

# Paralytic poliomyelitis in a rural area of north India

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## ABSTRACT

**Background.** Paralysis due to poliomyelitis is common in rural areas. The extent of paralysis, type and place of treatment and effect of local treatment on children with poliomyelitis was assessed in a house-to-house survey conducted between 1990 and 1991 in a rural area of north India.

**Methods.** Trained field workers conducted a house-to-house survey in 9 villages of Haryana with a total population of 22 883. All cases of deformity and muscular weakness suspected to be due to poliomyelitis were examined and details regarding immunization, diagnosis, treatment and follow up were recorded. The late consequences of neglect as well as inappropriate medical advice were also assessed by physical examination and direct questioning of the parents.

**Results.** Thirty-seven cases of paralytic poliomyelitis were identified indicating a prevalence rate of 1.6 per 1000 population. Of these, 97% were paralysed before they were 2 years old and 60% had a history of intramuscular injections preceding paralysis. Only 14% of them had received either partial or complete immunization. The majority of families preferred to take treatment from traditional healers or in city hospitals but not from primary health centres.

**Conclusion.** Despite the national immunization programme, paralytic poliomyelitis continues to be a significant problem in the villages surveyed. Primary health centres are an unreliable source of epidemiological data for paralytic poliomyelitis as villagers do not prefer to visit them for treatment of the disease. Injections given for treatment of fevers in rural areas may play a role in precipitating paralytic poliomyelitis. These findings highlight the urgency of a broad-based primary health care approach at primary health centres. Traditional healers and private practitioners should be trained to provide physiotherapy to children with polio and educated about the importance of not giving injections to children with minor fevers.

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## INTRODUCTION

A number of epidemiological studies have been done worldwide to determine the prevalence of paralytic poliomyelitis.<sup>1-3</sup> The majority of these studies assessed the need for immunization against poliomyelitis. The present study was done:

1. To compare the prevalence rates of paralytic poliomyelitis in

rural Haryana with those found in sample surveys conducted by the Government of India.

2. To assess the pattern of paralysis in poliomyelitis.
3. To assess the factors influencing the mode of treatment and the reasons for failure to seek medical help by families of paralysed children.
4. To gauge the effectiveness of immunization against poliomyelitis in rural areas before 1991.
5. To assess the impact of the method of treatment adopted, including local practices, on the child's disability.
6. To suggest guidelines for rehabilitation of children with paralytic poliomyelitis in rural areas.

## METHODS

The survey was conducted in 9 contiguous villages in Sonapat district of Haryana. A house-to-house survey was done by 14 field workers trained by the authors for this purpose. All children under the age of 15 years with paralysis of the upper or lower limbs were identified. Each case was then examined by an orthopaedic surgeon to confirm the diagnosis, assess the degree of impairment and possibility of rehabilitation. Children having paralysis of a limb due to causes other than poliomyelitis were excluded. All details were entered on a specially designed proforma and subsequently analysed. Children not found at home after three consecutive visits were excluded. The immunization status of all children between 1 and 2 years of age was recorded to determine the extent of immunization in the community.

## RESULTS

A total of 22 883 people were surveyed. Forty-five cases of suspected paralysis were identified by the field workers. Eight children were excluded from the study—2 could not be located even after three visits, 4 had spastic cerebral palsy, one had tuberculosis of the hip and one had chronic lymphoedema. The remaining 37 children (26 boys, 11 girls) had paralytic poliomyelitis; 36 had lower limb and one had upper limb involvement. The age distribution of the children with paralysis is shown in Table I. There were 9153 children in the 0-14 years age group in the

TABLE I. Age distribution of children with paralytic poliomyelitis

Village	<5 years	5-14 years	Population
Mandaura	1	4	3456
Mandauri	2	-	2153
Rampur	1	1	2247
Thanakalan	2	4	4042
Thanakhurd	-	2	2216
Saidpur	2	2	2506
Gopalpur	2	8	3186
Jatola	1	4	1639
Turkpur	1	-	1438
Total	12	25	22 883

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TABLE II. Age at which paralysis occurred

Age at paralysis (in months)	Number paralysed
<6	2
6-18	29
18-24	5
>24	1

community. This amounts to a prevalence rate of 4 per 1000 in the 0-14 years age group and 1.6 per 1000 of the general population.

Thirty-two (86%) children had received no immunization, 3 (8%) children had been partially immunized and 2 (5%) were fully immunized. Four of these 5 children were immunized at nearby primary health centres (PHCs). A one-year survey done separately in these villages to determine the immunization status of children in the age group of 1-2 years showed an immunization rate of only 41%; 31% were partially immunized and 28% had not been immunized.

