Brief Report

Prevalence of Cerebral Palsy in Children <10 Years of Age in R.S. Pura Town of Jammu and Kashmir

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Summary

Objective: To determine the prevalence of cerebral palsy in children aged <10 years.

Methods: The study was conducted in the framework of a population-based, single-centre, cross-sectional surveillance at R.S. Pura town, 22 km south-west of Jammu city.

Results: A total of 11 cases of cerebral palsy were ascertained yielding a crude prevalence rate of 2.27/1000 in the age group of <10 years. The proportion of cerebral palsy occurring in males was higher than that in females.

Interpretation: The prevalence rates of cerebral palsy among children <10 years of age in R.S. town compare favorably with studies from developed countries.

Introduction

Cerebral palsy (CP) is the most common cause of motor disability in childhood. Most previous population-based studies reported the prevalence of CP to range from 1.5 to 3.0 cases per 1000 live births or 1000 children [1–3]. The estimated lifetime cost of CP in the USA is nearly USD 1 million per person (2003 dollars) [4].

Monitoring of the CP prevalence and determination of whether changes in risk factors (such as birth weight distribution and number of multiple births) affect the prevalence of CP over time require ongoing, systematic, population-based surveillance. Population-based monitoring of CP prevalence also helps determine service needs for affected children and their families. Descriptions of the frequency of CP subtypes in the population may also yield clues regarding etiology, and studies of functioning can help clinicians and other service providers develop more coordinated, more holistic care.

Material and Methods

The study was conducted in R.S. Pura town of R.S. Pura health block, district Jammu. Jammu happens to be the winter capital of Jammu and Kashmir (J & K) state of India with an estimated population of 4.5 million and diverse topography. Block R.S. Pura is located in the south west of Jammu city adjacent to Indo-Pak border with a total area of 273 sq km and average density of 658 sq km−1. There are 176 villages and 1 town (R.S. Pura town) in the block with an estimated population of 1 79 636 [5]. Majority of population comprises of Hindus. The town is spread over 11 wards and has a population of 17 245 [5].

During the first phase of the study, the Anganwadi workers (AWWs) were trained in the detection of neurological complaints and in completing a screening questionnaire written in the local vernacular that had been prepared in accordance with the WHO protocol for measuring the prevalence of neurological disorders in developing countries [6]. The process was similar to the one adopted by one of the contributors in an earlier study in Rural Kashmir [7]. The AWWs subsequently carried out a house-to-house screening in the town and census in which no one refused to participate. Usually the older members of a family would give the details of neurological disease. The evidence was correlated with the help of interview carried out by the epidemiologist on all those suspected as suffering from a neurological disorder. The medical team comprising of a neurologist and an epidemiologist interviewed and examined
all suspect cases by home visits to verify findings on invalids.

**Definition of CP**
CP is an umbrella term covering a group of non-progressive but often changing motor impairment syndromes secondary to lesions or anomalies of the brain, arising at any time during brain development [8]. For survey purposes, we modified the definition used by Mutch et al. [8] to include children with postnatally acquired CP.

**Case definition**
For the 2009 survey, a CP case was defined as a child born between 1 June 1999 and 31 May 2009 whose parent(s) or legal guardian(s) resided in the surveillance area during survey period and who had a documented diagnosis of CP and/or physical findings consistent with CP in an evaluation by a qualified professional, a neurologist in our case. Case determination was completed through record review in two phases: case ascertainment by epidemiologist followed by clinical review by a neurologist. Linkages to vital records death files were completed at each site, to exclude children who died before the surveillance year.

**Case ascertainment**
We used house-to-house survey method to identify cases, as already outlined, with the help of AWWs who were earlier trained in the detection neurological complaints. At the house visit after completing a questionnaire on neurological disorders, special care was given to list CP. Case finding lists for CP were generated by using International Classification of Diseases, Ninth Revision, Clinical Modification diagnostic codes for CP and medical conditions associated with CP [9]. Demographic data, verbatim descriptions of relevant physical findings and diagnostic summaries were abstracted for each child identified as a possible CP case. CP cases were linked to birth certificate and census files to provide additional demographic information, wherever possible.

**Clinician review**
All evaluations from the case ascertainment phase were reviewed by a clinical reviewer (neurologist), to determine final case status. The final case status was based on the following criteria:

(i) In the absence of excludable conditions such as progressive disorders and neuromuscular diseases, children were to be classified as confirmed CP cases on the basis of diagnostic information and/or physical finding descriptions consistent with CP at ≥2 years of age found in source records.

