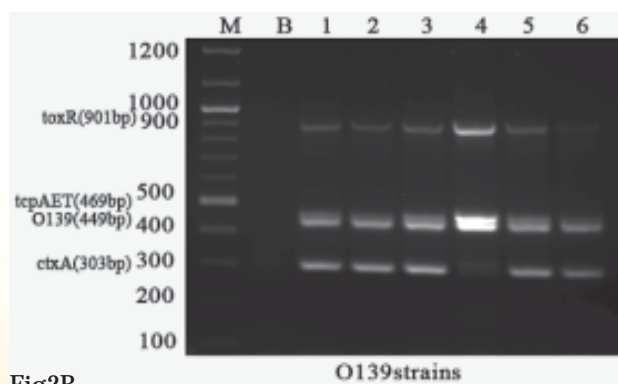


Fig2B

O139strains

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.**Fig2B.**Lane1,through lane 5 *V. cholerae* O139 strains;Lane 6, *V. cholerae* O139 reference strain MO10, lane B without template.

Completed Studies



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

Principal Investigator : Dr. B. Dwibedi
Co-Investigators : Prof. Niranjana Mohanty
Head, Department of
Pediatrics, SVP Post
Graduate Institute of
Pediatrics, Cuttack.
Period : February, 2012 to
September, 2015
Duration : 3 years and 6 months
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 trends of bacterial meningitis in children 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*.

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 in February, 2012. 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 in February, 2012 at NIE Chennai. Technical staff (2 SRFs, 2 research assistants and 2 technicians)

got laboratory training pertaining to identification of isolates using gram stain, blood and chocolate agar culture, biochemical tests during a workshop held at CMC, Vellore in February, 2012. A refresher training/workshop was also held for the technical staff (1 SRF, 2 research assistants and 3 technicians) in Dec, 2014 and Jan, 2015.

Standardisation of laboratory procedures at the centre's lab:

Laboratory investigation has been undertaken on trial samples (Blood & CSF samples) on the required laboratory procedures including CSF cytology (DC, TLC), CSF biochemistry (glucose, protein) by auto analyzer, culture (blood and CSF) and antibiotic sensitivity. Cultures were run on blood agar, chocolate agar and Mac conkey plates for identification and antibiotic sensitivity. Latex agglutination test was also carried out for the CSF samples. For few samples Binax test was done to detect the presence of *S. pneumoniae* in the CSF samples.

Quality control

Internal quality checks were done time to time on coded samples to see inter observer variations which was 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. In EQAS, 36 coded isolates were tested in 9 batches. Overall matching for bacterial identification was satisfactory.

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 CO₂ 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&B Division, necessary equipments have been shifted to the laboratory from RMRC and installed. Laboratory activity is ongoing to cover 24 hrs. X 7days surveillance activity.

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 to September, 2015 through 24hr surveillance. After obtaining written consent from parent or guardian accompanying the patient, the subjects were enrolled.

Case report form was filled with the help of resident paediatrician. History of illness and history of immunisation was also recorded. A total of 1232 numbers of suspected meningitis cases were enrolled in the study those 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 (78.16%). Other associated features were bulging fontanelle (17.37%), neck rigidity (21.91%), and altered sensorium (18.34%). Around 51.78% of patient reported to the above hospital within 24hrs of onset of fever. History of use of antibiotics before admission was observed in 54.7% of cases.

Around 2.35% cases had history of immunisation against Hib and *Streptococcus pneumoniae* among all cases that were enrolled. CSF and blood samples were collected following standard practise and procedure in the hospital for investigation. A total of 901 CSF samples and 757 blood samples were collected for investigation. In all cases, samples were processed immediately and put into culture (within 15-30 mins).

The CSF samples were subjected to latex test, 38 samples were latex positive (21 for *H. influenzae* Type b, 15 for *S. pneumoniae* and 2 for Group B *Streptococcus*). CSF cell count varied from 0 to 16500. About 27.76% of CSF samples presented with cell count more than 10, while only 9.42% of CSF samples had WBC count more than 100.

Of the total CSF samples subjected to culture, nine were found positive. One sample was positive for *S. Pneumoniae*, when subjected to antibiotic sensitivity testing it was found susceptible to Cefotaxime, Chloramphenicol, Penicillin, Vancomycin, Oxacillin, Teicoplanin and Rifampicin. Out of eight other samples, three were culture positive for *Staphylococcus aureus*, one for *Salmonella* spp., three for *Klebsiella pneumoniae* and one was positive for *E. coli*. 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. *Salmonella typhi* showed susceptibility towards Gentamicin, Cotrimoxazole, Chloramphenicol, Ceftriaxone and was resistant to Ampicillin, Cefotaxime, Ceftazidime. *Klebsiella pneumoniae* showed sensitivity for Cotrimoxazole, Azithromycin, Chloramphenicol, Amikacin, Meropenem and Gentamicin and *E. coli* showed susceptibility towards Imipenem and Meropenem

Out of 757 blood samples processed for culture, one was positive for Hib and it was sensitive towards Cefotaxime, Co-trimoxazole, Ampicillin and resistant towards Chloramphenicol. One sample was positive for *S. pneumoniae* and it sensitive to Cefotaxime, Chloramphenicol, Penicillin, Vancomycin, Oxacillin, Teicoplanin and Rifampicin. One was culture positive for *Klebsiella pneumoniae* and four were positive for *Pseudomonas aeruginosa*. Antibiotic susceptibility done against *Klebsiella pneumoniae* revealed that it was

sensitive to Norfloxacin, Cephalexin, 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. One sample showed positive growth of *Acinetobacter spp.* and it was resistant to almost all drugs like Cefotaxime, Co-trimoxazole, Imipenem, Meropenem, Amikacin. There were five samples that were culture positive for *Staphylococcus aureus*, out of which one was Methicillin resistant strain (MRSA). Three samples showed positive growth for *E. coli* and the antimicrobial sensitivity pattern revealed susceptibility for Co-trimoxazole, Amikacin and resistance for Gentamicin, Ciprofloxacin, Imipenem, Meropenem.

Out of 135 no. of CSF samples were sent to CMC Vellore in for real time PCR analysis, out of which 20 were positive for *S. pneumoniae* and 2 were positive for Hib.

Outcome and Application of the research for National Health Policy:

The aim of the project was to establish a network for sentinel surveillance for bacterial meningitis caused by *H. influenzae*, *S. pneumoniae* and *N. 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 was also studied as a part of the project.

This surveillance study provided hospital based data on bacterial meningitis specifically those caused

by *S. pneumoniae*, *H. influenzae* and *N. meningitidis*. Data on drug resistance using MIC 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.

2. Transfer of a molecular technique from lab based study to field for mapping of malaria vectors and their vectorial attributes.

Principal Investigator : Dr Rupenangshu
Kumar Hazra
Co-Investigators : Dr Namita Mohapatra
Collaborators : NIMR, Rourkela
VCRC, Koraput
Period : 3 years
Starting date : March 2012
Closing date : March 2015

1. Main Objectives of the proposal

- To standardize methodologies for different parameters for vector mapping.
- To test the standardized methodologies from Phase-1 (Phase-1 objectives are given below)
- To map the vectors at PHC level and identify operational issues.
- To prepare a vector map at district level.
- Transfer the laboratory based technology to field.

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 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.

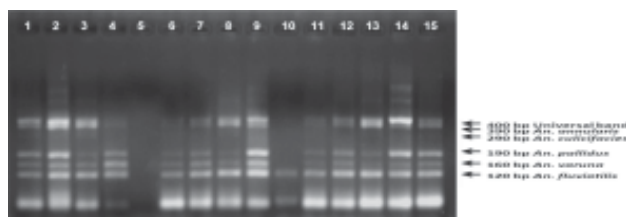
2. Work Progress

2.1. 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 Field Unit from 10th-13th January 2014. The District VBD consultant and Malaria Technical Supervisors were trained by the RMRC Entomological staffs.

2.2. 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-22nd April, 2013, 5th -7th May, 2013, 19th - 22nd November, 2013 and 12th -15th December, 2013. Optimization of the PCR



2.3. Study Area:



Fig.1 Map highlighting Keonjhar and Kalahandi district of Odisha.

assay for slot I was completed on 10th-14th February 2014.

2.4. 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 to 07:00am) and dusk (06:00 to 08:00pm) hours. Mosquito collection was done both in indoor and outdoor. Collections were also carried out from mixed dwelling. 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.

2.5. Morphological identification:

The adult *Anopheles* mosquitoes were identified taxonomically using 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.

2.6. Mosquito Preservation and processing:

After identification each individual specimen was dissected into the head thoracic and the abdomen part. 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 for transportation and preservation of mosquito samples, one method i.e. mosquito drying chamber was standardized and adopted.

2.7. Entomological collection

During the study period of 3 years a total of 18766

Anopheline mosquitoes were collected belonging to different vector and non vector 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*.

2.7.1. Collection methodologies

As per the standardized collection method, higher densities of mosquitoes were collected by hand catch using oral aspirator (86.2%) in comparison to light traps (13.2%).

2.7.2. Habitat of collection

Indoor collection contributed to 97.2% and outdoor contributed to only 2.8% of the total collection. From the indoor collection **cattle shade** contributed highest collection (52.8%) followed by mixed dwelling. Very few numbers of mosquitoes were collected from Human dwelling.

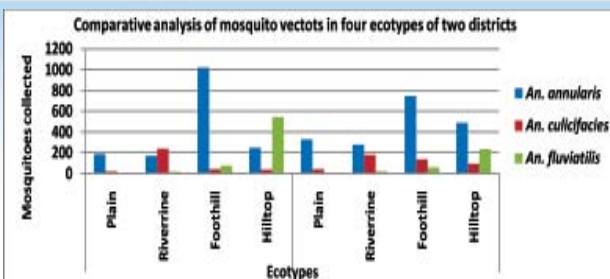
2.7.3. Ecotype collection

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.

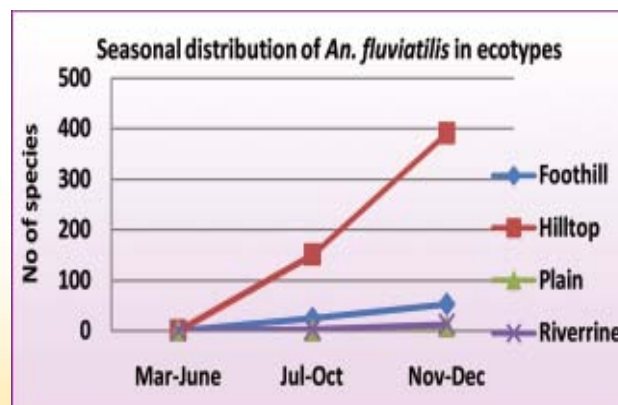
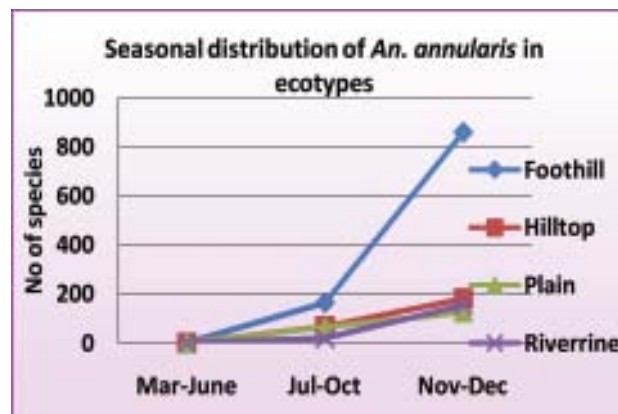
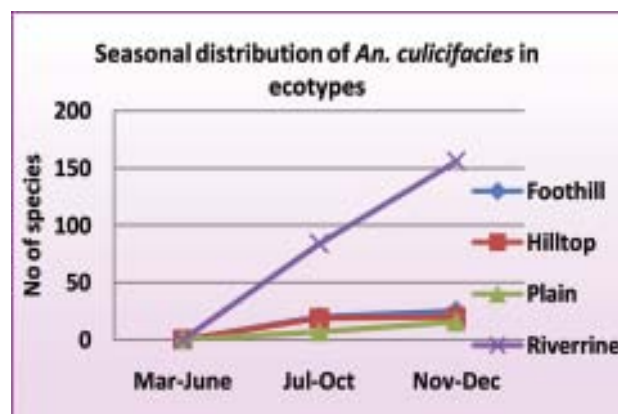
2.7.4. Seasonal prevalence

Season wise analysis of the mosquito's collection indicated highest density (45.7%) in **Monsoon** while lowest during **Summer** (19.9%). Winter collection contributed to 34.4% of the total collection.

The following observations for occurrences of vectors during Translational research studies in two districts of Odisha serve as the baseline data for malaria control strategies.

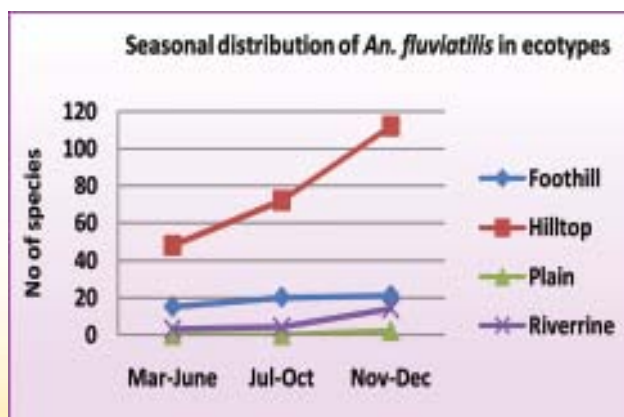
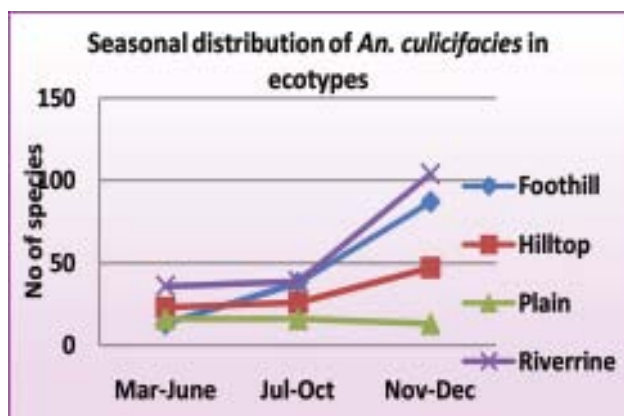
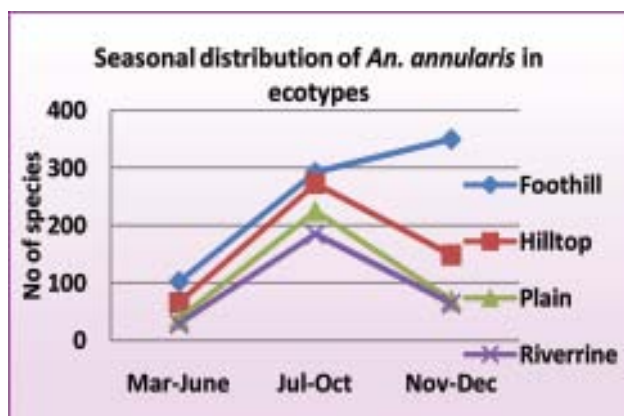


Seasonal distribution of three species in the four ecotypes of Keonjhar district.



An. annularis was found with maximum density during winter season in foothill, *An. culicifacies* was found with maximum density during winter season in riverine and *An. fluviatilis* was found with maximum density during winter in hilltop ecotype.

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



Pool PCR Assay: Multiplex PCR

Area	No. of pools	pool size	Pool +ve for pf	Pf +ve for Human blood
Plain	132	10	0	41
Riverine	78	10	0	14
Foot hill	98	10	2	21
Hill top	43	10	1	15

Result of multiplex PCR assay showing mosquito pools positive for Pf and human blood

2.8. 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.

9. Major Achievements

1. A simple, rapid and very efficient protocol for DNA isolation from mosquito species was established in our laboratory.

2. One workshop and many training programmes were organized during the work period of this project regarding the use of different basic entomological and molecular tools and technique. The basic objectives of these programmes were transferring these techniques from laboratory to field so that even a simple field worker can implement these techniques in field conditions with basic laboratory facilities. The major output of these training programmes is that these techniques will prove to be helpful in rapid monitoring and evaluation of malaria of an area. The participants were from entomologists & technical staffs of health department Govt. of Odisha and scientists and research staffs from field units of NIMR and VCRC.

10. 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. This 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 transmission by adopting the intervention and further it will help the decision maker to adopt appropriate measure for controlling the malaria.

2. This technique will help in total screening of Anophelines vectors of Odisha with 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.

3. Pool based screening for species identification, blood meal identification and vector incrimination will reduce time and man power in monitoring and evaluation programme.

4. Standardization of mosquito preservation method will help the workers from PHC level to transport it without any damage the centre.

11. Any publications:

1. Sushanta Kumar Barik, Rupenangshu Kumar Hazra, Manas Ranjan Prusty, Animesha Rath & Santanu Kumar Kar (2013): **A simple, rapid and very efficient protocol for DNA isolation from mosquito species.** Nature protocols/Protocol Exchange doi:10.1038/protex.2013.007.

2. Animesha Rath, Manas Ranjan Prusty,

Mumani Das, Namita Mohapatra, Harekrusna Tripathy, Rupenangshu Kumar Hazra (2015): A shift in resting habitat and feeding behaviour of *An. fluviatilis* sibling species in Keonjhar districts of Odisha, India. Transactions of the Royal Society of Tropical Medicine and Hygiene. Impact Factor: 1.83.

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

Principal Investigator : Dr. G. Bulliyya

Co-Investigators : Mr. R. K Das

Starting date : September 2013

Closing date : March 2015

Status : 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
- Ascertain, record age and infant feeding practices in all children below 3 years of age;
- Ascertain acute morbidity in under 5 children;
- Ascertain physiological status of women in reproductive age;
- Use instruments/equipments to be used in the survey and measure the parameters accurately;
- Perform quality control procedures to ensure accuracy in measurements; and
- 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. Over-nutrition, hypertension and diabetes are emerging as public health problem in both urban and rural areas, however, no surveys to provide district level data. The 12th Plan (2012-17) and National Health Mission (NHM) emphasized the need for district-specific planning of interventions based on magnitude of the problems in districts to reduce the gap between districts/states and accelerate the pace of improvement in health and nutritional status. Annual Health survey (AHS) was conceived in 2005 to yield core vital and health indicators at the district level on a continuous basis. It has become operational in 2010 in all the 284 districts of the 8 Empowered Action Group (EAG) states including Odisha with poor health indicators focusing attention to identify poorly performing areas (blocks). Three rounds of the survey have been completed (2010-11, 2011-12 and 2012-13) and the results containing 161 vital and health indicators in the form of district level data.

To supplement the information provided by AHS, Clinical, Anthropometric and Bio-chemical (CAB) survey has been introduced for the first time in AHS (2014) in order to obtain districts level data on the prevalence of under- and over-nutrition, anaemia and hypertension, abnormalities in fasting glucose levels, and availability of iodized salt. 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. This will enable to formulate decentralized 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 covered 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). 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.

Methodology

Training to field health supervisors/ investigators

RMRC, Bhubaneswar is one among the 9 nodal centres in the country carried out this survey that included five ICMR and 2 non-ICMR institutions (NIHFW & NFI). A 4-day intensive training has been provided to the field survey teams deputed by outsourcing agencies such as Nielson (India) Pvt Ltd and M/s. Sambodhi Research & Communications Pvt Ltd that covered orientation of CAB, identifying PSU in the district, households and form filling from AHS data sheets. The field investigators were trained for skill upgradation and taught about quality control measures to ensure accuracy of measurements. 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 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.

Haemoglobin estimation

Blood samples (20ul) collected on filter paper are

received in sealed plastic zip lock envelopes 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 measured 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 lab estimated Hb of the sample within 15 days after collection. The lab which sent the sample consolidated the results and verified that Hb values reported by external labs ensured within permissible range (+1 OD). If the variation was more, a repeat sample was to be sent. The results from all the nodal labs were sent to NIHFW and NFI for compilation and analysis. The field work has been outsourced and supervision was done by local Directorate of Census Operations on regular basis.

Results

The CAB survey (2014) conducted in Odisha found that 41.5% children, under the age of five were stunted (height below normal for age) and 38.9% of them were underweight (weight below normal for age) and 20.2% had wasting (weight below normal for height). However, gender differences revealed

38.0% boys to be underweight in comparison to 40% girls. Similar results turned up for underweight with 49.2% boys reporting it compared to 30.5% girls. Undernutrition in context of body mass index (BMI, weight for height) was 19.8% and 8.8% of them had severely undernourished. Malnourishment is shown to be more common in southern (Malkanigiri, Koraput) and tribal-dominant districts as compared to coastal districts. Undernutrition in terms of BMI-for-age was 32.2% among youngsters (between 5-18 years) with at least 11.6% severely undernourished. More boys (36.1%) were undernourished as compared to girls (28.1%). Only 1.4% and 0.3% of young children were overweight and obese respectively (Table-1).

