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PREVALENCE OF HYPERMOBILITY IN CHILDREN AGED 6-14 YEAR

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ABSTRACT

Introduction: Experts estimate that up to 10% of the general population may have some degree of hypermobility with women affected about three times more often than men. A recent review shows that prevalence of adult varies from 2 to 57% depending upon age, gender, and ethnic origin. For children it varies from 7 to 36% primarily depending on the tests and criteria used for diagnosing GJH. Children may experience functional disability, increased pain intensity and decreased quality of life were reported in children with joint hypermobility. **Methods:** 100 children aged 6-14, both gender, from Pimpri, Pune were studied after approval from ethical committee. Children with any musculoskeletal condition like fracture, dislocation, any neurological disorder/ impairment, diagnosed connective tissue disorders were excluded. The study was explained to the children & or their parent. Informed written consent was taken for their voluntary participation. Hypermobility test was done and scores was calculated according to Beighton score protocol. Descriptive analysis was done by calculating percentage. **Results:** Out of 100 Children, 53% of children's has Hypermobility according to Beighton Score. Comparing gender 69.8% Girls and 30.1% Boys are Hypermobile, age wise 6 to <8 age group Hypermobility is 100%. While, in 12-14 age groups Hypermobility is 27.77%. hypermobility in 5 components of Beighton score, maximum 50 (94.3%) showed hypermobility in passive dorsiflexion of the fifth MCP joint and least in passive hyperextension of the knees 14(26.14%). **Conclusion:** study concludes that among 100

children in age 6-14 years, 53% children have hypermobility. Of which 70% Girls had hypermobility as compared to boys with 30%.

KEYWORDS: Joint hypermobility, Beighton score.

INTRODUCTION

Joint hypermobility, defined as a more-than-normal range of movement in a joint, is either localized or generalized. The tightness or the restraining ligaments determine the maximal range of movement of a joint. Thus, the primary cause of hypermobility is ligamentous laxity.[1] The genetic make-up of an individual determines the extent of generalized joint hypermobility. Ligamentous extensibility is a result of changes in the connective tissue like collagen, elastin, fibrillin, and tenascin.[2] Experts estimate that up to 10% of the general population may have some degree of hypermobility with women affected about three times more often than men due to relaxin hormone. Hypermobile who do suffer chronic joint pain and other symptoms related to hypermobility or due to looseness of other tissues often accompanies hypermobility have a condition called joint hypermobility syndrome. Often, people who suffer from hypermobility syndrome are hypochondriacs or lazy as they avoid many daily activities due to pain.[3] Females are three times more likely to be hypermobile compared to males at any age and hypermobility decreases with increasing age due to tissue stiffening. The reduction in joint hypermobility is more rapid during childhood, lesser in teenage & very slow during adult life. The non-dominant side is typically more hypermobile than the dominant side.[4]

Generalized joint hypermobility (GJH) is a non-symptomatic condition and primarily affects the musculoskeletal system. Loose joints cause increased strain on nearby soft tissues (muscle, ligaments, tendons) that stabilize them. These soft tissues themselves often are overly lax, and because of their laxity and the increased strain on them, they are prone to tearing and spasm, leading to pain and stiffness around joints. Hence, there is need for liable ways of identifying children with joint hypermobility who are at a high risk of developing musculoskeletal complications so that education and therapeutic intervention can be targeted to this group before they become symptomatic or sustain injuries A recent review shows that prevalence of GJH in adult varies from 2 to 57% depending upon age, gender, and ethnic origin. For children it varies from 7 to 36% primarily depending on the tests and criteria used for diagnosing GJH. Children may experience a great variety of impairments as a result of increased laxity of connective tissue. This not only affects physical fitness, motor

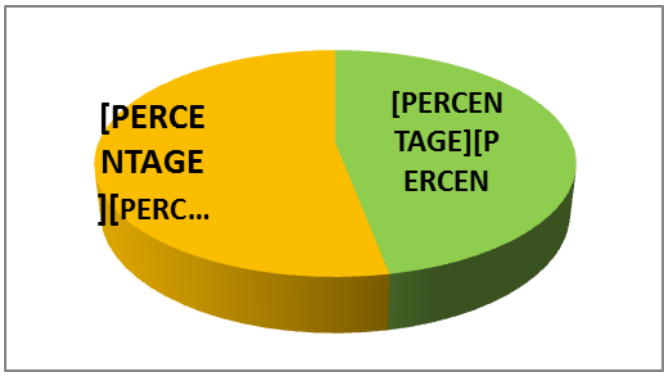
development, and proprioception but may also include problems with different organ system (e.g. skin, vessels, and internal organs) and psychological distress. As a result, children may experience functional disability, which often presents difficulties in normal daily life. Increased pain intensity and decreased quality of life were reported in children with joint hypermobility and it then associated with the joint hypermobility syndrome.[5] Joint hypermobility and musculoskeletal pain, giving rise to diagnosis benign joint hypermobility syndrome, as well as hypermobility and musculoskeletal pain are also part of other syndrome criteria, conditions belonging to group of hereditary diseases of connective tissues.

