



**Indian Council of Medical Research  
and  
All India Heart Foundation**



**Control of Rheumatic Fever/  
Rheumatic Heart Disease  
in India through  
School Health Services**

**Executive Summary of an ICMR  
Pilot Project**

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**Control of Rheumatic Fever/ Rheumatic  
Heart Disease in India Through  
School Health Services  
Executive Summary of an  
ICMR Pilot Project**

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- 1. Title of the Research**  
Pilot Study of the feasibility of utilizing the existing School Health Services in Delhi for the control of Rheumatic Fever/Rheumatic Heart Disease.
- 2. Location**
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- 6. Date of Termination**  
March 31, 1990
- 7. Objectives**  
To study the feasibility and effectiveness of a secondary prophylaxis programme in primary school children (Class I to V) utilizing the existing School Health Services.

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## INTRODUCTION

Because of the high prevalence of Rheumatic Fever/Rheumatic Heart Disease in India after World War II as reported in medical publications, the ICMR (and to a smaller extent the WHO and DST) embarked on several projects to determine; the prevalence of the disease in different parts of India, epidemiological features, the applicability of the Jones' Criteria, seasonal variations in streptococcal isolation and types involved and the efficacy of a pilot programme on secondary prophylaxis<sup>1</sup>. WHO had postulated the following requirements of successful control, all of which except the last had been achieved in India by 1982:

- a) Epidemiology of RHD in the area in schools
- b) Streptococcal epidemiology in the adjoining areas in schools
- c) A Streptococcal Reference Laboratory
- d) Free availability of Penicillin
- e) Cost of a Pilot Programme
- f) Formulation of a National Programme for RHD control
- g) Integration into the health care delivery systems of the country.

The ICMR embarked on a programme for integrating Rheumatic Fever/Rheumatic Heart Disease control into the regular health care delivery systems of the country utilizing (1) Primary Health Care Centre (PHCs) and (2) School Health Services (SHS). The work done under PHCs has been published<sup>2</sup>. This paper concerns the work done under the School Health Services in Delhi. A detailed report was submitted to the ICMR

in 1991. The present publication is a summary of the highlights of this work.

The details of this programme are given in the preceding sheet.

### **School Health Services in Delhi**

Delhi is one of the few Indian cities to have a full time SHS for primary schools under the Municipal Corporation of Delhi and this was one of the reasons for selecting it for the study. Every zone has its own clinic with a full complement of doctors, nurses, pharmacists and other para-medical personnel and is fully equipped for essential tests. At the time of the study Delhi had 1585 primary schools under the MCD with 5,92,199 pupils. There were 11 school zones.

## **MATERIAL AND METHODS**

### **Liaison with Health and Education Authorities**

This aspect was the key to the success of the project and no less a person than the Municipal Commissioner of Delhi gave his consent for the conduct of the programme. Subsequently, the Chief Education Officer, the Municipal Health Officer, the Officer-Incharge of SHS, doctors from SHS, Headmasters of the schools involved were all met in groups and individually over very long time consuming sessions. Because of this painstaking preliminary work, the project could be brought to a successful conclusion.

### **Plan of Work**

The objective of this work was to determine the feasibility of secondary prophylaxis (and to a lesser extent primary prophylaxis) through the SHS of Delhi. The persons to be utilized were parents, teacher, doctors and PHNs. An experimental zone (Lajpat Nagar – LNZ) where training and motivation was given to these categories and a control zone (Kamla Nagar – KNZ) where no such training was given were selected and compared for

- 1) referral rates to SHS clinic for sore throats and RF/RHD by parents, teachers and doctors.
- 2) Streptococcal isolations in winter and summer months in the school children.
- 3) A sore throat survey in the experimental zone by social workers;

- 4) Compliance for primary and secondary prophylaxis;
- 5) Prevalence of RF/RHD in the two zones.

**Zones Selected : Table 1, Figure 1 & 2**

Two zones, LNZ as experimental zone and KNZ as control were selected by the statistical division of ICMR on a random basis, inspite of the KNZ being much bigger. The demographic data and referral pattern are self-explanatory. LNZ is situated in South Delhi and KNZ in North Delhi, approximately 15 km apart.