In the age group of 18-59 years (adults), 27.1% had chronic energy deficiency or body mass index (BMI) less or equal to 18.5, while 14.1% and 2.6% people had overweight or obese (BMI<30). According to WHO, overweight and obesity are defined as abnormal or excessive fat accumulation is risk factors of heart related problems. Among the total population, 14.1% have normal BMI more than or equal to 25 (Table-1). Moreover, 38% of elderly had chronic energy deficiency (BMI<18.5) in 60 and over age category, while 10.8% and 2% respectively are overweight and obese. The percentage of overweight adults and elderly in rural areas is 11.5% and 8.7. Besides, in terms of percentage, females are more obese and overweight than their male counterparts. The percentage of obese women in the state is 3.4 while only 1.7% of males are facing the same health problem. In comparison to 23% and 34.8% males adults and elderly, 30.3% and 40.6% females respectively are underweight.

Anaemia status by haemoglobin level show that 70.8%, 81.2%, 74.5%, 74.8% and 82.1% are suffering from anaemia in the age groups of 5-59 months, 5-9 years, 10-17 years, 18-59 years and elderly respectively (Table-1). In the age groups of 10-17 and

Table 1: Nutritional status of population groups in Odisha by age, gender and setting.

Indicator	N	Total	Male	Female	Rural	Range between districts*
Nutritional status of children <5 years						
a. Weight for height z-score Wasting (<-2 SD) Severely wasting (SAM) (<-3SD)	12015	20.2 6.0	20.5 6.5	19.8 5.4	20.4 6.1	7.8-33.3(13-21) 1.4-16.0 (13-21)
b. Height for age z-score Stunting (<-2 SD) Severely Stunting (<-3SD)	12282	41.5 19.4	41.2 19.2	41.8 19.8	42.4 19.8	21.3-57.7 (12-20) 6.4-34.6(17-20)
c. Weight for age z-score Underweight (<-2 SD) Severely underweight (<-3SD)	12494	38.9 14.4	38.0 13.8	40.0 15.1	40.1 14.9	14.0-67.4 (12-21) 3.0-34.5 (12-21)
d. Body Mass Index-for-age Undernourished (<-2 SD) Severely Undernourished (<-3SD) Overnourished/overweight (>2SD) Overnourished or obese (>3SD)	12540	19.8 8.8 4.7 2.1	19.4 9.3 5.3 2.4	20.3 8.3 4.0 1.7	20.1 8.8 4.4 1.9	7.5-35.0 (13-21) 2.2-22.6 (13-21) 0.7-9.1 (15-7) 0.4-4.9 (21-26)
Nutritional status of children & adolescents (5-18 years)						
a. Undernourished Thinness (BMI-for-age <-2SD) Severely thin BMI-for-age <-3SD	38368	32.2 11.6	36.1 13.6	28.1 9.4	33.1 11.9	22.7-49.6 (24-15) 5.6-20.0 (13-15)
b. Overnourished Overweight BMI-for-age >2SD Obese BMI-for-age >3SD	38368	1.4 0.3	1.7 0.3	1.1 0.3	1.1 0.3	0.2-5.0 (23-16) 0.2-1.0 (11-16)
Nutritional status of adults (>18 years)						
a. Chronic energy deficiency (<18.5 kg/m ²) Adults (19-59 years) Elderly (>60 years)	89387 17705	27.1 37.6	23.3 34.8	30.3 40.6	29.2 39.9	12.6-45.3 (12-21) 22.9-57.9 (12-15)
b. Overweight (BMI >25.0 kg/m ²) Adults (19-59 years) Elderly (>60 years)	"	14.1 10.8	13.9 10.3	14.3 11.3	11.5 8.7	4.5-24.5 (23-19) 4.0-17.2 (23-14)
c. Obese (BMI >30.0 kg/m ²) Adults (19-59 years) Elderly (>60 years)	"	2.6 2.0	2.2 1.6	2.9 2.4	1.9 1.4	0.6-4.4 (23-16) 0.5-4.3 (25-28)
Anaemia by haemoglobin levels (g/dl)						
a. Age group 6-59 months Any anaemia Severe anaemia	9643	70.8 0.2	71.4 0.3	70.2 0.1	70.6 0.2	47.9-88.6 (13-23) 0.0-3.3 (-21)
b. Age group 5-9 years Any anaemia Severe anaemia	11872	81.2 3.3	81.2 3.2	81.3 3.3	81.1 3.4	52.7-93.5 (13-18) 1.7-8.8 (3-12)
c. Age group 10-17 years Any anaemia Severe anaemia	20438	74.5 2.7	70.5 2.4	78.4 3.1	74.7 2.7	39.0-90.0 (13-27) 0.8-8.7 (11-27)
d. Age group 18-59 years Any anaemia Severe anaemia	80233	74.8 2.4	71.8 1.7	77.7 3.1	77.5 3.1	27.2-95.3 (13-27) 0.0-6.9 (13-21)
e. Age group >60 years Any anaemia Severe anaemia	16218	82.1 3.6	82.7 2.9	81.4 4.3	82.4 3.7	47.2-98.2 (13-27) 1.8-11.7 (13-14)
Household salt iodine level (>15 ppm)	43488	72.4	-	-	71.8	40.3-94.5 (13-9)
*1. Anugul, 2. Balangir, 3. Baleshwar, 4. Bargarh, 5. Bhadrak, 6. Boudh, 7. Cuttack, 8. Debagarh, 9. Dhenkanal, 10. Gajapati, 11. Ganjam, 12. Jagatsinghpur, 13. Jajpur, 14. Jharsuguda, 15. Kalahandi, 16. Kandhamal, 17. Kendrapara, 18. Kendujhar, 19. Khordha, 20. Koraput, 21. Malkangiri, 22. Mayurbhanj, 23. Nabarangapur, 24. Nayagarh, 25. Nuapada, 26. Puri, 27. Rayagada, 28. Sambalpur, 29. Sonapur, 30. Sundargarh.						

18-59 years, the percentage of anaemia is higher in females (78.4% and 77.7%) than in males (70.5% and 71.8%). Also, in the same age categories, 3.1% females have severe anaemia than their male counterparts (2.4% and 1.7%). The prevalence of anaemia is significantly higher in the Rayagada, Nabarangpur, Kendujhar and Malkangiri districts for any of the age groups.

In the state, 8.5% people have hypertension with systolic >140 mmHg and diastolic >90 mmHg in above 18 population (Table-2). The survey shows three categories of very high blood pressure, 0.6% people

are suffering from very high blood pressure when systolic is >180 mmHg and diastolic is >110 mmHg. Around 1.3% of people are suffering from very high blood pressure when systolic >180 mmHg and diastolic is <110 mmHg. Also, 1.3% are suffering from very high blood pressure when systolic is <180 mmHg and diastolic is >110 mmHg. Considering moderately high blood pressure, 2.3% of population above 18 years is suffering from moderately high blood pressure when systolic is >160 mmHg and diastolic is >100 mmHg. Around 2.5% of population is suffering from moderately high blood pressure when systolic >160

Table 2: Lifestyle disorders of population groups in Odisha by age, gender and setting.

Indicator	N	Total	Male	Female	Rural	Range between districts*
Prevalence of hypertension adults >18y						
a. Above normal Systolic BP >140 & Diastolic BP >90	107101	8.5	8.7	8.4	8.1	3.4-19.9 (25-18)
Systolic BP >140 & Diastolic BP <90		6.4	6.7	6.1	6.3	2.9-10.4 (21-16)
Systolic BP <140 & Diastolic BP >90		5.8	6.1	5.5	5.6	1.6-13.5 (3-27)
b. Moderately high Systolic BP >160 & Diastolic BP >100	107101	2.3	2.4	2.3	2.2	0.1-6.0 (25-18)
Systolic BP >160 & Diastolic BP <100		2.5	2.5	2.5	2.5	0.7-5.2 (23-30)
Systolic BP <160 & Diastolic BP >100		2.4	2.4	2.3	2.3	0.9-6.9 (13-18)
c. Very high Systolic BP >180 & Diastolic BP >110	107101	0.6	0.6	0.6	0.6	0.1-1.3 (2-18)
Systolic BP >180 & Diastolic BP <110		0.8	0.8	0.8	0.8	0.3-1.7 (14-15)
Systolic BP <180 & Diastolic BP >110		1.3	1.3	1.3	1.2	0.1-4.2 (23-18)
Blood sugar among adults (>18 years)	104716					
a. Fasting blood sugar (>110 mg/dl)		8.3	9.1	7.7	7.8	3.5-14.0 (19-29)
b. Fasting blood sugar (130 mg/dl)		3.4	3.8	3.1	3.0	1.1-7.5 (28-23)
c. Fasting blood sugar (>150mg/dl)		2.0	2.7	1.7	1.8	0.8-3.8 (23-28)
*1.Anugul, 2.Balangir, 3.Baleshwar, 4.Bargarh, 5.Bhadrak, 6.Boudh, 7.Cuttack, 8.Debagarh, 9.Dhenkanal, 10.Gajapati, 11.Ganjam, 12.Jagatsinghapur, 13.Jajpur, 14.Jharsuguda, 15.Kalahandi, 16.Kandhamal, 17.Kendrapara, 18.Kendujhar, 19.Khordha, 20.Koraput, 21.Malkangiri, 22.Mayurbhanj, 23.Nabarangapur, 24.Nayagarh, 25.Nuapada, 26.Puri, 27.Rayagada, 28.Sambalpur, 29.Sonapur, 30.Sundargarh.						

mmHg and diastolic is <100 mmHg. Also, 2.4% of population is suffering from moderately high blood pressure when systolic is <160 mmHg and diastolic is >100 mmHg.

Around 8.3% of total population above 18 years of age in the state has fasting blood glucose level >110 mg/dl, who are at a high risk or pre-diabetic. Higher glucose level (>110 mg/dl) is found in about 9.1% males in comparison to 7.7% females. As far as rural area is concerned, 7.8% have blood glucose levels >110 mg/dl, including 7.2% females and 8.4% males. The blood glucose level >130 mg/dl is found in 3.4% including 3.1% of males and 3.4% of females. Moreover, 2.4% of total population had high blood glucose level >150 mg/dl (Table-2).

Summary and conclusion

CAB survey has been carried out first time to produce district-wise data on prevalence of hypertension diabetes in adults and under-nutrition and over-nutrition, micronutrient deficiencies in all age and physiological groups. The survey reveals that the state population is experiencing double burden of malnutrition and emergence of lifestyle disorders that may result in significant structural changes in disease patterns. Under-nutrition is widely prevalent in southern KBK and tribal-dominant districts, while overweight/obesity and lifestyle diseases are emerging to be public health problems in coastal (Cuttack, Puri, Jagatsinghpur, Jajpur, Baleswar) and northern (Jharsuguda, Sundargarh) districts. These biomarker measurements can serve as diagnostic tools to identify diseases in their early stages and can be used as surveillance tools to track changes in disease patterns or to evaluate intervention programs and can also be used at a macro level to measure the long-term effect of policies and programs. By using this data as the baseline, district specific programme implementation plans can be drawn up, funded and implemented. Thus, CAB survey aims to contribute

immensely to rapid improvement in health and nutritional indices in Odisha by making available district level data, enabling to bridge the gap between poor and good performing districts and by demonstrating good quality assessment of health and nutritional status in community setting.

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

Investigator	: Dr. B. Dwibedi Dr. A. Kerketta Dr G. Bulliyya Dr. A. Mohapatra
Co-ordinator	: Director in charge RMRC, ICMR
Collaborator	: CDMO, Rayagada
Duration	: 3 years

Background

Fever was identified as the commonest morbidity among tribals and due to poor health seeking behaviour this is leading to mortality. To reduce the duration of treatment seeking for febrile illness and improve accessibility to management of fever, following project was undertaken in Rayagada district with field unit staff.

Objectives

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

Preliminary work

Baseline survey was carried out in 5541 population of 24 villages of 3 sub centres in

Jemaidepenta CHC of Rayagada district from July 2012-July 2013. Door to door census of population was made by the census taker of the team. Detailed socio-demographic information was collected using pre-tested structured questionnaire. House to house interview was conducted for morbidity survey with the help of grass root level health providers in the village. Assessment of demography, seasonal prevalence and pattern of febrile illness, aetiology of fever present in the community, qualitative and quantitative assessment health seeking behaviour of community, availability of health manpower and logistic supply was carried out. Structure and function of primary health care delivery system for management of these morbidities in community was also assessed.

Baseline morbidity survey revealed total 14.98% individuals having various morbidities. The major morbidities were fever (7.69%) and musculoskeletal disorders (3.8%). Malaria, Acute respiratory disorders and Viral fever were the main contributors for febrile

illness. Etiological agent responsible for acute respiratory tract infections isolated from throat swab were bacteria like *H influenzae*, *S. pneumoniae* in 19.6% cases and viruses like *Corona virus*, *Para influenza*, *Rhino virus* in 10.3% cases. Mixed infection was found in 08.2% cases. E coli infection observed in 30% of stool sample collected from diarrhoea cases. Health seeking behaviour reported delay of 4.5 days for seeking treatment for febrile illness. It was noted that Community seek treatment from multiple sources including traditional healers, local practitioner and government health agencies including ASHA/AWW. Supply of logistic was insufficient and irregular. Based on this, an alternate effective fever management strategy was developed (Fig. 2).

Progress

The module was implemented in the study area with interim evaluation of the outcomes.

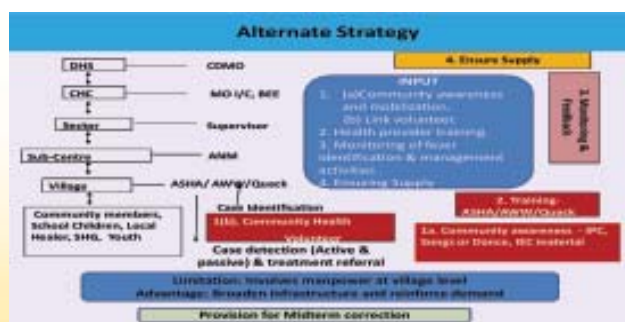
Intervention:

Intervention strategy was implemented in 27 villages of 3 sub-centres in Jemaidepenta CHC of Rayagada district from June 2014. Monthly concurrent evaluation of strategy in the form of input, process, output and outcome indicators is going on. Questionnaire format for ASHA/ AWW/ HW evaluation was developed and used for the purpose.

i. 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 community. 15-35 community members were present in each meeting. The people were sensitized regarding importance of hand washing, IRS and use of bed nets. Demonstration of hand washing given by school children in meetings was well appreciated by community.

Fig. 1 Study area:



ii. Capacity building:

Identification 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 was selected, if she was literate and ready to work without any honorarium as discussed in community meetings. In small villages or where community is not ready for CV, ASHA/AWW took responsibility of a CV.

Out of 27 volunteers only 19 no volunteers are successfully working in 19 villages. Out of 19 volunteers only 12 nos. of volunteers actively working. Training was given 5 to 6 times on fever case identification, its referral to ASHA/AWW at village level and warning signals for immediate referral. Community volunteers are now identifying fever cases in community daily and informing to ASHA for management. After training 70% of CV actively reporting fever cases (Table-1).

iii. Training of ASHA/AWW:

All 19 ASHAs and 20 AWWs were trained on fever case identification on RDT use, Malaria t/t with ACT and, 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. 100% of ASHA are now able to perform RDT test by their own.

iv. Training of ANM/MPHW and Health Supervisor:

3 ANMs, 1 MPHW and 1 health supervisor were

trained on RDT use, Malaria t/t with ACT and on fever case identification, its management through syndromic approach and warning signals for referral in different febrile illnesses. Training on monitoring of strategy using various indicators was given to them.

v. Promotion of healthy preventive practices by school children:

As suggested by the stakeholders during meeting, training on healthy preventive practices was given to school children from 18 schools (1-10 std.) in 27 villages to reduce the burden of febrile illness due to infectious diseases like viral fever, diarrheal diseases and malaria. Total 1432 school children were trained 4 to 5 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.

vi. Ensuring logistic supply:

Logistic supply at village level and sub-centre 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 requirement of medicine based upon monthly febrile cases detected by CV and tested by ASHA for study villages. Monthly availability of logistic at village and sub-centre level is monitored



Interaction with ASHA



Discussion with district health authority



Hand washing awareness in Community

by RMRC field staff and informed to CDMO and MO. Advocacy with state health department for anti-malarial drug when found shortage with field resulting timely supply to district. Close monitoring on logistic flow at village level monthly with ASHA and conveying to MOIC & CDMO. Demand generation from community based on CV fever record.

vii. Monitoring and Supervision:

Monitoring and supervision of strategy is carried out by district health system and by RMRC staff during their field visits. Monthly dash board indicators has been prepared and given to field staff for monitoring. Outcome of refereed cases in PHC/CHC/DHH is also monitored by field staff. Medical Officer

and district level officer monitor this strategy during their field visit. ANM/MPHW and supervisor involved in monitoring for case identification and its T/t and logistic supply. Cross check of fever in 10% cases by RMRC authority.

Outcome Evaluation: Interim Evaluation of input and output indicators was done, which is presented in **Table-1, 2, 3 & Fig-2.**

All the 1909 case received Paracetamol from ASHA.

Average of Duration of Fever is 2 Days (Jun'14 – Feb'15).

Additional reporting of Fever cases by CV is 41%.

Table – 1: Evaluation of intervention strategy input Indicator.

Indicator	Target	Achievement
Organization of community meetings two times	27 villages	100%
No. Of people sensitized in meeting on fever & its management	5600 population	15.20%
Identification of Community Volunteer	19 CV	70%
Training of CV	5 times	100%
Identification and training of SHG members	324 SHG members	26.8%
GKS members sensitization on use of GKS fund for referral of serious patients	190 serious patients	34.7%
No. of ASHA trained	19 ASHA	100%
No. of AWW trained	20 AWW	100%
No. of Health workers trained	5 health workers	100%
Local practitioner sensitized on fever management		03
No. of school children trained on hand wash	1432 school children	80%
Advocacy meeting with district level stakeholders		06

Table -2: No. of fever cases & Malaria +ve reported by ASHA & addition by community volunteer.

Period	No. of fever cases reported		Tested by ASHA for Malaria (by use of RDT)	Malaria Positive Cases	Treatment Given by ASHA	Malarial case referred to PHC/ Districts
	ASHA report	ASHA + CV addition				
June 14 to Mar 15	1120	1909	1330	399	158	93

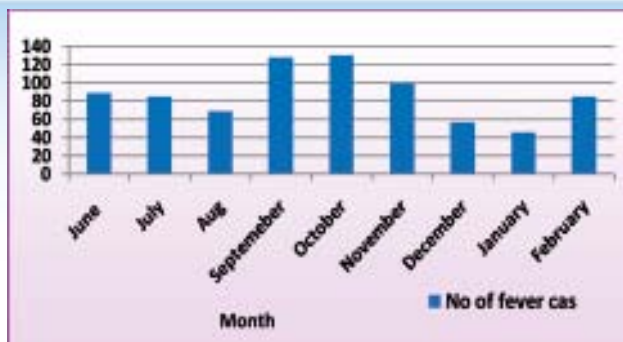


Fig. 2. Additional fever case reporting by Community volunteer (June 2014 –Feb 2015).

- 100% ASHA, AWW and MPHWH trained
- Community volunteer identified for 19/27 (70%) villages and trained
- 80% (1432) school children trained on hand washing
- 70% CVs actively reporting fever cases
- 94% ASHA/ AWW have adequate logistics

- Mean lag for fever treatment reduced to 2 days from 4.5 days at baseline.
- Additional reporting of fever cases by Community Volunteers - 41% (CV- 1909 fever cases, ASHA+AWW-1120 (3 sub centre report))
- Improved fever detection rate: 11.6% post intervention vs 7.1% pre intervention. No deaths due to febrile illness.

Outcome of the study

The fever management strategy using training of grass root level health workers, participation of community volunteers, monitoring and ensuring supply of logistics by the district health system was found to be useful in early recognition of fever, treatment at household level reducing morbidity period and thereby mortality. This model can be tried in similar setups and extended to other tribal areas for improving fever management at community level.

Photographs Showing: Community Meeting & Hand Washing in Villages.



A

B

C

D

Photographs Showing: Discussion with District Authority (A & B), Interaction with local health provider and community people (C & D).