(ii) CP subtype was determined on the basis of the classification system for spastic, dyskinetic and ataxic CP developed by the Surveillance of Cerebral Palsy in Europe Collaborative Group [2].

(iii) Cases that met the surveillance case definition but whose subtype could not be assigned readily to one of the Surveillance of Cerebral Palsy in Europe categories above were to be classified as follows:
(a) Cases with >1 but no predominant subtype were to be classified as spastic–dyskinetic, spastic–ataxic or dyskinetic–ataxic.
(b) Those with a previous diagnosis of hypotonic CP or CP not otherwise specified plus generalized hypotonic were to be classified as hypotonic CP.
(c) Those with a documented diagnosis of CP but insufficient information for assignment of a subtype were to be classified as CP not otherwise specified.

**Statistical analyses**
Prevalence estimates were calculated by using, as the denominator, the number of children <10 years of age residing in the survey area. Prevalence results are reported per 1000 children.

**Results**
Table 1 records the demographic profile of children screened during the period of study from R.S. Pura town of JK state. Consistent with the demographic profile of India, children <10 years of age and males constitute a significant proportion of population. The female to male ratio in R.S. Pura town is 924 : 1000.

A total of 3966 children aged <10 years (≥9 years and 364 days) were screened for presence of neurological disorders during house-to-house survey conducted by the AWWs. The distribution and prevalence of CP in children is shown in Table 2. A total of 11 CP cases were detected, yielding crude prevalence rate of 2.77/1000. The proportion of CP in male children (3.87/1000) was higher than in

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Male n (%)</th>
<th>Female n (%)</th>
<th>Total N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>994 (48.2)</td>
<td>902 (47.3)</td>
<td>1896 (47.8)</td>
</tr>
<tr>
<td>5–9</td>
<td>1068 (51.8)</td>
<td>1002 (52.7)</td>
<td>2070 (52.2)</td>
</tr>
<tr>
<td>Total</td>
<td>2062</td>
<td>1904</td>
<td>3966</td>
</tr>
</tbody>
</table>

Females per 1000 males = 924.
female children (1.57/1000). Spastic quadriplegia (54.5%; \( n = 6 \)) constituted the predominant type of CP (Table 3). The other types of CP found in our study were spastic paraplegia (36.3%; \( n = 4 \)) and dyskinetic (9%; \( n = 1 \)).

### Table 3

#### Types of CP

<table>
<thead>
<tr>
<th>Type of CP</th>
<th>( n )</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spastic quadriplegia</td>
<td>6</td>
<td>54.5</td>
</tr>
<tr>
<td>Spastic paraplegia</td>
<td>4</td>
<td>36.3</td>
</tr>
<tr>
<td>Dyskinetic</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>100</td>
</tr>
</tbody>
</table>

**Discussion**

In this study the pattern of the type of CP was similar to that seen in most developing countries [10–13]. Spastic quadriplegia was the most predominant type, followed by spastic paraplegia and dyskinetic types of CP. The distribution of the clinical types of spastic cases seems to vary between developed and developing countries. Spastic quadriplegia constitutes the most prevalent type of CP in most developing countries, whereas spastic diplegia and spastic hemiplegia predominate in some developed countries [10–13]. The higher occurrence of spastic diplegia in developed countries may be attributed to the increased survival of extremely premature infants. The high prevalence of spastic quadriplegia in developing countries reflects the contribution of severe birth asphyxia and acquired central nervous system infection. The etiological profile of the study needs to be carried out to confirm that the clinical spectrum of CP in the R.S. Pura town is consistent with that described in other developing countries. The economic impact of CP is enormous. Targeting preventable causes may help to reduce the burden of childhood disability in our part of world.

**References**


**Table 2**

**Distribution of children with CP**

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Total Males</th>
<th>Females</th>
<th>Prevalence rate/1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>11</td>
<td>10</td>
<td>1.57</td>
</tr>
<tr>
<td>0-4</td>
<td>4</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>5-9</td>
<td>7</td>
<td>2</td>
<td>3.38</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>10</td>
<td>1.57</td>
</tr>
</tbody>
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**Table 3**

Types of CP

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<tbody>
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<td>Dyskinetic</td>
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<td>Total</td>
<td>11</td>
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