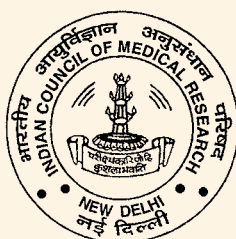


ANNUAL REPORT (2013-2014)



DESERT MEDICINE RESEARCH CENTRE

(Indian Council of Medical Research)

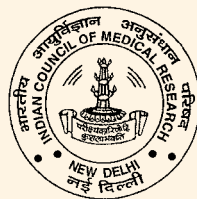
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डॉ विश्व मोहन कटोच
एम डी, एक एन ए एससी, एक ए एम एस, एक ए एससी, एक एन ए
सचिव, भारत सरकार
(स्वास्थ्य अनुसंधान विभाग)
स्वास्थ्य एवं परिवार कल्याण मंत्रालय एवं
महानिदेशक, आई सी एम आर
Dr. Vishwa Mohan Katoch
MD, FNASc, FAMS, FASc, FNA
Secretary to the Government of India
(Department of Health Research)
Ministry of Health & Family Welfare &
Director-General, ICMR



FOREWORD

It gives me immense pleasure to write this foreword to the Annual Report of Desert Medicine Research Centre (ICMR Jodhpur), for the year 2013-14 both in English and Hindi communicating its year long activities of promoting collaborative research, which effectively began with the organisation of Rajasthan Conclave in July, 2013. I am pleased to note that following this conclave, eight MoUs were signed between medical colleges, universities in the state and the state health authorities and various collaborative studies were initiated during the year. These studies, such as studies on Mapping of mosquito breeding using space technology (RS & GIS), Opium addiction and recurrence of pulmonary tuberculosis, Drug sensitivity testing of microbacterium tuberculosis, Hypertension among the tribes in Udaipur district and Nutritional status of elderly population; aim at important public health issues from widen horizon of approach.

The centre's contribution in facilitating the establishment of Model Rural Health Research Unit (MRHRU) at Bhanpur Kalan, Jaipur is appreciable. This is one of the fifteen such units being established across the country by the Department of Health Research, Govt of India. The initiation of one of the Biomedical Informatics Centre of ICMR at DMRC is another contribution of the centre towards developing a National Repository of clinical information. The appreciation, which the centre earned at district level in implementation of Rajbhasa, speaks for its commitment for implementation of Rajbhasa.

Assimilating Collaborative research, which is the need of the hour, and the distinguished work rendered for facilitation of the transfer of technology at rural level for improving health of rural people are laudable steps, which strengthen centre's efforts to bring health to the people of the region.


(V.M. Katoch)

PREFACE

Desert Medicine Research Centre (ICMR) has been committed to the health of the people of desert, right from its inception in 1984 through its multi dimensional health research endeavour to address various health problems posed by communicable, non-communicable and nutritional diseases. It has focused now to join hands with the stakeholders, in particular from last year as to widen collectively the horizons of approaches to address health related issues of the region. This approach resulted in collaborative research with medical colleges, state health departments and universities in the state. Various collaborative research projects were initiated during the year. During the year, DMRC also became a part of ICMR Task Force study on Hypertension.

Model Rural Health Research Unit has been set up by the Department of Health Research (DHR), Govt. of India for Rajasthan at Bhanpur Kalan, Jaipur with the objective of transfer of technology at rural level for improving health of rural people in particular. DMRC took a lead in facilitating the establishment of this unit, which was inaugurated by Secretary, DHR and DG, ICMR, Dr. V. M. Katoch on February 1st 2014. The land required for the construction of the unit has also been provided by state authorities free of cost and has now been transferred to DHR and the construction work of the building is going to start soon.

Apart from its untiring efforts for the health of the people of the region, DMRC has been very particular in implementation of the policies of Rajbhasha in the centre. “Chetna”, a quarterly bilingual (Hindi and English) magazine is published regularly by the centre is receiving much appreciation by its readers in its new look. Unicode training was imparted not only to all staff in DMRC but we received request from other organizations also such as FCI Aravali Gypsum and Prasar Bharti. DMRC trained the staff of these organizations as well in Unicode. This year, centre received the Runner-Up Shield by the Town Rajbhasha Implementation Committee as a token of appreciation of its efforts in implementation of Rajbhasha.

To address health problems of the region, the Centre is now putting its efforts in research of public health importance, with a new approach of collaboration with all the stakeholders as search for the solutions of complex health phenomena from a wider angle.

(Dr.G.S.Toteja)
Director

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COMMUNICABLE DISEASES

1.1 Mapping of risk of Dengue Hemorrhagic Fever (DHF) through dengue virus typing in *Aedes* mosquitoes of different settings of Rajasthan

Principal Investigator: Dr. Vinod Joshi, Scientist 'G'

Co-Principal Investigator: Dr. Manju Singhi, Scientist 'C'

Commencement: May, 2012 **Duration:** Two Years **Status:** Ongoing

Funding Agency: Vector Science Forum, ICMR (Extramural)

OBJECTIVES

1. Isolation of circulating Dengue virus types (DEN-1, 2, 3 & 4) among *Aedes* mosquitoes (*Aedes aegypti* & *Aedes albopictus*) of different districts of Rajasthan and mapping of circulating DEN types in study settings.
2. Characterization and typing of viruses from human patients of DHF reported from the same study settings.
3. Extrapolation of results of heterogeneity of circulating virus types (Extrinsic and Intrinsic) over study settings and prediction of risk areas for prospective emergence of DHF.

PROGRESS

Total numbers of 23 different districts have been covered for the collection of mosquito immatures. All the domestic as well as peri-domestic containers available in a selected house were searched for *Aedes* breeding. Total number of systematically sampled 14031 houses was screened in these districts of which 5.3% were positive for the breeding of *Aedes* mosquitoes. *Aedes* larvae were collected from .0.containers found positive for breeding which were then brought to the laboratory for virus isolation studies. Of the total 92,831 containers surveyed, 1929 containers were found to be positive. The key containers observed positive for *Aedes* breeding were cement tanks and clay pots. The details of entomological observations are depicted in Table 1.

Table 1: Details of entomological investigations in study villages (During Study Period)

S. No.	Districts	Total houses surveyed	Total houses +ve for breeding	% +ve	No. Of Containers examined	% Of Positive Containers	% +ve
1	Jalore U	193	15	7.77	1301	51	3.92
2	Pali U	302	40	13.24	2355	82	3.48
3	Sirohi U	492	56	11.38	1179	68	5.76
4	Barmer U	335	29	8.65	1521	56	3.68
5	Jaisalmer U	307	12	3.90	1539	37	2.40
6	Jodhpur U	1904	373	19.59	10748	537	4.99
7	Jodhpur R	208	37	17.78	1274	53	4.16
8	Jaipur U	1576	370	23.47	7857	445	5.66
9	Alwar U	403	52	12.90	2044	51	2.49
10	Dausa U	306	30	9.80	1931	31	1.60
11	Sikar U	591	105	17.76	3446	105	3.04
12	Jhunjhunu U	429	69	16.08	2830	105	3.71
13	Nagaur R	475	22	4.63	3445	23	0.66
14	Bhilwara U	937	33	3.52	7200	36	0.5
15	Tonk U	502	21	4.18	4470	22	0.49
16	Chittorgarh U	881	37	4.19	6584	38	0.57
17	Rajsamand U	560	30	5.35	4746	32	0.67
18	Banswara U	442	8	1.80	3558	10	0.28
19	Dungarpur U	418	14	3.34	3320	16	0.48
20	Pratapgarh U	362	20	5.52	3089	22	0.71
21	Kota U	952	40	4.20	7160	41	0.57
22	Bundi U	594	38	6.39	4489	44	0.98
23	Bharatpur U	862	26		6745	24	0.35
		14031	1477	10.52	92831	1929	2.07
<i>U: Urban, R: Rural</i>							

The field collected larvae were reared into adult mosquitoes in laboratory. Adults were subjected to Indirect Fluorescence Antibody Test (IFAT) to detect presence of dengue virus. Of 14031 houses surveyed in 23 districts, 1477 were found positive for breeding of *Aedes* mosquitoes. Of these, 1020 (7.2%) houses were positive for dengue virus presence. Percentage of houses positive for dengue virus ranged from 15.8% in Jaipur urban district to 1.1% in Dungarpur district. In 14031 houses, as many as 92831 domestic containers were examined for breeding of which 1079 (1.1 %) were positive for the presence of dengue virus (Table 2).

Table 2: Details of *Aedes* breeding and virus positivity at houses and container level in *Aedes* mosquitoes of study villages

S.no	Districts	Total houses surveyed	Total houses +ve for breeding	Total houses +ve for virus	% of virus +ve houses	No. Of Container	Virus +ve containers	% virus +ve containers
1	Jalore U	193	15	10	5.18	1301	11	0.84
2	Pali U	302	40	20	6.62	2355	25	1.06
3	Sirohi U	492	56	41	8.33	1179	45	3.81
4	Barmer U	335	29	20	5.97	1521	21	1.38
5	Jaisalmer U	307	12	9	2.93	1539	9	0.58
6	Jodhpur U	1904	373	251	13.18	10748	284	2.64
7	Jodhpur R	208	37	29	13.94	1274	31	2.43
8	Jaipur U	1576	370	250	15.86	7857	251	3.19
9	Alwar U	403	52	42	10.42	2044	42	2.05
10	Dausa U	306	30	23	7.51	1931	23	1.19
11	Sikar U	591	105	68	11.50	3446	72	2.08
12	Jhunjhunu U	429	69	63	14.68	2830	68	2.40
13	Nagaur R	475	22	6	1.26	3445	6	0.17
14	Bhilwara U	937	33	22	2.34	7200	22	0.30
15	Tonk U	502	21	19	3.78	4470	20	0.44
16	Chittorgarh U	881	37	26	2.95	6584	26	0.39
17	Rajsamand U	560	30	13	2.32	4746	13	0.27
18	Banswara U	442	8	8	1.80	3558	8	0.22
19	Dungarpur U	418	14	5	1.196	3320	5	0.15
20	Pratapgarh U	362	20	16	4.41	3089	17	0.55
21	Kota U	952	40	36	6.06	7160	36	0.50
22	Bundi U	594	38	21	3.53	4489	21	0.46
23	Bharatpur U	862	26	22		6745	23	
		14031	1477	1020	7.26	92831	1079	1.16

In 14031 houses surveyed during reported period, 92831 containers examined, 3843 larvae were collected and reared into adult mosquitoes. Maximum mosquito infections were observed in Barmer district, where 53.3% laboratory reared adults showed presence of virus where as least mosquito infectivity was observed in Dungarpur district (11.8 %). The virus positive mosquitoes were subjected to PCR for type specific virus isolations. RNA extraction was made for all the individual virus positive mosquitoes and preserved at -75°C. The extracted RNA are being subjected isolation employing Polymerase Chain Reaction (PCR). Both human sera and mosquitoes of house where dengue cases were reported, were subjected to type specific virus isolations (Fig.1)

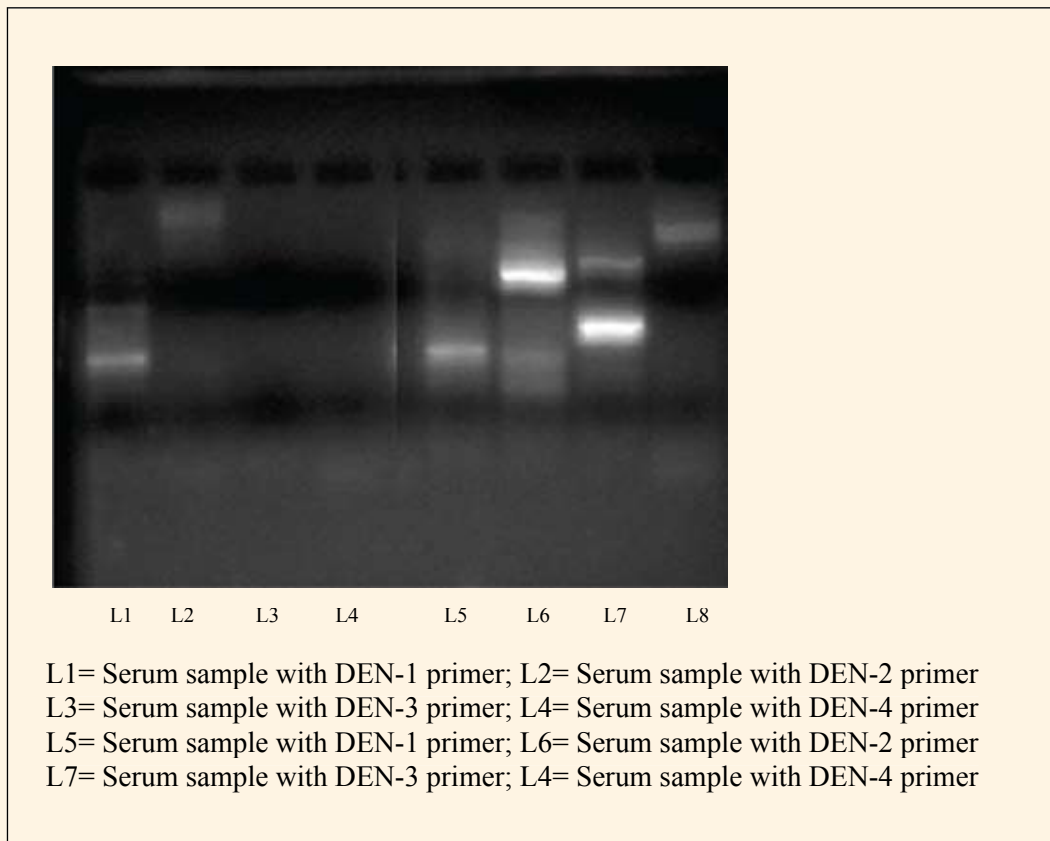


Fig. 1. PCR assay of human serum and mosquitoes of a dengue affected house

COMMUNICABLE DISEASES

1.2 Comparative study of Gene characterization of Influenza A pandemic (H1N1) 2009 viruses from virus isolates of 2009 pandemic and 2012 re-emerging viruses in western Rajasthan: Phylogenetic analysis and molecular characterization

Principal Investigator: *Dr. Vinod Joshi, Scientist 'G'*

Co-Principal Investigator: *Prof. Aruna Solanki, Prof. & Head, Department of Micro Biology, SN Medical College, Jodhpur*

Commencement: June, 2013 **Duration:** Three Years **MStatus:** Ongoing

Funding Agency: Desert Medicine Research Centre (Intramural)

OBJECTIVES

1. Comparative study of Gene sequences of virus isolates of influenza A pandemic (H1N1) 2009 viruses caused pandemic in 2009-10 and re-emergence during 2012.
2. Genome analysis of sequences obtained in available data base to study regional strain specificity of viruses.
3. Extrapolation of sequences over clinical conditions of patients to study possible viral genomic basis of clinical conditions.

PROGRESS

An era of H1N1 virus amplification in embryonated chicken eggs and its subsequent whole genome sequencing was started in the laboratory of the institute. A preliminary pilot trial of whole genome sequencing of the clinical samples and samples amplified in the chicken eggs was successfully accomplished with the technical guidance of National Institute of Virology, Pune.

The throat swab sample of a case of Pandemic Influenza A (H1N1) 2009 virus was taken and inoculated into the Allantoic cavity, Chorionic allantoic membrane, yolk sac and amniotic sac of 10 days old embryonated chicken eggs (Fig. 1).

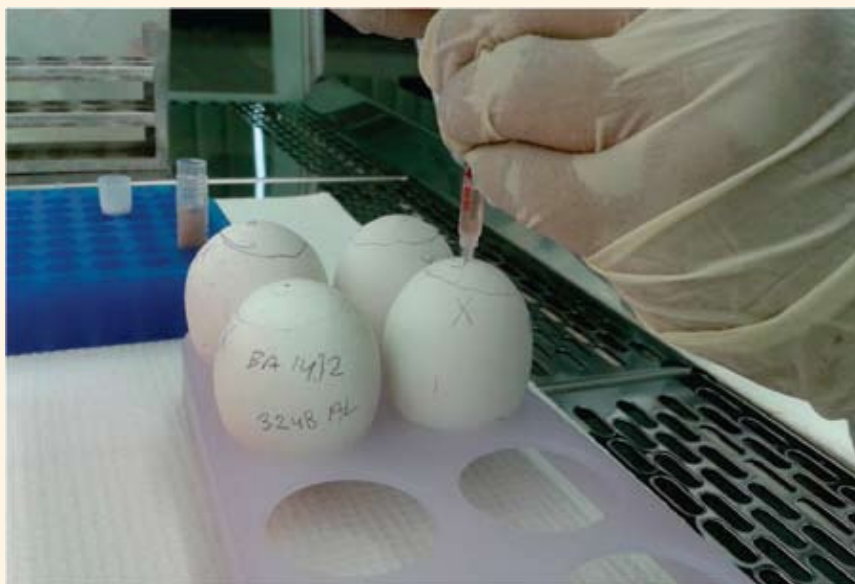


Fig. 1. Virus inoculation into eggs

After culture of virus for 24 hours, the yolk sac membrane and allanto-chorion membrane were processed for blocks preparation and subsequent study by the Electron Microscope (Commercially at All India Institute of Medical Sciences, New Delhi) to confirm the presence of virus in the membranes. The EM studies showed the presence of virus particles in the serial sections processed from the tissue blocks (Fig. 2).

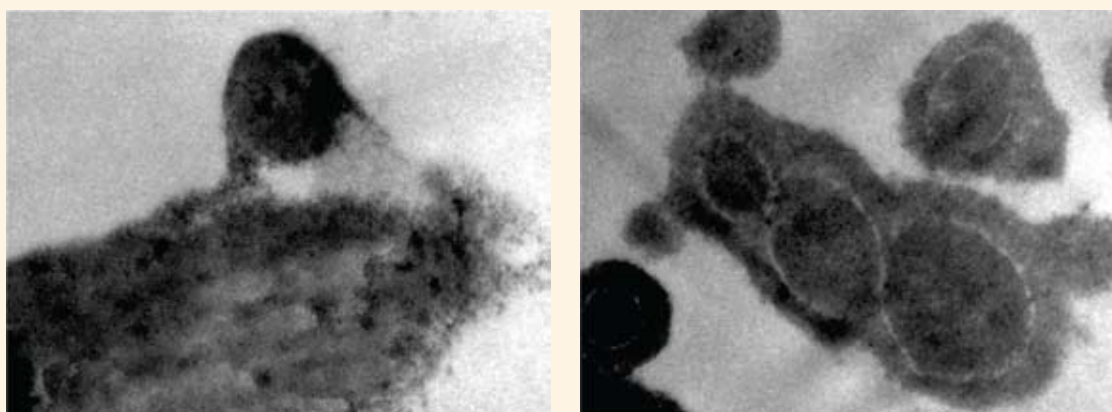


Fig.2. The Electron Microscopic picture of H1N1 virus particle grown in chorio-allantoise membrane of chicken eggs

The clinical samples proved to have H1N1 virus particle through EM studies and Real Time PCR, was subjected to further reactions for reverse transcription of viral RNA into c-DNA, denaturation, annealing and multiplication with about 94 primers belonging to all the eight gene segments of H1N1 virus genome. The c-DNA obtained were run on Agarose gel and bands of the some of the gene segments are shown in Fig.3

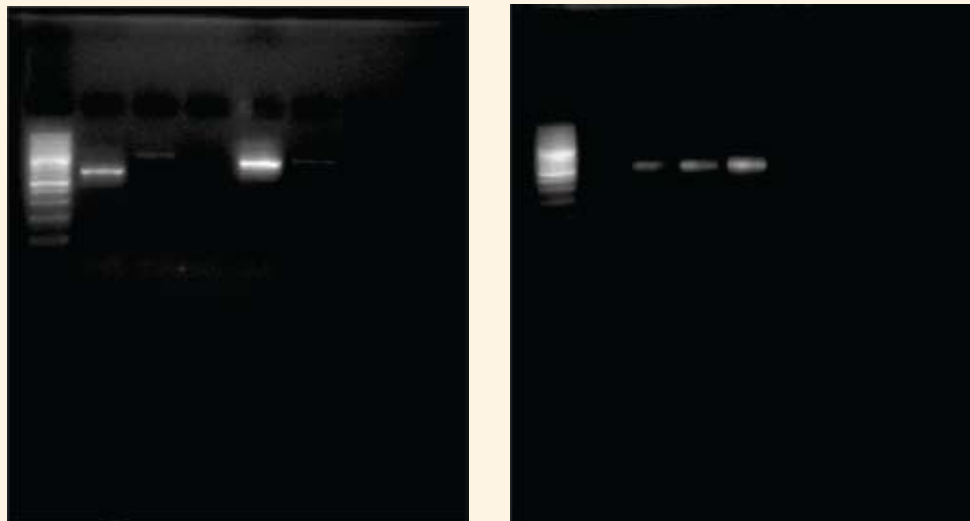


Fig.3. Agarose gel assay of some of the c-DNA of H1N1 virus.

3. Cycle Sequencing of c-DNA, purification and gene segment sequencing

c-DNA obtained from viral RNA and amplified subsequently and simultaneously was subjected to cycle sequencing, purification and sequencing of gene segments. The final product was subjected to gene sequencing (Fig. 4).

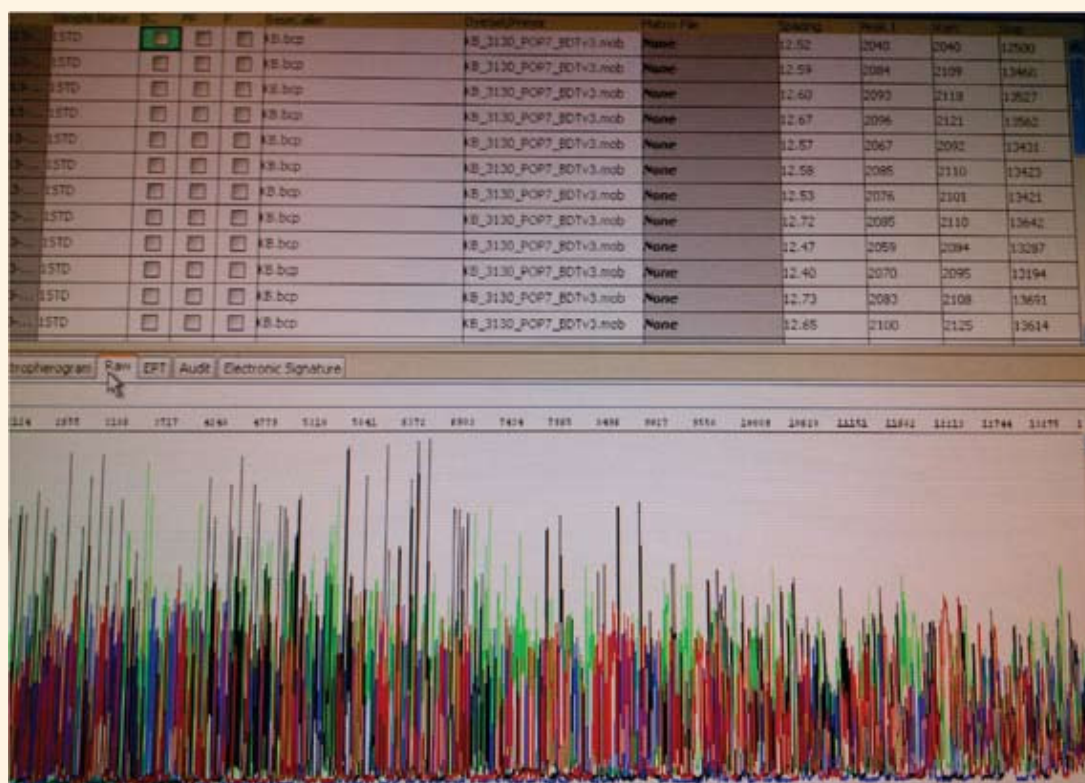


Fig. 4: Picture showing sequencing of one of gene segments of H1N1 virus

We expect to perform whole genome sequencing of H1N1 viruses and its agreement or dis-agreement pattern with reported genomes to explain the different clinical conditions of the patients.

COMMUNICABLE DISEASES

1.3 Surveillance of pyrethroid resistance in important malaria vectors of western Rajasthan and studies on genetic and biochemical mechanisms of pyrethroid resistance in *An. stephensi*

Principal Investigator: Dr. Karam V. Singh, Scientist 'F'

Co- Principal Investigator: Dr S. K. Bansal, Scientist 'F' and Dr. Himmat Singh, Technical Assistant

Commencement: June 1, 2012 **Duration:** Two Years **Status:** Ongoing

Funding Agency: Vector Science Forum, ICMR (Extramural)

OBJECTIVES

1. Periodic monitoring of insecticide susceptibility of *An. stephensi* and *An. culicifacies* to synthetic pyrethroids in the areas of their use to assess the development of insecticide resistance
2. Development of pyrethroid resistant strain of *An. stephensi* in the laboratory and investigation of the inheritance pattern of pyrethroid
3. Elucidation of the biochemical mechanism of pyrethroid resistance in *An stephensi* using laboratory selected strain and field collected resistant strains

PROGRESS

The studies were initiated in June 2012 in three desert districts i.e. Barmer, Bikaner and Jaisalmer, where synthetic pyrethroids have already been introduced as indoor residual spray under national control programme. From each district ten villages, having different spray histories of last three years, were selected for the study. Entomological surveys was conducted in each village for the collection of adult and larval forms of anopheline vector species from human- and cattle- sheds for presence adult form and domestic and peridomestic containers, tankas in each households, community tanks, ponds, ditches, 'Digis' (open cement tanks for collection water for village supply) etc for the presence of larval forms. The insecticide susceptibility status of the collected individuals was determined as per WHO method. The progress report of the work carried-out during the report period is as under:

Vector Species Prevalence

To study the season-wise prevalence of important malaria vectors of desert parts of Rajasthan, during the report period, the entomological surveys were conducted in 30 villages, 10 villages from each study district viz. Barmer, Bikaner and Jaisalmer during post-monsoon season. The district-wise details on the vector prevalence is as below:

Barmer district: The field studies in this district have been carried-out only during post-monsoon and pre-monsoon season in all 10 study villages (Table 1). In 07 study villages both *An. stephensi* and

An. culicifacies were collected in only one village i.e. Kalyanpur only *An. stephensi* was recorded, however in Baitu and Goliya villages no adult anophelines were collected (Table 1). The per man hour density (PMHD) of *An. stephensi* was recorded highest in village Nimbla (PMHD: 11.3) and minimum (PMHD: 0.5) in village Parlu (Table 1). *An. culicifacies* was also recorded maximum (PMHD: 16.6) in village Gunga, but the minimum (PMHD: 0.4) in village Thob.