Other Scientific Activities



1. National Reference Laboratory for Tuberculosis (NRL) : RMRC, Bhubaneswar.

Principal Investigator : Dr. D. Das, Scientist - E
Funding : Central TB Division,
New Delhi

Background

Effective implementation of DOTS and DOTS Plus strategy is the key component of RNTCP under Central TB Division under Ministry of Health and Family Welfare. For ease of supervision and monitoring work RMRC, Bhubaneswar was designated as new NRL along with Bhopal Memorial Hospital and Research Centre, Bhopal. The NRL, RMRC, Bhubaneswar was assigned 10 states namely Odisha, West Bengal, Assam, Meghalaya, Mizoram, Manipur, Nagaland, Sikkim, Tripura and Arunachal Pradesh.

The main focus of the activities includes

- Quality assessment of smear microscopy (EQA)
- Quality assurance of culture and drug susceptibility testing of laboratories under it
- Providing support to laboratories for capacity building
- Train and impart training to state laboratories on technologies
- Providing support to DOTS plus centers with laboratory support.

Work done

During the period, all the 10 states were visited by NRL, Bhubaneswar team and onsite evaluation of RNTCP activities were assessed and communicated to Central TB Division. Proficiency testing for Line Probe Assay of IRL, Guwahati and Nazareth Hospital, Shillong was carried out. The NRL also passed

proficiency testing for LPA, Solid 1st and 2nd line DST carried out by National Tuberculosis Institute, Bangalore and Supra National Reference Laboratory, NIRT, Chennai.



The NRL is providing support to the state of Odisha in MDR TB diagnosis for 10 districts and follow up culture for MDR TB patients on DOTS Plus treatment for 10 districts. Up to 3rd quarter of 2015, we have detected 23 MDR TB by Line Probe Assay and 2 MDR TB additionally by solid culture (Fig. 1). Up to 3rd quarter of 2015, we have processed 153 follow up samples among which 11 presumptive XDR cultures were sent to IRL Cuttack for 2nd Line DST (Fig.2).

The construction of BSL-3 was completed in the month of December, 2015 and MGIT machine was installed and on-site Liquid culture training was



Fig.1 MDR TB diagnostic sample processed.

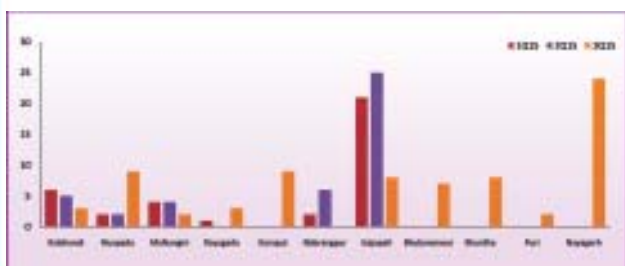


Fig.2 MDR TB Follow Up Culture.

organized at NRL from 7th to 11th December, 2015. Sample processing has already been started in BSL-3 and process for accreditation was also initiated by Liquid Culture for 1st and 2nd Line TB drugs.

Designated Microscopy Centre and DOTS site

The center has opened a DMC in its OPD for diagnosis of suspected TB patients with pulmonary and extra pulmonary symptoms. Till now 162 pulmonary TB patients and 52 Extra Pulmonary TB cases were tested by AFB microscopy and solid culture on Lowenstein Jensen media.



2. Biomedical Informatics Centre: RMRC, Bhubaneswar.

Principal Investigator : Dr. N. Mahapatra, Sci.-F
BIC Staff : Dr. Santosh Kumar Behera (Scientist-II), Mr. Budheswar Dehury (Scientist-I), Mr. Manoj Kumar Gupta (Research Assistant), Mr. Debadatta Samal (Lab Attendant)
Date of Commencement : April 2013

Objectives

The primary mission of task-force is to promote and support informatics in medical research. Specific objectives of the task-force are:

- To identify genetic loci associated with diseases of National interest such as Diabetes, Cancer, Stress, Mental illnesses etc. in Indian population.
- To develop solutions for controlling pathogens causing diseases of National interest such as Tuberculosis, Malaria, and AIDS etc.
- To develop a National Repository of clinical information/data, high-throughput data, genotype and phenotype.
- To increase awareness of recent developments in modern biology through workshops and training programmes.
- To promote applications of cutting-edge technologies in medical research.

Research Activities of the BIC

Study: 1

A study entitled “Overcoming the limitation of GWAS platforms using systems biology approach” was conducted on Type 2 Diabetes (T2D) using available Genome wide Association Studies (GWAS) data to identify missing heritability. In this study an attempt was made by combining significant findings of all the GWAS on T2D in order to avoid missing any

important marker due to variation in effect size in a particular population.

Objectives

The study was carried out with the following two objectives which are as follows:

- (a) To uncover the regulatory network involving gene-transcription factor-microRNA in T2D.
- (b) To elucidate the role of important non-synonymous SNPs (nsSNPs) involved in loss of biological function of key functional proteins associated with T2D.

Results

From the above study two key regulators i.e., microRNAs (hsa-miR17 and hsa-miR141) and one transcription factor (TF) i.e., CTCF was found to form a combinatorial network involved in regulation of genes associated with Type 2 Diabetes. In addition, network analysis revealed that among the hub genes i.e., HNF1A, IRS1 and PPARG are regulated by hsa-miR17, hsa-miR152, hsa-miR222 and hsa-miR141 miRNAs and YY1, CTCF and E2F1 TFs respectively. Five genes PAX4 (rs2233578, MAF: 0.024; rs2233580, MAF: 0.023), PCK1 (rs8192708, MAF: 0.068), PEPD (rs2230062, MAF: 0.024), SACS (rs2031640, MAF: 0.095), and TSPAN8 (rs3763978, MAF: 0.0271) were found to have non-synonymous SNPs affecting the structure stability based on sequence analysis using SIFT, PolyPhen and I-Mutant programs having minor allelic frequency (MAF) eH0.01. PEPD regulates IRS1 hub gene indicating that the destabilizing variants of PEPD may have an effect on the hub genes (IRS1) function. IRS1 is reported to be associated with increased risk of T2D and decreased insulin sensitivity.

Study: 2

A study entitled “**Dynamic Interplay between ATP and Casein Kinase I (CKI) from malarial parasite *Plasmodium falciparum* (Isolate 3D7):**

Insights from molecular dynamics simulations” was conducted on the available data of malaria parasite *Plasmodium falciparum*.

Objectives

The study was carried out with the following objectives:

- a) *In silico* characterization and elucidation of 3-dimensional structure of Casein Kinase I (CKI) through theoretical modelling.
- b) Molecular docking and molecular dynamics (MD) simulations of CKI with ATP to understand the dynamics and mode of ATP recognition.

Results

In this study an attempt was made to understand the structure-function mechanism of CKI from malarial parasite *Plasmodium falciparum* through combinatorial approach involving comparative modeling, docking and molecular dynamics (MD) simulations. Based on the available crystal structures (PDB ID: 3SV0, 3UYS and 4JJR) comparative modelling technique was employed to derive the three-dimensional structure of CKI. The modelled structure was refined and energy minimised using GROMACS. Subsequently docking followed by MD simulations was performed to inspect the dynamics and mode of ATP binding. Further critical residues i.e., Ser19, Leu85, Asp128, Lys130 and Asp149 aid in tight anchoring of ATP into the active site of CKI were identified. Future study involving biochemical and site directed mutagenesis of the key residues predicted in this study would open up better avenues towards development new drugs to treat malaria effectively.

Study: 3

A review on Mucins with special insight into non-communicable diseases was been carried out to unearthed the current status of different mucin proteins in understanding its role and function in

various non-communicable diseases in human with special reference to its organ specific locations.

Objectives

The study was carried out with the following objectives

- (a) To unzip the Mucins (MUC) genes associated with various non-communicable diseases
- (b) To target the differentially expressed MUC genes as potential therapeutic targets in various diseases and associated disorders.

Results

The findings of this study may be of direct relevance to the major research area in biomedicine with reference to mucin and mucin associated diseases. The study represented the role of all the 22 mucins (MUC) genes in various organ specific diseases and human health. Most of the diseases are supposed to be originated from malfunction or hyper-secretion of the mucins. The polymorphisms represented at various mucins VNTR's domains tend to play a key role in different aspects of human health and diseases. These polymorphisms are also helpful in identification of various biomarkers that in turn could be a diagnostic and prognostic tool.

Study: 4

A study entitled “**A study on gut microbiota associated with non-communicable diseases and mucosal immunity**” was carried

Objectives

The study was carried out with specific objectives

- (a) To infer the role of gut-microbiota in various human diseases
- (b) To investigate their pivotal role mucosal immunity.

Results

In this study we have unzipped various gut-microbiota associated with different non-communicable diseases in human with reference to mucosal immunity of mucin proteins in human body. The findings in this study may be of direct relevance to metagenomics. The study represented the difference in gut-microbiome from one individual to the other based on their food habits and life style. The study revealed a vast difference between adult, infants and mode of delivery of neonates. These microbes could be helpful as biomarkers for various non-communicable human diseases.

Activities of BIC

The Biomedical Informatics Centre (BIC) of RMRC, Bhubaneswar provides in-house bioinformatics services to faculty members and research scholars on high-throughput sequence data analysis, phylogenetic analysis, comparative modeling, molecular docking and molecular dynamics simulation. Apart from the above the scientist and staff of BIC are actively engaged in data analysis of field units of Rayagada, Kalahandi, MRHRU (Tigiria) and End Line Malaria Survey of Odisha and Andhra Pradesh.

i. Training in Bioinformatics

The centre provides training on cutting-edge bioinformatics tools and techniques applied on biomedical research to students during their M.Sc dissertation and research scholars.

RMRC Bhubaneswar act as a nodal centre for half yearly Pre-Ph.D coursework for research scholars of Utkal University, Bhubaneswar in the subject of Life Science and Biotechnology. Our BIC centre is actively engaged in imparting teaching and conducting practical sessions in various bioinformatics tools and programming languages including C++, PERL and R. Further they are trained in sequence analysis,

microarray data analysis, comparative modeling, molecular docking and molecular dynamics simulation studies.

ii. Conducting workshop

The centre organized two workshop-cum-training programme on different frontier areas of application of Bioinformatics in medical research during 2015.

1. Workshop-cum-training on “**Application of Bioinformatics in Medical Research**” on 19th & 20th Feb 2015. The workshop-cum-training was attended by 35 participants those were mostly medical faculties, PhD scholars, Research Assistants and M.Sc. students with e”2 year’s research experience.
2. Workshop-cum-training on “**Recent Development and Future Trends of Bioinformatics in Biomedical Research**” on 2nd & 3rd December, 2015. The workshop-cum-training was attended by 35 participants those were mostly medical faculties, faculty members from Universities/Research Institutes, PhD scholars and Research Assistants from institutes like NRRI, CIFA, KIIT, OUAT, Utkal University, IMMT, RMRC, RPRC, Vignan University, SUM Hospital, SCB and MKCG.

iii. Regional Repository of Clinical Information

The Online digital repository system has been developed by our centre, is supposed to be hosted shortly which is based on Nutritional, Malarial infection, Diarrhoea, Measles and Acute Respiratory Infection (ARI) data, obtained from rural, tribal and primitive tribes of Kalahandi and Rayagada districts of Odisha state, under various research activities started for improving the health status of under five children in these districts. Further, attempts has also been made to create one online portal to disseminate the disease prevalence in various PHCs and CHCs of

Tigiria division of Cuttack district under MRHRU scheme implemented by RMRC, Bhubaneswar.

Publications

Behera SK, Praharaj AB, Dehury B, Negi S (2015). Exploring the role and diversity of mucins in health and disease with special insight into non-communicable diseases. *Glycoconj J* 32(8):575-613.

Participation in Workshop/Conference

- Mr. Budheswar Dehury (Scientist-I) of BIC participated in the Indo-US Bilateral Conferences-cum-Workshop on “Big Data Analysis and Translation in Disease Biology (Big Data and Disease)” organised by JNU, New Delhi from January 18-22, 2015.
- Dr. Santosh Kumar Behera (Scientist-II) of BIC participated in the Hands-on-training programme on “Next Generation Sequence Data Analysis” organised by Fish Genetics & Biotechnology Division of ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar from 20th-24th January, 2015.
- Mr. Budheswar Dehury participated in the National Raj Bhasha Sammelan organised by Bharatiya Rajbhasa Parisad on 25th November, 2015 at Puri, Odisha.





Workshop-cum-training on “Recent Development and Future Trends of Bioinformatics in Biomedical Research” on 2nd & 3rd December, 2015

Other Scientific Activities

A. Outbreak of Cholera in Narla Block Kalahandi District.

Investigators : Dr. B. B.Pal and
Dr. H.K.Khuntia
Duration : 16th Sept. to 20th Sept. 2014

The outbreak of cholera was reported in the Narla block, Kalahandi district during September 2014. The outbreak was investigated in the cholera affected villages between 16.09.2014 to 20.09.2014. The present situation was discussed with the CDMO, ADMO (PH), Epidemiologist (IDSP), for situation analysis and recent problems at Narla Block and its affected villages. The problem was again discussed with MO, Narla CHC and other health staffs, obtained the date and village wise incidence of diarrhoea cases recorded in the hospital. As per the discussion and earlier laboratory findings different villages were visited to interrogate some diarrhoea cases and deaths to obtain the source and spread of infection, total cases, population and villages affected etc. The visited villages were Narla, Limursing, Jamupadar, Rekrpur, Pujapadar, Mandel, Asurgard, Bankel, Bairapada, Sargiguda. As per the hospital record the index case was admitted on 29.07.2014.

Index case:

The index case was Rameswar Gouda, 62 year male from Bairpada sahi of Bankel Village. The village is situated at the bottom of the mountain adjacent to a water reservoir. Basically the old man was a goat keeper. He usually goes to the mountain every day for grazing the goats. He went to the mountain on 28.07.2014 early morning for goat grassing and felt severe, thirst and drank water from the reservoir at 11 AM and returned home. Then he had profuse watery stool at about 7 PM, muscular cramping, vomiting, abdominal pain and severe dehydration. He admitted to the hospital on 29.07.2014 at 11AM, treated and cured. His diarrhoea clothes were cleaned near his house on the field. At that time there was continuous heavy rain fall for about 7 – 10 days. The rain water and stool material might have mixed with the rain water and flowed downward and mixed with other small nala and water of Sandul River. As per the hospital records on the diarrhoea, the affected villages were nearby Bankel village and gradually reported from Narla and Sargiguda village which were worst affected and gradually spread to other villages.

Source of Infection

Interrogating the diarrhoea patients reported to the CHC (Death case at Rekrpur and cases from Sargiguda village adjacent to Asurgard Sagar), it was found that one of the patient from the Sargiguda village went to the firm early morning, drank water from the Asurgarh Sagar at about 11am, returned home at about 4pm, suffered from severe diarrhoea and vomiting at 9.00PM on the same day. He was admitted to the hospital on the next day morning and cured. It indicted that the source of infection was Asurgarh Sagar water which must have contaminated earlier.

The Narla Block is having 1, 27,043 population, total population affected – 46236, total villages affected – 57, total cases reported – 321 and total deaths were – 3 {21.8.14 to 21.09.2014}. The date wise severe diarrhoea cases is described in the following figure.

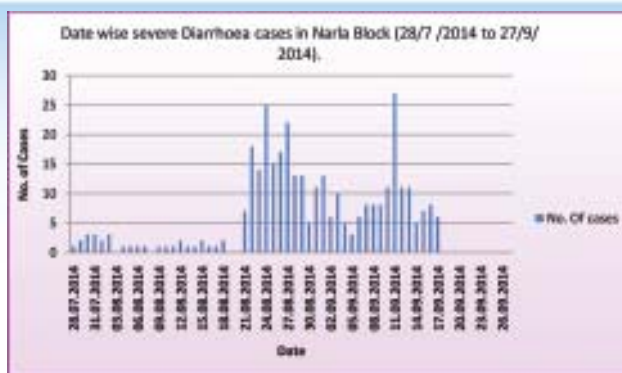


Fig: Date wise severe diarrhoea cases in norla block kalahandi district (28/7/2014- 27/9/2014).

Results of stool and water samples

Initially 11 rectal swabs were referred from CDMO, Kalahandi and 8 were positive for *V. cholerae* O1 Ogawa biotype El Tor. Further these strains were subjected to DMAMA PCR which indicated that all were *ctxB* 7 of Haitian variants of *V. cholerae*. The *V. cholerae* were sensitive to ciprofloxacin, norfloxacin, tetracycline, doxycycline and ofloxacin; but resistant to ampicillin, gentamicin, furazolidone, nalidixic acid, erythromycin and chloramphenicol. The DMAMA-PCR results indicates that all were *ctxB*₇ of Haitian variants of *V. cholerae* O1 Ogawa strains. This is the 1st report from the state causing large cholera outbreak during July to September- 2014 due to Haitian variants of *Vibrio cholerae* of O1 strains. Further 6 rectal swabs were collected and tested; 4 were *E.coli* and 2 were *V. cholerae* O1 Ogawa. Out of 13 water samples collected from different villages all were negative for *V. cholerae*.

The hygienic conditions of the villages were poor. People were not maintaining good hygienic health practices during cleaning utensils, and taking food. They were cleaning the cooking utensils nearby nala and river evidenced through photograph. The people defecates outside. The spread of the disease was due to unhygienic health practices like taking bath and mouth washing in the river and nala water and that was true found during discussion among the villagers

from different villages. Migration of the relatives for attending the patients and house hold contacts to the patient was also noticed. These factors might be the source of spread of the infection. IEC activities through mike were going on in different villages. Chlorination of drinking water sources and water sources used by human habitation were conducted. Contact doses were given in the family members in the affected villages The sand bags mixed with bleaching powder were packed and placed at upstream of different ghats of the water reservoirs like nala, river and stream .This type of control measures was advised by us 7 years back during Kashipur Cholera epidemic of 2007 and it was found fruitful .Early reporting and implementation of adequate control measures by the state health authorities checked the spread of cholera outbreak to the unaffected villages of Narla block.

B. Diarrhoea surveillance in Infectious disease hospital Puri, 2015.

Investigators : Dr A. S. Keketta and Dr H. K. khuntia
Duration : August, 2014 to January, 2015.

Objective

1. To isolate and identify various bacterial enteropathogens like *V. cholerae*, *E.coli* spp, *Sigella* spp, *Salmonella* spp, *V. Parhaemolyticus* from hospitlazed diarrhea patients in Infectious disease hospital(IDH), puri.
2. To serotype and genotype the isolated *V. cholerae* and *E. coli* spp.
3. To study the antibiogram profile of *V. cholerae*
4. To detect the toxic genes of *V. cholerae* and *E. coli* spp

During this study period from August, 2014 to January 2015, 74 rectal swabs were collected from

hospitalized diarrhoea patients in IDH, Puri. The rectal swabs were cultured within 3 to 4 hour for bacteriological analysis that yielded 14 (20%) *V. cholerae* O1 Ogawa, 3 (4%) non-O1 and non-O139 *V. cholerae*, 16 (21.6%) *E. coli* spp, 3 (4%) shigella spp, 1 (1.3%) *Salmonella* spp and 1(1.3) *Vibrio Parahaemolyticus*. Strains of *V. cholerae* O1 were sensitive to many antimicrobial drugs: tetracycline, trimethoprim/sulfamethoxazole, chloramphenicol, neomycin, gentamicin, ciprofloxacin, norfloxacin, ofloxacin, doxycycline and azithromycin and resistant to : ampicillin, erythromycin, co-trimoxazole, nalidixic acid and furozolidone. Some of the *V. cholerae* strains were found susceptible to Polymixin B (50U, BD, USA). Quadruplex PCR assay revealed, all *V. cholerae* O1 strains were positive for *ctxA*, *tcpA* (El tor), *wbe* and *ToxR* (Fig1). This indicates all *V. cholerae* were toxigenic and El Tor biotype. The presence of *wbe* confirmed their sero-positivity. Double mismatching amplification of mutation assay (DMAMA) PCR assay of *V. cholerae* detected the presence Haitian variant *ctxB* (*ctxB7*) in the present *V. cholerae* O1 strains (Fig2). Strain typing of isolated *E. coli* spp was done by

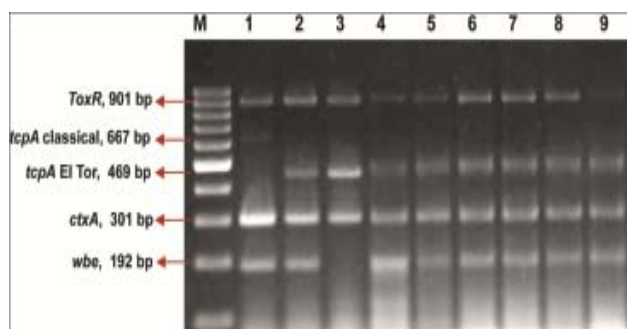


Fig1. Quadruplex PCR assay of *V. cholerae* O1 isolated from IDH, Puri during 2014.

Lane 1: *V. cholerae* O1, classical (O395), Lane 2: *V. cholerae* O1, El Tor (VC20) and lane3: *V. cholerae* O139 (SG 24). From lane 4 through lane 9, all IDH *V. cholerae* O1 are positive for *ctxA*, *tcpA* (El Tor), *wbe* and *ToxR* genes.

