



Original Research Article

## Comparison of Hypermobility between Boys and Girls Aged 6-12 Years

Praveen. S. Bagalkoti<sup>1</sup>, Parmar Sanjay<sup>2</sup>, Rajlaxmi Kubasadgoudar<sup>2</sup>

<sup>1</sup>Associate Professor, Department Of Pediatrics,

<sup>2</sup>Assistant Professor, Department Of Physiotherapy,  
SDM College of Medical Sciences and Hospital, Dharwad

<sup>2</sup>Consultant Pediatric Physiotherapist, Regional Neuroscience Centre, Hubli, Karnataka

\*Correspondence Email: [sanjay\\_parmar05@yahoo.co.in](mailto:sanjay_parmar05@yahoo.co.in)

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### ABSTRACT

**Objectives:** Generalised hypermobility is said to be present when the joints are unduly lax and range of motion (ROM) is in excess to the accepted norm in most of the joints. Generalised joint hypermobility is claimed to be present in 5-15% of general population. It is slightly more frequent among girls or women than boys or men. This study was done to compare the hypermobility between boys and girls aged 6–12 years.

**Design:** Cross sectional study

**Methods:** 420 healthy children were evaluated for hypermobility using Beighton score. One point was scored for each positive result (maximum: 9). Scores  $\geq 4$  were considered to be generalised hypermobility. The total number of boys and girls who were hypermobile was calculated. Then, the data was evaluated statistically using SPSS 16.0 version statistical software and results were obtained.

**Results:** The result showed that the prevalence of hypermobility was more in girls (35.12%) than boys (33.73%), though the hypermobility score was higher in boys. The total prevalence of hypermobility was found to be 34.29% in children aged 6-12 years.

**Conclusion:** Prevalence of hypermobility was more among girls than boys aged 6-12 years, though the hypermobility score was higher in boys.

**Key words:** Hypermobility, Beighton score, Gender, 6-12 years.

### INTRODUCTION

Normal joint mobility is a function of the joint capsule, ligament and muscle

tone. Joint hypermobility may indicate the upper end of the “normal” range of joint movement among normal individuals. There is clear evidence that factors such as gender,

age group, ethnic group, certain physical activities and their intensity, and the presence of certain pathological conditions, may be associated with joint mobility.<sup>[1]</sup>

Children possess an inherently greater range of motion in their joints than adults, with a gradual reduction in this range observed with age.<sup>[2]</sup> Joint hypermobility is common in childhood, occurring in 8-39% of school age children.<sup>[3]</sup> It is slightly more frequent among girls or women than boys or men.<sup>[4]</sup>

Joint hypermobility appears to be inherited as a gender- influenced dominant trait. Hypermobility is primarily caused by alteration in collagen.<sup>[5]</sup> The degree of the negative consequences depends on factors such as the degree of hypermobility or joint laxity, the physical condition of the individual, and the individual's vocation.<sup>[6]</sup>

The most widely used scale for hypermobility is the Beighton hypermobility score. It can be conducted easily and requires less time. A study done by van der Giessen LJ showed that Beighton score is valid in healthy children aged between 4 to 12 years.<sup>[7]</sup> It is a practical and reliable method for defining hypermobility in children.

There is no study done on comparison of hypermobility between boys and girls aged 6-12 years. There is need for identifying children with joint hypermobility who are at risk of developing musculoskeletal complications so that education and therapeutic interventions can be targeted to this age group before they become symptomatic and to prevent further sequelae. Early the diagnosis better will be the intervention and the overall quality of life of children.

In this study we compared the hypermobility between boys and girls aged 6-12 years.

## **METHODS**

Before commencement of the study, an ethical clearance from Shri Dharmastala Manjunatheshwara Institutional Ethical Committee, Dharwad was taken. Children from various schools were included in the study. Prior to the commencement of the study, a written consent letter was obtained from all parents.