The breeding of *An. stephensi* in Barmer district was detected in all the study villages in the habitats like indoor cemented ground tanks, indoor plastic-, cemented- and clay-containers, village ponds and ditches, whereas, of *An. culicifacies* only in the village ponds and ditches of three villages i.e. Jasol, Rani and Nimbla. The common breeding of both *An. stephensi* and *An. culicifacies* was observed in village ponds and ditches.

Table 1: Village-wise details of malaria vector species collected in Barmer district in monsoon season.

S. No.	Name of Village	Anopheline Species Collected	No. of Mosquitoes collected	PMHD*
1.	Kalyanpura	<i>An. stephensi</i>	02	0.8
2.	Jasol	<i>An. stephensi</i>	13	4.7
		<i>An. culicifacies</i>	08	2.9
3.	Thob	<i>An. stephensi</i>	03	1.1
		<i>An. culicifacies</i>	01	0.4
4.	Baitu	Nil	-	-
5.	Rani	<i>An. stephensi</i>	04	1.1
		<i>An. culicifacies</i>	07	1.9
6.	Gunga	<i>An. stephensi</i>	08	1.6
		<i>An. culicifacies</i>	83	16.6
7.	Goliya	Nil		-
8.	Parlu	<i>An. stephensi</i>	02	0.5
		<i>An. culicifacies</i>	02	0.5
9.	Kawas	<i>An. stephensi</i>	13	1.5
		<i>An. culicifacies</i>	02	0.5
10.	Nimbla	<i>An. stephensi</i>	31	11.3
		<i>An. culicifacies</i>	12	4.4

*PMHD – Per Man Hour Density

Bikaner district: The field studies in this district too have been carried-out during post-monsoon and pre-monsoon in all 10 study villages namely Khara, Shobhasar, Kodamdesar, Jagdewala Naal, Uttamdesar, Bhanipura, Kakku, Diyatra and Napasar (Table 2). *An. stephensi* was recorded from all the study villages during post-monsoon season, whereas, *An. culicifacies* only from nine villages except Khara. The per man hour density (PMHD) of *An. stephensi* was recorded highest in village Kakku (PMHD: 5.9) and minimum (PMHD: 0.3%) in village Khara and Bhanipura (Table 2). *An. culicifacies* was recorded maximum (PMHD: 8.0) in village Shobhasar, but the minimum (PMHD: 0.2) in village Naal.

Table 2: Village-wise details of malaria vector species collected in Bikaner district in monsoon season.

S. No.	Name of Village	Anopheline Species Collected	No. of Mosquitoes collected	PMHD*
1.	Khara	<i>An. stephensi</i>	01	0.3
2.	Shobhasar	<i>An. stephensi</i>	19	5.1
		<i>An. culicifacies</i>	30	8.0
3.	Kodamdesar	<i>An. stephensi</i>	15	3.1
		<i>An. culicifacies</i>	04	0.8
4.	Jagdewala	<i>An. stephensi</i>	03	0.9
		<i>An. culicifacies</i>	01	0.3
5.	Naal	<i>An. stephensi</i>	08	1.5
		<i>An. culicifacies</i>	01	0.2
6.	Uttamdesar	<i>An. stephensi</i>	02	0.4
		<i>An. culicifacies</i>	06	1.3
7.	Bhanipura	<i>An. stephensi</i>	01	0.3
		<i>An. culicifacies</i>	03	0.9
8.	Kakku	<i>An. stephensi</i>	37	5.9
		<i>An. culicifacies</i>	03	0.5
9.	Diyatra	<i>An. stephensi</i>	10	3.0
		<i>An. culicifacies</i>	13	3.9
10.	Napasar	<i>An. stephensi</i>	10	2.8
		<i>An. culicifacies</i>	01	0.3

*PMHD – Per Man Hour Density

In Bikaner district *An. stephensi* breeding was reported from all ten study villages, however, *An. culicifacies* was found breeding only in five villages i.e. Shobhasar, Kodamdesar, Uttamdesar, Jagdewala and Diyatra. The breeding of *An. stephensi* was found in indoor cemented containers/tanks, ground cemented open tanks, cattle tanks, village ponds and bird pots, whereas, *An. culicifacies* was found only in village ponds and community water tanks. The village ponds and community water tanks were found shared by both *An. stephensi* and *An. culicifacies* species for breeding.

Jaisalmer district: The field studies in this district too have been carried-out during post-monsoon in all 10 study villages (Table 3). Both *An. stephensi* and *An. culicifacies* were recorded from nine study villages except Gomath village. The per man hour density (PMHD) of *An. stephensi* was recorded highest in village Tejpala (PMHD: 8.9) and minimum (PMHD: 0.3) in villages Chinnu and Indira Nagar. *An. culicifacies* was recorded maximum (PMHD: 60.0) in village Raimala, but the minimum (PMHD: 0.3) in village Indira Nagar (Table 3).

Table 3: Village-wise details of malaria vector species collected in Jaisalmer district in monsoon season.

S. No.	Name of Village	Anopheline species collected	No. of mosquitoes	PMHD*
1.	Awaya	<i>An. stephensi</i>	08	1.5
		<i>An. culicifacies</i>	33	6.3
2.	Satyaya	<i>An. stephensi</i>	18	3.8
		<i>An. culicifacies</i>	03	0.7
3.	Chinnu	<i>An. stephensi</i>	01	0.3
		<i>An. culicifacies</i>	13	4.0
4.	Gomath	Nil	-	-
5.	Indira Nagar	<i>An. stephensi</i>	01	0.3
		<i>An. stephensi</i>	01	0.3
6.	Tejpala	<i>An. stephensi</i>	38	8.9
		<i>An. culicifacies</i>	211	49.6
7.	Sultana	<i>An. stephensi</i>	17	3.9
		<i>An. culicifacies</i>	98	22.5
8.	Raimala	<i>An. stephensi</i>	10	2.0
		<i>An. culicifacies</i>	300	60.0
9.	Hamira	<i>An. stephensi</i>	02	0.7
		<i>An. culicifacies</i>	01	0.4
10.	Thaat	<i>An. stephensi</i>	04	0.9
		<i>An. culicifacies</i>	06	1.4

*PMHD – Per Man Hour Density

In Jaisalmer district *An. stephensi* breeding was reported from all ten study villages, however, *An. culicifacies* was found breeding in only in five villages viz., Awaya, Satyaya, Tejpala, Sultana and Raimala. *An. stephensi* was found breeding in indoor underground (UG) and cemented tanks, open ground tanks, coolers, ground cemented cattle tanks, whereas, *An. culicifacies* in village pond and cattle tanks, which were also found sharing by *An. stephensi*.

Current susceptibility status of malaria vector species:

The current susceptibility status of *An. stephensi*, in Barmer district, was determined against DDT, malathion, alpha-cypermethrin, cyfluthrin and permethrin (Table 4). *An. stephensi* in village Kalyanpura was found susceptible to cyfluthrin (Mortality: 100.0%), intermediate resistant to DDT (Mortality: 92.0%) and resistant to malathion (Mortality: 72.0%); in village Thob, resistant to DDT and intermediate resistant to malathion (Mortality: 90.0%) and cyfluthrin (Mortality: 96.0%); in village Kawas susceptible to permethrin (Mortality: 100.0%); in village Baitu intermediate resistant to cypermethrin (Mortality: 96.0%), and in village Gunga susceptible to alpha-cypermethrin (Mortality: 100.0%). The experiments of *An. stephensi* against alpha-cypermethrin in village Baitu and Bhanipura and cyfluthrin in village Thob need repetition with adequate no. of individuals for verification of the results.

In Bikaner district, the current susceptibility status of *An. stephensi* was detected against DDT, malathion and permethrin (Table 4). *An. stephensi* in village Napasar was found susceptible to

permethrin (Mortality: 100.0%) and intermediate resistant to DDT (Mortality: 95.6%); in village Kakku susceptible to permethrin (Mortality: 100.0%); in village Diyatra, intermediate resistant to DDT (Mortality: 88.0%) and susceptible to malathion (Mortality: 100.0%); in village Naal against DDT intermediate resistant (Mortality: 88.0%), and in village Bhanipura intermediate resistant to alpha-cypermethrin (Mortality: 88.0%). The experiments of *An. stephensi* against alpha-cypermethrin in village Bhanipura need repetition with adequate no. of individuals for verification of the results.

In Jaisalmer district studies on the current susceptibility status were carried-out with both *An. stephensi* and *An. culicifacies* against DDT, malathion cyfluthrin and permethrin. *An. stephensi* in village Hameera was found susceptible to permethrin (Mortality: 100.0%), intermediate resistant to malathion (Mortality: 92.0%) and resistant to DDT (Mortality: 80.0%); in village Satyaya, susceptible to both cyfluthrin and permethrin (Mortality: 100.0%) and intermediate resistant to malathion (Mortality: 93.3%) and DDT (Mortality: 84.4%); in village Tejpala, intermediate resistant to cyfluthrin (Mortality: 96.0%), malathion (Mortality: 96.0%) and DDT (Mortality: 96.0%); in village Thaat, susceptible to permethrin (Mortality: 100.0%), intermediate resistant to DDT (Mortality: 86.0%) and resistant to malathion (Mortality: 68.0%), and in village Gomath susceptible to permethrin (Mortality: 100.0%), intermediate resistant to malathion (Mortality: 88.0%) and resistant to DDT (Mortality: 76.0%). The experiments of *An. stephensi* against cyfluthrin in village Tejpala village need repetition with adequate no. of individuals for verification of the results (Table 4).

Laboratory selection studies to establish a synthetic pyrethroid resistant strain:

Laboratory selection studies to establish a permethrin resistant strain of *An. stephensi* are continued. The strain collected from Kakku village of Bikaner district, has been selected for the purpose, as village Kakku since last 2 years has no history of any insecticide spray and the strain of the village was susceptible to permethrin. The selection studies using LT80 (selection pressure) value are in progress to develop a permethrin resistant strain which will be used for the biochemical and genetic studies.

Table 4: Susceptibility status of malaria vector specie collected from study villages against different insecticides.

District	Village	Species	Insecticide & diagnostic Dose	Exposure Time (in Hrs)	% Mortality	Susceptibility Status*
Bikaner	Napasar	<i>An. stephensi</i>	DDT 4.0%	1.0	95.6	IR
			Malathion 5.0%	1.0	95.6	IR
			Permethrin 0.75 %	1.0	100.0	S
	Kakku	<i>An. stephensi</i>	Permethrin 0.75 %	1.0	100.0	S
	Naal	<i>An. stephensi</i>	DDT 4.0%	1.0	88.0	IR
	Diyatra	<i>An. stephensi</i>	DDT 4.0%	1.0	88.0	IR
			Malathion 5.0%	1.0	100.0	S
Barmer	Bhanipura	<i>An. stephensi</i>	α - cypermethrin 0.05%	1.0	88.0	IR
	Baitu	<i>An. stephensi</i>	α - cypermethrin 0.05%	1.0	96.0	IR
	Kalyan-pur	<i>An. stephensi</i>	DDT 4.0%	1.0	92.0	IR
			Malathion 5.0%	1.0	72.0	R
			Cyfluthrin 0.15%	1.0	100.0	S
	Kawas	<i>An. stephensi</i>	Permethrin 0.75 %	1.0	100.0	S
	Thob	<i>An. stephensi</i>	DDT 4.0%	1.0	73.3	R
			Malathion 5.0%	1.0	90.0	IR
			Cyfluthrin 0.15%	1.0	90.0	IR
	Gunga	<i>An. stephensi</i>	α - cypermethrin 0.05%	1.0	100.0	S
Jaisalmer	Hameera	<i>An. stephensi</i>	DDT 4.0%	1.0	80.0	R
			Malathion 5.0%	1.0	92.0	IR
			Permethrin 0.75 %	1.0	100.0	S
	Satyaya	<i>An. stephensi</i>	DDT 4.0%	1.0	84.4	IR
			Malathion 5.0%	1.0	93.3	IR
			Permethrin 0.75 %	1.0	100.0	S
			Cyfluthrin 0.15%	1.0	100.0	S
	Tejpala	<i>An. culicifacies</i>	Cyfluthrin 0.15%	1.0	100.0	S
		<i>An. stephensi</i>	DDT 4.0%	1.0	96.0	IR
			Malathion 5.0%	1.0	96.0	IR
			Cyfluthrin 0.15%	1.0	96.0	IR
	Thaat	<i>An. stephensi</i>	DDT 4.0%	1.0	86.0	IR
			Malathion 5.0%	1.0	68.0	R
			Permethrin 0.75 %	1.0	100.0	S
	Gomath	<i>An. stephensi</i>	DDT 4.0%	1.0	76.0	R
			Malathion 5.0%	1.0	88.0	IR
			Permethrin 0.75 %	1.0	100.0	S
	Chinnu	<i>An. culicifacies</i>	DDT 4.0%	1.0	100.0	S
			Malathion 5.0%	1.0	100.0	S

*S- Susceptible, R- Resistant, IR- Intermediate Resistant

8. EXPECTED OUTCOME:

The findings would reveal whether the populations of *An. stephensi* and *An. culicifacies* select for resistance to synthetic pyrethroids or not in the field. The knowledge of the genetic and biochemical mechanisms of resistance would be useful in resistance management and control of *An. stephensi*.

COMMUNICABLE DISEASES

1.4 Impact of irrigation change on the prevalence of malaria in arid and non-arid parts of Rajasthan

Name of Principal Investigator: Dr. Karam V. Singh, Scientist 'F'

Name of Co-PI with designation: *Dr. S. K. Bansal, Scientist 'F'*

Dr. Himmat Singh, Technical Assistant

Commencement: September, 2013 **Duration:** Three Years **Status:** Ongoing

Funding Agency: Department of Science and Technology, Climate Change & Health Network (Extramural)

OBJECTIVES

1. To study the impact of irrigation change on the ecological conditions with respect to vector prevalence and malaria incidences.
2. To determine key factors influencing vector/malaria prevalence and distribution using RS and GIS.

PROGRESS

The project work has been initiated in September, 2013 to study the impact of irrigation change on the ecological conditions with respect to vector prevalence and malaria incidences and to determine key factors influencing vector/malaria prevalence and distribution using RS and GIS. The project staff has been trained to undertake entomological survey and collect information and data for the accomplishment of the project work as per the objectives of the project i.e. collection of adult and immature mosquitoes, incrimination of vectors and carrying out active malaria surveillance i.e. collection of blood slides and examination of blood smears for the detection of malaria parasite infections, besides recording data on different parameters being investigated in the study.

Two ecologically different districts, Jaisalmer and Banswara, have been considered to carry-out the studies and in both the districts the study areas have been identified. In Banswara districts, two areas, Kushalgarh Block, which represent characteristics of rain fed agriculture and Partapur block, characterized with canal irrigated agriculture, have been included. In Kushalgarh block four villages viz., Bhagatpura, Potaliya, Churada and Nathpura have been included in the study based on the past malaria incidence, whereas from Partapur block four villages namely Kheda, Nawagaon, Bhagora and Bodiya have been selected (Fig. 1).



Fig. 1. Map of Banswara district showing study villages

In Jaisalmer district too two study areas i.e. Nachna Block which represent the canal irrigated agriculture and Pokaran Block which represent desert characteristics and has rain-fed agricultural practices. In Nachna block four villages viz., Awai, Madasar, Sankaria and Shekhon ka Tala in Canal irrigated area have been considered for the study, however, in Pokaran block the selected study villages are Ujjala, Mandwa, Beethuwas and Jhalaria (Fig. 2).

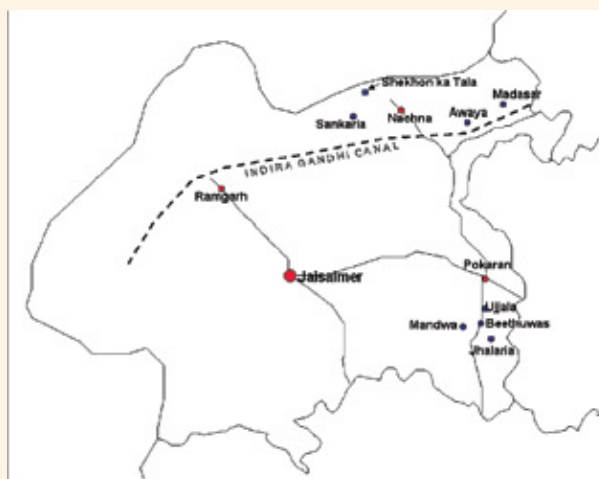


Fig. 2. Map of Jaisalmer district showing study villages

8. EXPECTED OUTCOME:

The study would identify the eco-environmental factors supporting the vector populations as well as malaria prevalence and based on which the key eco-environmental factors will be identified in view to utilize them in future as early warning tool.

COMMUNICABLE DISEASES

1.5 Synergistic efficacies of some plant extracts with and without some insecticidal formulations against vectors of malaria and dengue in North-Western Rajasthan

Principal Investigator: Dr. S. K. Bansal, Scientist 'F'

Co-Principal Investigator: Dr. Karam V. Singh, Scientist 'F'

Commencement: April, 2012 **Duration:** Three Years **Status:** Ongoing

Funding Agency: Desert Medicine Research Centre, (Intramural)

OBJECTIVES

1. Determination of the larvicidal activity of different parts of the plant *Withania somnifera* against urban mosquito vector species.
2. Determination of joint actions, synergistic/antagonistic of *W. somnifera* with both synthetic and plant-origin insecticides in view to develop the most promising combination(s) for inclusion in the IDVC programmes.

PROGRESS

Individual plant extracts are active only at higher concentration, which makes them uneconomical for field use. Therefore, in the present study synergistic, antagonistic and additive toxic effects of binary mixtures involving phytochemicals alone and in combination with other synthetic insecticides and microbial control agents are studied for their potential use in vector control.

Studies are being carried out on *W. somnifera*, also known as Ashwagandha, a plant in Solanaceae or nightshade family. Fruits, leaves and seeds of this plant have been traditionally used for the Ayurvedic system as aphrodisiacs, diuretics and for treating memory loss. We have already evaluated the insecticidal properties of *Solanum xanthocarpum*, the Indian nightshade commonly known as 'baigan kateli'. It is found throughout the country but more abundantly in the arid areas and used widely for a variety of ailments in public health. Extracts prepared from fruits of these plant species have been screened for their synergistic larvicidal potential against larvae of different mosquito vectors present in this area.

Susceptibility tests were carried out with larvae of two mosquito species viz. *Aedes aegypti* and *Culex quinquefasciatus*. For this purpose larvae of all the three mosquito species were collected from different areas of Jodhpur city and reared in the laboratory for further generations under controlled conditions. The different parts of the plant differ in their active constituents when extracted in different solvents. Ripe fruits of *S. xanthocarpum* and *W. somnifera* were shade dried between 30-40°C for 10-15 days. Dried plant material was powdered separately and dissolved in methanol and stock solutions and serial

dilutions were made as per requirement. Third or early fourth instar larvae of these mosquito species were tested as per standard WHO method for determining the baseline data on their susceptibility status. Experiments were carried out in 500 ml beakers containing 249 ml of water by using 20-25 larvae of each mosquito species. Mortality was noted after 24 hr and corrected by using Abbott's formula. Average of four observations was taken and data subjected to log probit regression analysis.

Observations on the results of the larval susceptibility to methanol extracts of yellow ripe fruits of *S. xanthocarpum* are given in Table 1. 24 hr LC_{50} and LC_{90} values along with their 95% fiducial limits, regression equation and chi-square were calculated. 24hr LC_{50} values as observed for *Ae. aegypti* and *Cx. quinquefasciatus* were 121.6 & 142.8 mg/l while the corresponding 24 hr LC_{90} values were 1261.5 & 1003.9 mg/l respectively. The results of the larval susceptibility to methanol extracts of red fruits of *W. somnifera* are given in Table 1. 24 hr LC_{50} values as observed for *Ae. aegypti* and *Cx. quinquefasciatus* were 135.1 & 1092.1 mg/l while the corresponding 24 hr LC_{90} values were 710.7 & 2159.4 mg/l respectively.

The results of the synergistic studies on larvae of *Ae. aegypti* and *Cx. quinquefasciatus* to the methanol extracts from yellow ripe fruits of *S. xanthocarpum* and red fruits of *W. somnifera* are given in table 1. Tests were carried out at concentrations from 5, 10, 25, 50, 100, 200, 400 and 500 mg/l with both the mosquito species and with different binary pairs. In the first test series the volume of *W. somnifera* was fixed and the proportion of *S. xanthocarpum* was increased and three different binary combinations (*viz.* WS:SX (1:1), WS:SX (1:2) and WS:SX (1:3)) were prepared for both the species (Table-1). A dose response curve was established to determine the 24 hr LC_{50} and LC_{90} values along with their 95% confidence limits, regression equation, chi-square (χ^2) / heterogeneity of the response by log probit regression analysis. In the second test series the volume of *S. xanthocarpum* was fixed and the proportion of the *W. somnifera* was increased and three different binary combinations (*viz.* SX:WS (1:1), SX:WS (1:2) and SX:WS (1:3)) were again prepared for both the species (Table-1).

The 24h LC_{50} values as determined for the three binary mixtures *viz.* WS:SX (1:1), WS:SX (1:2) and WS:SX (1:3) were 43.2, 31.1 & 25.8 mg/l and the 24hr LC_{90} were 380.2, 250.2 & 239.2mg/l for *Ae. aegypti* respectively, while the corresponding 24 hr LC_{50} values for these above three pairs were 87.2, 46.2 & 39.2 mg/l and the 24hr LC_{90} values were 281.2, 230.1 & 192.2mg/l for *Cx. quinquefasciatus* respectively (Table 1). From the results it is clear that both the species were very much susceptible to the binary mixture WS:SX (1:3) as compared to the binary pairs WS:SX (1:2) and WS:SX (1:1) or in other words the efficacy goes up with the increase in the proportion of *S. xanthocarpum* extract.

The 24h LC_{50} values as determined for other three binary mixtures *viz.* SX:WS (1:1), SX:WS (1:2) and SX:WS (1:3) were 43.2, 76.7 & 103.6 mg/l and the 24hr LC_{90} were 380.2, 476.6 & 513.4 mg/l for *Ae. aegypti* respectively, while the corresponding 24 hr LC_{50} values for these above three pairs were 87.2, 160.9 & 220.6 mg/l and the 24hr LC_{90} values were 281.2, 971.1 & 1057.6 mg/l for *Cx. quinquefasciatus* respectively (Table 1). From the results it is clear that both the species were very much susceptible to the binary mixture SX:WS (1:1) as compared to the binary pairs SX:WS (1:2) and SX:WS (1:3) or in other words the efficacy goes down with the increase in the proportion of *W. somnifera* extract. Synergistic Factor (SF) and Co-toxicity Coefficient (CTC) were also determined and it was observed that when the conc. of WS was fixed and the conc. of SX was increased from 1:1 to 1:3, the Binary pair 1:3 was found most effective synergist pair (Table 1). However, a mixture of 1:1 was found most effective when the conc. of SX was fixed and the conc. of WS was increased from 1:1 to 1:3 (Table 1). However, with respect to 24hr LC_{50} value, the pairs SX:WS (1:2) and SX:WS (1:3) were found antagonistic (SF- 0.9 and 0.7) while with respect to 24hr LC_{90} , the pair SX:WS (1:2) was additive (SF-1.0) for *Cx. quinquefasciatus*.