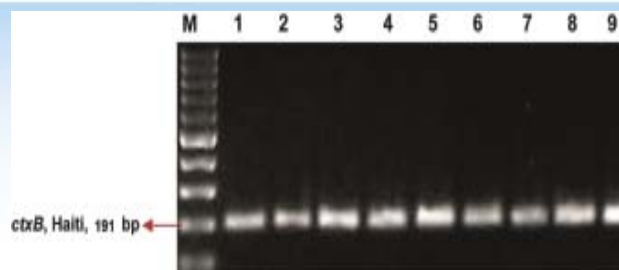
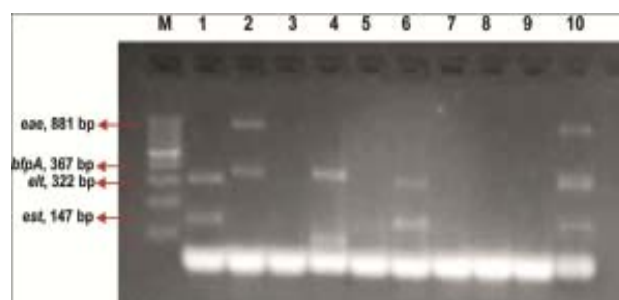


Fig2. DMAMA PCR assay of IDH *V. cholerae* O1, 2014.



All IDH, *V. cholera* O1 are positive for *ctxB* Haiti.

Fig3. Multiplex PCR assay for detection of toxigenic *E. coli* from the IDH *E. coli* spp, 2014.

employing multiplex PCR assay using specific primer pairs. Of the total *E. coli* spp, multiplex PCR assay detected 7 (9.4%) Enterotoxigenic *E. coli* (ETEC) and 5(6.7%) Enteropathogenic *E. coli* (EPEC) (Fig3).

From the present study it is concluded that the prototype *V. cholera* O1 El Tor biotype and El Tor variant isolated during the earlier years are gradually disappearing replaced by disseminated Haitian variant *V. cholerae* O1 in Odisha during 2014.

PCR assay detected lane1: positive for *elt* and *est* (ETEC), lane2: *eae* and *bfpA* (EPEC), lane3: negative, lane4: *bfpA* (EPEC), lane5: *est* (ETEC), lane6: *elt* and *est* (ETEC), lane7,8, 9: negative and lane10: *est*, *elt* and *eae* (ETEC and EPEC).

C. Activities of NNMB Field Unit, Bhubaneswar

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 survey team comprised of DR.A.R.Mahata, ARS (Medical), Mrs.Sukhalata Paikray, ARO (Nutritionist), Mrs.Haraprava Sahoo, Social Worker, Mr.S.K.Jujharsingh, Field Attendant, and Mr.R.K.Sahu, Driver and the team is being supervised and coordinated by Dr.G.Bulliyya, Scientist-E. The NNMB Odisha unit carried out the urban survey in Odisha 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

1. To assess the current status of food and nutrient intake among different age/ sex/ physiological groups of urban populations;
2. To assess the current nutritional status of all available individuals in the selected house hold in terms anthropometry and clinical examination;
3. To assess the history of morbidity during previous fort night among all individuals

covered for anthropometry;

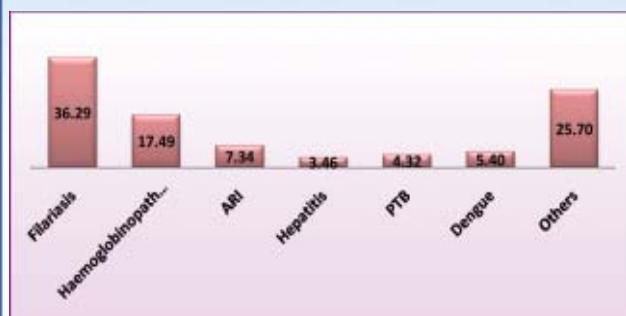
4. To assess the prevalence and determinants of overweight and obesity, hypertension, diabetes mellitus and dyslipidemia among urban adults men & women above 18 years;
5. To assess body composition using Bio-electrical impedance assessment (BIA), skin fold thickness at four sites among adults covered for anthropometry;
6. To assess knowledge and practices about obesity, hypertension, diabetes mellitus and dyslipidemia among urban adults; and
7. Assessment of lifestyle pattern and risk behaviors of adults.

A community based cross sectional survey conducted with multistage random sampling procedure covering five cities in the state, 15 municipal wards selected from each selected cities/ towns having more than 1 lakh population (Balasore, Baripada, Bhubaneswar, Rourkela and Berhampur). The study investigations in the selected household or individuals include household, socio-demographic particulars, anthropometry, 24 hour recall method of diet survey, food frequency questionnaire, collection

Sample coverage of NNMB-RMRC Odisha Unit (Sept. 2012-Oct.2015).

S. No.	Name of city	Wards	HHs	Diet Survey	FFQ	KAP	IYCF	Anthro-Pometry	FB S	Lipid profile	DB S	BI A
1.	Balasore	15	720	180	972	1534	78	2377	1351	234	1351	-
2.	Bhubaneswar	15	720	180	911	1353	42	2074	1212	708	310	680
3.	Baripada	15	720	180	905	1309	19	2110	1264	637	-	1192
4.	Rourkela	15	720	180	937	1413	51	2329	1379	648	133	1157
5	Berhampur	15	720	180	907	1197	12	1850	865	534	-	885
	Total	75	3600	900	4632	6806	202	10740	6071	2761	1794	3914
	Assam (Guwahati)	8	384	96	472	672	10	960	526	384	-	480

Chart-1: Disease wise distribution of OPD attendance.



of fasting blood glucose for adults above 18 years, measurement of blood-pressure, knowledge & practices of adults about their health nutrition & lifestyle, infant & young child feeding practices (<3 years child) and nutritional assessment of all the individuals.

The survey has been completed during September 2012 to July 2015 with following sample coverage. Apart from this the NNMB unit also covered Eight wards consisting of 384 households of Guwahati city, Assam State during the period from September-October 2015. The data is being analysed by the NNMB CRL and final report will be disseminated in 2016.

D. Activities of RMRC OPD:

Staff Involved : Dr. Anna S Kerketta (Sc-E)
Dr. B Dwibedi (Sc-D)
Dr. L M Ho (Sc- C, Project)

Supporting staffs : Mr. R N Nayak, Mr. B N sethi, Mr. T Moharana and Mr. B Kanhar

Work Progress

The OPD activities at newly built RMRC OPD building started from APRIL 2015. The diagnostic and consultancy facilities are being given to the patients report to OPD. Since opening till month of October a total 463 cases attended OPD, of which 309(66.7%) were male and 154 (33.4%) female. Out of the total 93.5% were new and 6.5% were repeat cases came for

follow up. The cases presented signs and symptoms of various diseases like Filariasis, Haemoglobinopathies (sickle cell and thalassemia), ARI, Pulmonary tuberculosis, Hepatitis, Dengue and others that include viral fever, malaria, joint pain, gastroenteritis, APD etc. The cases of haemoglobinopathies and diseases of viral origins were referred by the local government health institutions like AIIMS, Capital hospital, local dispensaries for diagnosis. Disease distribution detail is given in chart-1. The cases were provided free consultancy or diagnostic services.

D. Model Rural Health Research Unit (MRHRU) activity.

Department of Health Research, under ministry of Health and Family welfare, Government of India has established six MRHRUs in different state under the scheme of Development of Infrastructure for promotion of health research. The main aim of the project is to development of research project and infrastructure for state medical college for doing research. RMRC is the mentor institute for Odisha region. Tigiria CHC has been identified for the Unit with staff member of SCB Medical College. Preliminary base line data has been collect in Tigiria CHC to identify the disease burden.

Tigiria CHC is about 100 KMs from RMRC Bhubaneswar. This area is a plane land having a population of 33766 and with all caste including Schedule caste and schedule tribe and muslim. The main source of income is agriculture. The health care system is CHC and its 6 sub-centres. The CHC is well connected with roads for communication to its sub-centres as well as district head quarters.

Data collection and analysis:

As per Govt. of Odisha norm, Tabulation of patient's data is available in monthly basis in five different categories. These are as follows.

1. Panchabyadhi.

Five diseases are coming under this category. These are Acute Respiratory Infection (ARI), Diarrhea, Scabies, Leprosy and Malaria. For these five diseases free medicines are also available at CHC.

2. Vector borne diseases

Vector borne disease like Dengue, Chikungunya, Kala-zar and Japanese's Encephalitis (JE)

3. Non communicable diseases

Disease like Hypertension, Bronchitis and Accidental injury are coming under the head vector borne disease.

4. National program on Prevention and control of Cancer.

Three disease like Diabetes, struck (diabetes, Hypertension) have been categorized under this head.

5. Common acute diseases

Those not cover in National Health Plane like Acute diarrheal disease, acute respiratory disease, skin disease etc. Are coming under this category

We have collected data from September 2013 to September 2015. In the preliminary data collected for last 2 years provides the predominant disease burden of the area. It was found that; Acute Respiratory Infection (ARS) is predominant followed by Diarrhea, bronchitis, Skin disease and hypertension. Malaria is also prevalent in Tigiria CHC. The final analysis is yet to be done.

E. Evaluation of MDA on Filariasis (Govt. Program)

Pre MDA evaluation

Government of Odisha implemented its annual Mass Drug Administrative (MDA) on 19-21 December 2015 in Odisha. For third party evaluation, DHS has

requested to RMRC for evaluation of Pre and post activities of MDA in two district, namely Bhadrak and Jajpur. A team of four scientists consisting Dr. R K Hazra, Scientist-E, DR Dwibedi, Scientist -E, Dr. P K Sahoo, Scientist-B and Dr. B Dehury, Scientist-C were visited this two district. According to their norm the team has to evaluate two CHC of each district. Further two sub-centres of each CHC, two villages of each sub-centres and 10 families of each villages were taken care during the survey. One team visited Bhandari Pokhari CHC of Bhadrak district on 17/12/2015 for monitoring of Pre and MDA activities, where as the other visited Badchhana CHC of Jajpur district. Likewise one team visited Basudevpur CHC of Bhadrak district on 18/12/2015 for monitoring of Pre MDA activities, where as the other visited Madhuban CHC of Jajpur district.

Post MDA evaluation

The programme was on 19-21st December'2015. After that the team further visited in the same area for evaluation of post MDA activities. This time the visited not only District, CHC and sub-centre level but also to 80 families of each above district. The data were analysis and the report was handed over to Director of Health services, Government of Odisha in due time.



House hold survey of MDA at village Chudamani of Basudevpur CHC

(D R. R. K. Hazra, DR. P. K. Sahoo of RMRC and Mrs G. M. Sahoo, PHEO of Basudevpur CHC discussing with villagers).

Works of Ph.D Scholars

A decorative graphic at the bottom of the page consists of several overlapping, curved bands. The topmost band is a dark blue, followed by a lighter blue, and then a bright orange band. These bands curve upwards from the left and downwards to the right, creating a sense of movement and depth. The background of the entire page is a solid, medium blue.

1. Role of gut microbiota in type -ii diabetes susceptibility.

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

Background

Diabetes is a state of energy imbalance where caloric intake does not match caloric expenditure. Type II diabetes (T2D), is a complex metabolic disorder influenced by both environmental and genetic components, including genes of our gut microbiome. Gut, the organ connecting our environment to self, is majorly responsible for energy uptake as it is involved in absorption of nutrients. Therefore, gut finds a major place in development of obesity and diseases related to obesity, like diabetes. Gut harbors trillions of micro-organism collectively called gut microbiota. Cell wall of these microbes itself is a major factor for inflammatory responses and signal transduction in the host. It is also observed that colonization of gut with gram negative bacteria in mice directs them to gain weight and increases their insulin resistance leading to type II diabetes. Therefore, to improve insulin sensitivity and decrease adiposity, gut microbiota could be modulated with specific probiotics and prebiotics which may normalize aberrant microbiota population and create an anti-inflammatory milieu which may in turn help in prevention or progression of diabetes.

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.

Progress made so far

As of now (Dec 2013 to 30th Nov 2015) 401 newly detected type 2 diabetes patients within the age group of 30 to 65yr were enrolled in this study from Medicine OPD of IMS & SUM Hospital & Kalinga Institute of Medical Sciences, Bhubaneswar with the help of physicians. Further, we enrolled 386 healthy control participants of the same age group from the community. For each case 5 ml of fasting blood sample was collected after taking their written consent in Floride, EDTA and serum vials. The demographic data including age, sex, height, weight, waist circumference, occupation and income status were collected for both the control and T2D patients. Data regarding their disease status, family history, dietary pattern, blood pressure also recorded. Till now 350 stool samples were collected from diabetics group and 50 stool samples were collected from control group. Serum samples were separated and kept at -80°C for long time storage. All the blood, serum and stool samples were coded by specific laboratory coding number. Stool sample were kept at -20°C. QUICKI method was used to estimate insulin sensitivity/resistance. Insulin level was done using commercially available ELISA kits and LDL, HDL, total cholesterol and triglyceride estimation was done using auto analyzer (Roche, Germany). More than 65% (out 120 samples analyzed) newly diagnosed diabetes patients (not under any diabetes medication) were found to be insulin resistant, whereas, 30% were with low insulin levels (<4 µU/ml). Mean waist (Diabetic group=100.67±14.70 and Control group= 82.39±13.74) and BMI (Diabetic group=25.89±5.31 and Control group= 23.84±3.91) was found to be higher in diabetics than in controls. Mean waist of the male and female of newly diagnosed diabetic group was 99.95±14.7 and

102±16.3 respectively which was quite higher than the waist circumference of control group of male (82.78±13.91) and female (81.72±13.45) (Table 1). Among all the lipid profile parameters estimated, total cholesterol, triglycerides and VLDL found to be significantly different between diabetic and control groups (Table 2). BMI was found to be negatively correlating with fasting sugar in newly diagnosed diabetes patients.

Wok plan for next year:

- Continuation of collection of targeted blood and stool samples of newly diagnosed type II diabetics and control group.

- Continuation of biochemical analysis of stored serum samples.
- Isolation and quantification of DNA from stool samples.
- Standardization of Real Time PCR for quantitative assessment of individual gut microbial population.

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

Name : Pallabi Pati
Status : SRF(ICMR)
Guide : Dr M R Ranjit

Table-1. Demographic data of newly diagnosed T2D individual and control group.

Newly diagnosed type II diabetic individual (N=401)		Control individual (N= 386)		
Male	Female	Male	Female	
Number	266	135	243	143
Weight (Kg)	70.57 ± 14.4	63.53 ± 14.27	66.39 ± 9.64	61.38 ± 8.75
Waist (cm)	99.95 ± 14.7	102 ± 16.13	82.78 ± 13.91	81.72 ± 13.45
Height (cm)	165.91 ± 10	155.65 ± 9.52	166.29 ± 8	161.88 ± 5.95
BMI	25.64 ± 5.31	26.41 ± 5.80	24.10 ± 4.37	23.39 ± 2.91

Table-2. Fasting sugar and various lipid profile parameters of T2D individuals and control group.

Fasting sugar and lipid profile study	Newly diagnosed type II diabetic individual (N=401)	Control individual (N= 386)
Biochemical parameters		
FBS (mg/dl)	199.95 ± 69.61	82.10 ± 9.46
TG (mg/dl)	224 ± 105.12	146.6 ± 86
CHO (mg/dl)	223.10 ± 76.42	181.36 ± 39.18
HDL (mg/dl)	45.41 ± 28.68	43.41 ± 9.25
LDL (mg/dl)	122.30 ± 43.10	119.82 ± 28.95
VLDL (mg/dl)	44.80 ± 21.02	29.32 ± 17.2

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. **Malaria** is a mosquito-borne infectious disease of humans and other animals caused by parasitic protozoans belonging to the genus *Plasmodium*. Malaria causes symptoms that typically include fever, fatigue, vomiting, and headaches. Acute kidney injury (AKI) is one of the most dreaded complications of severe malaria. As per WHO criteria, acute kidney injury (serum creatinine level, $>$ or $=3$ mg/dL or $>$ or $=265$ μ M/L) occurs as a complication of AKI in *Plasmodium falciparum* and *Plasmodium vivax* malaria. It is more common in adults than children. Renal involvement varies from mild proteinuria to severe azotemia associated with metabolic acidosis. AKI may be present as a component of multi-organ dysfunction or as a complication. The prognosis in the latter is generally better.

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 68 cases with Malarial acute kidney injury (MAKI) and 98 healthy controls, 91 cases with mild Uncomplicated malaria (UCM) and 45 cases with non-malarial acute kidney (AKI) 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°C for PCR and other analysis. Samples were subjected for PCR (to diagnose the *Plasmodial species* and polymorphism analysis).



Fig. 1 Assay of serum insulin through ELISA.

OBSERVATIONS:

MALARIAL ACUTE KIDNEY INJURY (MAKI):

All the patients (n= 68) were admitted to the hospitals with suspected complicated malaria with fever, convulsions, acute kidney injury after occurrence of malaria and altered level of consciousness. Vomiting was observed in 80.88% of cases, headache was observed in 73.52% cases. 48.52% cases were pure *Pf*, 32.23% cases pure *Pv*, *Pf+Pv+Pm* mixed infection were found in 5.88.% cases, *Pf+Pm* mixed infection were found in 2.94% cases and *Pf+Pv* cases were found in 4.45% cases.

Molecular typing of candidate gene malarial acute kidney injury (MAKI cases) :

From 68 MAKI cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 27.94% cases AA type seen in 2.94% and BB type seen in 60.29% cases. For eNOS t-c polymorphism TC type seen in 17.64% cases, TT type seen in 16.17% cases. CC type seen in 13.23% cases. For eNOS E-D polymorphism DD type seen in 17.64% cases, ED type seen in 42.64% cases and EE type seen 16.17% cases. For ACE2 gene polymorphism CC type seen in 32.35% cases, CT type seen in 27.94% cases and TT type seen in 26.47% cases. For ACE ID polymorphism DD type seen in 47.05% ID type seen in 14.70% and II type seen 11.76% cases.

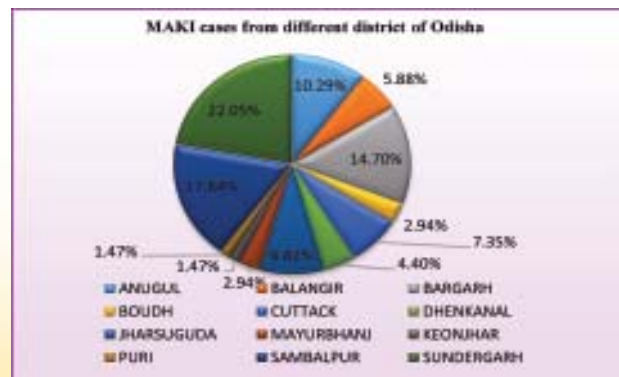
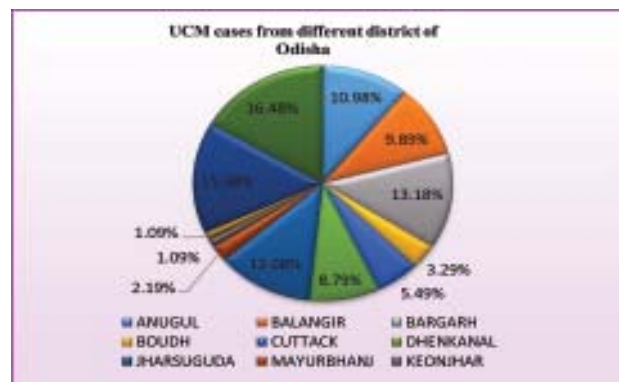
Molecular strain typing of Malaria parasite (MAKI cases):

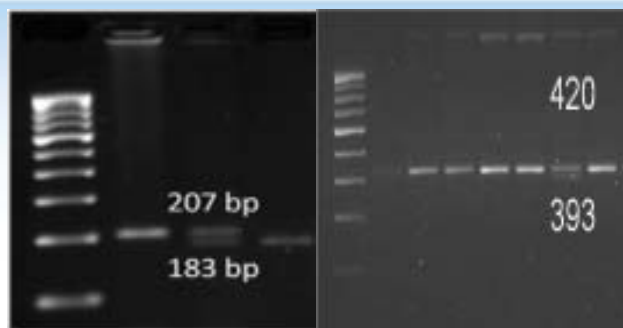
The pure *Pf*=48.52% cases were again analyzed for the strain typing of *PFEMP1*DBL α gene. Overall two (a, b) three (a, b, c) and four (a, b, c, d) types of variants were amplified for DBL 1- α - F1R2, F2R2 and FR region respectively. For FR region variant (a) type seen in 18.18% cases, type (b) seen in 24.24% cases, type (c) seen in 24.24% cases, type (ab) seen in 6.06% cases, type (ac) seen in 6.06% cases and type (bc) seen in 18.18% cases. For F2R2 region variant (a) type seen

in 12.12% cases, type (b) seen in 18.18% cases, type (ab) seen in 30.30% and type (bc) seen in 36.36% cases. For F1R2 variant (a) type seen in 18.18% cases, type (b) seen in 42.4% cases and type (ab) seen in 27.2% cases. The pure *Pv* 32.23% cases were again analyzed for the strain typing of *Pvcs* gene. Overall three (a, b, c) variants for VK210 and two (a, b) types of variants were amplified for VK247 respectively. For VK210 variant (a) type seen in 3.84% cases, type (b) seen in 19.23% cases, type (c) seen in 11.53% and type (bc) seen 34.61% cases. For VK247 variant (a) type seen in 3.84% cases, type (b) seen in 15.38% cases.