**Table 1**  
Demographic Data & Staffing Pattern of the two zones

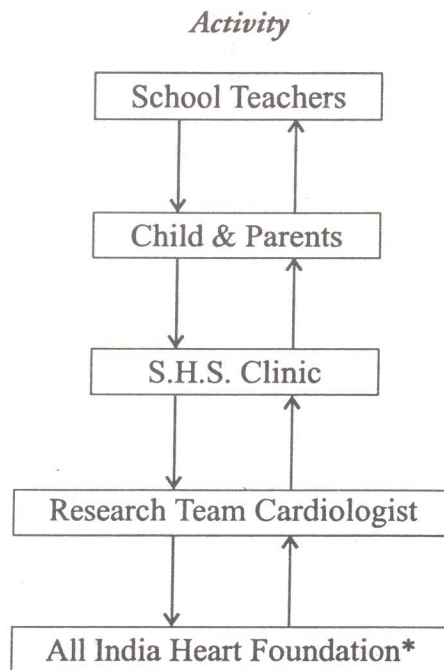
	LNZ	KNZ
No. of Schools	96	201
No. of Teachers	895	2000
No. of Children	34009	66086
No. of Medical Officers	4	6
No. of PHNs	4	9
No. of Lab Technicians	1	1
No. of Pharmacists	1	1

**Preparation of Maps, Teaching Manuals and Education Materials**

Maps of the two zones were prepared. Health education materials in the form of posters, flash cards and booklets were prepared for the education and subsequent evaluation of parents, teachers, doctors, PHNs and other para-medical personnel. Details of these are available in the report submitted to the ICMR and will not be presented here.



**Figure I**  
**REFERRAL SYSTEM**



\* For sophisticated test and free treatment and free hospitalization to poor children.

**Figure II**  
MAP OF THE TWO ZONES



**Legend :**

- LNZ : Lajpat Nagar Zone
- KNZ : Kamla Nagar Zone
- NHI : National Heart Institute
- ICMR : Indian Council of Medical Research

**Time Schedule**

There was considerable delay in initiating the work because of the liaison required with various authorities. The assassination of Mrs. Indira Gandhi on 31.10.1984 led to closure of all schools for a long period. Further, the number of working days in primary schools was only about 100 per year, after excluding Sundays and holidays (the latter scheduled and unscheduled). The work in LNZ was from April 1984 to September 1987 and that in KNZ from October 1987 to March, 1989.

**Role of SHS Personnel (LNZ & KNZ)**

The doctors and PHNs visited the schools as per their schedule. One group remained in the SHS Clinic to attend to patients who turned up upon referrals from parents, teachers or school health doctors. All students from Class I to V were examined by SHS doctors for the duration of the project. Cases of suspected sore throat, RF/RHD could be referred to the SHS clinic by parents, teachers or doctors. The strategy was to make the SHS personnel do the following with training in LNZ and without training in KNZ :

1. To detect sore throat cases and carry out throat culture if required.
2. To diagnose cases with RF/RHD
3. To provide primary prophylaxis to suspected strep. throat case.
4. To provide secondary prophylaxis to cases with RF/RHD and monitor recurrences.
5. To carry out a prevalence study of RF/RHD.

**Role of Project Team (LNZ & KNZ)**

The project team visited the two zones on separate days once a week. They confirmed cases with sore throat, of suspected RF/RHD, supervising collection of throat swabs by SHS team and giving of primary and secondary prophylaxis. A record was maintained by the statistician of the project team of the sore throat and RF/RHD cases.

**R.F./R.H.D. Survey (LNZ & KNZ)**

RF/RHD survey was carried out by the project team on 20,000 pupils in each zone. Every month, the schools were selected

randomly by the ICMR statistician to achieve the target. Many of them fell in the same group as the SHS doctors were surveying; this provided additional confirmation.

#### **Knowledge Attitude Practice (KAP) (At LNZ only)**

KAP tests of parents, teachers, doctors and PHNs were carried out on prescribed proforma. Pre-training of parents, teachers and doctors and post training evaluation was carried out on all the groups.

#### **Sore Throat Survey (At LNZ only)**

The social workers carried out a sore throat survey in LNZ only in the homes of the pupils and in the adjoining areas of the schools with the help of the statistician of ICMR between January 1986 and August 1987. The history of sore throat was obtained from parents and pupils themselves. Seasonal variation and prevalence of sore throat was determined.