Table 1. Synergistic and antagonistic effects on larvae of *Ae. aegypti* and *Cx. quinquefasciatus* when exposed to different proportions of methanol extracts (Fruits) of *S. xanthocarpum* (SX) and *W. somnifera* (WS)

Treatment Ratios	Mosquito Species	Regression Equation	Chi Sq. (χ^2)	24 hr LC ₅₀ $\pm$ SE Fiducial limits (mg/l)	CTC	SF	Response	24 hr LC ₉₀ $\pm$ SE Fiducial limits (mg/l)	CTC	SF	Response
SX	<i>Aedes aegypti</i>	$Y = 1.26x + 2.37$	0.11	121.6 (81.7-180.9)	-	-	-	1261.5 (396.6-4012.4)	-	-	-
WS		$Y = 1.78x + 1.22$	0.35	135.1 (98.9-184.5)	-	-	-	710.7 (339.2-1489.2)	-	-	-
WS:SX (1:1)		$Y = 1.36x + 2.78$	1.01	43.2 (29.2-63.9)	312.7	3.1	S	380.2 (125.0-1155.9)	186.9	1.9	S
WS:SX (1:2)		$Y = 1.41x + 2.89$	1.46	31.1 (20.0-48.1)	434.4	4.3	S	250.2 (79.0-791.9)	284.1	2.8	S
WS:SX (1:3)		$Y = 1.32x + 2.13$	1.68	25.8 (16.4-40.7)	523.6	5.2	S	239.2 (64.4-888.5)	297.1	3.0	S
SX:WS (1:1)		$Y = 1.78x + 1.22$	1.01	43.2 (29.2-63.9)	281.5	2.8	S	380.2 (125.0-1155.9)	331.8	3.3	S
SX:WS (1:2)	<i>Culex quinquefasciatus</i>	$Y = 1.85x + 1.51$	0.50	76.7 (56.6-104.0)	158.5	1.6	S	476.6 (176.2-805.0)	264.7	2.7	S
SX:WS (1:3)		$Y = 1.84x + 1.29$	0.63	103.6 (77.0-139.4)	117.4	1.2	S	513.4 (246.6-1068.7)	245.7	2.5	S
SX		$Y = 1.76x + 1.20$	1.91	142.8 (101.4-201.0)	-	-	-	1003.9 (319.7-3804.1)	-	-	-
WS		$Y = 1.22x + 1.28$	1.36	1092.1 (470.0-2537.2)	-	-	-	2159.4 (1640.5-9012.0)	-	-	-
WS:SX (1:1)		$Y = 2.52x + 0.12$	0.29	87.2 (68.5-110.9)	1252	12.5	S	281.2 (171.5-461.3)	767.9	7.7	S
WS:SX (1:2)		$Y = 1.84x + 1.94$	0.87	46.2 (34.0-62.9)	2363	23.6	S	230.1 (109.2-484.6)	938.5	9.4	S
WS:SX (1:3)	<i>Culex quinquefasciatus</i>	$Y = 1.85x + 2.05$	0.56	39.2 (28.3-54.1)	2786	27.9	S	192.2 (94.2-392.2)	1123	11.2	S
SX:WS (1:1)		$Y = 2.52x + 0.12$	0.29	87.2 (68.5-110.9)	163.8	1.6	S	281.2 (171.5-461.3)	357.0	3.6	S
SX:WS (1:2)		$Y = 1.64x + 1.38$	0.64	160.9 (118.0-219.3)	88.7	0.9	A	971.1 (418.7-2252.1)	103.4	1.0	D
SX:WS (1:3)		$Y = 2.39x - 0.59$	0.80	220.6 (172.0-282.9)	64.7	0.7	A	1057.6 (439.5-1306.0)	94.9	0.9	A

SF - Synergistic factor; CTC - Co-Toxicity Coefficient

S- Synergistic; A- Antagonistic; D- Additive

COMMUNICABLE DISEASES

1.6 Use of insecticide treated nets (ITNs) in alternative forms for the protection against malaria transmission in the desert region.

Principal Investigator: Dr. S. S. Mohanty, Scientist 'C'

Commencement: Sept, 2013 **Duration:** Three Years **Status:** Ongoing

Funding Agency: Desert Medicine Research Centre, (Intramural)

OBJECTIVE

Evaluation of the effectiveness of the insecticide treated nets (ITNs) with community participation and acceptance of use of ITNs in alternate forms in the desert part of India.

PROGRESS

Insecticide treated bed nets (ITBNs) have been strongly advocated for use to prevent malaria and are considered to be a significant improvement in the strategy to fight malaria. Several community-randomized control trials have shown that insecticide treated bed nets substantially reduce pediatric malaria morbidity. ITBNs reduce malaria transmission through the combination of a physical barrier (which prevents mosquito on feeding on occupants) and insecticide (which kills/repel mosquito vectors). Malaria is transmitted in the desert part of India largely by the *Anopheles stephensi* mosquitoes.

The study site constituted of six villages of the Pokaran CHC of the Jaisalmer district. The CHC has been selected because of the higher API (35). The base line survey was conducted in the six villages for the collection of the entomological and malaria epidemiology data. The base line surveys were made in the post monsoon period (September 2013) and in winter season (January 2014). The base line data of the post monsoon period are shown in table-1. Three *Anopheles* spp., *Anopheles stephensi*, *Anopheles culicifacies* and *Anopheles subpictus* were reported from the villages. Highest slide positive rate (SPR) was reported in the village Nathusar. In the winter base line survey no *Anopheles* spp. was collected from any of the six villages. However, malaria cases were only reported from the That village and SPR was 20% and *Plasmodium falciparum* percentage was 100. The curtains and other forms of the insecticide treated nets will be provided to the house holds before the monsoon season in the form of intervention and follow up will be done thereafter.

Table 1. Name of the mosquitoes species collected from the villages with density of Anopheles spp. Malaria cases in the form of SPR, Pf%, Pv% reported from the villages.

Names of the villages	Name of the mosquitoes species collected	Density of Anopheles (PHD)	SPR	Pf %	Pv %	Mixed cases
Nathusar	1. <i>Anopheles subpictus</i> 2. <i>Anopheles stephensi</i> 3. <i>Culex quinquefasciatus</i>	6	53.3%	25%	87.5	12.5%
That	1. <i>Anopheles subpictus</i> 2. <i>Anopheles culicifacies</i> 3. <i>Culex quinquefasciatus</i>	5	40%	75%	75%	50%
Kelawa	1. <i>Anopheles subpictus</i> 2. <i>Anopheles stephensi</i> 3. <i>Culex quinquefasciatus</i>	6	28.6%	50%	100%	50%
Ujjala	1. <i>Anopheles subpictus</i> 2. <i>Anopheles stephensi</i> 3. <i>Culex quinquefasciatus</i>	5	0%	0	0	0

PHD: Per hour density, Pf: *Plasmodium falciparum*, Pv: *Plasmodium vivax*, SPR: Slide positive rate.

COMMUNICABLE DISEASES

1.7 Mapping of mosquito breeding habitats and location of vertebrate hosts in North and Southern parts of Rajasthan state prone for emergence of JE virus using space technology (RS & GIS).

Principal Investigator: Dr. P. C. Kanojia, Scientist 'E'

Co-Principal Investigator: Dr. Rakesh Paliwal, Reasonal Remote Sensing Centre, Jodhpur,
Dr. Himmat Singh, Technical Assistant

Commencement: August, 2012 **Duration:** Three Years **Status:** Ongoing

Funding Agency: Vector Science Forum, ICMR (Extramural)

OBJECTIVES

1. Mapping of mosquito larval habitats, particularly *Cx. tritaeniorhynchus* and *Cx. vishnui* sub-group of mosquitoes and location of vertebrate hosts (pigs) which play major role in transmission of Japanese encephalitis virus (JE) using RS and GIS technologies.
2. To identify JE prone areas with the help of RS and GIS in conjugation with eco-entomological studies in the proposed study sites.
3. To develop early warning system of JE occurrence.

PROGRESS

In order to collect more information on prevalence of JE vectors, cultivation of vegetation type, location of new water bodies, location of vertebrate hosts (pigs) and establishment of new roosting sites of paddy, field visits were made to five districts of Rajasthan state namely Udaipur, Dungarpur, Banswara, Sri-Ganganagar & Hanumangarh during Pre and Post monsoon period of the year 2013

Collection of JE vectors from different resting habitats

A total of 503 mosquito specimens belonging to 16 species were sampled from different resting habitats of mosquitoes. As many as 10 JE vectors viz., *Cx. tritaeniorhynchus*, *Cx. bitaeniorhynchus*, *Cx. fuscocephala*, *Cx. quinquefasciatus*, *Cx. pseudovishnui*, *Cx. gelidus*, *An. subpictus*, *An. barbirostris*, *An. pedataeniatus* and *Ma. uniformis* were collected during the course of study. District & village-wise distribution of mosquitoes along with JE vectors are mentioned in Table-1

Table-1. Collection of JE vectors from different habitats in Udaipur, Dungarpur Banswara, Sri-Ganganagar & Hanumangarh district during the year 2013

Sr. No.	Name of locality	CCBF, Sri-Ganganagar	Lalgadiya Ki Dhani, Sri-Ganganagar	Lakhuwali, Hanumangarh	Tibi, Hanumangarh	Jetana (Udaipur)	Shivpur (Banswara)	Talwara (Banswara)	Bicchiwara (Dungarpur)
Species									
1.	<i>Ae. lineatopennis</i>	-	-	-	-	+	+	+	-
2.	<i>Ae. pipersalatus</i>	+	-	-	-	-	+	-	-
3.	<i>An. annularis</i>	-	-	-	-	-	+	-	+
4.	<i>An. barbirostris</i> *	-	-	-	-	-	+	+	+
5.	<i>An. culicifascies</i>	+	-	+	-	-	+	-	+
6.	<i>An. peditaeniatus</i> *	-	-	-	-	-	+	-	-
7.	<i>An. stephensi</i>	+	-	-	-	-	-	-	-
8.	<i>An. subpictus</i> *	-	-	-	-	+	+	-	+
9.	<i>Ar. subalbatus</i>	-	-	-	-	+	+	-	+
10.	<i>Cx. bitaeniorhynchus</i> *	-	-	+	-	-	-	-	+
11.	<i>Cx. fuscocephala</i> *	-	-	-	-	-	+	-	-
12.	<i>Cx. gelidus</i> *	-	-	-	-	+	+	-	+
13.	<i>Cx. pseudovishnui</i> *	-	-	-	-	+	+	+	+
14.	<i>Cx. quinquefasciatus</i> *	+	+	+	+	-	-	-	+
15.	<i>Cx. tritaeniorhynchus</i> *	-	-	-	+	+	+	+	+
16.	<i>Man. uniformis</i> *	-	-	+	+	+	+	+	+

*JE vectors

Collection of mosquito larvae

A total of 385 mosquito larvae belonging to 14 species along with 9 JE vectors namely *Cx. tritaeniorhynchus*, *Cx. bitaeniorhynchus*, *Cx. fuscocephala*, *Cx. quinquefasciatus*, *Cx. pseudovishnui*, *Cx. epidesmus*, *An. subpictus*, *An. barbirostris* and *An. peditaeniatus* were collected from different breeding habitats. Breeding habitats like Paddy fields, Perennial Pond and Marshy area produced maximum numbers of JE vectors. District & habitats-wise distribution of mosquito larvae are mentioned in Table -2

Table 2. Collection of mosquito larvae from different breeding habitats at Udaipur, Dungarpur Banswara, Sri-Ganganagar & Hanumangarh district during the year 2013

Sr. No	Month	May,2013	May,2013	May,2013	Sept. 2013	Sept. 2013	Sept. 2013	Sept. 2013	Sept. 2013
	Name of locality	Sardargarh, Sri-Ganganagar	CCBF, Sri-Ganganagar	Lakhuwali, Hanumangarh	Jetana (Udaipur)	Jetana (Udaipur)	Talwara (Banswara)	Talwara (Banswara)	Bicchiwara (Dungarpur)
	Host	Pond	pond	trenches	Well (in paddy field)	Perennial Pond	Paddy field	Pond (marshy area near pond)	Paddy field
	Species								
1.	<i>An. annularis</i>	-	-	-	-	+	-	+	+
2.	<i>An. barbirostris</i> *	-	-	-	-	-	-	-	+
3.	<i>An. culicifascies</i>	-	-	-	-	-	-	+	-
4.	<i>An. peditaeniatus</i> *	-	-	-	-	-	+	-	+
5.	<i>An. stephensi</i>	+	+	+	-	-	+	-	-
6.	<i>An. subpictus</i> *	+	-	-	-	+	-	-	-
7.	<i>An. tessellates</i>	-	-	-	-	-	+	-	-
8.	<i>An. vagus</i>	-	-	-	-	-	-	+	-
9..	<i>Cx. bitaeniorhynchus</i> *	-	-	-	-	-	-	-	+
10.	<i>Cx. epidesmus</i> *	-	-	-	-	-	-	-	+
11.	<i>Cx. fuscocephala</i> *	-	-	-	-	+	-	+	-
12..	<i>Cx. pseudovishnui</i> *	-	-	-	-	+	-	-	+
13.	<i>Cx. quinquefasciatus</i> *	-	+	-	-	-	-	-	-
14..	<i>Cx. tritaeniorhynchus</i> *	-	+	-	+	+	+	+	+

*JE vectors

**Pic.1:** Perennial mosquito breeding site at Jetana, Udaipur



Pic.2. Collection of mosquito larvae at Dozopal, Dungarpur



Pic. 3. Perennial mosquito breeding habitat at Talwara, Banswara

Location of vertebrate hosts (pigs & paddy birds)

All the five districts *viz.*, Udaipur, Dungarpur, Banswara, Sri-ganganagar & Hanumangarh were searched for location of pig sties and roosting places of ardiel birds which play important role in JE epidemiology. Geo-coordinates of all the locations were recorded for the purpose of satellite mapping -Table - 3 and 4

Recoding of Geographical coordinates of study sites

Geographical coordinates of mosquito breeding habitats, including ponds, trenches, large water bodies (water reservoir) and the area which is likely to remain under paddy cultivation during monsoon season in Udaipur, Dungarpur, Banswara, Sri-ganganagar & Hanumangarh district were recorded. In addition to this, Geographical coordinates of pig sties & roosting places of paddy birds were also recorded using Global Positioning System (GPS) for the purpose of satellite mapping.

Table 3: Geographical coordinates of Udaipur, Dungarpur & Banswara district

S No.	District	Name of the place	Geo-coordinates	Remarks
1.	Udaipur	Salumber	N-24.13393 E-074.04330	Paddy growing area
2.	Udaipur	Jetana	N-23.98823 E-074.08166	Perennial pond
3.	Udaipur	Jetana	N-23.99078 E-074.08372	Paddy growing area
4.	Udaipur	Pichola lake	N-24.56890 E-73.68375	Big water body
5.	Dungarpur	Bicchiwara	N-23.78669 E-73.52689	Paddy growing area
6.	Dungarpur	Gapsagar	N-23. 83924 E-073.71566	Big water body
7.	Dungarpur	Dozapal	N-23. 74391 E-073. 83298	Perennial water body
8.	Banswara	Shivpur	N-23. 55882 E-074. 36237	Cattle sheds
9.	Banswara	Talwara	N-23. 57523 E-074.31794	Marshy area

Table 4: Geo-coordinates of Sri- Ganganagar & Haumangarh district

S No.	District	Name of the place	Geo-coordinates	Remarks
1.	Sri-Ganganagar	Suratgarh near CCBF & Gaggar river	N- 29.34103 E- 073.86801	Paddy growing area
2.	Sri-Ganganagar	Sardargarh Railway Station	N- 29. 36751 E- 073.74889	Paddy growing area
3.	Sri-Ganganagar	Jaitsar	N- 29. 34625 E- 073.66610	Paddy growing area
4.	Sri-Ganganagar	Between Sardargarh & Jaitsar	N- 29. 37165 E- 073.73450	Paddy growing area
5.	Hanumangarh	Between Suratgarh & Hanumangarh	N- 29. 45389 E- 074.02594	Paddy growing area
6.	Hanumangarh	Hanumangarh Town near temple & nursery	N- 29. 59768 E- 074. 31379	Paddy growing area
7.	Hanumangarh	Hanumangarh Town near Railway bridge & Vet. hospital	N- 29. 75867 E- 074. 33169	Pig sties
8.	Hanumangarh	Tibbi	N- 29. 55861 E- 074. 41060	Paddy growing area

9.	Hanumangarh	Lalgadiya ki Dhani	N- 29. 58971 E- 074. 33296	Paddy growing & paddy birds' roosting place
10.	Hanumangarh	Sec.11 near Central jail, Hanumangarh Railway Junction	N- 29. 60567 E- 074. 27606	Paddy birds' roosting places
11.	Hanumangarh	Lakhuwali near Pillibanga	N- 29. 46673 E- 074. 05946	Paddy growing area
12	Hanumangarh	Ward No.25, Sindhi kat, Mohalla near Pillibanga	N- 29. 60470 E- 074. 27366	Pig sties

Meteorological data

Meteorological data pertaining to rainfall, numbers of rainy days, maximum/minimum temperature were also obtained in respect of Udaipur, Dungarpur, Banswara, Sri-ganganagar & Hanumangarh districts. This data will be used in analysing mosquitogenic conditions in these study sites.

COMMUNICABLE DISEASES

1.8 Standardization of a rapid method for direct drug sensitivity testing of *Mycobacterium tuberculosis* from sputum samples.

Principal Investigator: Dr. Murli Lal Mathur, Scientist 'G'

Co-Principal Investigator: 1. Dr. Aruna Solanki, Prof. & Head, Dept. of Microbiology, Dr. S. N. Medical College, Jodhpur, Prof. & Head, Dept. of TB and Chest Diseases, Dr. S. N. Medical College, Jodhpur-342003

Commencement: April 2013 **Duration:** Two Years **Status:** Ongoing

Funding Agency: Desert Medicine Research Centre (Intramural)

OBJECTIVE

To standardize safe, simple, economic, closed method of direct drug sensitivity testing of *M. tuberculosis* from sputum samples in seven days.

PROGRESS

First version of the new method was used for 111 sputum samples. It was decided to refine the method after getting the results of this method as compared to results of LPA/cartridge based nucleic acid amplification testing (CBNAAT). It was not a formal evaluation of the method. We collected sputum samples from 111 patients admitted at KN Chest hospital with suspicion of MDR-TB. Our method was followed blindly and results were available on 7th day for 103 samples. Out of the 111 samples, results of LPA were available for 45 samples, as shown in Table 1. Out of these, 22 were AFB negative, 28 were labeled as resistant to rifampicin, 47 as sensitive to rifampicin and six showed contamination. Results of LPA were available for 49 of these samples after two months. LPA showed 8 as resistant to rifampicin, of which six were also detected as resistant by our method, giving sensitivity of 75.0% ; LPA showed 25 as sensitive to rifampicin, of which 18 were also detected as sensitive by our method, giving sensitivity of 72.0%. The method needs to be more refined. For eight samples, results of first day smear and seventh day smear were same and therefore any conclusion could not be drawn.

Table 1. Results of new method as compared to results of LPA (Line Probe Assay)

Results of our method	Results of LPA					
	Negative	Contamination	NTM	Resistant	Sensitive	Total
Indeterminate	0	0	1	0	2	3
Negative	7	0	0	0	2	9
Contamination	0	1	0	0	1	2
Resistant	0	0	0	6	4	10
Sensitive	1	0	0	2	18	21
Total	8	1	1	8	27	45

First version of this new method was also used for 41 sputum samples of suspects of MDR-TB, sent to us by DTC Jodhpur. The results are shown in Table 2.

Table 2. Results of new method as compared to results of CBNAAT (Cartridge Based Nucleic Acid Amplification Testing)

Results of our method	Results of CBNAAT					
	Negative	Contamination	Error	Resistant	Sensitive	Total
Indeterminate	0	0	0	1	1	3
Negative	15	1	0	1	6	22
Contamination	0	0	0	0	0	0
Resistant	0	0	0	3	0	3
Sensitive	0	1	1	0	11	13
Total	15	2	1	5	18	41

The new method needs to be further refined and compared with standard methods. Since liquid medium was mixed with sputum and then smear of day 0 was prepared, it got diluted and often showed scanty AFBs. The method has now been changed, highly concentrated liquid medium is being prepared, of which 0.1 ml will be needed to be added to 1 ml of sputum, this step is likely to improve the method and better results are likely to be obtained. Many times clumps or microcolonies are very few in the smear of day 7 and are missed on microscopic examination of ZN stained smear. It is proposed to use fluorescent staining and LED microscopy to improve the sensitivity of the method. We were not able to procure Rifampicin from Sigma, the Rifampicin of CDH, which we are using does not mention potency factor or date of manufacture or expiry. The potency of this rifampicin might be low, which might be a factor responsible for detection of false resistance. NTI Bangalore has been contacted to provide solution of this problem, which will be implemented. After making these modifications, this method is likely to perform better.

COMMUNICABLE DISEASES

1.9 Rapid culture and direct drug sensitivity testing of *Mycobacterium tuberculosis* to isoniazid and rifampicin using liquid culture media.

Principal Investigator: Dr. Murli Lal Mathur, Scientist 'G'

Co-Principal Investigator: Dr. Aruna Solanki, Professor and Head, Dept. of Microbiology, Dr. Dr. S. N. Medical College, Jodhpur, State Tuberculosis Officer, Rajasthan

Commencement: September 2013 **Duration:** Two Years **Status:** Ongoing

Funding Agency: Indian Council of Medical Research, (Extramural)

OBJECTIVES

1. To Standardize and evaluate rapid method for culture and sensitivity of *M. tuberculosis*.
2. To support RNTCP with culture of *Mycobacterium tuberculosis* from sputum samples.

PROGRESS

First version of the new method was used by us for 11 sputum samples which were also examined by RNTCP using LPA. It was decided to refine the method after getting the results of this method as compared to results of LPA/cartridge based nucleic acid amplification testing (CBNAAT). It was not a formal evaluation of the method. Our method was followed blindly and results were available on 7th day for 11 samples. Results of our method as compared to LPA are shown in Table 1. Results of LPA were available for these samples after two months. LPA showed 2 as resistant to rifampicin, of which one was also detected as resistant by our method; LPA showed 6 as sensitive to rifampicin, of which 5 were also detected as sensitive by our method, giving sensitivity of 83.3%. The method needs to be more refined.

Table 1: Results of new method as compared to results of LPA (Line Probe Assay)

Results of our method			Results of LPA	
	Negative	Resistant	Sensitive	Total
AFB Negative	3	0	1	4
Resistant	0	1	0	1
Sensitive	0	1	5	6
Total	3	2	6	11

First version of this new method was also used for 54 sputum samples of suspects of MDR-TB, sent to us by DTC Jodhpur. DTC Jodhpur had examined these samples with CBNAAT (Cartridge Based Nucleic Acid Amplification Testing) The results of our method as compared to CBNAAT (Cartridge

Based Nucleic Acid Amplification Testing) are shown in Table 2.

CBNAAT showed 5 as resistant to rifampicin, of which four were also detected as resistant by our method, giving sensitivity of 80.0% ; LPA showed 28 as sensitive to rifampicin, of which 19 were also detected as sensitive by our method, giving sensitivity of 76.0%. The method needs to be more refined. For two samples, results of first day smear and seventh day smear were same and therefore any conclusion could not be drawn (Indeterminate).

Table 2. Results of new method as compared to results of CBNAAT (Cartridge Based Nucleic Acid Amplification Testing)

Results of our method	Results of CBNAAT					
	Negative	Contamination	Error	Resistant	Sensitive	Total
Indeterminate	0	0	0	0	2	2
AFB Negative	18	1	0	0	6	25
Resistant	0	0	0	4	1	5
Sensitive	0	1	1	1	19	22
Total	18	2	1	5	28	54

The new method needs to be further refined and compared with standard methods. Since liquid medium was mixed with sputum and then smear of day 0 was prepared, it got diluted and often showed scanty AFBs. The method has now been changed, highly concentrated liquid medium is being prepared, of which 0.1 ml will be needed to be added to 1 ml of sputum, this step is likely to improve the method and better results are likely to be obtained. Many times clumps or microcolonies are very few in the smear of day 7 and are missed on microscopic examination of ZN stained smear. It is proposed to use fluorescent staining and LED microscopy to improve the sensitivity of the method. We were not able to procure Rifampicin from Sigma, the Rifampicin of CDH, which we are using does not mention potency factor or date of manufacture or expiry. The potency of this rifampicin might be low, which might be a factor responsible for detection of false resistance. NTI Bangalore has been contacted to provide solution of this problem, which will be implemented. After making these modifications, this method is likely to perform better.

We have applied for accreditation of our laboratory by RNTCP for drug sensitivity testing of *M. tuberculosis*. Consequently, our lab was visited by team of RNTCP. At our laboratory, we have standardized Proportion method using LJ medium for drug sensitivity testing of *M. tuberculosis*. We have carried out drug sensitivity testing of *M. tuberculosis*, using proportion method from 75 sputum samples. We are continuing the same as report of 100 such samples from our laboratory is required for accreditation.

COMMUNICABLE DISEASES

1.10 A Case Control study of opium addiction and recurrence of pulmonary tuberculosis.

Principal Investigator: *Dr. Murli Lal Mathur, Scientist 'G'*

Co-Principal Investigator: *Dr. N. K. Chaudhary, District Tuberculosis Officer, Jodhpur*

Commencement: March, 2013 **Duration:** Three months **Status:** Completed

Funding Agency: Desert Medicine Research Centre, (Intramural)

OBJECTIVES

1. To find out if Opium Addiction increases risk of default in DOTS.
2. To find out if Opium Addiction increases risk of recurrence of pulmonary tuberculosis.

PROGRESS

For Objective 1- One matched control was selected for each of ten interviewed cases of default. Thus one to one matching was carried out for age, sex, literacy and habit of alcohol consumption. These cases and controls were contacted and interviewed. Out of ten cases of default, four were opium addicts and out of their ten matched controls five were opium addicts, the Odds Ratio was 0.67 (95% CI =0.08 to 5.51) indicating no significant association between opium addiction and default in DOTS.