UNCOMPLICATED MALARIA (UCM):

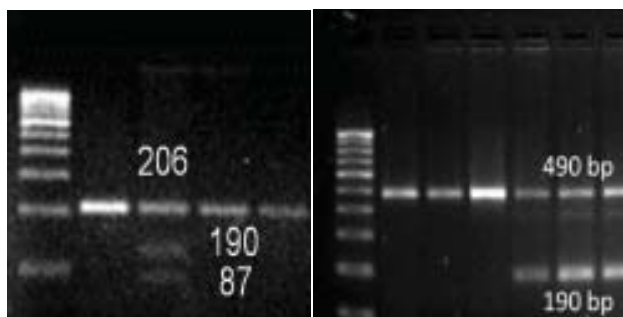
All the patients (n=91) were admitted to the hospitals with suspected uncomplicated malaria with fever. Vomiting was observed in 69.23% of cases, headache was observed in 71.42% cases. Among all the UCM cases pure *Pf* was observed in 52.74% cases, pure *Pv* was observed in 29.67% cases, *Pf+Pv* mixed infection were found in 16.48% cases.





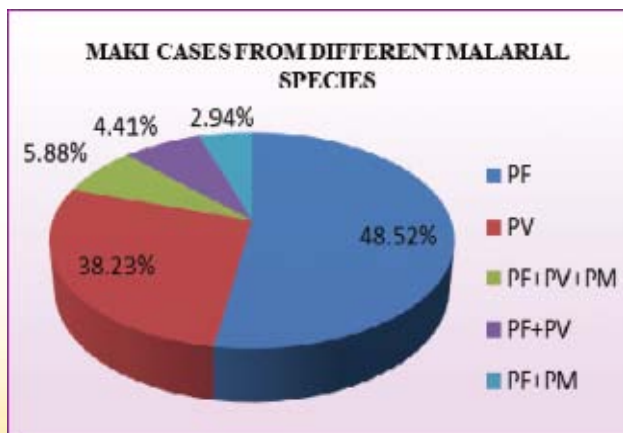
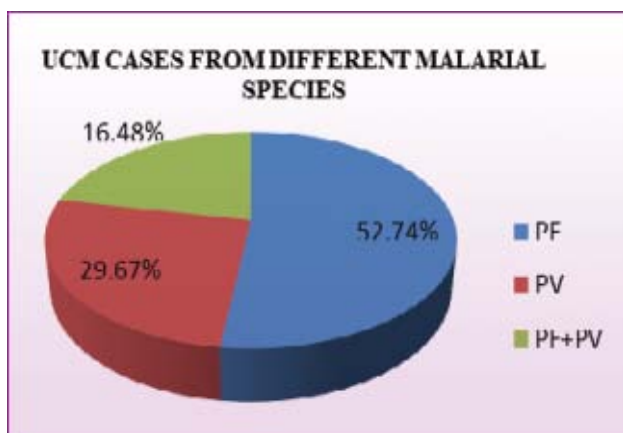
ACE 2C>T

e NOS VNTR 4a/b



e NOS E298D

ACE I/D



Molecular strain typing of Malaria parasite (UCM cases)

The pure *Pf* 52.74% cases were again analyzed for the strain typing of *PF* EMP1DBLá gene. Overall two (a, b) three (a, b, c) and four (a, b, c, d) types of variants were amplified for DBL 1-á - F1R2, F2R2 and FR region respectively. For FR region variant (a) type seen in 8.33% cases, type (b) seen in 10.41% cases, type (c) seen in 10.41% cases, type (ab) seen in 6.25% cases, type (ac) seen in 4.16% cases and type (bc) seen in 4.16% cases. For F2R2 region variant (a) type seen in 10.41% cases, type (b) seen in 20.83% cases, type (ab) seen in 16.66% and type (bc) seen in 12.5% cases. For F1R2 variant (a) type seen in 8.33% cases, type (b) seen in 42.4% cases and type (ab) seen in 31.25% cases. The pure *Pv* 29.67% cases were again analyzed for the strain typing of *Pvcs* gene. The result of *pvc*s gene was basically depend upon the amplification of two regions VK210 and VK247. Overall three (a, b, c) variants for VK210 and two (a, b) types of variants were amplified for VK247 respectively. For VK210 variant type (b) seen in 11.11% cases, type (c) seen in 7.40% and type (bc) seen 25.92% cases. For VK247 variant (a) type seen in 3.7% cases, type (b) seen in 11.11% cases

Molecular typing of candidate gene (UCM cases)

From 91 UCM cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 16.48% cases, AA type seen in 1.09% and BB type seen in 69.23% cases. For eNOS t-c polymorphism TC type seen in 21.97% cases, TT type seen in 45.05% cases. CC type seen in 8.79% cases. For eNOS E-D polymorphism ED type seen in 42.85% cases, DD type seen in 21.97% and EE type seen in 16.48% cases. For ACE2 gene polymorphism CC type seen in 37.36% cases, CT type seen in 18.68% cases and TT type seen in 27.47% cases. For ACE ID polymorphism DD type seen in 45.05%, ID type seen in 23.07% and II type seen in 12.08% cases.

Acute Kidney Injury:

All the patients (n=45) 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 17.77% cases and BB type seen in 46.66% cases. For eNOS t-c polymorphism TC type seen in 31.11% cases, CC type seen in 26.66% cases and TT type seen in 17.77%. For eNOS E-D polymorphism ED type seen in 84.44% cases DD type seen in 20% and EE type seen in 42.22% cases. For ACE2 gene polymorphism CC type seen in 42.22% cases, CT type seen in 17.77% cases and TT type seen in 24.44% cases. For ACE ID polymorphism DD type seen in 55.55%,

ID type seen in 20% cases and II cases seen in 11.11% cases.

Normal Healthy Control:

All are healthy blood donors (n=98) without any disease. From 60 cases polymorphism analysis of eNOS and ACE were done. For eNOS VNTR polymorphism AB type seen in 18.36% cases and BB type seen in 67.34% cases. For eNOS t-c polymorphism TC type seen in 36.73% cases, TT type seen in 29.59% cases and CC cases seen in 15.30%. For eNOS E-D polymorphism ED type seen in 46.93% cases DD type seen in 18.36% cases and EE type seen in 28.57% cases. For ACE2 gene polymorphism CC type seen in 54.08 % cases, CT type seen in 19.38% cases and TT type

Table 1: Diagnosis of malaria parasite and polymorphism analysis.

Total no of sample	Pure (In %)	Mixed (In %)	eNOS VNTR (In %)	eNOS TC (In %)	eNOS ED (In %)	ACE2 (In %)	ACE ID (In %)
MAKI=68	<i>Pf</i> =48.2 <i>Pv</i> =38.33	<i>Pf</i> + <i>Pv</i> + <i>Pm</i> =5.88 <i>Pf</i> + <i>Pm</i> =2.94 <i>Pf</i> + <i>Pv</i> =4.4	AB=27.64 BB=60.29 AA=2.94	TC=30.88 TT=16.17 CC=13.23	DD=17.64 ED=42.64 EE=16.17	CC=32.35 CT=27.95 TT=26.47	DD=47.05 ID=14.7 II=11.76
UCM=91	<i>Pf</i> =52.74 <i>Pv</i> =29.67	<i>Pf</i> + <i>Pv</i> =16.48	AB=16.48 BB=69.23 AA=1.09	TC=21.97 CC=8.79 TT=45.05	ED=42.85 EE=16.48 DD=21.97	CC=37.36 CT=18.68 TT=27.47	DD=45.05 ID=23.07 II=12.08
AKI=45	-	-	AB=17.7 BB=46.66	TC=31.11 CC=26.66 TT=17.77	ED=84.44 EE=42.22 DD=20	CC=42.22 CT=17.77 TT=24.44	DD=55.55 ID=20 II=11.11
NORMAL =98 Healthy people	-	-	AB=18.36 BB=67.34	TC=36.73 TT=29.59 CC=15.3	ED=46.93 EE=28.57 DD=18.36	CC=54.08 CT=19.38 TT=10.20	DD=31.63 ID=19.38 II=25.51

Table-2: Diagnosis of malaria parasite and strain typing analysis.

Total no of sample	<i>Pf</i> EMP1DBLα (In %)						<i>Pv</i> CS (In %)		
	Pure(In %)	FR		F2R2		F1R2	Pure(In %)	VK210	VK247
MAKI=68	<i>Pf</i> =48.2	a=18.18 b=24.24 c=24.24	ab=6.06 ac=6.06 bc=18.18	a=12.1 b=18.18	ab=30.3 bc=36.36	a=18.18 b=42.42 ab=27.27	<i>Pv</i> =38.33	a=3.84 b=19.23 c=11.53 bc=34.61	a=3.84 b=15.38
UCM=91	<i>Pf</i> =52.74	a=8.33 b=10.4 c=10.4	ab=6.25 ac=4.16 bc=4.16	a=10.41 b=20.83	ab=16.66 bc=12.5	a=8.33 b=31.25 ab=18.75	<i>Pv</i> =29.67	b=11.11 c=7.4 bc=25.92	a=3.7 b=11.11

seen in 10.20% cases. For ACE ID polymorphism DD type seen in 31.63%, ID type seen in 19.38% cases and II type seen in 25.51% cases.

The clinical details and molecular analysis result had been recorded for further analysis. The polymorphism analysis result and malarial diagnosis result shown in table 1. Molecular strain typing result shown in table 2.

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 *Pf EMP1DBL α* and *PvCS* in the development of

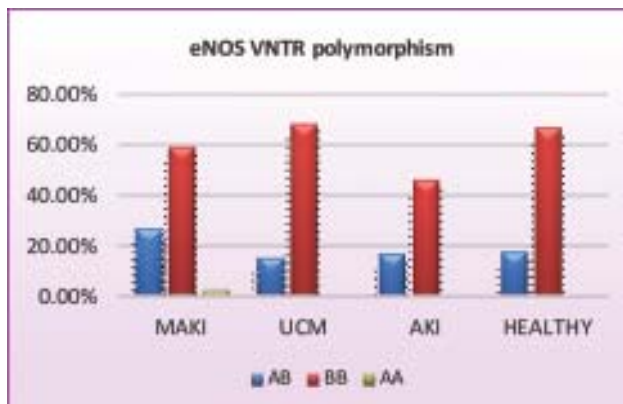
MAKI and ACE gene polymorphisms in the development of MAKI This study also has given an idea on the possible role of eNOS and ACE gene polymorphisms in the development of MAKI.

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

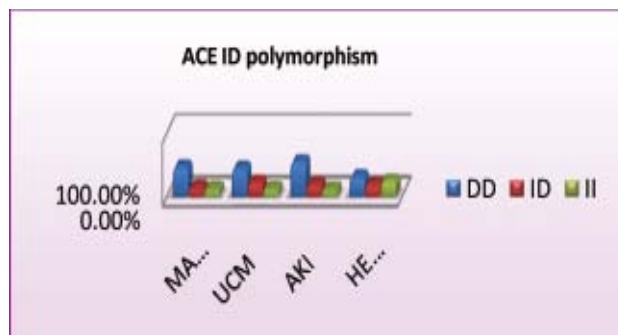
Name : Rashmirani Senapati
Status : SRF(ICMR)
Guide : Dr.Bhagirathi Dwibedi

Objectives

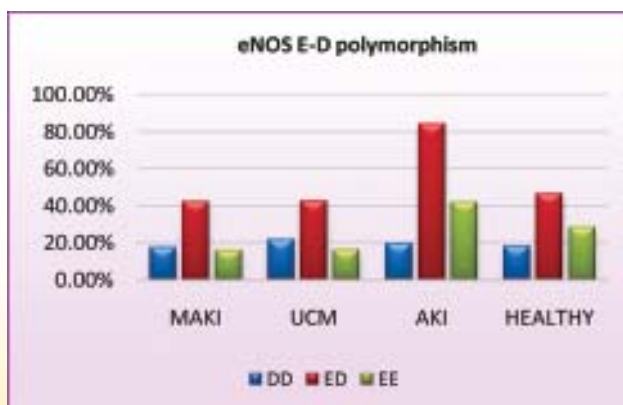
- To determine the HPV genotype distribution in the cases attending hospital with different grades of cervical malignancy.
- To study the viral integration into the host genome relating to the stage of carcinoma and treatment out come.



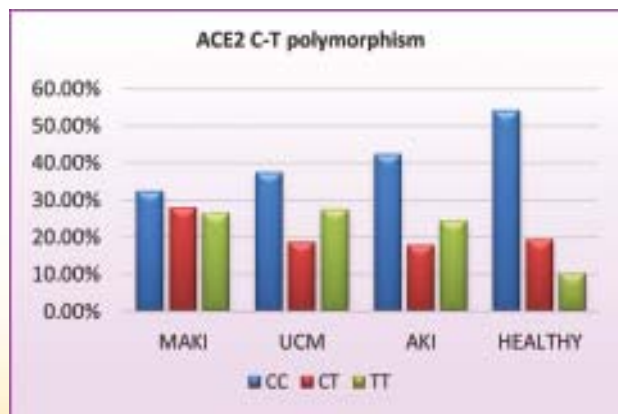
eNOS VNTR polymorphism analysis



ACE ID polymorphism



eNOS E-D polymorphism analysis



ACE2 C-T polymorphism analysis

Work Progress

In the previous year we had enrolled 165 cases from AHRCC, Cuttack and tested for the presence of HPV by L1 PCR. During this year a total of 188 cases were enrolled from AHRCC, Cuttack and SCBMH, Cuttack. Subjects attending OPD of O& G department of the above mentioned hospitals have been enrolled in this study. Nested multiplex E6/E7 PCR for genotyping of HPV strains (HPV16, 18, 31, 45, 33, 11, 6, 58, 52, 66, 39, 51, 68) has been standardized in the laboratory. 224 samples were genotyped by this Nested multiplex PCR till date. Major capsid protein of HPV 16 L1 region was sequenced by following sangers method. Standardization for the amplification of Papillomavirus oncogene transcript (APOT) assay for the study of viral integration of HPV 16 is going on. Cases were being followed up during the study period to ascertain their treatment, survival, recurrence and death.

Demographic data of the cases enrolled

A total of 188 cases were enrolled during the period from 21.8.2014 to 21.9.2015. The mean age of

the patients was 45.85 with age range of 19 to 86 years. Mean Parity was 3 with a range of 1-10 and 43.20% cases were having a parity of e"3. All the subjects were married woman and the age of marriage varies from 15 to 36 years. Out of all the cases 62.96% cases were illiterate /just literate and 43% cases belongs to below poverty line.

Clinical and histopathological features

The enrolled cases includes invasive cancer (n=50), Precancerous cases (n=6), Inflammatory smear (n=101) and cytology of rest of the samples (n=31) are yet to be known. Invasive carcinoma cases included different stages (I, II, II, IV) 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 Abnormal discharge with or without blood stain(55%), Post menopausal bleeding (20%), Bleeding and pain during coitus (2%), Lower abdominal pain(17%), Intermenstrual bleeding (14%), UV descend(6%), and Swelling abdomen (1%).

Table -1: Demographic data of the cases enrolled.

Socio demographic variables	Age		Education		Economical status		Age of marriage			Parity	
	d"40	> 41	Illiterate/ just literate	Secondary above	APL	BPL	>20	20 to 30	≥30	0-3	≥4
No of cases (n=188)	35.8%	64.1%	62.96%	37.03%	6%	43%	6%	37.03%	17.90%	59.87%	40.123%

Table -2: Clinical features.

Symptoms of all cases (n=188)	Post menopausal bleeding	Abnormal discharge	Intermenstrual irregular /bleeding	Bleeding and Pain during coitus	UV Descend	Lower abdominal pain	Swelling abdomen
No of cases (%)	20%	55%	14%	2%	6%	17%	1%

Table -3: Histopathology wise distributions of cases.

Histopathology/cytology	No of cases HPV positive
IIIB	28
IIB	12
IB	4
IIA/IIIA	6
CINII	2
CINI	4
Inflammatory smear	101
Cytology yet to be known	31
Total	188

Genotyping of HPV strains

A total of 224 samples were subjected to genotyping by Nested multiplex E6/E7 PCR. Out of the 224 cases, 166 cases were infected with HPV 16, 18, 51, 39, 66, 35, 45, 58, 68, 42, 44, 43, 6/11 and 52 genotypes. The most prevalent genotype among all HPV infected cases is HPV 16 (86.74%), followed by HPV 18(12.04%) and HPV 51(3.6%). Prevalence of other genotypes were negligible; such as HPV 66(3.01%), HPV 39(3.01%), HPV68 (2.4%), HPV 35(1.8%), HPV 45(1.8%), HPV 58(1.2%), HPV 42(.6%), HPV 44(.6%), HPV52 (.6%). Only 2 cases were found to be infected with genotypes other than HPV 16 or 18. Among all cases, 127 cases were infected with single genotype of HPV 16 or 18 or 45 whereas 39 cases were infected with multiple genotypes. Among the single genotype infected cases, 111 cases were found to be infected with HPV 16 and 15 cases were infected with HPV 18 genotype and 1 case with HPV 45. In case of multiple infections 17 subjects were infected with HPV 16 and 18. Infections with other genotype combinations have shown in Table no 4.

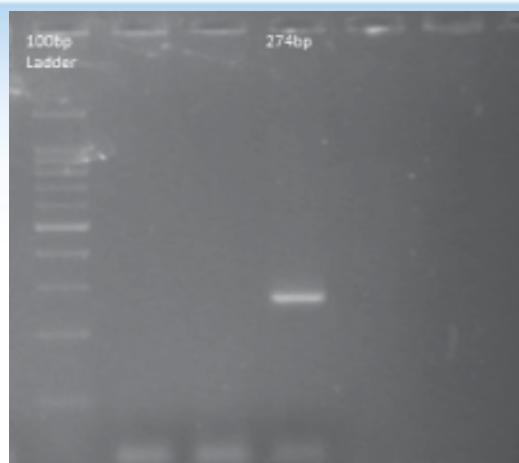


Fig: 1 HPV 58

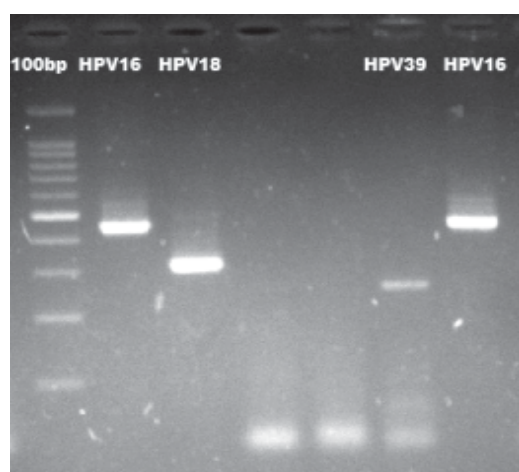


Fig: 2 HPV 16, HPV 18 & HPV 39.



Fig: 3 HPV51

Sequencing of L1 region

The major capsid protein L1 gene of HPV 16 from 5 samples was amplified and sequenced by sangers method. All are belongs to Alpha papillomavirus 9 group. One sequence was submitted to NCBI and released on 21st October 2015. Gene bank accession no- KR779824.1.

Follow up status of the cases

43 invasive cervical carcinoma cases are being followed up for their treatment, survival, death and recurrence.

Work remains to be done

1. Sequencing of integrated amplicon to analyze the site of HPV 16 integration
2. Whole genome sequencing for identifying the variants
3. Standardization of HPV 18 integration protocol
4. Genotyping of remaining samples.

5. Standardization of E6/E7 mRNA expression protocol and sample analysis.

4. Molecular characterization of *Mycobacterium tuberculosis* strains isolated from pulmonary tuberculosis cases of Odisha.

Name : Prakasini Satapathy
Status : SRF (ICMR)
Guide : Dr Dasarathi Das
Date of joining : September 2013

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.



Fig: 4. HPV 6/11, HPV 43, HPV66, HPV 68.