There was history of an intramuscular injection preceding the onset of paralysis in 22 children (60%). These injections were given by the local private practitioners for control of fever. Gopalpur village recorded the highest number (10) of post-injection paralysees. These children were given injections by private practitioners within the village, 2 by city doctors and 5 by traditional healers. The onset of paralysis from the time of injection was within 6 hours in 9 children, within 24 hours in 4 children and after 24 hours in 8 children. Parents of 5 children could not recollect the time of onset of the paralysis. In one child paralysis followed a DPT injection at a PHC.

The majority of children (97%) were paralysed between the ages of 6 months and 2 years; 5 were paralysed prior to the age of 6 months and one after the age of 2 years. The number of new cases per year ranged from 1 to 5 except in 1989 when no cases occurred. Table II gives details of the age of onset of paralysis in the children. Once paralysed, 13 (35%) preferred to go to a  *vaid* (traditional healer) for treatment, 30% to a medical college hospital and only 8% (3 cases) went to a PHC for primary treatment. Nine (24%) of those who consulted a city/medical college doctor chose to visit a traditional healer also. The usual treatment advised by the traditional healer was application of some oil and regular massage. Some of them also advised the use of honey and some medicines.

Of the 36 cases of lower limb paralysis, 29 were ambulant with one limb. Four patients were severely paralysed and were on all fours while 2 patients used crutches or sticks to walk. Only one child was using an orthotic device for ambulation. Two other children had orthotic devices but were not using them as they had outgrown or broken the calipers. Five children were prescribed and given calipers at medical college hospitals but they never used them as they found them uncomfortable. One limb was paralysed in 30 cases and both limbs were paralysed in 6. The most common deformity was equinus of the ankle and flexion of the hip. The most common muscles paralysed were the quadriceps and tibialis anterior. There was no deformity in 15 cases while 22 showed varying degrees of deformities (Table III). The two fully immunized children had severe paralysis of both lower limbs.

Almost 50% (18/37) of the afflicted children's families owned no land; 11 families owned up to 5 acres of land and only 1 family owned more than 10 acres.

There were 25 children in the school-going age group of whom 21 were going to school. There was at least one primary level school in every village and 77% of all children between 5 and 14

TABLE III. Types of deformities

Involved part	Deformity	No. of children
Ankle and foot	equinus	19
	calcaneus	3
	pes planus	1
	valgus	8
	varus	1
	cavus	1
Knee	flexion	2
	valgus	1
	recurvatum	4
Hip	flexion	9
	abduction	6
	external rotation	6
Spine	scoliosis	1

years of age were going to school. Among the paralysed children 11 were two or more classes below that expected for their age.

## DISCUSSION

House-to-house surveys have been shown to be the most sensitive method of identifying paralysed children in both rural and urban areas.<sup>2</sup> The prevalence rate of 1.6 per 1000 population in rural areas falls in the moderate range as described by Force *et al.*<sup>3</sup> As not all cases of infection by the polio virus result in paralysis, a rough estimate of all clinical cases of poliomyelitis could be made by multiplying the prevalence rate of residual paralysis due to poliomyelitis by a factor of 1.33.<sup>3</sup> A national sample survey conducted by the Government of India showed a prevalence rate of 1.05 per 1000 population. The estimated poliomyelitis infection works out to 2.12 per 1000 population.<sup>4</sup> In our study population of 22 883, 2-3 cases of fresh paralytic poliomyelitis were seen every year. The World Health Organization status report on poliomyelitis estimates that surveillance systems are still reporting only 1 case in 10.<sup>5</sup>

Despite a national immunization campaign the annual number of cases in this rural area has not changed. The fact that 3 of the children (8%) were paralysed despite full immunization is a matter of serious concern. Basu *et al.*<sup>6</sup> reported 14% fully immunized children with paralytic poliomyelitis. These may be related to a decrease in the potency of administered vaccine due to a break in the cold chain. Haworth *et al.*<sup>7</sup> reported that primary vaccine failure is the main reason for infection after immunization.

Though details of breast-feeding and weaning were not obtained, the highest incidence in the 6 months to 2 years age group is possibly because of lowered levels of maternal antibodies during this period. Since 90% of children are paralysed before the age of 2 years, programmes should aim to achieve complete immunization prior to this age.