For Objective 2- Patients were selected from list of cases registered for DOTS in TB Register of TB Unit, Balesar of Jodhpur district, who completed treatment or were cured. TB registers from year 2007 to year 2011 were used for this purpose. Only those rural males with age group of 20 years or more were selected for whom TC (Treatment completed) or cured was recorded in TB Register. There were 1362 such cases for whom TC or cured was recorded. Their village-wise list was prepared and field work was started to visit villages and residences of these patients. Villages, namely Agolai, Shekhala, Setrawa, Ootamber, Khudiyala, Birai, Jhinhinyala, Bawarli, Jiya Beri, Ghudiyala, Belwa, Surani, Duggar, Bhayla, Tulesar Charna, Bhatelai Charna, Dooda Bera, Charani Bhandu, Jati Bhandu, Bastawa, Deriya and Meriya were visited. Two hundred ninetythree patients were followed in these villages, out of which 121 could be interviewed, 71 had died and 101 were not available at their residence at time of visit. Rapport was established with all 121 patients at their residences and they were interviewed after obtaining their written informed consent.

Out of 121 patients interviewed, those who gave history of development of recurrence of tuberculosis disease for which they were again registered for DOTS, were taken as cases (of recurrence) and those who did not develop recurrence since completion of their treatment, were taken as controls. Out of 21 patients, 66 were cases of recurrence and 55 did not develop recurrence (controls). One matched control was chosen for each case, thus one to one matching was carried out. Total 40 pairs of cases (of recurrence) and matched controls could be made for case-control analysis. Table 1 shows final case control analysis of all matched pairs of cases and controls. Only 12 (30.0%) of 40 cases of recurrence

gave history of opium addiction as compared to 19 (47.5%) of 40 matched controls of these cases. The Odds Ratio was 0.47 (95% CI =0.19 to 1.19).

Table 1. Distribution of matched cases and controls according to opium addiction

	Case of Recurrence	Matched Controls (no Recurrence)	TOTAL
Opium Addiction = YES	12 (30.0%)	19 (47.5%)	31
Opium Addiction = NO	28 (70.0%)	21 (52.5%)	49
TOTAL	40 (100.0%)	40 (100.0%)	80

Odds Ratio=0.47 (95% CI =0.19 to 1.19)

Table 2 shows distribution of all 121 patients interviewed, as per their occupational history. Out of 55 cases of recurrence, 44 (80.0%) gave history of working in stone quarries where they were exposed to inhalation of silica rich dust. Out of 66 unmatched controls of these cases, 60.6% gave history of working in stone quarries. The difference was statistically significant ($p=0.035$).

Table 2. Distribution of 121 patients (interviewed) according to occupational history

	Case of Recurrence	Unmatched Controls (no Recurrence)	TOTAL
Worked in Quarries = YES	44 (80.0%)	40 (60.6%)	84
Worked in Quarries = NO	11 (20.0%)	26 (39.4%)	37
TOTAL	55 (100.0%)	66 (100.0%)	121

*Yates corrected $p=0.035$

Table 3 shows distribution of all 121 patients interviewed, as per history of opium addiction. Out of 55 cases of recurrence, 18 (32.7%) gave history of opium addiction as compared to 40.9% of unmatched controls. The difference was not statistically significant ($p=0.4$).

Table 3: Distribution of patients interviewed according to opium addiction

	Case of Recurrence	Unmatched Controls (no Recurrence)	TOTAL
Opium Addiction = YES	18 (32.7%)	27 (40.9%)	45
Opium Addiction = NO	37 (67.3%)	38 (57.6%)	75
Quit Opium	0	1 (1.5%)	1
TOTAL	55 (100.0%)	66 (100.0%)	121

* $p=0.4$

Conclusion

The preliminary retrospective data collected in three months did not support the hypothesis that opium addiction increases risk of default in treatment of tuberculosis or it increases chances of development of recurrence of tuberculosis after cure or completion of treatment. The study was therefore not continued further.

COMMUNICABLE DISEASES

1.11 Translational Research for development and testing of ICMR-DMRC module of Dengue control for Rajasthan

Principal Investigator: *Dr. Vinod Joshi, Scientist 'G'*

Co-Principal Investigator: *Dr. Manju Singhi, Scientist 'C'*

Commencement: March, 2011

Duration: Two years & nine months **Status:** Completed

Funding Agency: ICMR Translational Research, (Extramural)

OBJECTIVES

1. Development of a ICMR-DMRC Dengue Control Plan for 7 zones of department of health & family welfare of Rajasthan.
2. Demonstration of Dengue control/prevention in collaboration with the state health authorities using the larvicide used in programme.
3. Demonstration and monitoring of disease control/elimination for two consecutive years and handing over the documental manual of dengue control plan for Rajasthan.

PROGRESS

The surveillance of breeding of larval *Aedes* has been undertaken in 14 district headquarters towns and 6 rural areas. The areas namely Jalore, Pali, Sirohi, Barmer, Jaisalmer, Jodhpur, Jaipur, Alwar, Dausa, Sikar, Jhunjhunu, Bikaner, Churu and Ganganagar were surveyed taking representative samples from all the municipal wards of these towns. Rural areas worked out are Bhinmal, Sojat city, Shivganj, Balotra, Pokaran and Balesar. Work is going on in two districts of Ganganagar and Nagaur. In all, 10,568 houses were searched which included 193 households in Jalore, 302 in Pali, 492 in Sirohi, 335 in Barmer, 307 houses in Jaisalmer, 1886 in Jodhpur, 1566 in Jaipur, 403 in Alwar, 306 in Dausa, 591 in Sikar, 429 in Jhunjhunu, 996 in Bikaner, 246 in Churu, 555 in Ganganagar, 307 in Bhinmal, 325 in Sojat city, 410 in Shivganj, 417 in Balotra, 294 in Pokaran and 208 in Balesar for dengue vector breeding. Maximum breeding was observed in Sojat city (32.3%). In Jalore town, 193 houses studied included 1301 containers examined for *Aedes* breeding, of which 51 were positive for vector breeding. Out of these 51 containers, only 11 (0.8%) were positive for dengue virus. In Pali town, of 2355 containers examined, 3.4% were positive for breeding and of these only 1.0% showed virus activity. In all, 61,423 containers in 10,568 houses of 20 study have been searched out of which only 1153 (1.87%) containers were virus positive.

A comprehensive survey in the urban areas (district headquarters) of all the 34 districts of Rajasthan was accomplished till December, 2013.

During the course of investigations we have examined 1,30,525 domestic containers in 33 districts of Rajasthan. Out of containers examined only 2288 (1.75 %) of containers were positive for breeding of dengue vectors. At individual district level also the maximum breeding observed in Jaipur district was only 6.1% of containers examined. If we observe the percentage of total containers examined which were positive for presence of dengue virus it was clear that only 1.0 % of 1,30, 525 containers examined showed virus presence. At individual district level, maximum virus positive containers (3.8%) was observed in Jaipur (Table 1).

Table 1. District wise Distribution of breeding in containers

S.No.	Name of district	Number of containers examined	Number of containers positive for breeding	Percentage of containers positive for breeding	Number of containers positive for virus	Percentage of breeding positive containers positive for virus	Percentage of examined containers positive for virus
	Jalore	1297	56	4.31	17	30.35	1.31
	Pali	2338	78	3.33	33	42.30	1.41
	Sirohi	3015	75	2.48	44	58.66	1.49
	Barmer	1518	56	3.68	18	32.14	1.18
	Jaisalmer	1364	40	2.93	11	27.50	0.80
	Jodhpur	10, 666	521	4.88	341	65.45	3.19
	Jaipur	7855	485	6.17	301	62.06	3.83
	Alwar	2044	53	2.59	43	81.13	2.10
	Dausa	1931	31	1.60	27	87.09	1.39
	Sikar	3478	111	3.19	79	71.17	2.27
	Jhunjhunu	2845	105	3.69	68	64.76	2.39
	Bikaner	5999	107	1.78	61	57.00	1.01
	Churu	1417	7	0.49	7	100.00	0.49
	Ganganagar	3180	72	2.26	56	77.77	1.76
	Hanumangarh	1677	22	1.31	4	18.18	0.23
	Nagaur	7234	73	1.00	46	63.01	0.63
	Ajmer	4523	33	0.72	26	78.78	0.57
	Bhilwara	7200	36	0.50	22	61.11	0.30
	Tonk	4470	21	0.46	19	90.47	0.42
	Udaipur	2692	NF	-	NF	-	-
	Banswara	3558	10	0.28	8	80.00	0.22
	Chittorgarh	6584	38	0.57	26	68.42	0.39
	Pratapgarh	3089	22	0.71	17	77.27	0.55
	Dungarpur	3320	16	0.48	5	31.25	0.15
	Rajsamand	4746	32	0.67	13	40.62	0.27
	Kota	7210	41	0.56	38	92.68	0.52
	Baran	3062	46	1.50	30	65.21	0.97
	Bundi	4489	46	1.02	24	52.17	0.53
	Jhalawar	2436	5	0.20	5	100.00	0.20
	Bharatpur	6777	30	0.44	24	80.00	0.35
	Dholpur	2133	NF	-	NF	-	-
	Karauli	2385	7	0.29	7	100.00	0.29
	Sawai Madhopur	3993	13	0.32	12	92.30	0.30
		1, 30, 525	2288	1.75	1432	62.58	1.09

Based on our earlier findings that dengue viruses undergo transovarial or vertical transmission across generations of mosquito vectors, a translational research has been undertaken to study whether

maintenance of dengue viruses through vertical route could be taken as the point of intervention to break the extrinsic – intrinsic cycle of virus to achieve the check over active transmission of the disease. A study has been accomplished in 32 district headquarters of Rajasthan to develop and test model of intervention to interrupt dengue transmission. The early warning system developed based on the observations of presence of dengue virus in laboratory reared adult mosquitoes was found technically feasible and very useful in predicting possible onset of dengue in the areas. The translation of research generated observations into public health actions was attempted through existing set up of state health department. Wherever, translation of early warning was complied with corresponding anti larval actions, disease prevention/control was effectively observed.

COMMUNICABLE DISEASES

1.12 KAP study of Dengue and Malaria to design appropriate intervention among Tribal of Rajasthan

Principal Investigator: *Dr. P. K. Dam, Technical Officer*

Co-Principal Investigator: *Mr. Anil Purohit, Technical Assistant*

Commencement: February, 2013

Duration: Four months **Status:** Completed

Funding Agency: Desert Medicine Research Centre (Intramural)

OBJECTIVES

To assess existing status of Knowledge, Attitude & Practice towards Malaria & Dengue among Tribal as well as non-tribal population which may help to design a intervention programme as an attempt to reduce the Malaria & Dengue infestations among Rajasthan tribal.

PROGRESS

Out of total 27 tribal households covered from hamlets, 23 total cases of malaria (85.2%) were reported from 22 households, whereas 77.1% of total 70 tribal households covered from main villages reported occurrence of malaria. Thus occurrence of malaria was observed 79.4% in tribal households (hamlets & main villages) as compared to 70.8% in non-tribal households (Table 1). 40.3% of Tribal Suspected Malaria Cases opted treatment from Bengali Doctors & 37.7% of them opted treatment from Government Health Facility. 22% of Tribal Suspected Malaria Cases opted treatment from Private Doctors as well (Table-2). In case of Non-Tribal Suspected Malaria cases, 61.6% sought treatment from Government Health Facility & 28.8% from Private Doctors. A few of them (9.6%) opted treatment from Bengali Doctors as well (Table-2). Proportion of Tribal Suspected Malaria Cases reaching Bengali Doctors for treatment of Malaria, out of total cases from Hamlet was 78.3%. Proportion of Tribal Suspected Malaria Cases reaching Bengali Doctors for treatment of Malaria, out of total cases from Main village was 24.0%. Out of 40.3% of Tribal Suspected Malaria Cases who reached Bengali Doctors, 58.0% were from Hamlets & 42.0% were from main village (Table 3).

Non-tribal groups chiefly used CHC (36.9%) for seeking treatment of malaria, albeit 15.1% respondents procured tablets from Chemist shop to reduce fever & malaria (Table 3) without undergoing any diagnostic blood test. Such medicines were used randomly following incomplete doses and without any prescribed guideline. The tribal respondents expressed that they took treatment from Bengali Doctors in & around the villages (78.3% in hamlets; 24.0% in main villages), whose treatment may be expensive but they perceive that mode of treatment & medicine given by them always remained effective (78.3% in hamlets; 24.0% in main villages). In all 54 suspected malaria cases were reported from 70 tribal households from the main villages (Table I) & 6 of 54 (11.1%) opted malaria treatment

from CHC (Table 3). All these 6 cases reported that treatment from CHCs was effective. Similarly, out of 27 non-tribal participants, who opted treatment from CHCs, 2 /3rd respondents reported treatment from CHC, was effective (Table 4).

Thus, present study revealed slightly different scenario that although the tribal people had knowledge that mosquito bites result malaria infection but due to poor economic condition, they could not afford to purchase personal protection measures (bed net, Black Hit or coils/ mats, mosquito repellent crème etc.) to curb mosquito bites. Majority of tribal in hamlets (92.6%) & main village (81.4%) used fumigation of cow dung & Neem leaves as personal protection measures against mosquito bites. Use of bed net was reported by 5.7% of tribal (educated & Govt. employee persons) & 16.5% of non-tribal respondents. Majority of non-tribal reported combination of electric fan, mosquito coil & fumigation of cow dung & Neem leaves as personal protection measures (Table-5).

Expected Outcome

Treatment of the fever cases at PHC/CHC/OPD of Government hospital is very significant, particularly in the context of malaria transmission, prevention & control. Self-reported Malaria diagnostic and treatment practices amongst Settling Bengali Doctors (Private medical practitioners) in different villages of Kotra tehsil, Udaipur need to be evaluated against benchmark practices articulated in the National Standards of Malaria Treatment and factors associated with compliance with the set standards & guidelines. Capacity strengthening of the Bengali Doctors may yield fruitful outcome to improve Malaria management practices and to prevent diagnostic delay and drug resistance. However, in addition to 'Bengali Doctors', the inter-sectoral convergence of other agencies (e.g. Swachh Pariyojana Village level workers, Tribal Area Development Department, Udaipur) functioning hand in hand with the Health System in the Tribal area & need to be addressed by providing comprehensive intervention. Therefore, it is the need of the hour that to combat malaria effectively in the tribal villages & hamlets, intervention through inter-sectoral convergence may be undertaken, so that the tribal may take upon themselves the responsibility of making their residential area free from vectors or biting nuisance of mosquitoes. The pictorial posters with live demonstration in tribal dialect highlighting precautions & no delay in treatment after commencement of symptom of fever should be communicated to the tribal.

Table 1. Occurrence of malaria among Tribal and Non-Tribal households

Household	Households covered	Households Reported occurrence of Malaria	Total cases of Malaria	% of occurrence of malaria
Tribal Households (hamlets)	27	22	23	85.2
Tribal Households (main villages)	70	54	54	77.1
Total Tribal households (Hamlets & main villages)	97	76	77	79.4
Total Non-tribal households (main villages)	103	73	73	70.8
Total of tribal & non-tribal households	200	149	150	75.0

Table 2. Health Seeking Behaviour of Tribal & Non-Tribal against Malaria

Health facility	Tribal	Non-Tribal
Bengali Doctor	40.3	9.6
Govt. health facility	37.7	61.6
private	22.0	28.8

Figures are in percentage

Table 3. Distribution of respondents using different treatment measures against malaria.

Type of treatment	Total cases Tribal in Hamlets (n= 23)	Total cases Tribal in main village (n= 54)	Total cases Tribal in Hamlets & main village (n= 77)	Total cases Non-tribal (n=73)
Bengali Doctor	18 (78.3)	13 (24.0)	31 (40.3)	7 (9.6)
PHC	1 (4.3)	13 (24.0)	14 (18.2)	9 (12.3)
Sub Center	2 (8.7)	4 (7.4)	6 (7.8)	2 (2.7)
Chemist Shop	0 (0.0)	8 (14.8)	8 (10.4)	11 (15.1)
Pvt Doctor	1 (4.3)	6 (11.1)	7 (9.1)	3 (4.1)
CHC	0 (0.0)	6 (11.1)	6 (7.8)	27 (36.9)
Govt. Hospital	0 (0.0)	3 (5.5)	3 (3.9)	7 (9.6)
Pvt. Hospital	1 (4.3)	1 (1.8)	2 (2.6)	7 (9.6)

Figures in parenthesis are in percentage

Table 4. Distribution of effectiveness of different treatment measures against malaria as reported by the respondents

Type of treatment	Tribal Hamlet effective	Tribal Hamlet Not effective	Tribal Main Village effective	Tribal Main Village Not effective	Tribal & Hamlet & Main Village effective	Tribal & Hamlet & Main Village Not effective	Non-Tribal effective	Non-Tribal Not effective
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Bengali Doctor	18 (78.3)	0 (0)	13 (24.1)	0 (0)	31 (40.2)	0 (0)	4 (5.5)	3 (4.1)
PHC	1 (4.3)	0 (0)	11 (20.4)	2 (3.7)	12 (15.6)	2 (2.6)	4 (5.5)	5 (6.8)
Sub Center	0 (0)	2 (8.7)	0 (0)	4 (7.4)	0 (0)	6 (7.8)	1 (1.4)	1 (1.4)
Chemist Shop	0 (0)	0 (0)	3 (5.5)	5 (9.3)	3 (7.7)	5 (6.5)	2 (2.7)	9 (12.3)
Pvt. Doctor	1 (4.3)	0 (0)	6 (11.1)	0 (0)	7 (9.1)	0 (0)	3 (4.1)	0 (0)
CHC	0 (0)	0 (0)	6 (11.1)	0 (0)	6 (7.8)	0 (0)	18 (24.6)	9 (12.3)
Govt. Hospital	0 (0)	0 (0)	3 (5.5)	0 (0)	3 (3.9)	0 (0)	7 (9.6)	0 (0)
Pvt. Hospital	1 (4.3)	0 (0)	1 (1.9)	0 (0)	2 (2.6)	0 (0)	6 (8.2)	1 (1.4)
Total effective & not-effective	21 (91.3)	2 (8.7)	43 (79.6)	11 (20.4)	64 (83.1)	13 (16.9)	45 (61.6)	28 (38.3)

Table 5. Distribution of respondents using different Personal protection measures against mosquito bites

Personal Protection Measures	Tribal in Hamlets (n= 27)		Tribal in main village (n=70)		Tribal in Hamlets & Main Village (n=97)		Non- tribal (n=103)	
	N	%	N	%	N	%	N	%
Mosquito Coils only	0	0.0	7	10.0	7	7.2	19	18.4
Bed net	0	0.0	4	5.7	4	4.1	17	16.5
Cow dung fumigation with Neem leaves	25	92.6	57	81.4	82	84.5	30	29.1
Fan +coil+Fumigation by cow dung & Neem leaves	0	0.0	0	0.0	0	0.0	37	36.0
Pesticide Spray by personal expense	0	0.0	2	2.8	2	2.1	0	0.0
Covering exposed part of body	2	7.4	0	0.0	2	2.1	0	0.0

NON-COMMUNICABLE DISEASES

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

Site Principal Investigator: *Dr. K. R. Haldiya, Scientist 'G'*

Co-Principal Investigator: *Dr. Raman Sachdev, Scientist 'E', Dr. Raghvendra Roy, Dy. CMHO, Government of Rajasthan, Udaipur, Dr. Shalabh Sharma, Prof. Community Medicine, RLT Medical College, Udaipur, Dr. Rakesh Dashora, Associate Prof. MLV Tribal Research Institute, Udaipur*

Commencement: October, 2013 **Duration:** Three Years **Status:** Ongoing

Funding Agency: ICMR Task Force (Extramural)

OBJECTIVES

1. 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.
2. 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.
3. To assess the operational feasibility of integrating NCD risk reduction in community health programs through existing community level healthcare volunteers such as ASHA or equivalent.
4. To assess the usefulness of trained healthcare workers to affect changes in dietary fat, fibers and salt, tobacco and alcohol consumption and increasing physical activity.
5. To assess the efficacy of these interventions to evaluate changes in lipid levels and glycemia.

PROGRESS

In the task force study of hypertension the team surveyed Udaipur district to check the feasibility and accessibility of the Study area on the basis of highest tribal population and approach from the DMRC, Jodhpur. Kotra Tehsil with highest tribal population i.e. more than 90% of tribal population was selected as the study area to conduct the study on hypertension among tribal population of Kotra tehsil of Udaipur district.

A team from Desert Medicine Research Centre attended the training programme under the project at the Coordinating site Centre DISHA Phase II organized by CCDC, New Delhi from 27th-29th January 2014. The training was given with regards to methods of collection of blood samples; the necessary precautions therein; the transportation and packaging of the samples and taking the anthropometric measurements of height and waist circumference along with measuring Blood Pressure. The training was also imparted on bio impedance which included nine parameters i.e. weight, body-fat%, body-water%, BMI, metabolic age, bone mass, muscle mass, daily calorie intake, visceral fat rating.

Non-Communicable Diseases

2.2 Prevalence of Diabetes mellitus and impaired glucose tolerance in the Raika and other community with similar life style in Rajasthan.

Principal Investigator: *Dr. Bela Shah, Scientist 'G'*

Co-Principal Investigator: *Dr. K. R. Haldia, Scientist 'G'*

Commencement: August, 2009 **Duration:** Three and Half years (Extended by 4 months)

Status: Completed

Funding Agency: ICMR Task Force (Exramural)

OBJECTIVES

1. To estimate the prevalence of Diabetes Mellitus and impaired glucose tolerance in Raika community of Rajasthan.
2. To compare prevalence of Diabetes Mellitus and impaired glucose tolerance in Raika community and other communities with similar life style.
3. To find the association of Diabetes and impaired glucose tolerance with camel milk consumption, if any.

PROGRESS

A population based study was carried out in four districts of Rajasthan (Jodhpur, Barmer, Pali & Ajmer) in Raika community and non Raika community with similar life style living in the same geographical and socio-economic conditions by Jodhpur Centre. The districts were selected based on camel population, two districts (Jodhpur and Barmer) having camel population more than 15563 and two districts (Ajmer and Pali) having population lesser than 15563. Total sample population selected was 12000 of 18 years and above, out of which 10,003 were from raika community and 2017 from non raika community. Field survey was carried out by team comprising of one Research Scientist (Medical), one Technician, one field Investigators, one Attendant and one local helper from the selected village. During survey, Consent was taken and individuals were interviewed for their socio demographic parameters, personal habits, history of camel milk consumption, physical activity and were measured for body weight, height, Waist Circumference, Hip Circumference and Blood Pressure and data was recorded in pretested schedules.. Fasting Blood Sugar was measured in the field by glucometer and Oral Glucose Tolerance Tests was carried out on those individual having fasting blood sugar more than 110mg/dl. The data obtained was post stratified into Raika consuming camel milk (RCCM), Raika not consuming camel milk (RNCCM), Non-Raika consuming camel milk (NRCCM), Non-Raika, not consuming camel milk (NRNCM).

Results

Total Raika population covered in study was 10003, out of which 40.5% were males and 59.5% were females while non-Raika population covered was 2017, out of which 873 (43.3%) were males and 1144 (56.7%) were females. Majority of the non Raika population was in 21-30 yrs age group (22.1%) (Table 1). The major occupations of Raika population was labour, farming, herding and housework while non-Raika population, it was farming, housework, labour and others (Table 2). Among the Raika population the percentage of smokers was higher (17.3%) than non-Raika population (13.8%) while, smokeless tobacco (15.7%) and alcohol users (3.3%) were higher in non Raika population than Raika population i.e. 10.9% and 1.3% respectively (Table 3). The Raika population was more vegetarian (97.8%) than non Raika population (79.3%). The number of individuals consuming fruits daily was higher in non raika(0.9%) than raika population (0.7%). The rapeseed or soya oil was used by 92.9% of Raika population as compared to 96.9% of non-Raika population who consumed the same oil. Among Raika population, 65.6% of Raika subjects ever consumed camel milk whereas only 10.2% of non-Raika subjects ever consumed it. The frequency of consumption of camel milk daily was higher in raika (5.4%) population than non raika(0.4%) population. More than 500ml of camel milk was consumed by 5.2% of the Raika and only 0.5% of the non-Raika individuals. Raw camel milk was consumed by 34.9% of the Raika population while 6.9% of the non-Raika consumed raw camel milk (Table 4). Heavy physical or load carrying work was done by 17.3% of Raika and 17.6% of non-Raika population (Table 5).

Socio-economic status among the selected households of Raika community showed that majority (57.0%) of them belonged to lower middle income group as compared to non-Raika community (54.8%). Similarly, no agricultural land was possessed by nearly half (50.7%) of the households of Raika community while 48.0% by non-Raika community. A total of 53.1% of the non-Raikan households were pucca houses as compared to 45.7% of Raika households (Table 6). The mean age among Raika community consuming camel milk (RCCM) was 43.8 years, Raika community not consuming camel milk (RCNCM) was 30.9 years and among non-Raika community consuming camel milk (NRCCM) (48.1 years), non-Raika community not consuming camel milk (NRCNCM) was 37.8 years. The prevalence of Impaired fasting glucose (IFG), impaired glucose tolerance (IGT) and Diabetes Mellitus (DM) among RCCM individuals was 1.0%, 1.0% and 0.7% respectively as compared to prevalence among NRCCM individuals i.e. 1.5%, 1.5% and 2.1% respectively and the prevalence among RCNCM individuals was 0.4%, 0.5% and 0.5% respectively as compared to prevalence among NRCNCM individuals i.e. 0.3%, 0.4% and 1.0% respectively. The mean age of the diabetics among the study population was 50.5 years while it was 39.2 years among the non-diabetics. The Mean BMI, WHR among male and female, SBP and DBP was higher among the diabetics i.e. 22.1, 0.90 and 0.89, 138.8 and 78.9 mmHg as compared to non-diabetics i.e. 19.6, 0.85 and 0.82, 125.3 mmHg 71.5 mmHg respectively (Table 7). Among the 83 diabetics in the study population, 61 belonged to Raika community and 22 belonged to non Raika community (Table 8).