### **RESULTS**

These were adjudged as following:

1. KAP of parents, teachers, doctors & PHNs.
2. Referral rated for sore throat, RF/RHD in the two zones by (a) teachers (b) doctors
3. Results of sore throat survey by Social workers in LNZ.
4. Strep. Isolation (seasonal) and ASO titres in the two zones.
5. Primary prophylaxis in the two zones.
6. Secondary prophylaxis in the two zones.
7. Prevalence of RF/RHD in the two zones.

#### **KAP**

KAP of parents, teachers, doctors and PHNs was done at LNZ only.

#### **KAP of Parents**

The KAP test of parents was very disappointing as they belonged to illiterate and poor socio-economic strata. Both parents were usually at work and could not be contacted during working

hours. Those contacted were generally illiterate and ignorant about the working of the SHS, sore throat and its sequelae and RF/RHD and its effects. At least in the Delhi setting, they were not a suitable medium for the control of RF/RHD among school children. Out of 776 parents, 231 (30%) only could be interrogated. Regarding health status of children only 36 parents (16%) knew about the poor health status of their children. 220 (95.23%) parents were not at all aware of medical facilities available in the schools. Parents' knowledge regarding location of the School Health Service was very poor. Only 6 (3%) out of 231 knew about it. Knowledge regarding clinical manifestation of RF/RHD was nil.

#### **KAP of Teachers**

The teachers were definitely more knowledgeable and more amenable to training. Post training evaluation showed considerable improvement. Evaluation regarding knowledge of sore throat and its symptoms, complications, seasonal variation, spread of infection etc. was done in 3 sessions from 1985 to 1988. Percentage of those with knowledge of sore throat had improved although the numbers of teachers interrogated were not comparable in the two sessions. Awareness of the causative organism of sore throat as streptococcus improved slightly in the post training sessions.

The knowledge of symptoms of sore throat as pain in the throat with difficulty in swallowing had improved in the first two sessions. Knowledge with regard to complication of sore throat leading to RF improved in the first and second KAP assessments. It was observed that teachers were quite receptive and potentially better candidates for motivating parents and guiding their sick children to attend SHS clinic for treatment. They however needed frequent repetition of the training programme as they had many other duties in the school, which kept them occupied. They tended to forget easily what they had learnt.

Post training evaluation revealed that teachers had significant improvement after training. 64.1% teachers obtained 26-50% marks in pre-training whereas 72.49% teachers obtained 76-100% marks in post training sessions. Successive re-evaluation showed that their enthusiasm waned considerably with the passage of time and pre-occupation with the school curriculum.

#### **KAP of Doctors & PHNs**

A preliminary training of doctors and PHNs was done and evaluated. An evaluation before and after training of doctors

showed definite improvement in their knowledge with an average of 84% in pre-training and 93% in post-training sessions. PHNs obtained average marks of 64% before training and 84% after training and this showed significant improvement in their knowledge. On the whole, this group was the most suitable of all for training and motivation.

#### Sore Throat/RF/RHD Referrals by Teachers (Table 2 & 3)

A measure of the success of awareness was the number of cases of sore throat who came to SHS clinic on referral. The number of sore throat cases referred by School teachers was small in both zones. However the number was larger in LNZ where training had been given. The same held good for referrals for suspected RF/RHD. Training certainly had some effect but was not significant.

**Table 2**  
Sore throat referrals by school teachers

<i>Zone</i>	<i>Period</i>	<i>Referred</i>	<i>Turned Up</i>	<i>Sore Throat Confirmed</i>
LNZ	1985-89	183	79 (43.16%)	58 (32.0%)
KNZ	April '88-March '89	27	8 (30.00%)	6 (22.2%)

**Table 3**  
R.E./R.H.D. referrals by school teachers

<i>Zone</i>	<i>Period</i>	<i>Referred</i>	<i>Turned Up</i>	<i>Confirmed</i>	
				<i>RF</i>	<i>RHD</i>
LNZ	1985-89	88	36 (41%)	1	-
KNZ	April '88-March '89	1	1	-	-

#### Referral Rates by Doctors for Sore Throat and RF/RHD (Table 4 & 5)

Referrals for strep-throat by doctors was large although only 20-28% finally turned up at the SHS clinic. The number confirmed was also satisfactory. This shows that doctors can be trusted to detect sore throat with and without training. The numbers referred for suspected RF and RHD was significantly higher in LNZ which

can be attributed to prior training. The numbers confirmed were low in both cases. This may have been due to the unsatisfactory condition for auscultation in the schools, which in most cases were very poorly constructed, often without a roof.