Table -3:

Treatment	Disease free Survival	Death	Recurrence
Radiotherapy (n=22) Chemotherapy+Radiotherapy (n= 15) Surgery (n=6)	22	20	2

Progress of the Study

The state of Odisha is broadly divided into four ecological divisions: the Northern plateau, the Eastern ghats, the Central tract, and the Coastal plains. In the first year samples were isolated from Bhubaneswar, one of the tuberculosis districts of Odisha comes under coastal plain eco-zone of Odisha. This year study was undertaken in Rayagada and Kalahandi belongs to Eastern Ghats and Central Tract respectively two different eco zones of Odisha. Prior to start of sample collection, networking of District Tuberculosis Officer, Lab Technicians in the hospital was carried out.

The sputum samples of tuberculosis suspected patients, under treatment and failure cases were collected from District Head Quarter Hospitals of the respective districts. Both morning and spot samples were collected from individual patients in 50 ml sterile plastic centrifuge tubes.

Result

A total of 362 smear-positive sputum samples were isolated from suspected pulmonary tuberculosis patients (156 new cases and 206 previously treated cases) from the three districts.

Among these samples 200 cases from Bhubaneswar (156 new cases and 44 retreated cases), 56 retreated cases from Rayagada and 106 retreated

cases from Kalahandi districts.

Out of the above samples 238 samples were done by LPA (Table-1).

Of the total 9 MDR strains obtained by MTBDR_{plus} assay, a missing of WT8 in the *rpoBRRDR* region covering base pair 530-533 with corresponding S531L mutation were found in five strains. Whereas *rpoB* WT3 with corresponding S531L mutation were found in two strains. Missing of *rpoB* WT 3 and 4 without any corresponding mutations and missing of *rpoB* WT 7 with corresponding H526Y mutation were found in two isolates. For isoniazid resistance a missing of *katG* WT with corresponding S315T1 mutations were found in 5 MDR strains. There were two MDR strains in which the WT was present as well as mutation 1 in the *katG* gene suggesting a mixed infection. From the remaining two MDR strains in one strain *inhA* WT1 & 2 were absent without any corresponding mutation and missing of *inhA* WT1 with C15T mutation was found in the other strain.

Out of the four Rifampicin mono-resistances found in 3 districts were similar type of mutations i.e. missing of *rpoB* WT3 with corresponding S531L mutation.

Among 16 isoniazid mono-resistance obtained, one strain was missing *katG* WT without any corresponding mutation. Eight strains were missing

Table-1: Results of Rifampicin and Isoniazid resistance by genotype MTBDR_{plus} Assay in smear positive sputum samples (n=238).

No of samples tested (Districts)	Resistance pattern			Sensitive	NTM
	MDR	R-Mono resistance	H-Mono resistance		
78(Bhubaneswar)	2	1	5	56	14
56(Rayagada)	1	2	4	47	1
106(Kalahandi)	6	1	5	88	5
Total (238)	9	4	14	191	20

katG WT with S315T1 mutation. Whereas two strains in which the WT as well as mutation 1 was present in the *katG* gene. One of the INH monoresistant strains had resistance detected simultaneously in the *katG* and *inhA* gene regions (Table-2). In two strains there were missing of *inhA* WT 1 & 2 without any corresponding mutations.

A total of 248 culture positives on LJ media were

taken for the phenotypic DST (Table-3). Among them 117 were new cases and 131 were retreated cases. The overall prevalence of MDR-TB was 6 (2.42%). A majority of single drug resistance occurred by isoniazid (5.64%) followed by streptomycin (4.03%). Rifampicin and ethambutol monoresistance were found in 0.8% and 0.4% respectively. Resistance to both isoniazid and streptomycin were found in 5 (2.01%) cases.

Table-2. Pattern of gene mutations in resistant *Mycobacterium tuberculosis* strains (n=27) using genotype MTBDRplus Assay.

Gene Band	No of Resistance patterns in Bhubaneswar	No of Resistance patterns in Rayagada	No of Resistance patterns in Kalahandi	Total No of Resistance	Gene Region/ Mutation
<i>rpoB</i> WT3,4-, <i>katG</i> WT- & MUT1+	-	-	1	MDR(9)	513-519, S315T1
<i>rpoB</i> WT7-, MUT2A+, <i>katG</i> WT- & MUT1+	1	-	-		526-529, H526YS315T1
<i>rpoB</i> WT8-, MUT3+ <i>katG</i> WT- & MUT1+	1	-	2		530-533, S531L, S315T1
<i>rpoB</i> WT8-, MUT3+, <i>katG</i> WT+ & MUT1+	-	-	1		530-533, S531L, S315T1
<i>rpoB</i> WT8+, MUT3+, <i>katG</i> WT+ & MUT1+	-	-	1		S531L, S315T1
<i>rpoB</i> WT8-, MUT3+, <i>inhA</i> WT1 & 2-	-	-	1		530-531, S531L, -15/-16, -8
<i>rpoB</i> WT8+,MUT3+ & <i>inhA</i> WT1-,MUT1+	-	1	-		S531L, -15, C15T
<i>rpoB</i> WT8- & MUT3+ <i>katG</i> WT- & MUT-	1	2	1	RR(4)	530-533, S531L
<i>katG</i> WT- & MUT1+	1	-	-		315
<i>katG</i> WT- & MUT1+	3	1	4		315, S315T1
<i>katG</i> WT+ & MUT1+	-	2	-		S315T1
<i>katG</i> WT1-, MUT1+, <i>inhA</i> WT1-,MUT1+	-	-	1	RH(14)	315, S315T1, -15, C15T
<i>inhA</i> WT1&2-	1	1	-		-15/-16, -8

MDR-Multi Drug Resistance, RR- Mono resistance to Rifampicin, RH-Mono resistance to Isoniazid.

Twenty one isolates (seven from each district) were genotyped by spoligotyping (Table-3). The obtained spoligotyping results were compared with the shared type (ST) number and the lineages described in the SpolDB4 database.

The most frequent lineages observed were the East African-Indian genotype in 12 cases. These twelve EAI Spoligotypes included four ST340, two ST236, one

ST126, one ST1188 and remaining four genotypes were not matched with any share types in the international SpolDB4 data base. Two ST19 and one ST413 of EAI2-Manilal lineage were found in 3 isolates. Another share type, ST26 corresponds to CAS1-Delhi lineage were found in two cases. ST365/EAI3-IND and ST882/EAI6-BGD1 shared genotypes were found in two cases.

Table-3: Drug susceptibility patterns of *M. tuberculosis* in 248 pulmonary tuberculosis cases.

Resistance status	Bhubaneswar (n=161) (New=117 & Retreated =44 cases)	Kalahandi (n=63) Retreated cases	Rayagada (n=24) Retreated cases	Total (n=248)
Susceptible to all drug	140	53	20	213(85.887)
Any Resistance	21	10	4	35(14.11)
S	5	4	1	10(4.032)
H	9	4	1	14(5.64)
R	1	-	1	2(0.806)
E	1	-	-	1(0.403)
HR	2	-	1	3(1.209)
HS	2	3	-	5(2.016)
HRE	-	1	-	1(0.403)
SHRE	1	1	-	2(0.806)
MDR	3	2	1	6(2.42)

Table-4: Spoligotype Patterns of 21 isolates (according to the international database at the Pasteur Institute of Guadeloupe).

Total (n) 21	Family name	Spoligotype pattern
12	EAI	
3	EAI2-Manila	
2	CAS1-Delhi	
1	EAI3-IND	
1	EAI6-BGD1	
2	EAI1-SOM	

ST48/EAI1-SOM genotypes were found in another two cases.

Works to be done

- Sputum samples will be collected from Mayurbhanj District.
 - Microscopy, biochemical tests and culture will be done.
 - Drug Sensitivity Testing will be done by PST and LPA methods respectively.
 - Spoligotyping will be done for strain genotyping.
- 5. 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.**

Name : Bhagyalaxmi Biswal
Status : SRF(ICMR)
Guide : Dr. S. K. Kar
Co- Guide : Dr B.Diwedi
Date of joining : April 2014

Introduction

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. About 10 million children under the age of five die globally each year (WHO,2008). The 'Child Mortality Estimates Report 2012' released by Unicef in New York has said that in 2011, around 50 per cent of global under-five deaths occurred in just five countries like India, Nigeria, the Democratic Republic of the Congo, Pakistan and China. In India according to National family health survey (NFHS, 2005-06) the child mortality rate is 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.

Objectives

1. Culture, Isolation and characterization of bacterial pathogens causing Acute respiratory infections in under five children.

Total 603 samples and organisms identified are as follows-

Month	Sample	E.Coli	S.Aureus	Moraxilla Spp	k.pneumonie	Pseudomonas Aure.	GABHS	S.Pneu moniae	Sallmo nella spp
June	51	3	3		3				
July	61	2	9		0				
Aug	86	6	9	6	6			6	
Sep	74	1	3	3	12	2	6	7	
Oct	66		0		8	1		9	
Nov	62	6	6	0	9	0	0	5	2
Dec	44	9	0	0	6	0	0	3	
Jan	46	3	2	0	6	0	3	0	
Feb	48	3	0	0	0	0	0	5	
Mar	65				1		2	1	
Tota1	603	33(5.47%)	32(5.30%)	9(1.49%)	51(8.45%)	3(0.49%)	15(2.48%)	36(5.97%)	2(0.33%)

2. Antibiogram 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

Sample collection initiated from 2nd week of June 2014 after getting permission from the respective hospitals for sample collection and after preparation of clinical sheet and consent form (English/Oriya) for data collection of the patients. Then samples were collected from Capital hospital Bhubaneswar and Sisubhaban Cuttack and DHS, Rayagada from hospitalized children below 5 year age group having one or more of the Symptoms like 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. Samples were collected and immediately transported to RMRC laboratory for analysis. For viral analysis samples were collected in VTM (viral transport media) media and immediately transported to laboratory in cooling condition and stored in -70°C at virology lab for analysis.

Total 500 samples were collected from Capital hospital, Bhubaneswar, Sisubhaban, Cuttack and 103 from District head quarter hospital, Rayagada. After reaching at laboratory the samples were inoculated in different media [Blood agar for *S.pneumoniae*, Chocolate agar for *Himophilus influenza*, Mac Conkey agar for *K.pneumoniae*, *E.coli* and other gram negative organisms and nutrient agar plates]. After inoculation

the inoculated plates were kept for incubation, the chocolate and blood agar plates are kept in Co2 incubator for isolation of *s.pneumoniae* and *Himophilus influenza* and other related organisms. MacConkey, Blood agar and nutrient agar plates were kept in incubator for isolation of *e.coli*, *K.pneumoniae*, *s.aureuse* and other related organisms. Isolation and identification of bacterial isolates was done as per the procedure, (Manual of Medical Microbiology, ASM press) by colony morphology, gram stain and different biochemical tests. Antibiogram of the different identified organisms was carried out by disc diffusion method (Kirby, 1966). For *S.pneumoniae* Antimicrobial susceptibility was tested by the disc diffusion method (Kirby, 1966) using 5% sheep blood supplementation on Mueller-Hinton agar.

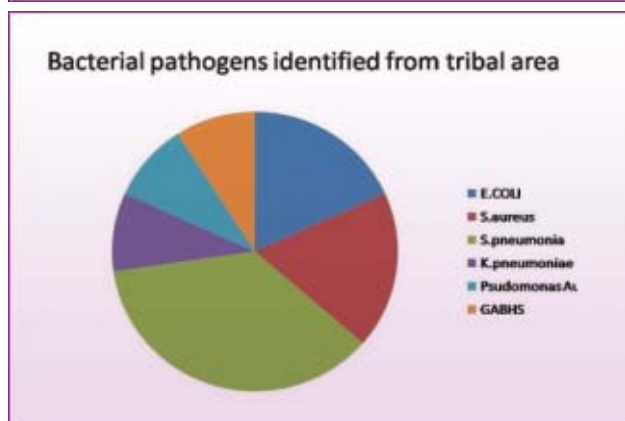
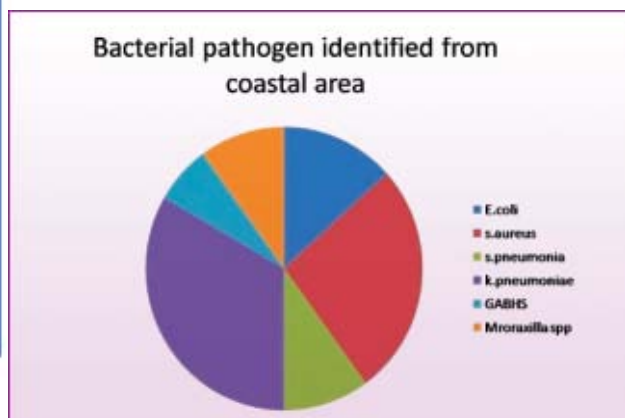
Discussion

Total 603 samples were collected from both costal and tribal areas of Odisha. Out of them various bacterial etiological agents were isolated. The sample

Antibiotic successibility pattern of *s.pneumoniae*.

Antibiotics	Sensitive	Resistant
Ceftriazone	30(83%)	6
Ceftazidime	28(76%)	8
Vancomicine	25(69%)	11
Amikacine	32(88%)	4
Peniciline-G	6(16%)	30
Methicilline	2(5%)	34
Azithromycine	30(83%)	6
Ofloxacine	10(27%)	26
Ciprofloxacine	22(61%)	14
Erythromycine	16(44%)	20
trimethoprim/ sulphamethoxazole	14(38%)	22

collection done throughout the year but it gradually decline in the winter. In hospitals the ARI patient admission was decreased. The significant difference is that throughout the year *S.pneumoniae* was predominant and especially in case of tribal



population of Odisha. *K.pneumoniae* and *E.coli* also isolated from the patients who have the symptoms of sever pneumonia. The isolation of bacterial pathogen's are significantly high in tribal population in comparison to coastal population.

Antibiotic sensitivity

The antibiotic sensitivity study was done for the bacterial pathogens isolated from the samples. For *s.pneumoniae* Antimicrobial susceptibility was tested by the agar-dilution method according to the NCCLS recommendations, using 5% sheep blood

supplementation on Mueller-Hinton agar. The following antimicrobial drugs were included in the tests: Penicillin, Erythromycin, Tetracycline, Amikacine, Trimethoprim/Sulphamethoxazole, Ceftriaxo, -Methiciline, Ofloxacin, Ciprofloxacin and Vancomycin. Among them few antibiotics are mostly sensitive like Ceftriazone, Vancomycine, Azithromycine and Amikacine. The antibiotics which are resistant to *S.pneumoniae* are Methicilline, Penicilline, Ofloxacin and Erythromycin. One of the major differences in case of bacterial pathogens isolated from coastal population and tribal population is the antibiotic sensitivity is much higher in tribal population than coastal population. As tribal population are not aware about the disease as well as their treatment. Also in tribal population the health facility is not much developed and people are getting the facilities hardly so antibiotic intake is not so frequent.

Viral analysis

The throat swabs collected in VTM media for analysis of viral etiological agents associated with ARI. PCR was done for different viruses like respiratory syncytial virus (RSV), measles virus, human para influenza viruses type 1, 2, 3 (PIV-1, PIV-2 and PIV-3), influenza virus and varicella virus. Mostly RSV and Human para influenza type 1 was isolated.

Conclusion

During the study period the bacterial etiological agents isolated from the coastal and tribal ARI patients are *E.coli*, *S.aureus*, *Moraxilla spp*, *S.auroginosa*, *Salmonella spp*, GABHS (group A beta hemolytic *s.pneumoniae*) and *S.pneumoniae*. The novelty of the study is the detection of methicilline resistant *s.pneumoniae* which Pose a significant threat in treatment aspect of ARI patients affected by *s.pneumoniae* in odisha.

6. Characterization of Rotavirus strains affecting Orissa based on VP8 region : a possible additional candidate for new rota virus vaccine.

Name : Eileena Mohanty
 Status : SRF(ICMR)
 Guide : Dr B. Diwedi
 Date of joining : August 2013

Introduction

It is estimated that rotaviruses are responsible for more than one-half a million deaths annually among children aged <5 years, with the majority of these deaths occurring in developing countries and India alone is estimated to account for approximately one-quarter of the global deaths from 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.

India spends ₹. 2.0-3.4 billion annually to treat rotavirus disease in children less than five years of age. Sowmyanarayanan et al in 2012 have found the median cost of a diarrhoeal episode based on annual household expenditure in India was 7.6 per cent for rotavirus diarrhea.

Diarrheal deaths due to Rota virus infection are common in Orissa. Orissa has been included in various surveillance studies carried out in India. Molecular characterization has revealed changing pattern of human rotavirus in Eastern India. The rotavirus serotypes prevalent in the country appear to be different from that in the West. In a multi-center study enrolling 4,243 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. Therefore, prevention of rotavirus through immunization is considered a global priority to manage the disease. Two currently licensed live oral rotavirus vaccines (Rotarix® and RotaTeq®) are highly efficacious against severe rotavirus diarrhea. However, the efficacy of such vaccines in selected low-income African and Asian countries is much lower than that in middle or high-income countries. Additionally, these two vaccines have recently been associated with rare cases of intussusception in vaccinated infants. A small risk of intussusception (<1-2 cases per 100,000 infants vaccinated) has been detected in some settings following immunization with the first dose of both currently available rotavirus vaccines. 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. The important antigenic characteristics of rotavirus strains are defined by two neutralizing antigens on the outer capsid - VP4 (a protease-sensitive protein protruding from the surface and labeled as the P-type) and VP7 (an outer capsid glycoprotein labeled as the G-type). These two antigens are encoded by separate genes and are able to segregate independently due to the segmented nature of the viral genome. It has been well established that rotavirus G-P combinations G1P[8], G2P[4], G3P[8] and G4P[8] are of global epidemiologic importance with G1P[8] being the most important. The currently available two live oral rotavirus vaccines, are selected or designed to provide antigenic coverage to such epidemiologically important G and P types. It is of note that recently, unusual G and P types causing a high incidence of human infection have been reported in various regions of the world including

G8, G2P [11], G3P[11], G10, G12, and P[6] that are not covered serotypically by Rotatarix® and RotaTeq®. In developing countries, human Rotavirus strains with uncommon G/P type combinations, due to reassortment with animal Rota viruses, could be a frequent cause of disease in young children. Recent studies have shown that the VP8 domain of the Rota virus spike protein VP4 specifically interacts with Histo blood group antigens and hence could be utilizing HBGAs as receptors to gain entry into mature enterocytes of the GI tract. Hence characterizing the vp8 region to determine conserved region and mutations would help in determining whether this region is suitable as a vaccine candidate as this region has been taken up as the next possible vaccine candidate.

Objectives

1. To genotype VP4 and VP7 region to identify isolated Rota virus strains causing diarrhea in Orissa.
2. To Sequence the VP4 region and identify novel variants in relation to disease severity.
3. To identify conserved region in the VP8 sequence of VP4.
4. To test the antigenicity of these peptides coded by VP8 conserved region in mice models.

Work Progress

(1) 200 subjects having diarrhea satisfying case definition admitted to hospitals were enrolled into the study adding to the total of 569 subjects enrolled into the study. Stool samples (n=200) were collected from patients admitted to the major referral hospital Capital Hospital (Bhubaneswar) (n=200) covering the coastal region (eastern and northern Odisha).

The 200 cases enrolled during the study period September 2014-February 2015 were tested for rota antigen by ELISA out of which 104 (52.00%) tested positive. Overall positivity was 53.60% (n=569). 20 samples were successfully genotyped. The most common P genotype obtained were P[8]. The most common G genotype obtained was G[1].

(2) *In silico* study on the conserved region in the VP8 region of rotavirus -from the available sequences in the database. Sequence variants of the human rotavirus A, VP4 protein (from different regions across the globe) were retrieved from NCBI protein database (<http://www.ncbi.nlm.nih.gov/protein>) and UniProtKB database (<http://www.uniprot.org>) followed by removal of duplicates and partial sequences from the dataset. Sequences of VP4 was subjected to multiple sequence alignment in Multalign.

(3) Association between rotavirus infection

Table-1: Distribution of blood groups among hospitalised children with diarrhea.

Blood group	Cases associated with rotavirus infection (n = 96)	Cases not associated with rotavirus infection (n = 51)	Total (n=147)
A [#]	28 (29.17%)	14 (27.5%)	42 (28.57%)
B [#]	40 (41.66%)	13 (25.5%)	53 (36.05%)
AB [#]	7 (7.29%)	4 (7.8%)	11 (7.48%)
O*	21 (21.87%)	20 (39.2%)	41 (27.89%)

P>0.05, *P=0.022.

and blood groups was studied. 147 cases could be tested for their blood group who agreed for the same and is illustrated in Table 1.

210 (53.9%) of 389 children were positive for rotavirus. Distribution of blood group in 96 rotavirus positive patients (A - 29.17%, B-41.66%, AB - 7.29%, O - 21.87%) and 51 rotavirus negative patients (A - 27.5%, B-25.5%, AB-7.8%, O-39.2%) did not show susceptibility to any particular blood group. However O blood group seems to be protective against rotavirus gastroenteritis.