### **Subjects**

420 children aged 6–12 years were included, of which there were 252 boys and 168 girls. At first, all the children were screened by a paediatrician and children with skeletal problems such as fracture, neuromuscular disorder like cerebral palsy, rheumatic disorders, metabolic dysfunctions or disorders such as homocystinuria, developmental delay and genetic disorders such as Down's syndrome were excluded.

### **Procedure**

Beighton score was used to measure joint hypermobility for five body areas. One point was scored for each positive result (for each side), and scores of 4 or more points were considered to be generalised hypermobility. The children were categorized according to the scoring. Passive extension of the fifth finger, opposition of thumb to forearm, active extension of elbow and knee, and active anterior flexion of the trunk were evaluated. Then total number of boys and girls who were hypermobile was calculated.

### **STATISTICAL ANALYSIS**

SPSS 16.0 version statistical software was used for statistical analysis. The investigator used Chi square test to evaluate the descriptive statistics that is distribution of study subjects by gender and hyper mobility. Then, comparison of male and female with respect to mobility scores was found out by t-test.

## RESULTS

**Table 1: Distribution of study subjects by gender and hyper mobility**

Gender	Normal mobility	%	Hyper mobility	%	Total	%
Male	167	66.27	85	33.73	252	60.00
Female	109	64.88	59	35.12	168	40.00
Total	276	65.71	144	34.29	420	100.00
Chi-square=0.0868 df=1 p=0.7689						

Table 1 shows the distribution of study subjects by gender and hyper mobility. The percentage of hypermobility in male was 33.73% and in female was 35.12%. Total prevalence of hypermobility was 34.29%.

**Table 2. Comparison of male and female with respect to mobility scores by t-test**

Gender	Mean	SD	t-value	p-value
Male	2.4762	1.7773	0.2041	0.8384
Female	2.4405	1.7258		

Table 2 shows comparison of male and female with respect to mobility scores. The mean was more in males (2.4762) when compared to females (2.4405) with standard deviation of 1.7773 and 1.7258 respectively. There was significant difference between male and female with a p-value of 0.8384.

## DISCUSSION

The purpose of this study was to compare the hypermobility between boys and girls aged 6–12 years. A study was conducted on 1005 school children with an age group of 6 to 19 years in Tehran to determine the prevalence and feature of joint hypermobility using Beighton score. They found that 23.9% of children were hypermobile (14.11% of boys and 33.7% of girls). They also found that the prevalence of joint hypermobility was significantly greater in lower age group (6-12 years) in comparison with higher age group (13-19 years); 27.2% and 20.5%, respectively.<sup>[8]</sup>

A study was done to determine the presence of hypermobility and differences between females and males in a Dutch population (primary and secondary school

population), Beighton and Biro measurements were used. Using Beighton score with a cut off point  $>4$  or  $=4$ , 15.5% of group I (n = 252; 4-13 years) and 13.4% of group II (n = 658; 12-17 years) were hypermobile. Hypermobility was found more in females than in males, the difference being significant in the older group.<sup>[9]</sup>

A study reported that in 267 children aged of 12 years in Iceland, the prevalence of hypermobility was found to be 40.5% in girls and 12.9% in boys. Hypermobility was evaluated using Beighton criteria with a cut off  $\geq 4$ .<sup>[10]</sup>

Our study showed that the prevalence of hypermobility was more among girls (35.12%) than boys (33.73%), though the hypermobility score was higher in boys. Total prevalence of hypermobility

was found to be 34.29% in children aged 6-12 years. So therefore, further study should be carried out with equal number of boys and girls to know the exact hypermobility prevalence rate.

The limitations to our study was that further follow up regarding any complication secondary to generalised hypermobility was not carried out. Moreover, hypermobile children were screened subjectively and individual hypermobility were not documented (example, elbow hyperextension). The factor responsible for hypermobility was not studied.

Future scope of this study will be long term follow up of any secondary problem in hypermobile group. Factors responsible for hypermobility may be studied. Further assessment below 6 years and above 12 years can be studied for hypermobility.

## CONCLUSION

From this study, we can conclude that the prevalence of hypermobility was more among girls (35.12%) than boys (33.73%), though the boys had higher hypermobility score.

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