The prevalence of IFG, IGT and DM among Raika Community Consuming Camel Milk was increasing with age except prevalence of DM in the age group of 20-29 years of age group whereas prevalence of IFG, IGT and DM among Raika Community Not Consuming Camel Milk population was also increasing with age except prevalence of IFG in >60 years age group. Among the group of Non Raika Community Consuming Camel Milk, the prevalence of DM was also increasing with age upto 60 years of age Whereas in Non Raika Community Not Consuming Camel Milk population, the prevalence of IFG, IGT and DM was increasing with age except prevalence of IFG in >60 years age group (Table 9)

Table 1. Age wise distribution of studied population

Age Group (Years)	Raika N= 10003		Non Raika N=2017	
	Male (%)	Female (%)	Male (%)	Female (%)
15-20	587 (14.5)	1025 (17.2)	146 (16.7)	216 (18.9)
21-30	786 (19.4)	1439 (24.2)	179 (20.5)	267 (23.3)
31-40	833 (20.6)	1166 (19.6)	169 (19.4)	201 (17.6)
41-50	742 (18.3)	991 (16.7)	142 (16.3)	214 (18.7)
51-60	608 (15.0)	665 (11.2)	118 (13.5)	118 (10.3)
61-70	353 (8.7)	464 (7.8)	87 (10.0)	85 (7.4)
>70	144 (3.6)	200 (3.4)	32 (3.7)	43 (3.8)
TOTAL	4053 (40.5)	5950 (59.5)	873 (43.3)	1144 (56.7)

Table 2. Occupation wise distribution of studied population

Age Group		Farming (%)	Herding (%)	Housework (%)	Labour (%)	Other (%)	TOTAL
15-20	Raika N=10003	176 (10.9)	81 (5.0)	550 (34.1)	288 (17.9)	517 (32.1)	1611
	Non-Raika N=2017	63 (17.4)	7 (1.9)	114 (31.5)	34 (9.4)	144 (39.8)	362
21-50	Raika N=10003	1383 (23.2)	1062 (17.8)	999 (16.8)	1997 (33.5)	516 (8.7)	5953
	Non-Raika N=2017	515 (43.9)	10 (0.9)	209 (17.8)	320 (27.3)	118 (10.1)	1172
51-70	Raika N=10003	351 (16.8)	499 (23.9)	959 (45.9)	253 (12.1)	28 (1.3)	2090
	Non-Raika N=2017	189 (46.3)	10 (2.5)	163 (40.0)	31 (7.6)	15 (3.7)	408
>70	Raika N=10003	15 (4.4)	19 (5.5)	306 (89.0)	4 (1.2)	0 (0.0)	344
	Non-Raika N=2017	9 (12.0)	1 (1.3)	64 (85.3)	0 (0.0)	1 (1.3)	75

Table 3. Distribution of personal Habits in studied population

SI No.	Habits	Raika N=10003	Non raika N=2017	Total N=12020
1	Smokers	1731 (17.3%)	278 (13.8%)	2009 (16.7%)
2	Smokeless Tobacco	1094 (10.9)	347 (17.2)	1441 (12.0)
3	Alcohol	132 (1.3%)	67 (3.3%)	199 (1.7%)

Table 4. Distribution of Dietary Habits and Camel Milk Consumption in Studied Population

Parameters		Raika N=10003	Non-Raika N=2017	Total N=12020
Diet	Vegetarian	9786 (97.8)	1599 (79.3)	11385 (94.7)
	Non-vegetarian	217 (2.2)	418 (20.7)	635 (5.3)
Fruit Consumption	Daily	72 (0.7)	19 (0.9)	91 (0.8)
Oil used in cooking	Rapeseed or Soya Oil	9291 (92.9)	1955 (96.9)	11246 (93.6)
Camel milk	Subjects ever Consumed	6566 (65.6)	205 (10.2)	6771 (56.3)
Frequency of consumption of camel Milk	Daily	539 (5.4)	8 (0.4)	547 (4.6)
	Once in a month	468 (4.7)	11 (0.5)	479 (4.0)
	Occasionally	5322 (53.2)	180 (8.9)	5502 (45.8)
Quantity Consumed	200-300 ml	2415 (24.1)	104 (5.2)	2519 (21.0)
	300-400 ml	1238 (12.4)	37 (1.8)	1275 (10.6)
	400-500 ml	1759 (17.6)	20 (1.0)	1779 (14.8)
	More than 500 ml	522 (5.2)	11 (0.5)	533 (4.4)
Type of camel milk Consumed	Raw	3489 (34.9)	139 (6.9)	3627 (30.2)
	Raw and Warm	2365 (23.6)	56 (2.8)	2421 (20.1)
Duration of Consumption	6-10 yrs	1870 (18.7)	56 (2.8)	1926 (16.0)
	>10 yrs	3120 (31.2)	68 (3.4)	3188 (26.5)

Table 5: Information Regarding Physical Activity at Work

		Raika N=10003	Non-Raika N=2017	Total N=12020
Physical activity at work	Very light	211 (2.1)	30 (1.5)	241 (2.0)
	Light	1299 (13.0)	236 (11.7)	1535 (12.8)
	Moderate	3420 (34.2)	568 (28.2)	3988 (33.2)
	Heavy	5068 (50.7)	1183 (58.7)	6251 (52.0)
	NA	5 (0.05)	0 (0.0)	5 (0.04)

Table 6. Information regarding Socio economic assessment in selected households

Parameters		Raika N=4604	Non-Raika N=829	Total N=5433
Income Group	Less Than 500/-	936 (20.3)	115 (13.9)	1051 (19.3)
	Lower Middle (5,000 to 9,999/- pm)	2625 (57.0)	454 (54.8)	3079 (56.7)
	Upper Middle (10,000 to 19,999/- pm)	1043 (22.6)	260 (31.4)	1303 (24.0)
Type of House	Pucca	2105 (45.7)	440 (53.1)	2545 (46.8)
Agricultural land	No Land	2334 (50.7)	398 (48.0)	2732 (50.3)
	1-5 acres	2073 (45.0)	329 (39.7)	2402 (44.2)
	>5 acres	197 (4.3)	102 (12.3)	299 (5.5)

Table 7. Demographic profile of study population

		RCCM N=6566		RCNCM N=3437		NRCCM N=205		NRCNCM N=1812	
		Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
Mean age (yrs)		43.8	16.6	30.9	14.1	48.1	16.8	37.8	17.0
Gender	Male	3150		902		149		724	
	Female	3416		2535		(56)		1088	
BMI		19.7	3.4	19.3	3.0	20.5	3.8	20.0	3.4
WHR	Male	0.848	0.070	0.834	0.071	0.884	0.067	0.871	0.071
	Female	0.834	0.074	0.805	0.072	0.860	0.083	0.828	0.070
	Total	0.841	0.072	0.813	0.073	0.878	0.072	0.846	0.073
B.P.	Sys.	127.1	18.4	122.2	14.9	129.0	19.1	125.0	16.7
	Dia.	71.9	11.6	70.0	11.1	75.9	12.2	72.6	11.6
FBS		85.5	19.4	83.9	18.6	86.3	17.3	85.5	16.3
OGTT		134.6	60.7	152.7	69.1	137.4	46.2	152.3	56.6
IFG		64 (1.0)		11 (0.4)		3 (1.5)		5 (0.3)	
IGT		59 (1.0)		15 (0.5)		3 (1.5)		8 (0.4)	
DM		46 (0.7)*		15 (0.5)**		4 (2.1)*		18 (1.0)**	

Table 8. Information about clinical status in diabetic subjects in study population

Parameters		Diabetics in Raika N=61	Diabetics in Non-Raika N=22
Diabetic status	Known	23 (37.7)	10 (45.5)
	Disclosed after test	38 (62.3)	12 (54.5)
Duration of Diabetes (years)		6.7±4.4	3.8±3.2
Treatment for diabetes □	Prescribed dietary modification	16 (26.2)	7 (31.8)
	Prescribed physical exercise	6 (9.8)	2 (9.1)
	Traditional medicine/therapy	5 (8.2)	3 (13.6)
	Insulin	11 (18.0)	0 (0.0)
	Oral anti-diabetic drugs	10 (16.4)	8 (36.4)
	None	0 (0.0)	1 (4.5)

Table 9. Age specific prevalence of IFG, IGT and DM in different groups

Age Group (yrs)	Total No.	INFERENCE		
		IFG	IGT	DM
RCCM 20-29	975	4 (0.41)	1 (0.10)	7 (0.71)
30-39	1743	9 (0.51)	8 (0.45)	6 (0.34)
40-49	1335	16 (1.19)	11 (0.82)	8 (0.59)
50-59	1088	14 (1.28)	17 (1.56)	12 (1.10)
>60	1028	21 (2.04)	17 (1.65)	13 (1.26)
Total	6169	64 (1.03)	59 (0.95)	46 (0.74)
RCNCM 20-29	931	3 (0.32)	2 (0.21)	1 (0.10)
30-39	916	5 (0.54)	4 (0.43)	3 (0.32)
40-49	398	0 (0.00)	3 (0.75)	4 (1.00)
50-59	185	2 (1.08)	2 (1.08)	4 (2.16)
>60	133	1 (0.75)	4 (3.00)	0 (0.00)
Total	2563	11 (0.37)	15 (0.49)	12 (0.43)
NRCCM 20-29	27	0 (0.00)	0 (0.00)	1 (3.70)
30-39	37	1 (2.70)	0 (0.00)	0 (0.00)
40-49	44	0 (0.00)	1 (2.30)	2 (4.54)
50-59	44	1 (2.27)	1 (2.30)	0 (0.00)
>60	46	1 (2.17)	1 (2.17)	1 (2.17)
Total	198	3 (1.53)	3 (1.53)	4 (2.05)
NRCNCM 20-29	409	0 (0.00)	1 (0.24)	0 (0.00)
30-39	427	1 (0.23)	1 (0.23)	1 (0.23)
40-49	312	1 (0.32)	0 (0.00)	4 (1.28)
50-59	192	2 (1.04)	2 (1.04)	3 (1.56)
>60	201	1 (0.49)	4 (1.99)	10 (4.97)
Total	1541	5 (0.27)	8 (0.44)	18 (0.99)

Conclusion:

The prevalence of Diabetes Mellitus in Raika community was 0.6% which was found to be lower than non Raika community (1.1%). The prevalence of impaired glucose tolerance (IGT) and Diabetes Mellitus (DM) among Raika community consuming camel milk individuals was 1.0% and 0.7% respectively which was lower than prevalence among non Raika community consuming camel milk individuals i.e. 1.5% and 2.1% respectively.

The prevalence of IGT in Raika community not consuming camel milk individuals was slightly higher (0.5%) than the non Raika community not consuming camel milk individuals i.e. 0.4%. The prevalence of DM in Raika community not consuming camel milk individuals was low (0.5%) than the non Raika community not consuming camel milk individuals i.e. 1.0%. The mean age of camel Milk users was 43.8yrs $\pm$ 16.6, significantly different from non users (30.9yrs $\pm$ 14.1), which is indicative of primitive role of age in prevalence of diabetes irrespective of any Community, lifestyle and SES.

NUTRITION

3.1 Nutritional status of elderly rural population and development of appropriate intervention model using existing health system

Principal Investigator: *Dr. Madhu B., Scientist 'F'*

Co-Principal Investigator: *Dr. Arvind Mathur, SN Medical College, Jodhpur; Dr. Harish Aggarwal, SN Medical College, Jodhpur; Dr. MP Soni, M/o, CHC, Luni, Mr. RK Kalunda, Technical Assistant*

Commencement: Oct, 2013 **Duration:** Three Years **Status:** Ongoing

Funding Agency: Desert Medicine Research Centre (Intramural)

OBJECTIVES

1. Clinical assessment of the elderly population
2. To assess the anthropometric measurements of the elderly population
3. Assessment of micronutrient deficiencies viz Iron, Zinc, Vitamin A and E, Calcium, Selenium, Chromium and lipid profile
4. Assessment of the dietary intake of the elderly population
5. To develop an intervention model using existing health system

PROGRESS

This project has been initiated and sampling has been done. Recommendation of Ethics Committee by DMRC and Dr. S.N. Medical College, Jodhpur has been taken. Meetings have been conducted with Director, ICDS, Jodhpur district along with Joint director and Lady Supervisor of Luni Tehsil telling them about the objectives of the project, nutrition intervention and the importance of the study and seeking their cooperation in the study. Meeting has also been conducted with CMHO, Jodhpur district for their cooperation at Luni CHC.

Luni tehsil has 8 CHC/PHC (Salawas, Luni, Dhundara, Bhatinda, Guda Vishnoi, Khejarli, Satlana and Jawar). Randomly Luni CHC has been selected, Luni village then has been selected, as it has CHC and population more than 5000 with availability of Medical Officer for intervention.

Meetings have been conducted with MO, Incharge, Luni CHC, Jodhpur and Tehsildar and all the Aganwari workers, ASHA workers and Sahyogini of the Luni village along with Sarpanch and Ward Panch in order to make rapport and making them aware about the objectives of the project.

In the Luni Village, five Aganwari centres are present. List of all the elderly individuals equal or above the age of 60 years have been prepared by the all the AWs of the five centres. This village has 379 elderly populations as per the list prepared by the AWs.

Schedules have been prepared and pretested in the Luni village in 10 HHs and modified accordingly. First training has been provided to all the five ASHA/ AWS/ Sahyogi workers along with Sarpanch, Ward Panch of the village.

NUTRITION

3.2 Nutritional status along with morbidity and mortality of under five children in Jodhpur District of Rajasthan - A follow up study of earlier registered Neonates and Infants up to 5 years.

Principal Investigator: Dr. Ranjana Fotedar, Scientist 'C'

Co-Principal Investigator : Dr. Madhu B. Singh, Sc. 'F', Dr. M.S. Chalga, Technical Officer & Mr. Pankaj Kumar, Technical Assitant

Commencement: Sept, 2010

Duration: Five Years

Status: Ongoing

OBJECTIVES

1. To study profile of Health and Nutritional Status of earlier registered neonates & infants followed up to 5 years of age group by means of anthropometry, and clinical examination for nutritional deficiency signs along with feeding practices and their follow up to 5 years of age group at the interval of 6 months.
2. To study the types of morbidity, mortality and their causes of earlier registered neonates & infants followed up to 5 years of age group.
3. To study the time trend analysis of growth and nutrition of earlier registered neonates & infants followed up to 5 years of age group.

PROGRESS

This is in continuation of an earlier project study entitled 'Nutritional status along with morbidity and mortality of Neonates and Infants in Jodhpur district'. It is a follow up study and will be continued on earlier registered 300 neonates & infants from 28 villages (Table 1) from Luni Panchayat Samiti of Jodhpur district which has been followed up to 5 year of age group at an interval of 6 months in the above mentioned project. The study has been continued on same 300 subjects as mentioned above.

Table 1: List of Villages from Salawas CHC from where the earlier registered neonates and infants were covered

S. No.	Villages	S. No.	Villages
1	Tanavda	15	Shikarpura
2	Sangaria	16	Jhalamand
3	Salawas	17	Nimbla
4	Nandvan	18	Guda Bishnoi
5	Sarecha	19	Sangasani
6	Sar	20	Bacharna
7	Mogarkalla	21	Chainpura Bhatan
8	Feach	22	Karnayali
9	Dhundhara	23	Modi
10	Hanwant Nagar	24	Golia Magra
11	Piparli	25	Madopur
12	Dedas	26	Dudia
13	Luni	27	Nai Basti
14	Vishnu Nagar	28	Krishna Kheda

Under five children which have been earlier registered as Neonates & Infants were distributed according to different Months / Years as given in Table 2.

During the period under report, we covered 250 under five children. Now 50 under five children are remaining to be covered. Each registered child / infants are followed up every six month for clinical examination of nutritional deficiencies, morbidities, mortality, anthropometry, immunization, mile stones, feeding practices and socio-cultural causes for mortality. Their mothers were also interviewed.

Table 3. Distribution of children of 24 months age group according to WHO classification for Weight for age

Sex	No.	Normal		Moderate <-2SD		Severe <-3SD	
		No.	Percent	No.	Percent	No.	Percent
Boys	112	61	54.5%	41	36.6%	10	8.9%
Girls	161	109	67.7%	38	23.6%	14	8.7%
Total	273	170	62.3%	79	28.9%	24	8.8%

Table 4. Distribution of children of 24 months age group according to WHO classification for Height for age

Sex	No.	Normal		Moderate <-2SD		Severe <-3SD	
		No.	Percent	No.	Percent	No.	Percent
Boys	112	10	8.9%	27	24.1%	75	67.0%
Girls	161	24	14.9%	33	20.5%	104	64.6%
Total	273	34	12.5%	60	22.0%	179	65.6%

Table No. 2. Distribution of under Five Children according to different Months / Years

S. No.	Months / Years (Neonates)	Neonates (0-7 days)	Infants (1 year)		1½ year		2 years		2½ years		3 years		3½ years		4 years		4½ years		5 years	
I	Sept 2007 to Dec 2007 (1 to 58)	58	Sept 2008 to Dec 2008 (58 – 8)	50	Mar 2009 to June 2009 (50 - 1) (49 + 1) Child come back	50	Sept 2009 to Dec 2009 (50 - 1) (49 - 1)	48	Mar 2010 to June 2010	48	Sept 2010 to Dec 2010	48	Mar 2011 to June 2011	48	Sept 2011 to Dec 2011	48	Mar 2012 to June 2012	48	Sept 2012 to Dec 2012	48
II	Jan 2008 to Apr 2008 (59 to 128)	70	Jan 2009 to Apr 2009 (70 – 6)	64	July 2009 to Oct 2009 (64 – 1)	63	Jan 2010 to Apr 2010	63	July 2010 to Oct 2010	63	Jan 2011 to Apr 2011	63	July 2011 to Oct 2011	63	Jan 2012 to Apr 2012	63	July 2012 to Oct 2012	63	Jan 2013 to Apr 2013	60
III	May 2008 to Aug 2008 (129 to 190)	62	May 2009 to Aug 2009 (62 – 6)	56	Nov 2009 to Feb 2010 (56 – 1)	55	May 2010 to Aug 2010	55	Nov 2010 to Feb 2011	55	May 2011 to Aug 2011	55	Nov 2011 to Feb 2012	55	May 2012 to Aug 2012	55	Nov 2012 to Feb 2013	55	May 2013 to Aug 2013	53
IV	Sept 2008 to Dec 2008 (191 to 250)	60	Sept 2009 to Dec 2009 (60 – 3)	57	Mar 2010 to July 2010	57	Sept 2010 to Dec 2010	57	Mar 2011 to July 2011	57	Sept 2011 to Dec 2011	57	Mar 2012 to July 2012	57	Sept 2012 to Dec 2012	57	Mar 2013 to July 2013	57	Sept 2013 to Dec 2013	55
V	Jan 2009 to July 2009 (251 to 300)	50	Jan 2010 to July 2010	50	July 2010 to Jan 2011	50	Jan 2011 to July 2011	50	July 2011 to Jan 2012	50	Jan 2012 to July 2012	50	July 2012 to Jan 2013	50	Jan 2013 to July 2013	50	July 2013 to Jan 2014	50	Jan 2014 to July 2014	50
	Sept 2007 to July 2009	300	Sept 2008 to July 2010	277	Mar 2009 to Jan 2011	275	Sept 2009 to July 2011	273	Mar 2010 to Jan 2012	273	Sept 2010 to July 2012	273	Mar 2012 to Jan 2013	273	Sept 2011 to July 2013	273	Mar 2013 to Jan 2014	273	Sept 2012 to July 2014	266

Among the under five children belonging to 2 years age group (N= 273) revealed that that 41.0 percent were males and 59.0 percent were females (Table 3).

The extent of different types of malnutrition viz stunting (Height for age), under weight (Weight for age) and wasting (Weight for Height) were computed by adopting standard anthropometric measurement less than Median-2SD of WHO values were considered as undernourished.

Under weight (Weight for age): Table 3 shows the distribution of children of 24 months age group according to under weight i.e. Weight for age using WHO standards. It was observed that 54.5% boys were normal whereas 45.5% were under weight. In case of girls, 32.3% were under weight. Overall 37.7% children were under weight and 8.8% belong to severe category.

Stunting (Height for age) was 87.5 % among children of 24 months age group with the prevalence of severe stunting 65.6%, which needs attention. Stunting was 91.1% in boys and 85.1% in girls (Table 4). Wasting (Weight for Height) computed by adopting standard severe wasting 0.0% (Table 5).

Table 5. Distribution of children of 24 months age group according to WHO classification for Weight for Height

Sex	No.	Normal		Moderate <-2SD		Severe <-3SD	
		No.	Percent	No.	Percent	No.	Percent
Boys	112	111	99.1%	1	0.9%	0	0.0%
Girls	161	160	99.4%	1	0.6%	0	0.0%
Total	273	271	99.3%	2	0.7%	0	0.0%

Main morbidities observed among children of 24 months age group were, fever (23.1%), GIT (23.1%), acute respiratory infection (20.5%), Ear disease (7.7%), Eye disease (2.6%) and skin infection (1.5%). ARI observed higher in males (29.5%) in comparison to females (14.3%) whereas Fever & GIT was higher in females (25.5% & 24.2%) than males (19.6% & 21.4%), Epilepsy (one female baby) and Polio (one male baby) (Table 6).

Table 6. Distribution of children of 24 months age group according to Morbidity

Morbidity	Males N=112		Females N=161		Total N=273	
	No.	Percent	No.	Percent	No.	Percent
N.A.D.	58	51.8%	83	51.6%	141	51.6%
Fever	22	19.6%	41	25.5%	63	23.1%
GIT	24	21.4%	39	24.2%	63	23.1%
ARI	33	29.5%	23	14.3%	56	20.5%
Eye Disease	3	2.7%	4	2.5%	7	2.6%
Ear Disease	11	9.8%	10	6.2%	21	7.7%
Skin Infection	2	1.8%	2	1.2%	4	1.5%

Regarding nutritional deficiency signs, it was observed that discoloration of hair, a sign of protein calorie malnutrition was observed to be high i.e. 62.3%, Angular stomatitis was observed to be 12.5%, Teeth Problem was 0.4% (Table 7). It was observed that 99.6% of children belong to category of 'Breast feeding & Top Milk consumption' and same 99.6% of children belong to category of 'Cereal Supplementation' up to the age of 24 months.

Table 7. Distribution of population according to nutritional deficiency signs

Nutritional deficiency Signs	Males		Females		Total	
	N=112	%	N=161	%	N=273	%
N.A.D.	40	35.7%	54	33.5%	94	34.4%
Hair Discoloured	71	63.4%	99	61.5%	170	62.3%
Angular stomatitis	14	12.5%	20	12.4%	34	12.5%
Teeth Problem	0	0.0%	1	0.6%	1	0.4%

Out of 300 neonates & infants registered earlier, 13 died up to the age of one year and 10 were not available/ not co-operated. The children followed up to the age of 24 months were 273, out of which 1 died between 1-1/2 year and 2 years age. Thus, mortality between one & half year – two years age group was 03.3/1000, whereas Mortality up to two years age (0-24 months) was 56.7/1000.

Expected Outcome

Results of the study will be helpful in formulation of simple interventional plan for under five children for reduction of under nutrition, morbidity and mortality among under five children. The Research output of this project will also help in developing package for under 5 children, which will be useful to State Health Department Functionaries.

NUTRITION

3.3 National Nutrition Monitoring Bureau Unit

Principal Investigator (Jodhpur Site): Dr. G. S. Toteja, Scientist 'G' & Director

Commencement: November, 2012 **Duration:** Upto July 2015 **Status:** Ongoing

Funding Agency: Indian Council of Medicine Research (ICMR) (Extramural)

OBJECTIVES

1. To assess the current status of food and nutrient intake among different age/gender/physiological activity groups of urban population in all the NNMB States.
2. To assess the current nutritional status of all the available individuals in the selected HHs in terms of anthropometry and clinical examination.
3. To assess the history of morbidity during previous fortnight among all the individuals covered for anthropometry.
4. To assess the prevalence and determinants of overweight and obesity, hypertension, diabetes mellitus and dyslipidemia among the urban adult men and women (≥ 18 years).
5. To assess body composition using bio-electrical impedance assessment (BIA)/ skin-fold thickness at 4 sites among adults covered for anthropometry.
6. To assess knowledge and practices about obesity, hypertension, diabetes and dyslipidemia, among adults and Assessment of lifestyle patterns and risk behaviours of adults.
7. To assess the infant and young child feeding practices among the mother of < 3 year children

PROGRESS

In 2012, NNMB has been expanded to six more states which included Rajasthan. The unit in Rajasthan is located at Desert Medicine Research Centre, Jodhpur. The unit is currently working on the project “*Assessment of Diet and Nutritional Status of Urban Population and Prevalence & Determinants of Hypertension and Diabetes among adults in India*”.