Future work plan

1. Sequencing of vp4 gene from a fraction of collected samples.
2. Testing of antigenicity of peptide in mice model.

7. Prevalence and genetic diversity of *Staphylococcus aureus* associated with hospitalized Septic patients from Odisha.

Name : Anima Mohanty
 Status : JRF (ICMR)
 Guide : Dr. Bibhuti Bhusan Pal
 Co- Guide : Dr. K. C. Mohapatra
 SCB, Cuttack
 Date of joining : February 2015

Objectives:

1. Phenotypic characterization of *Staphylococcus aureus* with special reference to Methicillin resistant strains isolated from septic patients from Khurda, Bhubaneswar and Cuttack areas.
2. Detection of various toxic genes and clonality among isolated *Staphylococcus aureus* stains.

Background

Staphylococcus aureus is a major bacterial pathogen that causes a wide spectrum of clinical infections, ranging from localized soft-tissue infections to life-threatening bacteremia and endocarditis. The

incidence of methicillin resistant *S. aureus* (MRSA) in India ranges from 30-70%. In recent years, a number of virulence factors that are expressed, secreted by *Staphylococci* have shown to affect the outcome of the infective process. Thus, genetic susceptibilities to both sepsis and death due to sepsis have been increasingly recognized. A few studies have been reported from Odisha on septic patients where the studies were for short periods. Therefore, the present study has been envisaged for isolation, identification, antibiogram and detection of various toxic genes and their clonality of MRSA strains. Early detection of this gram positive organism can make a substantial difference in mortality rates and treatment strategies.

8. "Role of *Wolbachia* in *Aedes* mosquitoes and its effect in transmission of Dengue and Chikungunya".

Name : Ipsita Mohanty
 Status : JRS-LTMT
 Guide : Dr. R. K. Hazra

Objectives:

- Prevalence of *Wolbachia* and its characterization in four different species of *Aedes* found in Odisha.
- Establishment of *Wolbachia* colonies in *Aedes* mosquitoes and study of its dynamics both in laboratory and field conditions.
- To evaluate the factors responsible for cytoplasmic incompatibility.

Introduction: Vector-borne or arboviral diseases (e.g. dengue, chikungunya, malaria, filariasis, Japanese encephalitis, yellow fever) occur in more than 100 countries, primarily restricted within the tropics, with an annual global death rate in the millions. The increase in environmental pollution, public health hazards and insecticide resistant vector population indicate that the insecticides are no longer a sustainable control method of arboviruses and

arboviral diseases. Ideally, an alternative, *Wolbachia* a gram negative endosymbiont of arthropod vectors can be explored as a novel eco-friendly control strategy. In arthropods, *Wolbachia* behaves more like a reproductive parasite by inducing: feminization of genetic males, parthenogenesis, male-killing, and cytoplasmic incompatibility (CI). These modifications typically give a reproductive advantage to infected individuals and allow for the spread of *Wolbachia* through a population through mainly vertical transmission. Taking advantages of the “reproductive parasitism” and “transovarian transmission” of *Wolbachia*, prevalence of *Wolbachia* and characterization of its strain in four different species



Results

- Areas Surveyed:
- Entomological collection and *Wolbachia* detection:

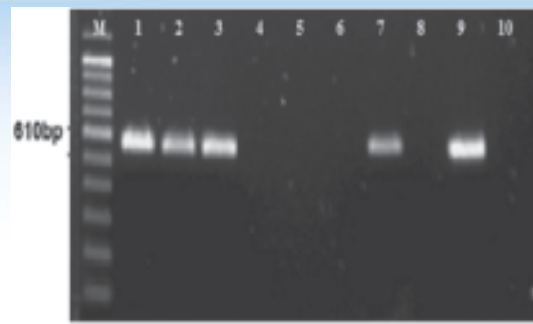
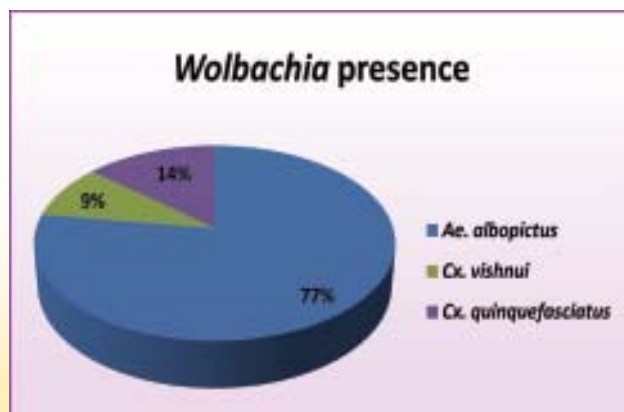


Fig. 1. Showing *Wolbachia* specific wsp general primer that amplifies around 610 bp from mosquito species of Odisha.

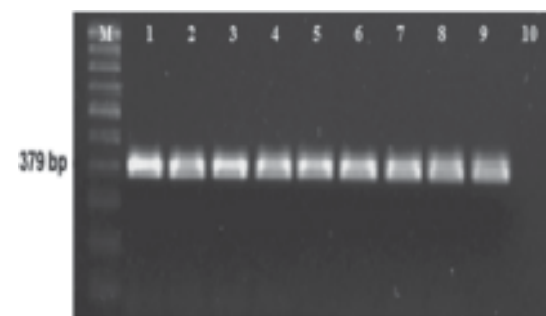


Fig. 2. *Aedes albopictus* collected from different areas of Odisha showing wsp A subgroups (albA) strains of *Wolbachia* specific primer that amplifies around 379bp.

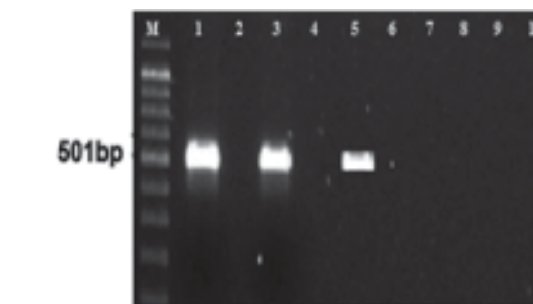


Fig. 3. *Culex* species were collected from different areas of Odisha showing wsp B subgroups (pip) strains of *Wolbachia* specific primer that amplifies around 501bp.

of *Aedes* found in Odisha has been carried out as described below.

9. Discussion:

Mosquitoes are medically important insects that transmit a variety of arboviral diseases. In this study, a preliminary survey in different areas (especially chikungunya and dengue affected areas) along with

entomological and molecular analysis was performed to know the type of *Wolbachia* circulating in the mosquitoes of Odisha and its prevalence in different mosquitoes.

Three major species of *Aedes* i.e *Aedes albopictus*, *Aedes aegypti* and *Aedes vittatus* along with *Culex* and *Anopheles* species were collected from the surveyed areas. It was found that *Wolbachia* strain inhabiting *Aedes albopictus* (wAlb A) is different from that of the *Culex* (wPiP) strain.

9. “Study on Risk factors for persistence of malaria in Odisha with special reference to molecular analysis of *Anophelines* species complex and malaria transmission”.

Name : Barsa Baisalini Panda
Status : JRS(DST)
Guide : Dr. Rupenangshu K. Hazra
Date of joining : March 2015

Objectives

- To identify different risk factor for persistence of malaria transmission.
- To identify malaria vector and its species complex, bionomics, feeding habit and susceptibility status in four geographical regions of Odisha.
- To incriminate the vectors and to find out entomological inoculation rates (EIR).
- To study the incidence of malaria and screening the population by parasite diversity MSP1/ MSP2, GLURP and the drug resistance strain.

Background

Malaria is caused by a parasite that is passed from one human to another by the bite of infected *Anopheles* mosquitoes or by a contaminated needle or transfusion. Delay treatment may lead to serious

consequences including death. It is estimated that almost half of the world’s population is at a risk of these diseases. Malaria transmission occurs primarily between dusk and dawn because of the nocturnal feeding habits of *Anopheles* mosquitoes. Climatic factors greatly influence the pattern and level of malaria transmission in Odisha. The most climatic factor that directly affects malaria transmission is temperature, rainfall and humidity. Non-climatic factor also affects malaria transmission; the type of vector, the type of parasite, environmental development and urbanisation, population movement and migration, the level of immunity to malaria in the human hosts, insecticide resistance in mosquitoes and drug resistance in parasites, all have a role in affecting the severity and incidence of malaria.

Preliminary work done so far:

The study was undertaken in 3 geographical regions of Odisha viz Northern Plateau, Coastal Belt, Eastern region. Mosquitoes sample was collected from 4 districts viz, Mayurbhanj, Keonjhar (Northern plateau) in the month of May to July 2015(pre monsoon season),Kalahandi(Eastern region)in the month of Aug to Sep 2015(post monsoon season),Balasore (Coastal belt) in the month of Sep 2015(post monsoon season). From each district 2 PHCs representing all ecotypes was selected. 2 Villages were selected in each PHC for routine entomological studies. In these villages routine collection of mosquitoes by different methods was done. Fig-1&2 shows district wise Hand Catch Man Hour Density in Odisha during May to September 2015. It revealed that out of 949 mosquitoes (12 species) collected 67% were found in cattle shed and 32% in Human Dwelling. Specimens of vector species viz *An.culicifacies*(23.7%), *An.annularis* (11.6%), *An.fluviatilis* (3.2%) were collected whereas among

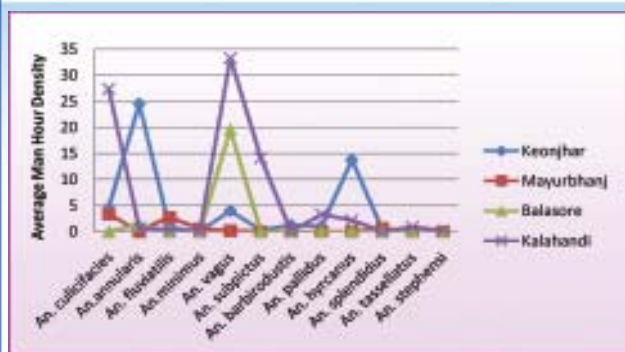
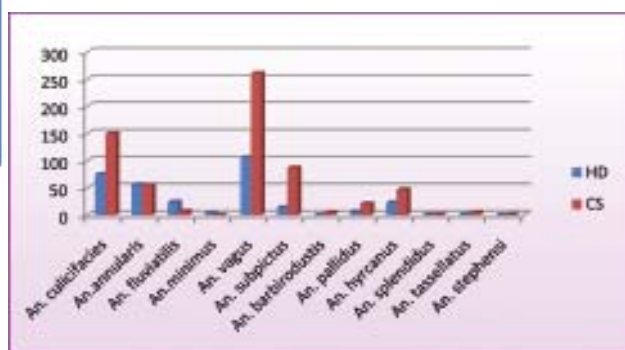


Fig-1: District wise Per Man Hour Density collection in Odisha during May-September 2015.



HD: Human Dwelling, CS: Cattleshed.

Fig-2: Prevalence of *Anopheles* species in different habitats.

other species most dominant were *An.vagus* (38.6%), *An.subpictus* (10%), *An.hyrcanus*(7.3%).

From the mosquito collected from Keonjhar, Mayurbhanj, Kalahandi districts *An.culicifacies* and *An.fluviatilis* were tested for the presence of plasmodium sporozoites and Human Blood Fed. Out of 13 *An.fluviatilis* 6 shows +ve for human blood and no mosquito was found +ve for sporozoites.

Future Plan

- The type of vector, the type of parasite, urbanization, population movement and migration, the level of immunity to malaria in the human hosts, insecticide resistance in mosquitoes, and the drug resistance in parasites will be measured.
- EIR will be calculated on monthly basis.



Training Manual released on RMRC OPD Inauguration



School students visiting RMRC Lab



Debate competition among school students on Swachh Bharat

Publications and Information



Publications

Publications-2014

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 14. Behera SK, Praharaj AB, Dehury B, Negi S . Exploring the role and diversity of mucins in health and disease with special insight into non-communicable diseases.2015; *Glycoconj J* 32(8):575-613.
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Facilities

Biostatistics

The centre has facility for statistical analysis of research data. The researcher working in scientific projects including Pre-Ph D and Msc students have availed this facilities for presentation of there results. The activity has been strengthened with joining of a Scientis-C in the division recently.

Library, Information & Publication

The primary mission of the Centre's Library is to provide relevant and latest biomedical information in the shortest possible time, to the researchers and biomedical scientists of the institute. Its objectives is to support the research programs of the institute by

providing physical and intellectual access to information, consistent with the present and the anticipated research functions of the Centre. In accordance with the objectives of the Centre, the library aims to develop a comprehensive collection of documents useful for the scientists and the research community of the Centre. The secondary mission is, to serve as a resource center for the scholars and biomedical scientific community of the region. The collection of the library which includes books, journals, and reports is regarded one of the richest collections in the state, in the field of Biomedical & Health Sciences.

It provides both library and Information services not only to the scientists and researchers of this Centre but also to the researchers, doctors and academicians of this state. The foreign journal collection of this library is unique in the state in the field of bio-medical sciences. The library and information centre provides Local Area Networking (LAN) facilities to all scientists and researchers through dedicated leased lines like NKN & BSNL. In the year 2014, the library has been named as “Laxmi Narayan Memorial Library” by Secretary, DHR & D.G, ICMR New Delhi in the memory of the Centre’s first Director Prof. Laxmi Narayan Mohapatra.



Library Review Committee in RMRC Library

ONLINE JOURNALS

ICMR-EJC: ICMR E- journal Consortia

The Centre’s Library is now member of ICMR E- Consortia which subscribes world’s top weekly research journals in the field of Science, Technology & Medicine. They are (1) Nature (<http://www.nature.com>) (2) Science (<http://www.sciencemag.org>) (3) New England Journal of Medicine (<http://content.nejm.org>) (4) Lancet (<http://www.sciencedirect.com>). The ERMED consortia could not be accessible for the year 2015 due to non renewal by National Medical Library, New Delhi. Besides that library is accessible to J-Gate@ICMR. J-Gate is an electronic gateway to global e-journal literature provided by by Informatics India Limited, Bangalore. J-Gate in collaboration with ICMR, G-Gate@ICMR has formed for Biomedical resource sharing among ICMR Libraries as well as e- journal accessibility.

Publication Cell

The library & Information Centre is doing publication activities of the Institute. RMRC News Bulletin and Library News Letter which are due for publication from 2012 have been published this year. Besides that, the publication cell has published the following publications during this Year.

- i. Comprehensive Health care plan for Raygada District, Odisha
- ii. Comprehensive Health care plan for Kalahandi District, Odisha
- iii. Medical Entomology Training Module
- iv. Reorientation training Module for multi skill Laboratory Technicians
- v. Booklet on New Born Child (ODI IEC Material for ASHA Karmi)
- vi. Booklet on Primary Health Care (ODIA IEC Material for ASHA Karmi)
- vii. Manual for Multi skill Laboratory Technicians
- viii. Training Manual on Medical Entomology

Library Trainee

The library & information division of the Centre have recruited two Library Trainees for the period of one year for Library automation purposes. The two trainees (Prabhat Kumar Swain & Lipika Rani Sharma) are recruited as per Govt. of India apprentice scheme. During their practical training they have learn various facets of library and Information Science like, Classification, working on Library Automation software KOHA, News clipping activities, and day to day job of the library. Now the Centre's library automation has been shifted from Libsys-4 to KOHA since KOHA is an open source software.

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.

Insectorium

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 to 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 equipments for each space is mentioned in the planning.

Ph.D Awarded

- i. Mr.PGS Sethy awarded Ph.D entitles "Protein-energy and micronutrient malnutrition among preschool children in Bhubaneswar block of Orissa "by Utkal University, Bhubaneswar in 2015 under the guidance of Dr. G. Bulliya, Scientist-E, RMRC, Bhubaneswar.
- ii. Miss. Shuchismita Behera awarded Ph.D entitles "Study on micronutrients malnutrition with special reference to vitamin A and its associations with other major trace elements among children in Orissa" by Berhampur University, Berhampur in 2015 under the guidance of Dr. G. Bulliya, Scientist-E, RMRC, Bhubaneswar.

Ph.D Submitted

1. Rashmi Mishra submitted her Thesis entitled "Role of B-lymphocytes and autoantibodies in human lymphatic filariasis" to Utkal Univ, Bhubaneswar for Ph.D degree.
2. K Gopinath Achary submitted his thesis entitled "Investigation on the effect of maternal infection on humoral and cellular immune responses of neonates in lymphatic filariasis" to Utkal Univ, Bhubaneswar for award of Ph.D degree.

Pre Ph.D Program

RMRC, Bhubaneswar (Nodal Centre of Utkal University) enrolled 5 Pre Ph.D students for six month course work for enrollment of Ph.D program in Life Sciences/ Biotechnology under Utkal University for the year 2014-15.

M.Sc. Dissertation program

RMRC, Bhubaneswar under took six month M.Sc. dissertation program in the subject areas of Biotechnology/ Microbiology/ Life Sciences/ Bioinformatics/ from Jan- June 2015. During this

period total 28 M.Sc. dissertation students from various universities have undertaken 6 month M.Sc. dissertation program under scientists of RMRC.

Guest Lecture:

1. A Guest lecture on “*Glucose to Noval Nucleosides as Anti-sense Monomers and Amphiphiles for Nano-Formulation of ICG*” was held on 20th April 2015 in RMRC, Library. Prof. Ashok Prasad, Prof. in Chemistry, Delhi University was the guest speaker.
2. Dr. H. K. Chaturbedi, Scientist-F, NIMS, New Delhi delivered a talk on “*Sampling and Analysis of Scientist Data*” in RMRC auditorium on 28 August, 2015 at 10.15 A.M.

Events (Meeting/Seminar Organized/ Lecture organized)

3. Establishment of Model Rural Health Research Unit (MRHRU) at Tigiria, Cuttack. The foundation stone laying ceremony of MRHRU, Tigiria : an Initiative under approval of Department of Health Research, MoHFW, Govt. of India, is organized at Tigiria Community Health Centre, on 31st Jan 2015. The foundation stone was laid by Sj. Bhartruhari Mahatab, Hon'ble Member of Parliament, Cuttack & Sj. Ranendra Pratap Swain, Hon'ble MLA, Athagarh, in presence of Dr. V.M.Katoch, Secretary, DHR & DG ICMR & Dr. S.K.Kar, Director, RMRC, Bhubaneswar.
4. Inauguration of New RMRC OPD and Training Hall. The Out Patient Department & Facility for Research & Training in the premises of the institute was inaugurated on 31st January 2015 at 3 PM by Dr. Vishwa Mohan Katoch, Secretary, DHR & DG ICMR in presence of Ms. Arti Ahuja, Principle Secretary, Department of Health & FW, Govt. of Odisha & Ms. Roopa Mishra, Mission Director, National Health Mission, Govt of Odisha and Dr. S.K.Kar, Director, RMRC, Bhubaneswar.
5. RMRC, Bhubaneswar organized workshop and training program on “Application of

Bioinformatics on Medical Research” was held on 17th and 18th February, 2015.

6. The SAC Sub - committee meeting of RMRC, Bhubaneswar was held on 20th March, 2015.
7. RMRC, Bhubaneswar observed its Annual Day celebration on 27th March 2015.
8. International day of Yoga: International Day of Yoga was celebrated on the day of 21st June, 2015 in RMRC Auditorium. RMRC scientist, Staff and some family members were participated in the Yoga.
9. Visit of Sr. DDG (Admn), ICMR, New Delhi. Sri T. S. Jawahar, IAS Senior Deputy Director General (Admn.) and senior Finical Advisor (ICMR) visited RMRC, BBSR and reviewed its working including the collaborative activities of Govt. of Odisha on the date of 4th August, 2015.
10. Sadbhavana Diwas was celebrated on 20th August, 2015 at RMRC, Bhubaneswar.
11. Hindi Day celebration in RMRC, auditorium on Sept 14th. Hindi speech competition held among RMRC staff. Prize given to RMRC Staff. Hindi debate on Swachh Bharat Avhiyan was organized among RMRC staff followed by prize distribution by direct in charge Dr Mamita Mahapatra . Dr. Dasarathi Das, Scientist –E – Cum Hindi Officer organized the Hindi day celebration . Dr. B. sahuo, LIO was co-organized the Hindi day celebration Sci-E, Dr. T. Hussain, Sci-E and Dr. A. S. Kerketta Sci- E were judges for the competition on the occasion.
12. A meeting on Cochrane Library was held on 16th Sept. 2015 . The speaker was Mr. Sudipta Saha of Wiley India Limited and Dr. B. Sahoo, Lib & Inf. Officer was the coordinator of the meeting.
13. A demonstration program on “Make My Trip: online data collection” by M/S Luminous Infoways, Bhubaneswar on 16th Sept. 2015 was organized in RMRC Auditorium. All scientists and field staff were present. Dr. B. Sahoo, LIO was oordinator of the meeting.