It is important to accurately identify generalized hypermobile children who are at a risk of catastrophic cardiac or vascular complications later on, for example, children with EDS (vascular type). Joint hypermobility syndrome describes the combination of joint hypermobility with associated symptoms such as chronic joint pain, back pain, joint subluxation and dislocation, soft tissue injuries, skin features.[6] The Beighton criteria contain both phenotypic features of HDCTs and symptoms, which are thought to be complication of joint hypermobility.[7] Children with joint hypermobility who are at a high risk of developing musculoskeletal complications, so awareness and therapeutic intervention should be targeted to this group before they become symptomatic or sustain injuries. Thus the aim of the study is to find Prevalence of hypermobility in children in age of 6-14 year. with objectives to determine hypermobility in children gender wise, comparing between age groups and comparing right and left sides of body.

METHODOLOGY

The observational study was conducted on 100 children aged 6-14years, both gender, in and around Pimpri, Pune, after approval from ethical committee. Children with any musculoskeletal condition like fracture, dislocation, any neurological disorder/ impairment, diagnosed connective tissue disorders were excluded. The study was explained to the children & or their parent. Informed written consent was taken for their voluntary participation. Demographic data like age, gender, dominance was obtained. Hypermobility test for the joints was done and scores was calculated according to Beighton score protocol, with the cut-off value equal and more than 4, to consider a child as hypermobile. The data was recorded and analyzed was done by percentage.

DATA ANALYSIS



Garaph 1: Prevalence of Hypermobility in Children of 6-14 year.

Table 2: Hypermobility in children gender wise.

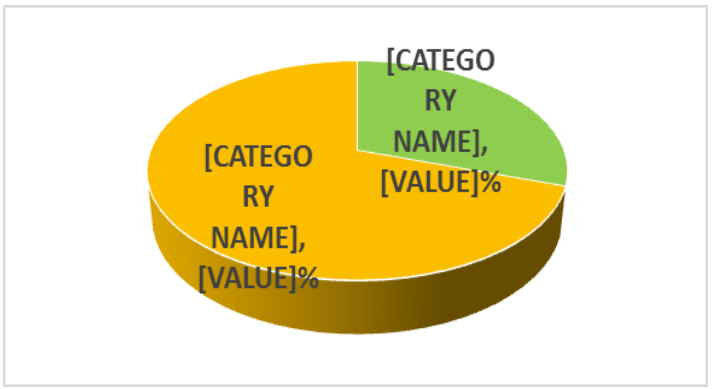
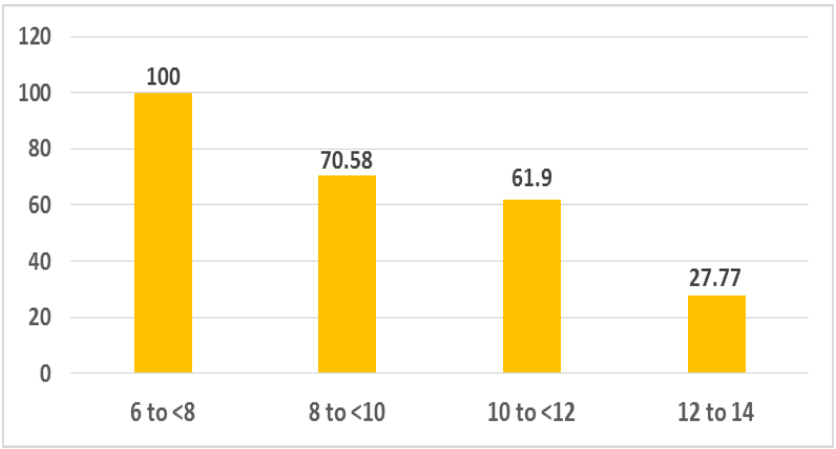
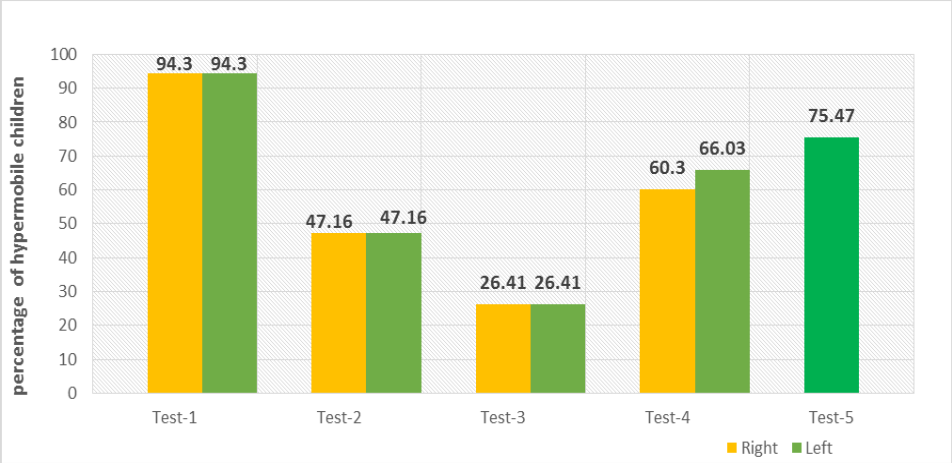