In this study, 5 cities of Rajasthan namely Jaipur, Jodhpur, Kota, Hanumangarh and Dholpur are to be covered, over a period of 30 months. The team comprises of a Medical officer, Nutritionist and a Social Worker. The survey has been completed in Jodhpur city. The preliminary analysis indicated that around 12.7 % of adults are diabetic, 14.53 % are hypertensive and 17.4 % are hypercholesterolemic.

Survey is now being carried out in Jaipur city, since September, 2013. Eight wards have been surveyed till March, 2014. The anthropometric data, basic demographic details were collected and biochemical investigations have been done.

NUTRITION

3.4 Nutrition Monitoring Survey on NNMB pattern in Jodhpur district of Rajasthan

Principal Investigator: *Dr. Madhu B. Singh, Scientist 'F'*

Co-Principal Investigator: *Dr. Ranjana Fotedar, Scientist 'C', Dr. Manjeet Chalga, Tehnical Officer, Mr. Pankaj Kumar, Technical Assitant*

Commencement: January, 2005 **Duration:** Upto March 2014 **Status:** Completed

Funding Agency: Desert Medicine Research Centre (Intramural)

OBJECTIVES

1. To develop continuous monitoring service to study the nutritional status, dietary habits, food availability and the effect of changing social and environmental factors on the health status of the population.
2. Aim at doing comparisons with other states data as to assess the variation among the states.

PROGRESS

NNMB surveys were initiated in Pali district with similar sample design and 30 villages have been selected from 9 tehsils of Pali district. Field work has been started data has been collected from 600 household belonging to twenty eight villages of nine tehsils (Sumerpur, Rohat, Bali, Pali, Desuri, Raipur, Sojat, Marwar and Jaitaran) of Pali district. The entire selected households were examined for Socio-demographic and Socio- economic aspects. All the members in the household have been examined for nutritional deficiency signs, anthropometric measurements (Height, weight, arm circumference and FFT), Dietary intake (24 hours recall method) and examination of nutritional morbidities in preceding 15 days. Dietary intakes of the individuals information were recorded in alternate houses i.e. 10 households from each village are covered.

Analysis of 600 households covering 2651 individuals has been done. Table 1 showed age and sex wise distribution of study population (1307 males and 1344 females). Nuclear families were significantly more (86.1 %) (Tables 2). Table 3 revealed that illiteracy is significantly high in females (48.4 %).

Table 1. Age and sex wise distribution of population covered

Age group	Males	%	Females	%	Total	%
0-5	250	19.1	231	17.2	481	18.1
6-9	116	8.9	157	11.7	273	10.3
10-14	151	11.6	144	10.7	295	11.1

15-17	73	5.6	72	5.4	145	5.5
18- 29	291	22.3	315	23.4	606	22.9
30 - 39	187	14.3	181	13.5	368	13.9
40-49	116	8.9	102	7.6	218	8.2
50 -59	58	4.4	54	4.0	112	4.2
>=60	65	5.0	88	6.5	153	5.8
Total	1307	100	1344	100	2651	100

Table 2. Distribution of households according to type of family

Type of family	N	%
Nuclear	517	86.1
Extended Nuclear	58	9.7
Joint	25	4.2
Pooled	600	100.0

Table 3. Distribution of population according to educational status

Educational status	Males	%	Female	%	Total	%
Illiterate	384	29.4	650	48.4	1034	39.0
Read & Write	28	2.1	12	0.9	40	1.5
1-4 Standard	238	18.2	230	17.1	468	17.7
5-8 Standard	303	23.2	255	19.0	558	21.0
9-12 Standard	199	15.2	77	5.7	276	10.4
College	67	5.1	25	1.9	92	3.5
N. A.	88	6.7	95	7.1	183	6.9
Pooled	1307	100.0	1344	100.0	2651	100.0

Main morbidities observed in population were, fever (11.4%), acute respiratory infection (20.3%), and diarrhea (0.9%) (Table 4). Regarding nutritional deficiency signs, it is observed that discoloration of hair, a sign of protein calorie malnutrition was observed to be high i.e. 7.1 percent which was significantly higher in females than males (Table 5). Marasmus was observed in 0.1. Angular stomatitis, Cheilosis and glossitis were 2.3, 3.6 and 0.3 percent. Vitamin A deficiency i.e. Bitot spot were 0.1 percent. Dental caries (26.7%) and dental fluorosis (21.6%). Koilonychia, a sign of anemia, was observed only in females (0.1%).

Table 4. Distribution of population according to Morbidity profile

Morbidity	Males N=1307	%	Females N=1344	%	Total N=2651	%
N.A.D.	1095	83.8	794	59.1	1889	71.3
Fever	82	6.3	221	16.4	303	11.4
Diarrhoea	12	0.9	13	1.0	25	0.9
Dysentery	0	0.0	2	0.1	2	0.1
A. Res. Infec.	151	11.6	386	28.7	537	20.3
Measles	1	0.1	0	0.0	1	0.0
GIT	53	4.1	161	12.0	214	8.1

Table 5. Distribution of population according to Nutritional deficiency signs

Deficiency Signs	Males	%	Females	%	Total	%
	N=1307		N=1344		N=2651	
N.A.D.	1066	81.6	673	50.1	1739	65.6
Hair Discoloured	89	6.8	100	7.4	189	7.1
Marasmus	1	0.1	1	0.1	2	0.1
Bitot Spot	2	0.2	1	0.1	3	0.1
Angular stomatitis	12	0.9	50	3.7	62	2.3
Cheilosis	16	1.2	79	5.9	95	3.6
Glossitis	2	0.2	5	0.4	7	0.3
Koilonychia	0	0.0	1	0.1	1	0.0
Gums-Spongy bleeding	30	2.3	226	16.8	256	9.7
Dental Caries	142	10.9	565	42.0	707	26.7
Dental Fluorosis	97	7.4	475	35.3	572	21.6
Thyroid gland palpable	0	0.0	1	0.1	1	0.0
Thyroid gland visible	0	0.0	1	0.1	1	0.0

The weights of pre-school children were expressed as percent of NCHS standards and categorized into different nutritional grades, based on Gomez classification (Tables 6-7). The overall prevalence of under nutrition was very high i.e. 79.1 percent. It was higher in SC community (80.4%) in comparison to ST communities (73.5%). The overall prevalence of severe under nutrition was high i.e. 9.4 percent. Under nutrition was higher significantly in Nuclear families (79.5 %).

Table 6. Distribution of 1-5 years children according to Gomez distribution and Type of family

Type of House	N	Nutritional Grades*			
		Normal	Mild	Moderate	Severe
Nuclear	249	20.5	37.3	31.7	10.4
Extended	23	17.4	43.5	39.1	0.0
Joint	6	50.0	33.3	16.7	0.0
Pooled	278	20.9	37.8	32.0	9.4

* NCHS Standards

Table 7. Distribution of 1-5 years children according to Gomez distribution and type of house

Type of House	N	Nutritional Grades*			
		Normal	Mild	Moderate	Severe
Kutchra	41	17.1	39.0	34.1	9.8
Semi Pucca	169	21.9	37.9	30.8	9.4
Pucca	68	20.6	36.8	33.8	8.8
Pooled	278	20.9	37.8	32.0	9.4

* NCHS Standards

Underweight (Weight for age) in preschoolers observed was 64.4 %, higher than NFHS III (44.0 %). The proportion of severe underweight was high (32%). Underweight were observed higher in females than

males. Declining trend has been observed in underweight in comparison to DMRC Phase one (71.6%), but higher than Phase II (59.5%), Phase III (58.3 %), and Phase IV (49.8 %) and Phase V study (59.3%) in Jodhpur district. Underweight in preschoolers observed was 64 percent using WHO standards.

Stunting (Height for age) was 57.3 percent in preschoolers with the prevalence of severe stunting 35.5 %, which needs attention. It's lower than DMRC Phase I (71.6 %), DMRC Phase II (62.1 %), and DMRC Phase IV (59.5%) but higher than NFHS III (33.7 % - up to 3 years), NNMB (49.3 %), and DMRC Phase III (57.1%). Stunting computed by adopting standard deviation classification using WHO standards was 60.1 percent in preschoolers with the prevalence of severe stunting 39.1 percent. Wasting (Weight for Height) computed by adopting standard deviation classification using WHO standards was 33 percent in preschoolers with the prevalence of severe wasting 12.6 percent.

The distribution of adults according to BMI grades has been shown in Tables 8. At the aggregate level, 51.2 percent had normal BMI (18.5-25.0), while 38.4 percent had severe chronic energy deficiency, whereas obesity was observed to be 10.4 percent.

Table 8. Distribution of adults (>=18 years) according to BMI classification

Gender	Obese II ≥ 30	Obese I 25-30	Normal 20-25	Low wt Normal 18.5-20	CED I 17-18.5	CED II 16-17	CED III <16
1. Male N=102	1.0	12.7	34.3	17.6	14.7	7.8	11.9
2. Female N=588	1.5	8.3	31.5	19.6	19.2	8.0	11.9
Pooled N=690	1.4	9.0	31.9	19.3	18.5	8.0	11.9

Dietary intake from 300 households was collected. In dietary intake, average intake of Calcium, Vitamin C and Vitamin B12 was less than RDA in children up to 15 years of age group whereas Beta Carotene i.e. Vitamin A was less than RDA in all age groups. Trends revealed that underweight in preschoolers and chronic energy deficiency in adults was more in Pali district in comparison to Jodhpur district as covered earlier in DMRC Phase II and DMRC Phase III, DMRC Phase IV and DMRC Phase V studies. Stunting was more in Pali district than Jodhpur district preschoolers (DMRC Phase III, and DMRC Phase V studies). Trends revealed that high illiteracy, poor economic conditions along with high deficiencies in their diet played important role for higher nutritional deficiencies, especially stunting more children and chronic energy deficiency more in adults of this region.

EXPECTED OUTCOMES

The results of the study carried out on representative segment of the population in desert areas have provided information and useful guidelines for food policies and also to assess the impact of the nutritional programs currently in progress and for future planning in the state of Rajasthan.

NUTRITION

3.5 Estimation of Zinc deficiency, under nutrition and morbidities especially ARI, Diarrhoea and Fever in school children of Rajasthan

Principal Investigator: *Dr. Madhu B. Singh, Scientist 'F'*

Co-Principal Investigator: *Dr. Ranjana Fotedar, Scientist 'C', Dr. Manjeet Chalga, Tehnical Officer, Mr. Pankaj Kumar, Technical Assitant*

Commencement: May, 2012 **Duration:** Two years **Status:** Completed

Funding Agency: Desert Medicine Research Centre (Intramural)

OBJECTIVES

1. Estimation of extant of Zinc deficiency in school children of Rajasthan
2. Estimate the prevalence of under nutrition and morbidities especially ARI, Diarrhoea and Fever
3. To facilitate the health functionaries in the reduction of the Zinc deficiency Disorders in school children of Rajasthan

PROGRESS

This project has been initiated recently. Keeping in view the operational feasibility, 15 clusters (schools) have been adopted to cover 450 school children i.e. 30 children per cluster for the identification of the problem in this area. At first step, listings of all the government and private schools with children 6-11 years of age from both rural and urban areas were listed from district education office of Jodhpur. Secondly cumulative enrollment was determined. Finally schools were selected using PPS sampling technique as recommended by WHO. In the selected schools, children were selected randomly using Tippetts random number table. Equal proportion of boys and girls from 6-11 years were covered from the selected schools.

All children have been interviewed / examined for Socio-demographic profile, nutritional deficiency signs, morbidity for last 15 days and anthropometry (Height, Weight and FFT) using standard WHO techniques.

Blood samples have been collected for estimation of Zn deficiency along with anemia and Urine samples for estimation of UIE in laboratory. Blood samples have been collected from school children, for that, collection tubes and the cryotubes (in which serum was stored) was labeled. Each child was given a code number that was also the same on the collection tube, cryotube and prescribed form. The blood collected in the tube was allowed to clot at room temperature in dark for 15 minutes. After, 15 minutes, tubes with clotted material were kept in the rotor of a battery operated centrifuge machine and spun @ 1,500 to 2,000 rpm for 5 minutes. After centrifuging the clotted material, serum that was separated from the clot, and was removed very carefully with the help of a micropipette and

immediately transferred to cryotubes. Precaution was taken at the time of separating the serum from the clot, so that the tip of micropipette should not come in contact with the clot. For each sample, a new micropipette tip was used to avoid contamination. A casual urine sample was also collected. Zn deficiency was assessed by AOAC method using flame mode of Atomic Absorption Spectrophotometer. Anemia was assessed by Hemoglobin levels (Cyanmethaemoglobin technique), and was classified as per WHO classification. Iodine deficiency disorders was assessed by clinical examination of thyroid gland using the standard method as recommended by the joint WHO / UNICEF / ICCIDD consultation. A casual urine sample was also collected for estimation of Urinary Iodine Excretion (UIE) levels to assess the Iodine nutriture status. UIE was determined by Ammonium Persulphate Digestion on Microplate method (APDM) using standard laboratory technique. UIE level less than 10 mcg/dl have been considered as indicator of iodine deficient nutriture.

Analysis of 465 school children has been done. Table 1 showed age and sex wise distribution of study population (241 males and 224 females). Stunting (Height for age) was 17.4 percent in school age children with the prevalence of severe stunting 4.5 %. Underweight (Weight for age) in school age children observed 24.9 % and wasting 8.4 %. Both stunting and wasting were observed higher in females (17.9% & 11.2%) than males (17.0% & 5.8%).

Table 1. Age and sex wise distribution of school children covered

Age group	Males	%	Females	%	Total	%
6+	35	7.5	36	7.7	71	15.3
7+	30	6.5	53	11.4	83	17.8
8+	54	11.6	36	7.7	90	19.4
9+	36	7.7	35	7.5	71	15.3
10+	48	10.3	43	9.2	91	19.6
11+	38	8.2	21	4.5	59	12.7
Total	241	51.8	224	48.2	465	100.0

Analysis of the serum zinc has been done for 410 school children. It is observed that 76.1 percent school children were normal and 23.9 percent children were deficient in serum zinc i.e. serum Zn level was less than 0.65 mg/l (Table 2). It was observed that serum zinc deficiency was more in early age group i.e. 60.1 percent in 6 to 7 years age group than 11 years age group (12%). It was observed that serum zinc deficiency was 22.1 percent in boys whereas 25.6 percent in girls.

Table 2. Age wise distribution of school children according to Serum Zinc

Age Years	Normal Serum Zn level ≥ 0.65 mg/l (less than 10 years)		Deficient Serum Zn level < 0.65 mg/l (less than 10 years)	
	N	%	N	%
6+ N=64	45	70.3	19	29.7
7+ N=69	48	69.6	21	30.4
8+ N=79	59	74.7	20	25.3
9+ N=63	50	79.4	13	20.6
10+ N=85	66	77.6	19	22.4
11+ N=50	44	88.0	6	12.0
Total N=410	312	76.1	98	23.9

Cut offs for 10 years and above: Ref. IZiNCG, 2004

Male- Normal: Serum Zn level ≥ 0.70 mg/l; Deficient: Serum Zn level < 0.70 mg/l

Female- Normal: Serum Zn level ≥ 0.66 mg/l; Deficient: Serum Zn level < 0.66 mg/l

Analysis of 393 school age children according to Hb estimation revealed that only 26.5 percent children were non anemic ($Hb \geq 11.5$ g/dl) where as 55 percent children belong to mild category (10-11.5 g/dl) and 18.3 percent to moderate category (7-10 g/dl) of anemia.

Epidemiological criteria, as prescribed by WHO, for assessing iodine nutrition is based on median urinary iodine concentrations / levels. Analysis of 289 urine samples has been done. Median urinary iodine value was 150 mcg/l. It was observed that proportion of school children less than 100 $\mu\text{g/L}$ were 25.6 percent, whereas, proportion of school children less than 50 $\mu\text{g/L}$ were 5.9 percent. Iodine content of 113 salt samples has been estimated using standard iodometric titration method. 69 percent children consumed salt adequately iodized i.e. 15 ppm or more. Overall high proportion of children (31%) consumed salt having inadequate iodine content i.e. less than 15 ppm. 2.7 percent children consumed salt having negligible iodine content (Less than 7 ppm).

This study revealed that school children are not only suffering from anemia but also with Zinc deficiency (23.9%) along with Stunting (17.4%), Underweight (24.9%) and Wasting (8.4%). Both stunting and wasting were observed higher in females (17.9% & 11.2%) than males (17.0% & 5.8%) though statistically insignificant.

OTHER ACTIVITIES

4.1 Biomedical Informatics Centre of ICMR

Coordinator: *Dr. G. S. Toteja, Director, DMRC, Jodhpur*

Principal Investigator: *Dr. Vinod Joshi, Scientist 'G'*

Co-Principal Investigator: *Dr. Manju Singhi, Scientist 'C',*

Dr. Praveen Anand, Scientist 'C', Dr. S. S. Mohanty, Scientist 'C' and Dr. M. S. Chalga, Technical Officer

Commencement: July, 2013 **Duration:** Five Years **Status:** Ongoing

Funding Agency: Indian Council of Medicine Research (ICMR) (Extramural)

OBJECTIVES

1. To identify genetic loci associated with diseases of National interest such as Diabetes, Cancer, Stress, Mental illness etc. in Indian population.
2. To develop solutions for controlling pathogens causing diseases of National interest such as Tuberculosis, Malaria, and AIDS etc.
3. To develop a National Repository of clinical information/data, high-throughput data, genotype and phenotype.
4. To promote applications of cutting-edge technologies in medical research.

PROGRESS

Meta analysis for the associates of Diabetes mellitus

With the objectives such as, to investigate risk factors associated with diabetes as derived through a relevant systematic review and meta-analysis, to determine cause & effect relationship of risk factors either individual or as co-group having significant implication in DM pathogenesis and to find out existing gaps and planning selected wet lab experiments, an exhaustive meta analysis exercise has been undertaken during reported period.

Extensive literature search and data mining was done on various scientific databases such as pubmed, medline, clinical trials (clinicaltrial.gov), published studies and reviews (cochranereviews.org) to develop a knowledge stock of risk factor in consideration with DM risk. Longitudinal studies with having different treatment groups for dietary factor in consideration were included. Appropriate combination of MeSH (Medical Subject Heading) terms was used to search relevant literature and clinical studies. Studies focusing on risk of DM development were included. Studies done on diabetic population or not having groups with differential exposure of factor in consideration were excluded.

To conduct meta-analysis STATA software (STATA Corp. TX USA) was used. “Meta” command of STATA software was used for performing calculations of meta-analysis. Combined RR (Relative Risk) was calculated by using adjusted RR from individual studies.

Results suggest potent role of non-vegetarian, western diet, and animal protein in developing DM pathogenesis. Results are intriguing as they indicates role of dietary animal protein, non-vegetarian diet and western pattern in DM pathogenesis. While vegetable protein, legumes, soyabean and prudent pattern are found to decrease risk of DM. No role of fat is seen. Overall role of protein type in modulating DM risk and negligible role of dietary fat are intriguing and needs further investigation.

OTHER ACTIVITIES

4.2 Facilitation of establishment of Model Rural Health Research Unit in Rajasthan by DMRC

The Department of Health Research, Ministry of Health & Family Welfare, Government of India has taken initiative for establishment of Model Rural Health Research Units (MRHRU) during the 12th Plan period. To start with 15 MRHRUs would be set up in the country. During 2013-14, the Govt. of India has approved setting up of 7 MRHRUs. On 1st February, 2014, one of the MRHRU was inaugurated at Bhanpur Kalan CHC, District Jaipur, Rajasthan by Dr. V. M. Katoch, Secretary, Department of Health Research and Director General, Indian Council of Medical Research. The members and citizens of Bhanpur Kalan Panchayat welcomed Sh. J. L. Meena, MLA, Jamwa Ramgarh and Dr. V. M. Katoch. On behalf of public, Sh. J. L. Meena thanked Dr. Katoch for establishing MRHRU at Bhanpur Kalan.

Dr. G. S. Toteja, Director, Desert Medicine Research Centre, Jodhpur were present on the occasion with DMRC staff. The members of Research Advisory Committee (RAC) for MRHRU Prof. F.U. Ahmed, Chairperson; Dr. D. C. S. Reddy, Co-Chairperson; Dr. Shalabh Sharma, Dr. S. K. Kabra, Dr. Kuldeep Singh, Dr. Arvind Mathur, Dr. Arvind Pandey and Dr. Bharati Malhotra were present on the occasion along with Dr. O. P. Thakan and Dr. Ravi Prakash C.M.H.O. (Chief Medical and Health Officer), Jaipur; Dr. S. P. Tripathi, Director, National JALMA Institute of Leprosy and other Mycobacterial Disease, Agra. Following faculty of S.M.S Medical college, Jaipur also were present: Dr. Sandeep K. Mathur, Prof. & Head, Department of Endocrinology; Dr. Amita Kashyap, Professor of PSM; Dr. Kusum Gaur, Professor of PSM; Dr. Monika Rathore, Associate Professor of PSM and Dr. Rajeev Yadav, Assistant Professor of PSM. From CHC, Bhanpurkalan Medical Officer and In charge Dr. Vishal Sharma along with his colleagues Dr. Maneesha Pareek and Dr. Neha Meena were also present. Dr. P. C. Dhindhoria, Additional Director and Dr. R. S. Chhipi, Joint Director from Directorate of Medical Health Services were also present on this occasion.

The medical college identified to be associated with Bhanpur Kalan MRHRU by the Government of Rajasthan is S.M.S Medical College, Jaipur. The facilitating Institute is Desert Medicine Research Centre (ICMR), Jodhpur.

OBJECTIVES

1. Create infrastructure at the periphery for transfer of technology to the rural level for improving the quality of health services to rural population.
2. To ensure an interface between the new technology developers (Researchers in the Medical Institutions; State or Centre), health systems operators (Centre or state health services) and the beneficiaries (communities in rural areas)
3. Ensure the much needed geographical spread of health research infrastructure in the country.

Each MRHRU is being provided one time grant of Rs. 3.075 crores (2.075 crores for civil work and 1.0 crore for equipments). The recurring contingency of Rs. 30 lakhs towards salary of contractual staff and Rs. 20 lakhs per annum for training/consumables will also be provided.

PROGRESS

For the establishment of MRHRU, the process of allotment of land of 1200 sq.mt free of cost from Rajasthan Govt. through local Panchayat in the name of D.H.R. is in progress. MOU with CPWD, Jaipur for civil work of MRHRU was signed on 1.2.2014. Two rooms in the premises of CHC Bhanpur Kala and two rooms in Panchayat Bhawan adjacent to CHC have been provided by CHC and Panchayat Samiti of Bhanpurkalan to initiate the work.. In these rooms labs have been established. Two autoclaves are procured and installed. Purchase order of Ultra low Temperature Deep freezer & light Microscope is issued and delivery is expected soon. Minor Equipments procured are Colorimeter, Vortex mixture and Centrifuge Machine. Furniture has been purchased on DGS & D rate contract & installed at MRHRU. Research Advisory Committee (RAC) of MRHRU is constituted with the approval of Secretary, DHR.

The first meeting of RAC was held on 1st February 2014 at Bhanpur Kalan, Jaipur.

Nine studies were presented and discussed in this meeting which are as follows:

1. Appropriate use of “mamta card” for improving maternal understanding and managing care.
2. Adiposopathy in modernizing rural families: molecular epidemiology & implication in diabetes and insulin resistance.
3. Impact of accredited social health activist male (asham) on health: a community bases interventional study.
4. Community based intervention for management of anaemia in adolescent girls, village bhanpur, district jaipur.
5. Psychiatric morbidity in rural area of jaipur, rajasthan (india)
6. Prevalence of risk factors for non communicable diseases (ncd) in rural area of jaipur district
7. Improving the nutritional status of vulnerable population by multi-component health and nutrition in the high burden districts of Andhra Pradesh (3), Haryana (5), Jharkhand (5), Gujarat (15), Rajasthan (4) and UP (13).
8. Study of active screening to detect unregistered open cases of tuberculosis.
9. Study of diabetes mellitus among patients registered for dots in jaipur district.

The above projects were discussed thoroughly and useful comments were made for suitable revision. After adequate revision, the projects were forwarded to the high power committee for review.

To monitor the implementation of research programme and the construction of MRHRU building, the Director, DMRC has constituted Scientific and building construction committees involving the scientists of DMRC. It is expected that with these efforts work at MRHRU will begin shortly.

OTHER ACTIVITIES

4.3 Annual Health Survey- Clinical Anthropometric and Biochemical Component (CAB) Survey-2013-2014

Co-ordinator: Dr. G. S. Toteja, Scientist 'G' & Director.

Co-Principal Investigator: Dr. K. R. Haldiya, Scientist 'G', Dr. Madhu .B. Singh, Scientist 'F', Dr. S. S. Mohanty, Scientist 'F'

Commencement: September, 2013

Duration: Nine Months (Extended by Dec, 2013) **Status:** Ongoing

Funding Agency: Ministry of Health & Family Welfare (Extramural)

OBJECTIVES

1. To provide training to health investigators and supervisors recruited by survey agencies.
2. To estimate hemoglobin from blood filter spot samples of surveyed population of Rajasthan sent by agencies.
3. To make and analyze blood filter spot samples being sent to other collaborative institutes for inter laboratory quality assurance.

PROGRESS

Training- Intensive training was provided to field survey teams consisting of health supervisors and health investigators of surveyed agencies in 4 batches with 15 members in each batch. They were familiarized with techniques for measurements of health indicators/parameters that are being measured in CAB survey (like height and length on stature meter and infantometer respectively, weight on digital weighing balance, blood pressure on digital BP monitor, blood glucose on glucometer). Hands on practice was given for pipetting 20 microlitre of anticoagulant blood and collecting 20 microlitre blood from finger prick onto a filter paper for haemoglobin estimation. Alongwith this thorough practice sessions were conducted in filling pre- designed schedules. They were taught about quality control measures so that they could measure these parameters accurately and consistently across personnel and place.