Almost 60% of the children developed paralysis soon after they were given an injection. This suggests that an injection may have contributed to the precipitation of paralysis in a patient who has infection due to the polio virus. Wyatt reported that in Pondicherry up to 70% of children paralysed due to poliomyelitis had received one or more injections just before paralysis.<sup>8</sup> It is well known that an injection changes the pattern of paralysis in the infected limbs. The increase in severity and incidence of paralysis has been called aggravation poliomyelitis and is similar to the previous known severity of poliomyelitis after strenuous activity. Wyatt and Mahadevan<sup>7</sup> estimate that in the period 1980-90, as many as 600 000 Indian children may have been paralysed by

unnecessary injections and another 900 000 may have suffered more severe paralysis. It is possible that the onset of paralysis in many of these cases could have been prevented if they had not been given intramuscular injections.

There is a tendency among local medical practitioners, including traditional healers, to give injections for controlling fever. Therefore, there is a need to discourage the use of injectable antipyretics at all levels. Other methods of controlling fever such as hydrotherapy and oral medications, when indicated, need to be promoted more widely.

Parents prefer to take paralysed children to traditional healers or city hospitals. Only 8% of the paralysed children were taken to PHCs for treatment. The functioning of PHCs in this regard needs to be reviewed.

After the acute illness 9 out of the 11 cases visiting city hospitals did not continue follow up at the city hospital but chose to go to a traditional healer. The reasons for this varied from having to spend a whole day commuting to and from the hospital, long waiting periods at the hospital, inability to go daily for physiotherapy, financial constraints and lack of personal attention. Some of the parents chose to go to a traditional healer after they were told that there was no cure for the disease. Children requiring surgery were not taken to surgical clinics for fear of the procedure itself and of worsening the paralysis.

Traditional treatment consisted of local massage in all cases and in some cases giving honey orally. Two children were even given small pills (unknown composition) for more than one year. Though massage is routinely condemned by orthopaedic surgeons because of the risk of stiffness and myositis ossificans, we did not see a single case of myositis ossificans in these children. In some of the children who were given regular massage no deformities were found. Judicious use of massage could perhaps be combined with exercises to prevent deformities. Honey, though expensive, could add some calories without doing any harm.

The deformities seen in most of the children were preventable either by physiotherapy or by the use of a caliper. Seven cases with significant contractures were seen. However, considering the lack of locally available resources and expertise it is difficult for poor parents to sustain the effort of caring for a paralysed child.

Of the 37 paralysed children only 3 had orthotic devices to aid in walking. One child discontinued the use of his caliper after one year because he outgrew it. On last examination 2 years after the first assessment he was again developing deformities. One child was found to have calipers which were never used because they were uncomfortable and the parents found it difficult to go to the city hospital for regular follow up where calipers were prescribed. The third child had just discontinued the use of his calipers as repeated attempts at repair had failed and he could not afford to purchase a new one. Correct fitting and gait training with calipers requires time and supervision by trained personnel. Fitting calipers without proper follow up is meaningless.

Analysis of the socio-economic status of the population indicated that about half the families owned no land and another 30% had less than 5 acres of agricultural land. This was also the land ownership pattern in the cluster of villages.

Physical impairment leading on to educational backwardness was seen in the paralysed children. Sixteen per cent of the paralysed children were not attending school. Forty-four per cent of the children were two grades or more behind their expected grades indicating that these children would have greater social handicap than what their impairments would produce. This is despite the fact that every village had its own school within walking distance.

The prevalence of paralytic poliomyelitis in the villages surveyed was high despite a stepping up of the national immunization programme. The immunization coverage of 41% in the village was much lower than the expected levels. As paralysis was found to be related to the administration of intramuscular injections in 60% of the children, merely promoting the immunization programme may not help. Factors other than immunization which contribute to paralysis should also be tackled. These include measures to ensure maintenance of the cold chain. As PHCs already exist in villages an improvement in their functioning to increase their acceptability among the local population may help. PHCs could then follow up cases of paralytic poliomyelitis to prevent contractures and deformities. All rehabilitation services should be networked so that local follow up is possible. The medical personnel at the PHC could liaise with traditional and other practitioners to avoid unnecessary injections and combine physiotherapy with massage.

City doctors need to be trained to handle a disabled child and be sensitized towards the problems of rural patients. Special schemes to prevent educational backwardness of paralysed children should be part of every village development programme. A review of current policies restricting budgetary inputs to the welfare sector is necessary, as any further decline of welfare services will hamper the control of polio.

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