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## **The Prevalence of Genu Varum and Genu Valgum in Primary School Children in Iran 2003-2004**

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The aim of this study was to determine the prevalence of genu varum (GVR) and genu valgum (GVL) in Iranian primary school children. Three thousands children, age between 7 to 11, were selected by multistage random sampling from primary school in Kerman Iran. For evaluating of GVR and GVL intercondylar and intermalleolar distance were measured and angle deformities were cleared from data. The prevalence of GVR was 7.9% (238 cases) and GVL was 2% (59 cases). GVR in boys was twice than girls but GVL in girls was 3 times more than boys. There was not any significant difference at age group and angle deformities. Present data showed GVR and GVL was more frequent in girls. Differentiation of pathologic from physiologic conditions is important in growth of children.

**Key words:** Genu varum, genu valgum, angle deformities, prevalence, Iran

**INTRODUCTION**

Lower extremity bowing is a normal physiologic process that commonly occurs in walking children under the age of 2 years<sup>[1,2]</sup>. Children are maximally bowlegged at age 6 months and progressed toward approximately neutral knee angle (0 degree) by age 18 months<sup>[3,4]</sup>. Great angle after this year need more evaluation because of many pathologic reasons like: Metaphyseal beaking, Blount's disease, Tibia vara, Rickets, Achondroplasia, Neurofibromatosis, Osteogenesis imperfecta and Comptomelic dysplasia<sup>[1]</sup>. Recognition of these pathologic conditions by determination of tibiofemoral angle and genu varum (GVR) and genu valgum (GVL), is important for differentiating that will resolve spontaneously from those, which will require surgery or other treatment<sup>[1]</sup>.

This study aimed to distinguish the prevalence of GVR and GVL in Iranian primary school students.

**MATERIALS AND METHODS**

The lower limbs of 3000 Iranian children aged from 7 to 11 years in primary school were included in this study. The multistage random sampling was used for selecting the samples. The primary school in Kerman province of Iran were selected as clusters and randomly selected. At every school grades (1 to 5) were distinguished as stratum and random sampling was used in every class. There were girls and boys equal together. The children with a history of musculoskeletal system disorders were excluded from study. The intercondylar and intermalleolar distance were measured with a tape measure, as previously described<sup>[3]</sup>. After measurement of these distance, the data were graded as previous grading<sup>[5-7]</sup>.

Statistical analyzed were concluded using SPSS version 10.0.5. Chi square test assessed relation between nominal data. Mann-Whitney test and Kruskal-Wallis test were used to assess variables for difference between age groups, grade of bowing. Correlation was assessed by Spearman's correlation coefficient. In all statistical tests, the null hypothesis was rejected at p<0.05.

**RESULTS**

The prevalence of GVR was 7.9% (238 cases) and GVL was 2% (59 cases). There was statistical significant difference between gender and the rate of knee angular deformities (Table 1). GVR in boys was twice time more than girls, but in GVL proportion of girls to boys was 3 to 1. The grade of GVL in females was higher than males significantly but no in GVR (Table 2).

In comparison of frequency of knee angular deformities in different age groups, no significant difference was assessed (Table 3). There was not any

Table 1: Distribution of GVR and GVL in sexes of studied sample

Knee deformity	Sex	Negative	Positive	Statistical test
GVR	Boys	1340	160	$\chi^2=30.74$ p<0.00001
	Girls	1422	78	
GVL	Boys	1485	15	$\chi^2=14.521$ p<0.00001
	Girls	1456	44	

Table 2: The knee deformities grade in sexes

Sex grade	Boys		Girls	
	GVR	GVL	GVR	GVL
I	123	15	51	19
II	37	0	26	20
III	0	0	1	5
IV	0	0	0	0

GVR: Mann-Whitney test, U= 550.5 p=0.055

GVL: Mann-Whitney test, U=1142.5 p<0.0001

Table 3: Distribution of knee deformities versus age

Age	Deformities	
	GVR*	GVL <sup>§</sup>
7	36	8
8	43	9
9	55	13
10	51	15
11	53	14

\* Kruskal-Wallis test:  $\chi^2=5.185$  p=0.269

§ Kruskal-Wallis test:  $\chi^2=6.989$  p=0.136

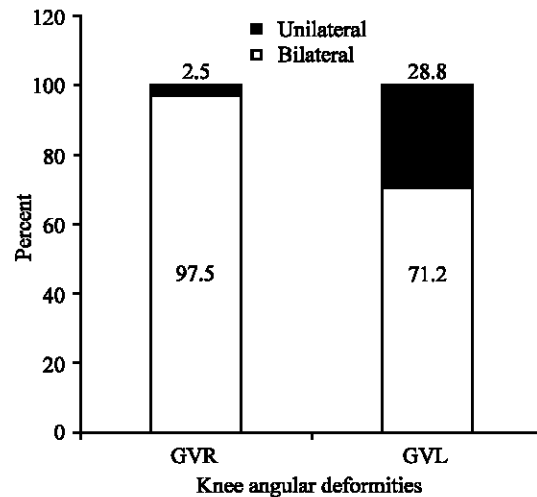


Fig. 1: Frequency of knee deformities sites

significant correlation to grade of angulations and age groups. More cases had bilateral deformities. 232 cases (97.5%) had bilateral GVR and 42 cases (71.2%) had bilateral GVL (Fig. 1).

**DISCUSSION**

Bowleg in children is common orthopedic problem. Both pediatricians and orthopedic surgeons are often faced with these situations. Many studies have tried to define the range of variations of knee angle. In Iran Javid and Hadari determined tibiofemoral angle that was

5.5+/-1.2 degree ranging from 3.1 to 8.3 degrees but they did not clear the rate of GVR and GVL<sup>[8]</sup>. Salenius and Vankka mean valgus of 5-6 degree in children between age 7-12 years<sup>[9]</sup>. Cheng *et al.*<sup>[10]</sup> reported 5 degree varus in normal children aged 3 to 11<sup>[10]</sup>. Contrary to these reports, Heath and Stahli observed at least 2.5 degrees of valgus in white children at age 11<sup>[3]</sup>. Similar results were reported by Cahuzac *et al.*<sup>[11]</sup> in European children. Two reports from Africa and Turkey had higher degrees of TF angle. Omololu *et al.*<sup>[12]</sup> were found at about 11 degree difference at age between 1 to 10 years in both sexes. Arazi *et al.*<sup>[13]</sup> observed mean valgus 9.6 degrees for boys and 9.8 degrees for girls. Noticeably, the mean of TF angle in Iran has been reported from 3.1 to 8.3 degree<sup>[8]</sup>.

Present results showed mild prevalence rate in knee angular deformities. As the other studies bilateral angular deformities were more common than unilateral.

It seems knee angular deformities are more frequent in girls to boys, totally. Present study revealed that GVR was twice in boys than girls, but in GVL was 3 time higher in girls. Although the mean of knee angular deformities have been distinguished in Iran<sup>[8]</sup>, it seems to need more studies. It was better that we evaluated TF angle and the intercondylar and intermalleolar distance calculated quantitatively.

In the other hand, there are several methods for measurement of knee angular deformities, like roentgenographic techniques and clinical examination. Today, clinical examination is selective because of good accuracy and without invasion and radiation. We selected this method. We decide designing of a new study for evaluation quantitatively.

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