Hemoglobin Estimation:

Central Biochemical Research Laboratory has done haemoglobin analysis of 20, 494 blood filter spot samples received from two survey agencies. Details are given in Table 1

Table 1. Details of Sample analyzed under Annual Health Survey till 15th April 2014

Sl no.	Name of Agency	Name of District	PSU	No of Samples
1	AMS	Jaipur	6	770
2		Sikar	9	1632
3		Jaisalmer	1	407
4		Alwar	12	3130
5		Churu	12	2819
6		Bikaner	4	600
7		Jodhpur	5	506
Total		7	49	9864
7	Sambodhi	Rajsamand	2	376
8		Bhilwara	1	34
9		Udaipur	2	420
10		Chittaurgarh	12	1745
11		Jhalawar	9	2296
12		Barmer	5	546
13		Pali	8	1284
14		Sirohi	2	328
15		Karauli	2	280
16		Tonk	7	1738
17		Kota	7	1150
18		Banswara	2	433
Total		11	59	10630
Cumulative		18	108	20494

The results of haemoglobin estimation of above samples are being sent to surveyed agencies for further analysis.

This survey will help to improve health and nutrition status by planning district specific interventions based on magnitude of problem in different districts so as to reduce the gap between districts, states and segments of population.

OTHER ACTIVITIES

4.4 Determination of Micronutrient Deficiency Disorders among Pregnant women and their association with the outcome of the pregnancy with respect to LBW babies - A hospital based study (ICMR Fellowship Project)

Name of Fellow: Dr. Neetu Parihar, Research Associate.

Name of Guide: Dr. Madhu Bala Singh, Scientist 'F'

Desert Medicine Research Centre (ICMR)

New Pali Road, Jodhpur-342 005

Name of Co- Guide: Dr. Ranjana Desai, Professor & Unit Head

Department of Gynecology & Obstetrics

Umaid Hospital, Jodhpur

Commencement: July, 2013 **Duration:** Three years **Status:** Ongoing

Funding Agency: Indian Council of Medical Research Centre, (ICMR) (Extramural)

OBJECTIVES

1. To determine the level of following micronutrients in blood samples of pregnant women of 3rd trimester
 - Hematological: Hb, Iron, Ferritin, Folic acid, B12
 - Vitamins: A, E, C
 - Trace elements: Zn, Se, Cu
 - Hormones: T3, T4, & TSH
 - Urine Iodine Excretion level
 - Salt Iodine
2. To determine the association of LBW babies with micronutrient deficiencies of 3rd trimester pregnant women
3. Dietary Intake of micronutrients in 3rd trimester of pregnant women

PROGRESS

This project has been initiated and sampling has been done. Recommendation of Ethics Committee by DMRC and Dr. S.N. Medical College, Jodhpur has been taken. Rapport has been established with the Department of Gynecology & Obstetrics, Umaid Hospital, Jodhpur. The schedules were prepared in detail and pre tested. Finally field work has been started.

Recruitment of pregnant mothers: All the pregnant women of 3rd trimester attending the Ummaid Hospital (Government hospital) of Jodhpur district has been enrolled and data has been collected from 76 pregnant women of 3rd trimester.

Exclusion criteria- Pregnant women of 1st and 2nd trimester and all the pregnant women suffering from chronic diseases are excluded from the study. Those pregnant women who are intending to deliver elsewhere have also been excluded from the study.

All the registered pregnant women of 3rd trimester have been interviewed / examined for the following nutritional deficiency signs

- Signs of anaemia (platinichia and koilonichia),
- Night blindness,
- Bitot Spot, and
- Goiter by examining the thyroid gland using the standard method as recommended by the joint WHO / UNICEF / ICCIDD.

Dietary intake and Anthropometry: Using 24 hour dietary recall method, dietary intake has been collected from 76 enrolled women. Birth weight, Recumbent length & Head circumference of 26 new born babies of the enrolled pregnant women have been taken within 48 hours adopting WHO method.

Collection of samples:

Blood: Each subject has been given a code number that was also the same on the collection tube, cryotube and prescribed form. Blood samples (venous blood 5 ml) have been collected in two tubes i.e. EDTA Tube and SST tubes from all 76 enrolled pregnant women. 20 µl of blood have been spotted on filter paper (Whatmen No. 1). Serum and plasma has been separated in the DMRC lab following the standard procedure.

Urine: A casual urine sample has been collected from 76 registered pregnant women for estimation of Urinary Iodine Excretion (UIE) levels to assess the Iodine nutriture status.

Salt: Sample of 20 gm. salt consumed in their families have been collected in auto seal LDPE pouches. Iodine content of salt sample will be estimated using standard iodometric titration method. Salt samples having iodine content less than 15 ppm will be classified as with inadequate iodine.

Transportation of sample: WHO Manual has been followed up for transportation of blood samples from hospital to DMRC, Jodhpur and CNRT lab, Delhi. Cold chain has been maintained for their transportation.

The distribution of the 76 pregnant women of 3rd trimester collected so far has been shown in Table 1. Table 2 shows the distribution of 76 pregnant women of 3rd trimester according to anaemia on the basis of haemoglobin estimation and revealed that 17.1 percent pregnant women were non-anaemic, whereas 82.9 percent were anaemic. The percentage belonging to severe anaemia was 3.9 percent.

Table 1. Distribution of pregnant women according to duration of Months

Duration of Pregnancy	No. of Pregnant Women	Percentage
Seven	13	17.1
Eight	42	55.3
Nine	21	27.6
Total	76	100

Table 2. Distribution of women according to anaemia (Haemoglobin Estimation)

Pregnant Women	Non-anemic		Anemic					
	Normal (≥ 11 g/dl)		Mild (10-11 g/dl)		Moderate (7-10 g/dl)		Severe (<7 g/dl)	
	N	%	N	%	N	%	N	%
Pregnant N = 76	13	17.1	27	35.6	33	43.4	3	3.9

Out of 76 registered women, 26 deliveries have been followed with in 48 hours till now. It was observed that 46.2 percent deliveries were normal whereas 53.2 percent were Cesarean.

The project is going on. The seventy six samples of serum and plasma are in the process of transportation to CNRT lab, New Delhi for estimation of Iron, Ferritin, Folic acid, B12, Vitamins: A, E, C, Trace elements: Zn, Se, Cu, Hormones: T3, T4, & TSH. Other parameters viz UIE and Salt iodine are still to be analyzed at DMRC, Jodhpur. Analysis of Dietary Intake of micronutrients in 3rd trimester of pregnant women and determination of the association of LBW babies with micronutrient deficiencies of 3rd trimester pregnant women is to be done.

OTHER ACTIVITIES

4.5 Collaborative Efforts for Tribal Health Research

For tribal health study at Kota, Jhalawar & Baran Districts, DMRC team of Scientists visited Jhalawar Medical College to participate in the joint meeting with the faculties of various Departments of the Medical College. The meeting was held on 31st March, 2014. Dr. G. S. Toteja, Director; Dr. Praveen Anand, Scientist 'C'; Dr. Rajender Kumar, Scientist 'C' and Dr. P. K. Dam, Technical Officer 'A' participated in the meeting from DMRC side. Prof. Raghuvir Singh, Head of the Department, PSM & Professor Diwan along with their learned faculty members participated in this meeting from Medical College.

Dr. Toteja presented glimpses of functionalities of ICMR & DHR at country level. He enlightened the group as regards to role of ICMR to grant approval of fund for extramural projects as well as to those who may be interested in opening 'Centre of Excellence'. Following this, Dr. Toteja discussed certain pertinent points to initiate collaborative research projects.

Dr. Raghuvir Singh reciprocated that the newly introduced PG course in Anatomy, Physiology & Microbiology in Jhalawar Medical College with effect from 2014 may augment the possibility of collaboration studies between DMRC, Jodhpur and Jhalawar Medical College. Dr. Singh mentioned that responsibilities of the Research Wing of Jhalawar Medical College has been entrusted to Dr. Diwan & Dr. Mogra from Pathology Department, who as 'Nodal Officers' review various collaborative research proposals received by Medical College. Dr. Singh, thereafter introduced Dr. Ashish Yadav, Faculty Member of PSM Department and currently pursuing Ph. D. degree in Statistics & willing to collaborate with DMRC for forthcoming joint studies. He also offered that DMRC may use the retrospective data from 'data repository' maintained in the 'Record Room' of Jhalawar Medical College in order to find out any trend revealed through 'data repository' that may help as pre-requisite for finalizing theme of joint research protocol.

Prof. Diwan expressed his interest in specific researchable issues related to extra-pulmonary TB and Nutritional Deficiency (Anemia). He stated that collaboration with Physiology Department may be helpful in conducting Pulmonary Function Test of suspected TB cases of the study group. If Tissue PCR is undertaken & samples from such extra-pulmonary TB cases are handed over to DMRC Laboratory, then it may form researchable issue. Moreover, he said that among Cancer patients those who attend Jhalawar Hospital for treatment, this has been observed that cases of Breast Cancer, Cervical Cancer and Oral Cancer are more compared to other types (e. g. Leukaemia).

The DMRC team also visited villages of Baran district, where Sahariyas tribes are living.

5. LIST OF PAPERS PUBLISHED/JOURNALS/ PROCEEDINGS/CHAPTER IN BOOK BY THE SCIENTISTS DURING 2013-14

In the Journals

1. Agarwal R, Virmani D, Jaipal M, Gupta S, Sankar MJ, Bhatia S, Agarwal A, Devgan V, Deorari A, Paul VK, Toteja GS; Investigators of the LBW Micronutrient Study Group. Poor zinc status in early infancy among both low and normal birth weight infants and their mothers in Delhi. *Neonatology*, 2013,103(1):54-59.
2. Anand P K, Dixit A K, Chauhan M K, Lata S. Magnitude, Distribution and Associated Socio-behavioral Risk Factors of Coronary Artery Disease: A Hospital Based Study from Desert Ecology in India. *Journal of Human Ecology*, 2013, 44(3): 275-280.
3. Angel A, Angel B, Bohra N, Joshi V. Structural studies on mosquito ovarian proteins participating in Transovarial transmission of dengue viruses. *International Journal of Current Microbiology and Applied Sciences*. 2014, 3(4): 565-572.
4. Bansal SK, Singh KV, Sharma S. Larvicidal potential of wild mustard (*Cleome viscosa*) and gokhru (*Tribulus terrestris*) against mosquito vectors in the semi-arid region of Western Rajasthan. *Journal of Environmental Biology*. 2014,35:327-332.
5. Chakrabarty B, Kabra SK, Gulati S, Toteja GS, Lodha R, Kabra M, Pandey RM, Srivastava A. Peripheral neuropathy in cystic fibrosis: a prevalence study. *J Cyst Fibros*, 2013, 12(6):754-260.
6. Jain P, Gulati S, Seth R, Bakhshi S, Toteja GS, Pandey RM. Vincristine-induced Neuropathy in Childhood ALL (Acute Lymphoblastic Leukemia) Survivors: Prevalence and Electrophysiological Characteristics. *J Child Neurol*, 2013: 18.
7. Jain P, Gulati S, Toteja GS, Bakhshi S, Seth R, Pandey RM. Serum Alpha Tocopherol, Vitamin B12, and Folate Levels in Childhood Acute Lymphoblastic Leukemia Survivors With and Without Neuropathy. *J Child Neurol*, 2014 (Online 22 May 2014):
8. Joshi V, Angel A, Angel B, Kucheria K. Egg laying sites of *Aedes aegypti* and their elimination as the crucial etiological intervention to prevent Dengue Transmission in Western Rajasthan, India. *International Journal of Scientific Research*, 2013,2(12): 37 -38.
9. Radhakrishnan N, Dinand V, Rao S, Gupta P, Toteja GS, Kalra M, Yadav SP, Sachdeva A. Antioxidant levels at diagnosis in childhood acute lymphoblastic leukemia. *Indian J Pediatr*, 2013, 80(4):292-296

10. Singh H. "Impact of altered land use pattern on small mammalian diversity of hilly-tracts of Rajasthan", India Faunal Heritage of Rajasthan: Past, Present and future, *Springerlink*, Springer Berlin Heidelberg Publication, 2013, (2): 79-92.
11. Singh H, Marwal R., Mishra, A, Singh K V. Invasion of the predatory mosquito *Culex (Lutzia) fuscans* in the western desert parts of Rajasthan, India. *Polish Journal of Entomology/Polskie Pismo Entomologiczne*, 2013, 82(1), 49-58.
12. Singh H, Marwal R, Mishra A, Singh K V. Predatory habits of *Lutzia Metalutzia) fuscana* (Wiedmann) (Diptera: Culicidae) in the arid environments of Jodhpur, western Rajasthan, India. *Arthropods*, 2014, 3(1): 70-79.
13. Singhi M, Purohit A. Studies on comparative larvicidal efficacy of methanol extracted latex of *Calotropis procera* and temephos against *Aedes aegypti* in arid parts of Rajasthan. *Res. Journal of Pharmacological, Biological & Chemical Sciences*, 2013, 4(4):1139-1142.

Paper No. 1, 5, 6, 7 and 9 are from the work done at ICMR/CNRT, New Delhi

In Proceedings

1. Joshi V, Angel B, Angel A. Need for development of sero-molecular diagnostic combinations for early detection of risk of Dengue Haemorrhagic Fever. *Proceedings of National Conference on Diversity and Physiology of Desert Fauna*, 2014, pp11.
2. Kumawat R, Singh K V. Effect of relative humidity on breeding of *Aedes Aegypti* with respect to container proactivity. *Proceedings of XII International Conference on vector and Vector Borne Diseases*. MLS University, Udaipur, 2013, 132-139.
3. Marwal R, Mishra A, Singh H. A study on ovipositioning preference of *Aedes aegypti*, *Proceedings of XII International Conference on Vector and Vector borne Diseases*, Mohanlal Sukhadia University, Udaipur. 2013, 123-126.
4. Singh H, Marwal R, Mishra A, Singh K V. Impact of change in rainfall pattern on incidences of malaria in Jodhpur. *Proceedings of XII International Conference on Vector and Vector borne Diseases Organised at Mohanlal Sukhadia University, Udaipur*. 2014, pp152.
5. Singhi M. Valuable medicinal plants of desert and their marketing scenario. *Proceedings on constraints and problems in trading of Herbal Medicines*, Dr. S R Rajasthan Ayurveda University, Jodhpur, 2013, 4-5.

6. WORKSHOPS/CONFERENCES/SYMPOSIA/ SCIENTIFIC MEETINGS/TRAINING IMPARTED/ ATTENDED BY SCIENTISTS DURING 2013-14

Dr. K. R. Haldiya, Scientist 'G'

Imparted skill intensive training to field survey teams consisting of health supervisors and health investigators of surveyed agencies in 4 batches with 15 members in each batch organised by the centre.

Dr. Karam. V. Singh, Scientist 'F'

Attended 'Brain storming conference on dengue scenario in India: Disease burden, surveillance and control', held from 25th to 26th July, 2013 at Madurai, and present a paper entitled 'Key productive habitats of *Aedes aegypti*, the vector of Dengue/DHF, in urban arid situations'.

Attended project monitoring meeting DST CCP network on 'Climate Change and its impact on Health' 9th January, 2014 at the Centre for Atmospheric Sciences, Indian Institute of Technology, Delhi.

Attended Research Advisory Committee meeting of Model Rural Health Research Unit (MRHRU), Bhanpur Kalan, Jaipur, on 1st February, 2014, Special Invitee.

Dr.S. K. Bansal, Scientist 'F'

Participated and displayed the research activities of DMRC in Mega exhibition of 'Bharat Nirman Jan Susana Abhiyan' organized by Press Information Bureau, Jodhpur and held at Marwar Junction, Pali from 17th to 19th August, 2013.

Dr. Madhu B. Singh, Scientist 'F'

Participated and displayed the research activities of DMRC in Mega exhibition of 'Bharat Nirman Jan Susana Abhiyan' organized by Press Information Bureau, Jodhpur and held at Marwar Junction, Pali from 17th to 19th August, 2013. Also delivered a talk on 'Malnutrition in pregnant women and children in Jodhpur and Pali District of Rajasthan' in this exhibition.

Attended "Training of Trainers for Annual Health Survey CAB" from 15th to 17th April 2014 organised by National Institute of Health and Family Welfare, New Delhi.

Dr. Ranjana Fotedar, Scientist 'C'

Participated in "5th vision Rajasthan 2014", organised by Friendz Promotions Pvt. Ltd., New Delhi, February 17th-19th 2014, Chomu-Jaipur.

Dr. Manju Singhi, Scientist 'C'

Delivered lecture as Resource person on "Valuable medicinal plants of desert and their marketing scenario " in One day workshop on "constraints and problems in trading of herbal medicine " organized by Dr S.R. Rajasthan Ayurveda University, Jodhpur, sponsored by Department of Science & Technology, Govt. of Rajasthan on October 29th, 2013 and Chaired one session.

Dr. P. K. Dam, Technical Officer

1. Attended International Symposium held in Dr. S.R. Rajasthan Ayurved University, Jodhpur on 27th October, 2013 and presented a paper, 'Cross matching of practice and published research on tribal Ethno medicine in Rajasthan' (Abstract published).

Dr. Himmat Singh, Technical Assistant

Attended and gave lecture in "International Environmental Workshop" at Rajmata Krishna Kumari Senior Secondary School in a workshop organized to sensitize teachers on biodiversity conservation and its importance on 23-24 January 2014.

Attended conference on "Hospital Setting: Infection Control & Hygiene" 1st CME organized by the Department of Microbiology, AIIMS, Jodhpur on 13-14, December 2013 at AIIMS, Jodhpur.

Attended National Conference on Conservation of Desert Biodiversity Organized by Department. Of Zoology, JNV University, Jodhpur on 3rd March 2013.

7. SCIENTIFIC ADVISORY COMMITTEE

Prof.(Dr.) N.K. Mehra Chairperson
Head, Department of Transplants Immunology
& Immunogenetics
All India Instt. Of Medical Sciences
Ansari Nagar, New Delhi – 110 029

Prof.(Dr.) R. C. Mahajan
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Prof.(Dr.) Aloke Kalla
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Prof.(Dr.) F.U.Ahmed
Director
Integral Institute of Medical Sciences and Research
Dean, Faculty of Medicine, Integral University,
Lucknow

Prof.(Dr.) D.C.S. Readdy
Prof. & Head (Retd.)
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Dr. A. V. Kurpad
Dean & Head
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Prof. & Head
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AIIMS
New Delhi 110 029

Prof.(Dr.) Ashutosh Nath Aggarwal
Additional Professor
Department of Pulmonary Medicine
PGIMER, Chandigarh- 160 012

ICMR Institutes

Dr. S.P. Tripathy
Scientist-G & Director
National JALMA Institute for Leprosy &
Other Mycobacterial Diseases, Tajganj
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Dr. Arvind Pandey
Scientist-G & Director
National Institute of Medical Statistics
Ansari Nagar, New Delhi – 110 029

Dr. S. M. Mehendale
Scientist-G & Director
National Institute of Epidemiology
Second Main Road ,Tamil Nadu Housing Board
Ayapakkam, Chennai – 600 077

Ex-Officio

Dr. V.M. Katoch, Secretary, DHR & Director-General
Indian Council of Medical Research
V. Ramalingaswami Bhawan
New Delhi – 110 029

Dr. D. K. Shukla, Scientist 'G' & Head, Division of Non-Communicable Diseases
Indian Council of Medical Research
V. Ramalingaswami Bhawan
New Delhi – 110 029

Dr. B. R. Meena, The Director Public Health
Directorate of Medical Health Services
Swasthya Bhawan
Jaipur-302005

Member Secretary

Dr. G. S. Toteja, Scientist 'G' & Director
Desert Medicine Research Centre
New Pali Road
Jodhpur

Statutory Members

Dr. Neena Valecha,
Scientist-G & Director,
National Institute of Malaria Research
Sector-8, Dwarka, New Delhi-110077

Dr. Pradeep Das,
Scientist-G & Director,
Rajendra Memorial Research Institute of
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Dr. B.K. Tyagi, Director-in-Charge
Centre for Research in Medical Entomology
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Scientist-G & Director
Regional Medical Research Centre
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Dr. J. Mahanta,
Scientist-G & Director,
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Dr. Neeru Singh,
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Regional Medical Research Centre for Tribals
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P.O. Garha, Jabalpur

Dr. P. Vijaychari,
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Port Blair - 744 101

Dr. P. Jambulingam,
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Vector Control Research Centre
Medical Complex
Indira Nagar, Puducherry-605006

Dr. D.T. Mourya,
Scientist-G & Director,
National Institute of Virology
20-A, Dr. Ambedkar Road
Post Box No.11, Pune-411001

Vector Borne Diseases Science Forum (VBDSF) Experts

Dr. Rashmi Arora ,
Scientist-G & Head, Division of ECD/ Representative,
Indian Council of Medical Research
Ansari Nagar
New Delhi – 110029

Dr. Sarala Subharao,
Former Director, NIMR, Delhi
Address: Apartment No. 704, Block No. 13,
East End Apartment, Mayur Vihar, Phase-I, New Delhi 110069

Dr. A.P. Dash,
Former Director,
NIMR, Delhi
Milano Mahagun Mansion II, Plot No. 1/4 Vaibhavkhand,
Indrapuram, Ghaziabad 201 014, U.P.

Director
National Vector Borne Disease Control
Programme
22-Sham Nath Marg
Delhi-110054

8. ETHICS COMMITTEE

S. No.	Name & Address	Status	Discipline
1	Dr. Adesh Mathur, Prof. & Head (Retd.), Dept. of Pharmacology S. N. Medical College, Jodhpur Email: adeshmathur123@yahoo.co.in	Chairperson	Clinician
2	Dr. Alok Gupta, Professor, Department. of Medicine, S. N. Medical College, Jodhpur Email: dralokgupta@gmail.com	Co-Chairperson	Clinician
3	Dr. K. V. Singh, Scientist-F, Desert Medicine Research Centre, Jodhpur-342005 Email: karamvs@gmail.com	Member Secretary	Basic Scientist
4	Dr. R. S. Tripathi, Principal Scientist, Central Arid Zone Research Institute, Jodhpur Email: rstripathi@cazri.res.in	Member	Basic Scientist
5	Dr. S.P. Gupta, Prof. & Head, Department of Sociology, JNV University, Jodhpur Email: spgupta1957@yahoo.co.in	Member	Social Scientist
6	Dr. Lalita Vatta, Asstt. Prof., Dept. of Home Science, JNV University, Jodhpur Email: ikvatta@gmail.com	Member	Social Scientist
7	Mr. M.S. Godara, Advocate, 68-A, Laxmi Nagar, Basni -Ist, Jodhpur	Member	Legal Expert
8	Mr. T.R. Bhandari, Advocate, Gulab Vatika, Paota 'C' Road, Jodhpur Email: trideep@synco.co.in	Member	Legal Expert
9	Mr. Sumer Mal Jangid, 245, Sector H-2, Sangariya Industrial Area, Jodhpur Email: siajodhpur@gmail.com	Member	Person from the community
10	Mr. S.P. Goyal, Branch Manager, Oriental Insurance, Jodhpur Email: sumitgoyal@yahoo.com	Member	Person from the community

9. SCIENTISTS & STAFF

Dr. G. S. Toteja, Director

SCIENTISTS

1. Dr. K. R. Haldia, Scientist - G
2. Dr. Vinod Joshi, Scientist - G
3. Dr. M. L. Mathur, Scientist - G
4. Dr. Karam V. Singh, Scientist - F
5. Dr. S. K. Bansal, Scientist - F
6. Dr. S. P. Yadav, Scientist - F
7. Dr. Madhu B. Singh, Scientist - F
8. Dr. Raman Sachdev, Scientist - E
9. Dr. A. K. Dixit, Scientist - E
10. Dr. Phoolchand Kanojia, Scientist - E
11. Dr. Ranjana Fotedar, Scientist - C
12. Dr. Manju Singhi, Scientist - C
13. Dr. P. K. Anand, Scientist - C
14. Dr. S. S. Mohanty, Scientist - C

TECHNICAL OFFICERS

1. Dr. P. K. Dam
2. Dr. Manjeet Chalga
3. Sh. Raj Kumar Kalundha

TECHNICAL ASSISTANTS

1. Dr. Himmat Singh
2. Sh. Anil Purohit
3. Sh. Pankaj Kumar

LABORATORY TECHNICIANS

1. Sh. Rajneesh Kumar
2. Sh. Pooran Mal Meena
3. Sh. Ramesh Chandra Sisodiya
4. Sh. Santosh Kumar Dhawal
5. Sh. Rohit Prasad Joshi
6. Sh. Rajendra Kumar Chouhan
7. Sh. Trilok Kumar