**Table 4**  
Referral of suspected sore throat cases by doctors

<i>Zone</i>	<i>Period</i>	<i>Referred</i>	<i>Turned Up</i>	<i>Clinically Confirmed</i>
LNZ	1984-89	3580	1031 (29%)	1011 (98%)
KNZ	1987-89	4642	933 (20.09%)	920 (99%)

**Table 5**  
Referral of suspected R.F./R.H.D. by doctors

<i>Zone</i>	<i>Period</i>	<i>Referred</i>	<i>Turned Up</i>	<i>Confirmed</i>	
				<i>R.F.</i>	<i>R.H.D.</i>
LNZ	1984- Sept.' 87	788	387 (49.11%)	6 (2%)	79 (20.41%)
KNZ	1987-89	185	18 (10%)	-	3 (17%)

**Results of Sore Throat in LNZ (By Social Workers) Table 6**

Sore throat survey was carried out in the areas near the school between January '86 and August '87. The history of sore throat was obtained from the parents and children themselves. The prevalence varied from 7.45% to 40%. The seasonal occurrence of sore throat as reported was much higher in winter months as compared to summer. Social workers can be entrusted with detection of sore throat in the eventuality of doctors and nurses not being available.

**Seasonal Isolation of Beta Haemolytic Streptococci with Group 'A' and ASO Titers in Sore Throat (Table 7 & 8)**

In both zones, the total incidence of Beta haemolytic streptococci and of Group A were significantly higher in winter as against summer. The total Beta haemolytic streptococci and of Group A isolations were almost the same in the two zones although Beta haemolytic streptococci isolated were higher in summer in LNZ, perhaps due to better sore throat detection.

**Table 6**

Seasonal occurrence of sore throat at LNZ  
(Social workers' study)

	SUMMER (April-September)		WINTER (October-March)	
	Total Interrogated	Sore Throat Confirmed	Total Interrogated	Sore Throat Confirmed
April '86- Sept. '86	831	102	659	34
April '87 August '87	1149	128	1485	373
<b>Total</b>	<b>1980</b>	<b>231 (12%)</b>	<b>2144</b>	<b>407 (19%)</b>



Table 7  
Seasonal Isolation of Beta Haemolytic Streptococci (BHS) and Group 'A' Streptococci

Zone	Period	No. of Throat Swabs	Beta Haemolytic Streptococci Isolation	Group 'A' Isolation	SEASONAL INCIDENCE			
					SUMMER (April-Sept.)		WINTER (October-March)	
					BHS	Group 'A'	BHS	Group 'A'
LNZ	1984-89	983	155 (16%)	93 (9.46%)	51 (5.18%)	29 (3%)	104 (11%)	64 (7%)
KNZ	1987-89	851	112 (13.16%)	62 (7.28%)	15 (2%)	7 (1%)	97 (11.39%)	55 (6.46%)

Table 8

BHS isolation and A.S.O. Titers of sore throat cases

Zone	Period	Clinically Confirmed Sore Throat	Results of Throat SWAB Culture			A.S.O. Titer Level	
			Samples Taken	Beta Haemolytic Streptococci Isolated	Group 'A' Isolation	Samples Taken	A.S.O. >200
LNZ	1984-89	1011	983 (97.2%)	155 (16%)	93 (9.46%)	169 (17%)	42 (25%)
KNZ	1987-89	920	851 (93%)	112 (13.16%)	62 (7.28%)	728 (79.13%)	168 (23.07%)

The number with positive ASO was the same in the two zones. A total beta haemolytic streptococci isolation of 11-16% and of group A of 7-9% and positive ASO titres around 25% may be taken as the norm in Delhi from this and earlier studies.<sup>3</sup>

#### **Primary Prophylaxis to Sore Throat Cases (Table 9)**

The numbers treated were the same in the two zones (96-98%). Penicillin was given on diagnosis of sore throat by the doctors as throat culture confirmation was not readily available. The majority of cases received Benzathine Penicillin especially in LNZ which was proof of good motivation. Normally pupils refuse injection.