Table 3: Hypermobility in Percentage in children age wise.





Graph 4: No of children showing hypermobility in 5 component of Beighton score protocol.

RESULT

Graph 1 shows prevalence of hypermobility, out of 100 Children, 53% of children's has Hypermobility. *Graph 2* shows hypermobility in children gender wise with 69.8% Girls and 30.1% Boys are Hypermobile. *Graph 3* gives age group wise percentage of hypermobility in children. It shows that between 6 to <8 age group Hypermobility is 100%. While, in 12-14 age groups Hypermobility is 27.77%. Thus it shows that as the age increases hypermobility decreases. *Graph 4* indicates the no of Children showing hypermobility in 5 components of Beighton score. It shows that of 53 hypermobile children, maximum children i.e. 50 (94.3%) showed hypermobility in test 1 ie. passive dorsiflexion of the fifth MCP joint of Beighton score followed by passive apposition of the thumb to the flexor side of the forearm with 34 to 37(60-66%) children, passive hyperextension of the elbow 25(47.16%) of children, passive hyperextension of the knees 14(26.14%) and forward flexion of the trunk 40 (75.47%) children hypermobile.

DISCUSSION

The purpose of the present study is to find out the prevalence of hypermobility in children in age of 6-14 year. The data has been analyzed with objectives of hypermobility in children gender wise, age-wise and dominance. It was found that out of 100 children 53% of children has hypermobility, assessed by the Beighton score protocol, hypermobility test. As the Generalized joint hypermobility is defined as a condition in which most of the individual's synovial joint, moves beyond the normal limits of ROM. The primary cause of hypermobility is ligamentous laxity. Loose joints cause increased strain on nearby soft tissues (muscles,

ligaments, tendons) that stabilize them. These soft tissues themselves often are overly lax, and because of their laxity and the increased strain on them, they are prone to tearing and spasm, leading to pain and stiffness around joints.[3] This is inherent in a person's make up and is determined by their fibrous protein genes, genes that encode collagen, elastin, and fibrillin.[2]

Gender wise out of 53, 69.8% girls and 30.1% boys were hypermobile. A study conducted by, Pranay Jindal, et al(2016) found that females are three times more likely to be hypermobile compared to male at any age. In females, hormones like relaxin affect the ligament extensibility which is the reason of increased hypermobility in female.[3] Studies by, F.Dehghan, et al (2013) found that relaxin hormone alters cartilage, tendon stiffness and ligament mechanics by activating collagenase. Collagenolytic effect mediated by discharge of matrix metalloproteinase (MMPs). Increase in serum relaxin concentrate may also correlate with joint laxity. However, study done in 2002 by Arnold C. Van Bell C, on relationship between serum relaxin level and joint laxity reported no significant association between the relaxin hormone levels and generalized joint laxity, which is contradictory to this study.[8]

In the study correlation between hypermobility & age was analysed from age of 6-14 year, the children from 6 to <8yr showed 100% hypermobility whereas 12-14 yr children's have 27.77% suggesting, as age increases hypermobility decreases. Studies by Pranay Jindal and Amitesh Narayan et al. (2016) found the same result that, the reduction in joint hypermobility is more during childhood, lesser in teenage years and very slow during adult life. The reason hypermobility decreases with increasing age due to tissue stiffening.[4] Hypermobility often decreases with age, as joints become less mobile, both as natural result of aging and because loose joints are predisposed to premature osteoarthritis, the wear-and-tear form of arthritis. The study be Rodney Grahame in 1999 found that, joint laxity is maximal at birth, declining rapidly during childhood, less rapidly during the teens, and more slowly during adult life.[1]

CONCLUSION

Thus, the study concludes that among 100 children in age of 6-14 years, 53% children have hypermobility. Of which 69.8% Girls shows hypermobility as compared to boys with 30.1%.

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Conflict Of Interest

Authors declares no conflict of interest.

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