ACCOUNTS OFFICER

1. Sh. Anil Kumar

SECTION OFFICER

1. Sh. Narender Bajaj

OFFICE ASSISTANTS

1. Smt. Neelam Devi
2. Sh. Dharam Pal Belani
3. Sh. Rajinder Singh
4. Sh. Joginder Singh

JUNIOR HINDI TRANSLATOR

1. Smt Kanchan Bala

UPPER DIVISION CLERK

1. Sh. Shamshad Ali
2. Sh. M. C. Pargi
3. Smt. Chandra Kala
4. Sh. Yash Pal Singh

STENOGRAPHER

1. Vacant

LOWER DIVISION CLERK

1. Sh. Ram Nivas
2. Sh. Nand Kishore
3. Sh. Manohar Singh Seervi

HINDI TYPIST

1. Vacant

DRIVERS

1. Sh. Raghu Nath Singh
2. Sh. Mohd. Gaffar
3. Sh. Ishwar Khetani
4. Sh. Manohar Singh
5. Sh. Rana Ram
6. Sh. Naveen Kumar

LABORATORY ATTENDANTS /ATTENDANTS

1. Sh. Banwari Lal, Laboratory Attendant
2. Sh. Sridhar Bohra, Laboratory Attendant
3. Sh. Lal Chand Bandra, Laboratory Attendant
4. Sh. Raghu Nath Singh Bisht, Animal Attendant
5. Sh. Babu Lal Bunker, Animal Attendant
6. Sh. Mahaveer Prasad, Animal Attendant

7. Sh. Satya Prakash, Animal Attendant
8. Sh. Mahesh Chand Sharma, Attendant
9. Sh. Jodha Ram, Attendant
10. Smt Laxmi Kanta, Attendant
11. Sh. Khushal Singh, Attendant
12. Sh. Ram Lal, Peon
13. Sh. Ladhu Ram, Peon
14. Smt. Sua Devi, Sweeper
15. Smt. Soni Devi, Peon (Upto 18 October, 2013)

TRAINEE

1. Sh. Bhawar Manohar Singh

PROJECT STAFF

1. *National Nutrition Monitoring Bureau, Jodhpur Unit-PI: Dr. G. S. Toteja, Scientist 'G' & Director*
 1. Dr. Rameshwar Lal, Scientist - B
 2. Ms. Kanchan Jaiswal, Research Assistant
 3. Mr. Nikhil Batra, Research Assistant
 4. Bharat Jawa, Field Attendant
2. *Prevalence of Diabetes mellitus and impaired Glucose tolerance in the Raika & other communities with similar life style in Rajasthan-PI: Dr. K. R. Haldiya, Scientist 'G'*
 1. Mr. Rishi Pal, Field Investigator
 2. Ms. Suman Rathor, Lab Technician
 3. Mr. Ravinder, Lab Technician
3. *Translational Research for development and testing of ICMR-DMRC module of Dengue control for Rajasthan-PI: Dr. Vinod Joshi, Scientist 'G'*
 1. Mrs Annett angel, Field Investigator (Ph.D Student)
 2. Mr. Ajay Vyas, Field Investigator
 3. Mr. Gajender Singh, Field Investigator
 4. Mr. Narender Vyas, Field Investigator
 5. Mr. Chandan Singh, Field Attendant
4. *Mapping of risk of dengue hemorrhagic fever (DHF) through dengue virus typing in Aedes mosquitoes in different settings of Rajasthan-PI: Dr. Vinod Joshi, Scientist 'G'*
 1. Dr. Bennet Angel, Scientist B
 2. Mr. Dhan Raj Choudhary, Insect Collector
5. *Surveillance of pyrethroid resistance in Anopheles stephensi strains of Rajasthan and studies on genetic and biochemical mechanisms of pyrethroid resistance in An. stephensi-PI: Dr. Karam V. Singh, Scientist 'F'*
 1. Mr. Robin Marwal, Junior Research Fellow
 2. Mr. Prashant, Insect Collector
 3. Mr. Deva Ram, Insect Collector
6. *Mapping of mosquito breeding habitats and location of vertebrate hosts in North and Southern parts of Rajasthan state prone for emergence of JE virus using space technology (RS & GIS) -PI: Dr. P.C. Kanojia, Scientist 'E'*
 1. Mr. Tejendra Kumar, Research Assitant
 2. Mr. Devendra Singh Ranawat, Research Assitant

3. Mr. Bhanwar Lal, Insect Collector
4. Mr. Hari Singh/Mahipal Singh, Insect Collector
7. *Biomedical Informatics Centre of ICMR, Dr GS Toteja, Scientist 'G' & Director, Dr. Vinod Joshi, Scientist 'G'*
 5. Mr. Rajendra Baharia, Scientist 'C'
 6. Mr. Ajay Joshi, Scientist 'B'
 7. Ms Suman Rathore, Research Assitant
 8. Mr. Manoj Kumar, Attendent
8. *Rapid culture and direct drug sensitivity testing of Mycobacterium tuberculosis to isoniazid and rifampicin using liquid culture media. – PI: Dr. M.L. Mathur, Scientist 'G'*
 1. Dr. Jyoti Gaur, Scientist 'B'
 2. Mrs. Soniya Sharma, Research Assitant
 3. Mr. Atif Iqbal, Research Assitant
9. *Annual Health Survey- Clinical Anthropometric and Biochemical Component (CAB) Syrvey-PI: Dr. K. R. Haldia, Scientist 'G'*
 1. Neha Deora, Lab Supervisor
 2. Padma Ram, Lab Technician
 3. Rishi Pal, Lab Technician
 4. Prakash Kumar, Lab Technician
 5. Harpat Singh, Lab Technician
 6. Romesh Mathur, Lab Technician
 7. Anita Bansal, Lab Technician
 8. Deepanshu, DEO
 9. Jitesh, DEO
 10. Dinesh, Daily Wages Worker
10. *Impact of irrigation change on the prevalence of malaria in arid and non-arid parts of Rajasthan – PI: Dr. Karam V. Singh, Scientist 'F'*
 1. Mr. Prakash Kalwani, Junior Research Fellow
 2. Mr. Kan Singh, Project Assistant
 3. Ms. Ritika Panda, Project Assistant I
 4. Ms Noopur Jaipal, Project Assistant I
11. *Effectiveness of diet and lifestyle intervention through Information Education Communication (IEC) tools with Angan Wadi Centres (AWCs) of Tribal population of Udaipur District of Rajasthan as the centre of knowledge dissemination for hypertension (including hypercholesterolemia and diabetes) risk reduction – a cluster randomised controlled trial-PI: Dr. K.R. Haldia, Scientist 'G'*
 1. Dolat Singh Shekhwat, Research Assitant
 2. Sonika Parmar, Research Assitant
12. *Determination of Micronutrient Deficiency Disorders among Pregnant women and their association with the outcome of the pregnancy with respect to LBW babies - A hospital based study-PI: Dr. Madhu Bala Singh, Scientist 'F'*
 1. Dr. Neetu Parihar, Research Associate

केन्द्र में राजभाषा को प्रोत्साहन

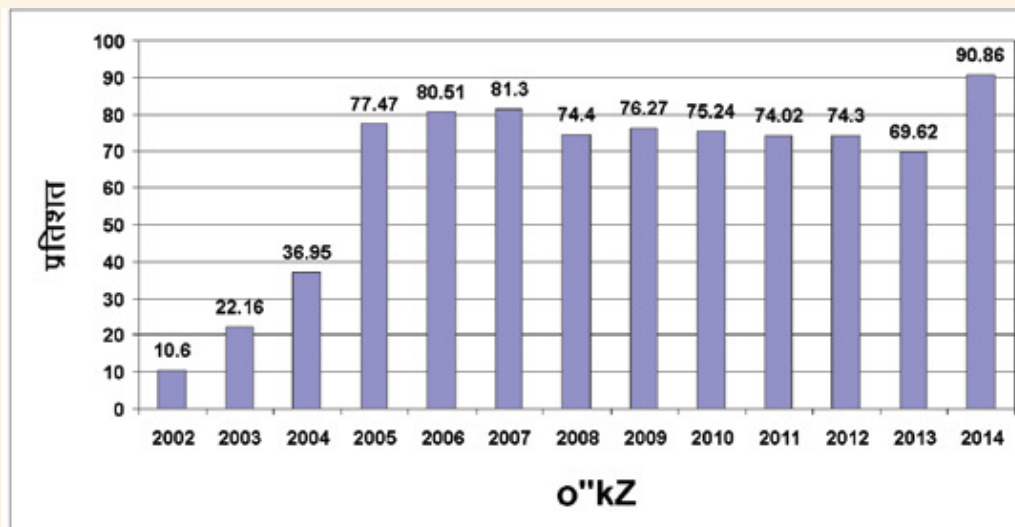
1. त्रैमासिक पत्रिका 'चेतना' का प्रकाशन

केन्द्र में राजभाषा कार्यों के प्रोत्साहन के लिए वर्ष 2002 से त्रैमासिक पत्रिका का प्रकाशन किया जा रहा है। केन्द्र की वैज्ञानिक सलाहकार समिति की संस्तुति के बाद अप्रैल-जून, 2007 से इस पत्रिका का द्विभाषी प्रकाशन प्रारम्भ किया गया। इस पत्रिका में केन्द्र की गतिविधियों के साथ-साथ, पाठकों के लिए स्वास्थ्य संबंधी उपयोगी लेखों का समावेश किया जाता है। प्रस्तुत है वर्ष 2013-14 में प्रकाशित पत्रिकाओं की एक झलक :-



2. हिन्दी में पत्राचार

राजभाषा विभाग, गृह मंत्रालय, भारत सरकार द्वारा प्रतिवर्ष जारी वार्षिक कार्यक्रम में निर्धारित लक्ष्यों में से हिन्दी में पत्राचार के प्रतिशत का निर्धारित लक्ष्य प्राप्त करना भी एक है। इस लक्ष्य को ध्यान में रखते हुए केन्द्र द्वारा विशेष प्रयास किए जा रहे हैं। प्रस्तुत है पिछले कुछ वित्तीय वर्षों के अंत में प्राप्त प्रतिशत की एक झलक :



हिन्दी में उत्कृष्ट कार्य के लिए केन्द्र को पुरस्कार



हिन्दी में उत्कृष्ट कार्य करने के लिए केन्द्र को दिनांक 20 नवम्बर, 2013 को नगर राजभाषा कार्यान्वयन समिति, जोधपुर द्वारा उपविजेता के रूप में चल-वैजयंती व प्रशस्ति पत्र प्रदान किए गए।

हिन्दी कार्यशाला



केन्द्र में दिनांक 14 सितम्बर तथा 27 दिसम्बर, 2013 को हिन्दी कार्यशालाओं का आयोजन किया गया। इन कार्यशालाओं में वक्ता के रूप में क्रमशः जय नारायण व्यास विश्वविद्यालय, जोधपुर के हिन्दी विभाग के पूर्व आचार्य एवं विभागाध्यक्ष डॉ. नन्दलाल कल्ला तथा भूजल विभाग, राजस्थान सरकार, जोधपुर के पूर्व वरिष्ठ वैज्ञानिक डॉ. दुर्गादत्त ओझा को आमंत्रित किया गया।

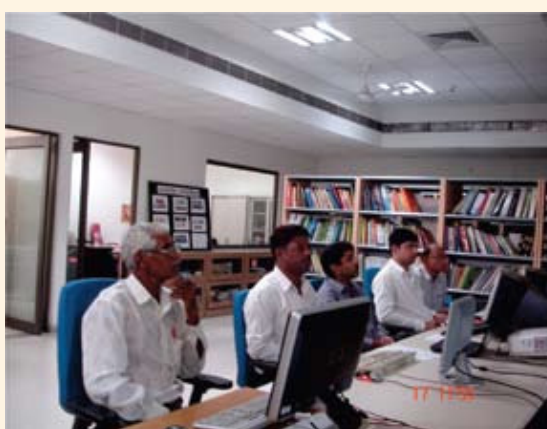
राजभाषा कार्यान्वयन समिति की बैठकें



केन्द्र में हर तिमाही में राजभाषा कार्यान्वयन समिति की बैठकें आयोजित की जाती हैं। यह समिति केन्द्र की राजभाषा गतिविधियों की समीक्षा करती है तथा राजभाषा कार्यों की उत्तरोत्तर प्रगति हेतु अपने सुझाव देती है। वर्ष 2013-14 में यह बैठकें दिनांक 15 जून, 22 अगस्त, 21 नवम्बर, 2013 तथा 21 फरवरी, 2014 को आयोजित की गई।

केन्द्र के स्टाफ के लिए युनिकोड प्रशिक्षण कार्यक्रम





केन्द्र में कार्यरत सभी वैज्ञानिकों, तकनीकी, प्रशासन एवं लेखा अनुभाग के सभी अधिकारियों एवं कर्मचारियों को हिन्दी में कम्प्यूटर पर कार्य करने के लिए विभिन्न बैचों में युनिकोड का प्रशिक्षण दिनांक 3 अप्रैल, 17 अप्रैल, 1 मई, 2013 तथा 23 अगस्त, 2013 को दिया गया।

जोधपुर शहर के कार्यालयों के कर्मचारियों के लिए केन्द्र द्वारा युनिकोड प्रशिक्षण कार्यक्रम



केन्द्र के तकनीकी अधिकारी एवं आई. टी. प्रोफेशनल डॉ. मंजीत सिंह दिनांक 6 सितम्बर, 2013 को एफसीआई अरावली जिप्सम एण्ड मिनरल्स इण्डिया लिमिटेड, जोधपुर के कर्मचारियों को तथा दिनांक 20 फरवरी, 2014 को प्रसार भारती, भारत का लोक सेवा प्रसारक, आकाशवाणी, जोधपुर में युनिकोड प्रशिक्षण देने हेतु हिन्दी कार्यशाला में व्याख्याता के रूप आमंत्रित किया गया।

हिन्दी सप्ताह समारोह का आयोजन



हिन्दी में कार्य करने के उत्साह को बनाए रखने हेतु मरुस्थलीय आयुर्विज्ञान अनुसंधान केन्द्र में गत वर्षों की भांति इस वर्ष भी दिनांक 14 से 21 सितम्बर, 2013 तक हिन्दी सप्ताह का आयोजन किया गया। सप्ताह के दौरान निबन्ध लेखन, युनिकोड, प्रश्न मंच तथा वाद-विवाद प्रतियोगिता के अलावा हिन्दी कार्यशाला का भी आयोजन किया गया।

ADDRESS BY HONOURABLE PRESIDENT ON NATIONAL KNOWLEDGE NETWORK

On 7th January, 2014, Honourable President of India Dr. Pranab Mukherjee addressed the students and faculty members of all the institutes connected under NKN. The employees of Desert Medicine Research Centre, Jodhpur which was connected with National Knowledge Network (N.K.N.) on 15th May, 2013, participated in the webcast of this programme.

IMPLEMENTATION OF RESERVATION POLICY FOR SCHEDULE CASTES

Regarding the implementation of reservation policy for scheduled castes in the Centre, the following actions were initiated/completed during the report period.

- i. In each selection committee for the recruitment of the staff directions for including the scheduled Castes representative have been followed.
- ii. In both, direct recruitment as well as in promotions the policy of Government was followed in toto and the relaxations/concessions were given to Scheduled Castes employees as per the guidelines.
- iii. The Centre has no back log of Scheduled Castes on vacancy based roster in all categories prior to 01.01.1997 and the short fall as switching over to post based roster vide DOP&T O.M. No. 36012/12/96-Estt.(Res) dated 02.07.1997. During the report period no vacancy has been filled-up under Special Recruitment Drive.
- iv. For ensuring the implementation of the government policies for Scheduled Castes/Tribes and review and monitoring of rules of reservation and service safeguard provided to the Scheduled Castes under the constitution, the Centre has 'SC-ST Cell', a designated 'Liaison Officer' and a 'Grievances Committee'. However, during the report period no complaint of any type was received by the above statutory bodies/officials.

Besides above, the information on the implementation of the government policies for Scheduled Castes monitoring of rules of reservation and service safeguard provided to the Scheduled Castes under the constitution has been provided by the Centre as and when required for monitoring/reviewing purposes.

ADDRESS BY HONOURABLE PRESIDENT ON NATIONAL KNOWLEDGE NETWORK

On 7th January, 2014, Honourable President of India Dr. Pranab Mukherjee addressed the students and faculty members of all the institutes connected under NKN. The employees of Desert Medicine Research Centre, Jodhpur which was connected with National Knowledge Network (N.K.N.) on 15th May, 2013, participated in the webcast of this programme.

IMPLEMENTATION OF RESERVATION POLICY FOR SCHEDULE CASTES

Regarding the implementation of reservation policy for scheduled castes in the Centre, the following actions were initiated/completed during the report period.

- i. In each selection committee for the recruitment of the staff directions for including the scheduled Castes representative have been followed.
- ii. In both, direct recruitment as well as in promotions the policy of Government was followed in toto and the relaxations/concessions were given to Scheduled Castes employees as per the guidelines.
- iii. The Centre has no back log of Scheduled Castes on vacancy based roster in all categories prior to 01.01.1997 and the short fall as switching over to post based roster vide DOP&T O.M. No. 36012/12/96-Estt.(Res) dated 02.07.1997. During the report period no vacancy has been filled-up under Special Recruitment Drive.
- iv. For ensuring the implementation of the government policies for Scheduled Castes/Tribes and review and monitoring of rules of reservation and service safeguard provided to the Scheduled Castes under the constitution, the Centre has 'SC-ST Cell', a designated 'Liaison Officer' and a 'Grievances Committee'. However, during the report period no complaint of any type was received by the above statutory bodies/officials.

Besides above, the information on the implementation of the government policies for Scheduled Castes monitoring of rules of reservation and service safeguard provided to the Scheduled Castes under the constitution has been provided by the Centre as and when required for monitoring/reviewing purposes.

DMRC ACTIVITIES 2013-14 : A PICTORIAL VIEW

A lecture by Dr. Puneet Kaur, Additional Professor, Department of Bio-physics, All India Institute of Medical Sciences, (AIIMS), New Delhi on "Structural Bio-informatics and its applications in Bio-medicinal Sciences" was organized in the Centre, 13th May, 2013.

OUR COLLABORATIVE EFFORTS

Director and Scientists of DMRC discussing collaborative issues with :



Vice Chancellor and Faculty of Jai Narayan Vyas University, Jodhpur, 25th May, 2013.



Vice Chancellor and Faculty of Mohanlal Sukhadia University, Udaipur, 30th May, 2013.



Scientists of DMRC and Faculty of Maharana Pratap University of Agriculture and Technology, Udaipur, 30th May, 2013.



Scientists of DMRC and Manikya Lal Verma Tribal Research Institute, Udaipur, 30th May, 2013.



Scientists of DMRC with Principal and Faculty of Jawahar Lal Nehru Medical collage, Ajmer, 5th June, 2013.



DMRC Scientists and Principal and Faculty of Sawai Mansingh Medical Collage, Jaipur, 6th June, 2013.



DMRC director Vice Chancellor and Faculty of IIS University, Jaipur, 6th June, 2013.



Faculty of DMRC and Vice Chancellor and Faculty of MDS University, Ajmer, 6th June, 2013.



DMRC Scientists with Registrar and Faculty of Suresh Gyan Vihar University, Jaipur, 6th June, 2013.



Faculty of DMRC Vice Chancellor of Rajasthan University of Health Science, Jaipur, 6th June, 2013.

CONNECTIVITY OF DMRC WITH 'NATIONAL KNOWLEDGE NETWORK'



Inauguration of connectivity of DMRC with 'National knowledge Network', 14th June, 2013.

SCIENTIFIC ADVISORY COMMITTEE MEETING - 12TH AND 14TH JULY, 2013



Meeting of Scientific Advisory Committee of the Centre,
12th and 14th July, 2013



Release of Annual Report (Hindi) 2012-13



Dr. G. S. Toteja, Director



Dr. V. M. Katoch, Secretary,
DHR & DG, ICMR



Prof. N. K. Mehra,
chairman, SAC & Head,
Immunology Deptt, AIIMS



Dr. T. S. Jawahar, IAS,
Senior DDG, ICMR



Scientists of the Centre presenting their research proposals.

PLANTATION IN THE CENTRE BY DIGNITARY GUESTS



Dr. V. M. Katoch, Secretary, Department of Health Research & Director-General, Indian Council of Medical Research, New Delhi



Sh. T. S. Jawahar, IAS, Senior Deputy Director-General (Admin), ICMR



Prof. N. K. Mehra, Head, Department of Transplants Immunology & Immunogenetics, All India Institute of Medical Sciences, New Delhi



Prof. R. C. Mahajan, Emeritus Professor, Post Graduate Institute of Medical Education & Research, Chandigarh

ORGANIZATION OF RAJASTHAN CONCLAVE



Dr. V. M. Katoch, Secretary, DHR & DG, ICMR lighting the lamp



Sh. T. S. Jawahar, IAS, Senior Deputy Director-General(Admin), ICMR addressing the participants



Organization of Rajasthan Conclave in the Centre, 13th July, 2013 with the objective to promote collaborative health research between the Centre and Medical Collages, State Health Department, Research Organizations and Universities in Rajasthan.

SIGNATURE ON MEMORANDUM OF UNDERSTANDING (MOUS)



With Amity University, Jaipur



With Jai Narain Vyas University, Jodhpur



With IIS University, Jaipur



With NIMS University, Jaipur

ORGANIZATION OF ANNUAL MEETING OF ICMR TRIBAL HEALTH RESEARCH FORUM



Annual Meeting of Tribal Health Research Forum, 9th and 10th August, 2013.

INDEPENDENCE DAY CELEBRATION



Independence Day Celebration, 15th August, 2013



After the flag-hoisting programme, games (Volleyball, Cricket and Badminton) programme were organized in the Centre.

CENTRE'S PARTICIPATION IN 'BHARAT NIRMAN JAN SUCHANA' EXHIBITION



Centre's Participation in 'Bharat Nirman Jan Suchana' Exhibition, Marwar Junction, Pali, 17-19th August, 2013

OUR COLLABORATIVE EFFORTS IN TRIBAL HEALTH RESEARCH



DMRC scientists discussing Collaborative Health Research Projects for Tribal population of Rajasthan with Divisional Commissioner, Tribal Area Development Department and with Principal, RNT Medical College, Udaipur and the faculty members, 29th August 2013

TRAINING PROGRAMME: ANNUAL HEALTH SURVEY – 2013



Organization of Training programme on Clinical, Anthropometric and Bio-chemical (CAB) component of the AHS in batches from 16th to 19th September, 2013, 24th to 27th September, 2013, 15th to 18th October, 2013 and 22nd to 25th October, 2013.

VIGILANCE AWARENESS WEEK



DMRC staff taking the oath of fidelity of truth and honesty

OUR COLLABORATIVE EFFORTS WITH HOME SCIENCE DEPARTMENT, J N V UNIVERSITY, JODHPUR



Discussion on collaborative issues with Professor Indra Pal Rai, Professor and Home Science Department, J N V University, Jodhpur



Collective participation by DMRC and University Staff

INAUGURATION OF AN AUTOMATIC VENDING FOUR LANE MACHINE



Inauguration of an Automatic vending four lane machine by Dr. Haldiya, Scientist -F
5th December, 2013.



DMRC Staff taking Tea, Coffee.

JOINT MEETING ON SEVERE MALARIA AND COMPLICATIONS DUE TO P. VIVAX INFECTION



Director, DMRC, Jodhpur and NIMR, New Delhi in the meeting.



Participants of DMRC, NIMR and Medical colleges of Rajasthan.

ADDRESS BY HONOURABLE PRESIDENT ON NATIONAL KNOWLEDGE NETWORK



Honourable President of India Dr. Pranab Mukherjee addressing the students and faculty members of all the institutes connected under NKN, 7th January, 2014



DEMONSTRATION OF FILE O. P. A. SYSTEM AND LETTER MOVEMENT SYSTEM



Demonstration of File O. P. A. System and Letter Movement System to DMRC officials by Dr. Manjeet Singh, Technical Officer of the Centre, 7th January, 2014

ELDERLY CARE: A PROJECT ON THEIR NUTRITION



Training to all the Accredited Social Health Activist (ASHA)/ Anganwadi workers (AWs)/ Sahyogini workers along with Sarpanch, Ward Panch of the village, Aganwari centre, Luni village, 10th January, 2014

REPUBLIC DAY CELEBRATIONS



Dr. G. S. Toteja, Director, DMRC, Jodhpur hoisting the national flag and addressing DMRC staff, 26th January, 2014

ESTABLISHMENT OF MODEL RURAL HEALTH RESEARCH UNIT IN RAJASTHAN UNDER THE SUPERVISION OF DMRC



Dr. V. M. Katoch, Secretary, DHR & DG, ICMR inaugurating MRHR Unit at Bhanpur Kalan CHC, District Jaipur, Rajasthan, 1st February, 2014,



Signing of MOU with CPWD, Jaipur for construction of MRHRU Building, 1st February, 2014.

PARTICIPATION IN SCIENCE & TECHNOLOGY EXHIBITION '5TH VISION RAJASTHAN 2014'



Participation of Desert Medicine Research Centre in Science & Technology exhibition '5th Vision Rajasthan- 2014' organized by the Friends Exhibitions & Promotions Pvt. Ltd., Chomu – Jaipur to convey the people about the research activities undertaken by the Centre, 17th-19th February, 2014

MEETING OF ETHICS COMMITTEE



Members of Ethics Committee discussing different projects, 27th February, 2014

BUILDING ADVISORY COMMITTEE MEETING



Dr. G. S. Toteja, Director, DMRC and Professor Ram Gopal, Former Director, DRDO, New Delhi addressing Building Advisory Committee, 11th March, 2014

COLLABORATIVE EFFORTS FOR TRIBAL HEALTH



DMRC Team Visiting District Health Committee (Tuberculosis) Baran District, 31st March, 2014



DMRC Team discussing with the Bengali Doctor, Baran District, 31st March, 2014