#### **Secondary Prophylaxis to RF/RHD Cases (Table 10)**

The number receiving secondary prophylaxis was marginally higher in LNZ for the total group and for RHD. Both groups showed good record of secondary prophylaxis proving that even without motivation, doctors were performing satisfactorily.

The nurses of the SHS in both zones had no difficulty in giving Penicillin injections for both primary and secondary prophylaxis. They were aware and fully prepared for anaphylactic reactions with the necessary drugs and equipment. No such reaction however occurred during the period of this study. There is an unnecessary fear of giving Inj. Penicillin in many parts of India.

#### **Prevalence of RF/RHD (Table 11, 12)**

The prevalence of RF and RHD was the same in the two zones and unacceptably high in both. In the West, it is less than 0.5 per 1,00,000 children.

Of the valvular lesions 59 (75%) were MR, 7 (9%) MS+MR, 12 (15.18%) MS and 3.17% combinations of aortic and mitral lesions.

### **CONCLUSION**

The important fact which emerges from this study, is that the School Health Services can play a significant role in the control of RF/RHD. Even without training, doctors were detecting sore throats, giving primary prophylaxis in suspected cases and giving secondary prophylaxis to nearly 75% to 80% of cases. Training improved the numbers treated. There was no hesitation in giving penicillin injections by either nurses or doctors. Secondary prophylaxis remains the most potent tool for RHD prevention at the present time. Should a vaccine be introduced in the future, the

**Table 9**  
Primary Prophylaxis given to Sore Throat Cases

Zone	Period	Clinically confirmed sore throat cases	Total No. of Cases Treated	PRIMARY PROPHYLAXIS		
				Injection Penicillin	Oral Penicillin	Other Bactericidal Drugs
LNZ	1984-89	1011	995 (98.41%)	435 (43.03%)	497 (49.15%)	63 (6.23%)
KNZ	1987-89	920	270 (96.42%)	201 (72%)	50 (18%)	19 (7%)

**Table 10**

Secondary Prophylaxis given to RF/RHD cases

Zone	Period	Category	R.F. Cases	R.H.D. Cases	Total
LNZ	1984-89	Expected (Due)	255	3262	3517
		Observed (Given)	212 (83.13%)	2724 (84%)	2936 (83.48%)
KNZ	1987-89	Expected (Due)	55	524	579
		Observed (Given)	44 (80%)	387 (74%)	431 (74.43%)

**Table 11**

Prevalence of R.F./R.H.D. in the two zones

Zone	R.F.	R.H.D.	Total	Prevalence Per 1000		Total Prevalence Per 1000
				R.F.	R.H.D.	
LNZ	6	79	85	0.3	4	4.3
KNZ	7	63	70	0.4	3.15	4

**Table 12**

Valvular Lesions in R.H.D. cases

Zone	MR	MS	MR+MS	AR and Combination of Aortic & Mitral Valvular Lesions	Total
LNZ	59 (75%)	12 (15.18%)	7 (9%)	1	79
KNZ	54 (86%)	2 (3.17%)	5 (8.19%)	2 (3.17%)	63

story may be different. The unnecessary of anaphylactic penicillin reactions is one of the reasons for the high endemicity of the disease in India. Such reactions are rare and if adequately prepared for, need cause no alarm.

School teachers although amenable to education were less suitable than the School Health Service team because of their preoccupations. Parents at least in Delhi were completely unsuitable because of their low literacy and poverty.

The desirability of introducing a School Health Service for all primary schools in the country is obvious. Apart from RF/RHD many childhood illnesses and disabilities of sight, speech, hearing and locomotion can be detected and corrected at an early age. The control of RF/RHD can be safely and successfully introduced through the School Health Services as in Delhi. This is an argument for creating School Health Services where they do not exist in a phased manner throughout the country in the different States.

RF/RHD is endemic in India especially among the poor. Its eradication to which mere lip service is being paid by the authorities could be done easily through the primary health care services such as PHCs and School Health Services as in this study. The latter appears much easier because of the involvement of doctors. Improvement in living conditions, better sanitation, clean water supply etc. are a far cry in India. Utilizing the existing channels such as PHCs and SHS would appear to be suitable alternatives.

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