14. A Seminar was held on "Swachh Bharat- Sustha Bharat" on 1st Oct. 2015 in RMRC Auditorium. Prof. A.P. Dash, Vice Chancellor, Tamilnadu Central University was the invited speaker on the seminar. He delivered a talk on "Living with Dangu".
15. Swachh Bharat Aviyam was organized in RMRC, Bhubaneswar on 9th Oct. 2015. On this occasion an Odia debate competition was held among school students on the topic "Swachh Bharat".
16. The Vigilance awareness week was observed in RMRC, Bhubaneswar from 26th October to 31st Oct. 2015. Sri Bipin Bihari Mishra, IPS Ex. DG Police, Govt. of Odisha was invited Guest on the occasion of vigilance Awareness Week.
17. Workshop on E-Journal Consortia, J-Gate@ICMR was held on 27th Nov. 2015 in RMRC Library. Dr. V.K. Srivastava, Head, P&I were the chief guest of the workshop.
8. Attended Director's meeting on 4/9/2015 at Chennai.
9. Attended "Expand TB Symposium" on 11/9/2015 at Delhi.
10. Attended "Space Technology Meeting" on 06/10/2015 at Delhi.
11. Attended "NVBDCP-WHO Brainstorming Workshop on Integrated Vector Management" on 02/11/2015 at NCDC Auditorium, Delhi.

Dr M Ranjit

CONFERENCES/MEETINGS ATTENDED

Dr. N Mohapatra

1. Attended meeting of Odisha State Innovation Council, held under the Chairmanship of Chief Secretary, Odisha at 10.30 AM on 8/4/2015 in the Conference Hall of Secretariat.
2. Attended Translational Research meeting on 05th May 2015 at ICMR Hqrs.
3. Attended NRL meeting at Delhi & SAG meeting at ICMR on 20th & 22nd May 2015.
4. Attended meeting of Odisha State Innovation Council held under the Chairmanship of Chief Secretary at 12.30 PM on 8/6/2015 in the Conference Hall of Odisha Secretariat.
5. Attended Independent Committee meeting to finalise the result for Selection of Scientist-C (Biostatistics) meeting on 02nd July at ICMR Hqrs.
6. Attended onsite evaluation visit of IRL, Kolkata on 30th July 2015.
7. Attended Polio Virus Containment meeting on 9th August 2015 at ICMR.
12. Attended the 83rd Annual Meeting of the Society of Biological Chemists of India (SBCI) and Symposium on Evolution: Molecules to Life organized by KIIT University and ILS, Bhubaneswar from 18th-21st Dec 2014 and delivered a guest lecture on "*Role of microparticles in the pathogenesis of Severe Malaria*".
13. Invited as Chief Guest to the Science Society of Paradeep College, Paradeep and delivered a lecture on "*Malaria: A dreaded disease*" on 17th January 2015
14. Delivered a guest lecture to the Post Graduate students of Zoology, Basics Science College, OUAT, Bhubaneswar on 15/09/2015 on "*Molecular Genetics of Cerebral Malaria*".
15. Attended the Tribal Health Research Forum Meeting and Symposium on Tribal Health on the eve of International Day of the World's Indigenous People organized by NIRTH, Jabalpur from 8th Aug to 9th Aug 2015.
16. Delivered a guest lecture to the Post Graduate students of Biotechnology, Academy of Management and Information Technology, Bhubaneswar on 13/10/2015 on "*Diagnosis of Malaria by LAMP assay*".
17. Delivered a guest lecture on "*Nucleic acid amplification in diagnosis of infectious diseases with special reference to LAMP assay*" on 19th Nov 2015 in a ICAR-sponsored short course on Molecular approaches in diagnosis and control of emerging and transboundary diseases of fresh water fishes

and shellfish from 17th-26th Nov 2015 at CIFA(ICAR), Bhubaneswar.

Dr. G. Bulliyya

18. Attended Indian Dietetics Association Celebration Day, Odisha Chapter meeting on 'A Healthy Girl Becomes A Healthy Mother: Good nutrition is an investment like no other' and presented a paper 'Adolescent Malnutrition is an intergenerational vicious cycle' at Hotel Sandy's Tower, Bhubaneswar on 10th January, 2015.
19. Attended a 'Conclave: Nourishing India's Tribal Children. Voices of Frontliners, promising practices and policy implications' organised by UNICEF at Mayfair Convention, Bhubaneswar on 15-16th January, 2015.
20. Attended as a resource person for 'Regional Workshop on Mid-Day Meal' organised by State Project Management Unit & School and Mass Education Department, Government of Odisha at Hotel Lucky India Royale Heritage, Puri on 16th January, 2015.
21. Attended 'Convergence Meeting under Mid-Day Meal Programme' held at School & Mass Education Department, Bhubaneswar on 6th June 2015.
22. Attended as a resource person at Concurrent Monitoring of Mid-Day Meal Scheme in Odisha, at Hotel Crown, Bhubaneswar on 25th June 2015.
23. External Examiner for conducting viva-voce of 6 M.Sc DFSM, IGNOU, Bhubaneswar.
24. Attended 'Launching of Odisha Library Academy, Librarian's Day & Seminar on 'New Perspectives of Librarianship' held at RMRC Auditorium, Bhubaneswar on 9th August 2015
25. Attended as a Technical Advisory Group Meeting on 'Fortification rice under Mid-Day Meal in Gajapati district, Odisha, at Hotel Crown, Bhubaneswar on 26th August 2015.
26. Attended as a Guest Speaker on the occasion of 'National Nutrition Week' organized by

Nutrition and Dietetics Department held at SUM Hospital, Bhubaneswar on 7th September 2015.

27. Attended the 47th Annual Conference of Nutrition Society of India as a Convenor of Bhubaneswar Chapter and Judge to evaluate the papers presented at the Poster Session held at National Institute of Nutrition, Hyderabad on 9-10th October 2015.
28. Attended a Meeting on "Chronic Kidney Disease in Cuttack district, Odisha and Srikakulam district, Andhra Pradesh" held at DGHS Committee Room-249, Nirman Bhavan, New Delhi on 23rd October 2015.
29. Attended a meeting on "Agri-Nutrition Knowledge Exchange-Tackling Undernutrition in India" organized by MSSRF at Swosti Premium, Bhubaneswar on 17th November 2015.
30. Attended State-level Steering-cum-Monitoring Committee Meeting on Mid-Day Meal Cost held at Secretary, School & Mass Education Department, Bhubaneswar on 21st November 2015.
31. Attended a meeting on 'India Food Fortification Summit: Enriching Foods, Enriching Lives' organized by Global Alliance for Improved Nutrition (GAIN) at Habitat Centre, New Delhi on 29th November 2015.

Dr. A Mohapatra

32. Convener of Research Committee - 12 "Population, Health & Society" of the 40th All India Sociological Conference, Organised by Indian Sociological Society (ISS), at Kasi Vidyapith, Varanasi, during Nov29, 30 & Dec 012014.
33. Attended ICMR Organised Zonal Workshop on J-Gate plus@ICMR organised at RMRC, Bhubaneswar on 21st April 2014.
34. Delivered a Key Note address in the National Seminar On, "Development and Future of Social work", being Organized by The Department of

Social work, Gujarat University, Ahmedabad, Gujrat during 29th- 30th October, 2015.

35. Invited Speaker in the National Conference on the theme "Fulfilling the Dream of Hon'ble Prime Minister to Provide Toilet in Each Household by 2019 – Challenges and the Way Ahead", at Constitution Club, New Delhi, on November 19&20, 2015.

Dr. T. Hussain

36. Participated in 3rd Annual Conference of Research Society for the Study of Diabetes in India (RSSDI) - Odisha State Branch held on 22nd -23rd August, 2015 at Mayfair Convention, Bhubaneswar.

Dr Debdutta Bhattacharya

37. As Chief Guest to a UGC sponsored seminar on "Knowledge attitude & Practice (KAP) on food hygiene in rural community of West Bengal" at Debra Thana Sahid Kshudiram Smriti Mahavidyalaya, Debra, West Bengal and delivered a lecture on "Hygiene & Public Health" on 18th September, 2015.
38. Invited as Honourable Speaker & Resource person to a DBT sponsored Seminar on "Nutrition education & its prospects" at Raja N.L. Khan Women's College, Midnapur, West Bengal and delivered a lecture on "Nutrition & Health" on 19th September, 2015.

Dr. D. Das

1. Attended National Reference Laboratory Coordination Committee meeting at NITRD, Delhi from 19.5.2015 to 20.5.2015 and presented NRL, RMRC, Bhubaneswar activity.
2. Attended Programmatic Management of Drug Resistant TB review meeting for Eastern region at Raipur, Chhattisgarh from 15.7.2015 to 17.7.2015.
3. To assess the tuberculosis diagnosis work at IRL, Kolkata, on-site evaluation visit was made from 29.7.2015 to 31.7.2015.

4. To assess the tuberculosis diagnosis work at IRL, Cuttack, Odisha onsite evaluation visit was made from 31.8.2015 to 4.9.2015.
5. Attended XPAND TB End of project symposium on 11th of September, 2015, at Hotel Grand, Vasant Kunj, New Delhi.
6. Attended Hindi workshop on biological waste management at NIV, Pune on 21st and 22nd September 2015.
7. To assess the tuberculosis diagnosis work at IRL, Gangtok, Sikkim and North Bengal Medical College, Silliguri, West Bengal on site evaluation visit was made from 5.10.2015 to 10.10.2015
8. Attended workshop on "CBNAAT sensitization workshop" at National Tuberculosis Institute, Bangalore from 16 to 17 November 2015.
9. Attended National Rajbhasha Sammelan organized from 23.11.2015 to 25.11.2015 at Puri, Odisha.
10. Attended workshop on "Biosafety Practices in TB Laboratory" at National Tuberculosis Institute, Bangalore from 26 to 27 November 2015.

Dr A. S. Kerketta

39. Attended seminar on "Thirteenth MDRF -UAB-FIU International seminar on "Prevention and control of non-communicable diseases" from 23rd to 25th January 2015 held at MDRF, Chennai.
40. Attended IDEA meeting on Initiative against diarrhoeal and enteric diseases in ASIA, at New Delhi on 30th March 2014-2nd April 2015.
41. Presented paper: "Experience of Oral cholera vaccine implementation in Odisha at Satyabadi of Puri district during 2911".
42. Attended "World water Day at ICAR- Indian Institute of water management at Bhubaneswar on 23rd March 2015 and delivered lecture on "Water for Health".
43. Attended Research Ethics meeting of Dept of Health and Family welfare, Govt of Odisha in September 2015.

29th Scientific Advisory Committee

- | | | | | |
|----|---|----------|---|--------|
| 1 | Dr Indira Chakravarty, PhD, D.Sc.
12 Swinhoe Street, Flat 7
Kolkata - 700 019
E- Mail: indiracal@hotmail.com | Chairman | Tamil Nadu
E- Mail: apdash@gmail.com | |
| 1. | Dr Gita Satpathy Panda
Prof. & Head
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All India Institute of Medical Science,
Ansari Nagar, New Delhi - 110 029
E Mail: gitasatpathy@gmail.com | Member | 6. Dr K.R.John
Formerly Professor & Head
Department of Community Health
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| 2. | Dr.Satish Gupta
Staff Scientist-VII and Chief
Gamete Antigen Laboratory
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dracdhariwal@gmail.com | Member |
| 3. | Dr Rama Baru
Social Sciences Centre of Social
Medicine and Community Health
Jawaharlal Nehru University
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E Mail: rama.v.baru@gmail.com | Member | 8. Dr S.M.Mehendale
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| 3. | Dr.N.K. Mehra
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| 4. | Dr R.M.Pandey
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Dept. of Biostatistics
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neenavalecha@gmail.com | Member |
| 5. | Prof. A.,P.Dash, Ph.D
Vice Chancellor
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Thiruvarur - 610 101 | Member | 11. Dr Sarala K. Subba Rao
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Consultant ICMR
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12. Dr Rashmi Arora ICMR Representative
Head
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arorar@icmr.org.in
13. Director Health Services State Representative
Health & Family Welfare, Govt. of Odisha
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14. Dr. Namita Mahapatra
Director- in-Charge
Regional Medical Research centre (ICMR)
Chandrasekharapur,
Bhubaneswar 751 023
diricmr@icmr.org.in
Member Secretary

Human Ethical Committee

1. Dr. J.P. Das Chairman
Sr. Consultant Cardiologist
656 Mahanadi Vihar
Cuttack 753004
- 2 Prof.Aruna Mishra
68/1, Laxmi Vihar
PO: Sainik School, Bhubaneswar
- 3 Prof. P. K. Dash Member
Ex-DMET
Rajendra Nagar, Cuttack - 10
- 4 Mrs Kasturika Pattanayak Member
Ex-Chair Person, Social Welfare Board
Govt. of Orissa, 1, Lewis Road
Bhubaneswar.
- 5 Dr P. K. Acharya Member
N-1 A/10 IRC Village
Near CRP Square, Bhubaneswar 751 015
- 6 Dr. Sisir Kumar Mahapatra Member
Sr. Consultant Physician

Surya Nivas, Plot No:B-1/91
Lingaraj Vihar, Pokhariput,
Bhubaneswar 751 020

- 7 Shri. Shantanu Das Member
Retd. District & Sessions Judge
202, Block "C" ,Nageswar Residency
Nandan Vihar, Patia, Bhubaneswar751024
- 8 Prof. Rita Ray Member
423 Swarnapuri Road
Opp: Kanan Vihar Phase-II
Bhubaneswar 751 024
- 9 Dr.Namita Mahapatra Member Secretary
Director-in-Charge
Regional Medical Research Centre
Bhubaneswar

Animal Ethical Committee

1. Dr. Namita Mahapatra Chairman
Director-in-Charge
Regional Medical Research Centre
Bhubaneswar
2. Dr S. K. Ray, Member
Ex-Principal
Qr.No.M-109, Baramunda H.B. Colony
Bhubaneswar 751 003
3. Dr. Arabinda Behera Member
V.A.S., MKCG Medical College
Berhampur 760 004
Dist-Ganjam, Odisha
4. Dr.Ramesh Ch. Pradhan Member
Deptt. of Microbiology
SCB Medical College
Cuttack 753 007, Odisha.
5. Ms.Trupti Rekha Swain Member
Associate Professor in Pharmacology
Qr.No.J.O.-4, S.C.B.Medical College
Cuttack 753 007
- 6 Mr N.R.Mansingh Member
Gundicha Vihar, (3rd Lane)

- Left side, Sarvodaya Nagar
Puri 752 002 Member
- 7 Dr.M.R. Ranjit, Member
Scientist-F, RMRC, BBSR Member
- 8 Dr. B. Dwibedi Member
Scientist-D, RMRC, BBSR
- 9 Dr. A. K. Satapathy Member-Secy.
Scientist-E, RMRC, BBSR.

Technical Purchase Committee

- 1 Dr. P. Das Chairman
Principal Scientist
CIFA, Kausalyagang
Bhubaneswar- 751 002
- 2 Dr. S. K.Das Member
Scientist-E
Inst. Of Life Sciences
Bhubaneswar
- 3 Dr. N.K. Debata Member
Prof. Microbiology
SUM-Hospital, Bhubaneswar
- 4 Mr. R.C.Muduli Member
Administrative Officer
RMRC, Bhubaneswar
- 5 Accounts Officer Member
RMRC, Bhubaneswar
- 6 Dr. Madhusmita Bal Member Secy.
Scientist-B
RMRC, Bhubaneswar.



Cultural Program on the eve of
RMRC Foundation Day celebration-2015

Budget & Resource Generation (2013-14)

Grant in Aid Salary	Rs. 5,55,20000.00
Grant in aid General	Rs. 29,43,300.00
Equipment	Rs. 23,27,000.00
Capital	Rs.2,65,19000.00
Resource Generation through Extramural Projects.	Rs.4,62,13829.00

Staff position

(As on 31st December 2015)

Scientists:

1.	Dr. (Mrs.) N. Mahapatra, M.Sc., Ph.D.	Scientist-F and Director-in-Charge
2.	Dr. M.R. Ranjit, M.Sc., Ph.D.	Scientist-F
3.	Dr. A. Mahapatra, M.Sc., M.Phil., Ph.D.	Scientist-E
4.	Dr. G. Bulliyya, M.Sc., Ph.D.	Scientist-E
5.	Dr. A.K. Satapathy, M.Sc., Ph.D.	Scientist-E
6.	Dr. B.B. Pal, M.Sc., Ph.D.	Scientist-E
7.	Dr. Taziba Hussain, M.Sc., Ph.D.	Scientist-E
8.	Dr. (Mrs.) A.S. Kerketta, M.B.B.S.	Scientist-E
9.	Dr. Dasarathi Das, M.Sc. Ph.D	Scientist-E
10.	Dr. R.K. Hazra, M.Sc., Ph.D.	Scientist-E
11.	Dr. Bhagirathi Dwibedi, M.B.B.S, M.D	Scientist-D
12.	Dr. Debdutta Bhattacharya, M.Sc., Ph.D	Scientist-C
13.	Dr. A.S.Acharya , M.Sc., M.Phil, Ph.D	Scientist-C
14.	Dr. Madhusmita Bal, M.Sc.M. Phil, Ph.D	Scientist-B
15.	Dr. P.K.Sahoo, M.Sc., Ph.D	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.	Mrs. G. Mallick, M.Sc.	Technical Asst.
4.	Mr. B. Murmu, M.Sc., M.Phil.	Technical Asst.
5.	Mr. N.S. Marai, M.Sc., LL.B.	Technical Asst.
6.	Mr. D.P. Hansdah, M.Sc.	Technical Asst.
7.	Mr. H.K. Tripathy, B.Sc, PGDME	Technical Asst
8.	Dr. H.K. Khuntia, M.Sc. Ph.D	Technical Asst.
9.	Mr. R.C. Parida, M.Sc.PGDCA	Technical Asst.
10.	Miss. Sujata Dixit, M.Phil, M.Sc	Technical Asst.
11.	Mr. R.N. Nayak, B.A.	Technical Asst.
12.	Mr. B.N. Sethi, Dip. MLT	Technical Asst.

13.	Mr. H.S. Naik, Dip. MLT	Technician-C
14.	Mr. T. Moharana	Technician-C
15.	Mr. M. Barik, Dip. MLT	Technician-C
16.	Mr. C.R. Samantray	Technician-B
17.	Mr. K.C. Dalai, B.A., ITI	Technician-B
18.	Mr. B.K. Kanhar	Technician-B
19.	Mr. N. Sahoo	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. K.C. Jena	MTS (Lab. Technical)
27.	Mr. S. K. Mallick	MTS (Lab. Technical)
28.	Mr. Banamali Nayak	MTS (Lab. Technical)
29.	Mr. K.G.Samal	MTS (Tech. Maintenance)

Library & Information

1.	Dr. B. Sahoo, M.L.I.Sc., Ph.D.	Library & Information officer
2.	Mr. Prabhat Kumar Swain, M. Lib & Inf. Sc.	Apprentice Library Trainee
3.	Miss. Lipika Nayak, 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. B. Sutar, M.Com	Section officer
3.	Mr. P.C. Nayak, B.A.	Personal Assistant
4.	Mr. A.P.Parida, B.A	Assistant
5.	Mr. B.S. Rao	Asst.
6.	Mr. S. K. Satapathy	U.D.C.
7.	Mr. R. Rath	UDC.
8.	Mr. D. K. Mohanty, B.A	Stenographer
9.	Mr. S. Nayak	U.D.C

10.	Mr. S. K. Das, B.Com.	L.D.C.
11.	Mr. S. K. Majhi, M.A., LL.B.	L.D.C.
12.	Mrs. S. Beuria, M.A	L.D.C
13.	Mr. R. C. Dash	MTS(General)
14.	Mr. Sankar P. Sharma	MTS(General)
15.	Mr. M. B. Thappa	MTS(General)
16.	Mr. T. Bahadur	MTS(General)
17.	Mr. D. C. Rao	MTS(General)
18.	Mr. Sankar Bisoi	MTS(General)
19.	Mr. Baburam Behera	MTS (General)
20.	Mrs. Triveni Nayak	MTS(General)
21.	Mr. R. K. Hembram	MTS(Lab. Technical)
22.	Mr. Pandaba Sahoo	MTS(Lab. Technical)

Director's Office

1.	Mrs. R. Varghese	Personal Asst
2.	Mr. K. C. Nayak	MTS(General)
3.	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



Inauguration of RMRC OPD by DG ICMR on 31st Jan 2015



Sri B.B.Mishra, IPS (Retired Police DG, Govt. of Odissa) addressing the RMRC staff on the occasion of Vigilance Awareness Week



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