Prevalence and causes of postural deformities in upper and lower extremities among 9-18 years old school female in Golestan province

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ABSTRACT

This study is a descriptive cross-sectional study, and its purpose is to determine the prevalence of spinal deformity, knees and feet among all the girl students (18-9 years) in Golestan province. This research is based on a multistage cluster sampling method and was based on Morgan Table (N=400). In this research, data was collected by using questionnaires, New York tests with using vertical lines, Posture Screen, calipers, meters and scals for assessing students' deformities. Descriptive and inferential statistical analysis was used to test the hypotheses. The SPSS software was used for statistical calculations. The results showed that, there is a Meaningful relationship between weight and lordosis, kyphosis and how to do the homework, between scoliosis and how to sit on the bench, the shoulders drop and carrying bag and books, as well as between hallux valgus and Wearing Narrow-toed shoes and high heels. Also, there were no observed Meaningful relationships between the height and the heads up, and the genu varum and how to sit in the students. The significant relationship between certain disorders and indicates addictions have show the poor awareness of students correct body position while reading, doing homework, sitting and wearing uncomfortable shoes and carrying objects is incorrect. Thus, according to most experts and teachers of physical education in schools to increase students ' awareness and identifying faulty postural and corrective actions necessary to appear.

Keywords: *Postural Deformities, Carrying Bags, Scoliosis, Kyphosis, Female Students*

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INTRODUCTION

The health and fitness of the population, is one of the most important indicators in developed countries. Machination life of contemporary life although has valuable services for humans, but it has numerous effects such as poverty of movement, immobility and obesity. In addition to these, wrong patterns is sitting, standing, carrying of objects, use of improper clothing, heritage, cultural conditions and anthropometry can cause deviation from desired condition of height and predisposing of people to skeletal anomalies [1]. The statistics based on the investigations of researchers in some points of the country about the prevalence of skeletal anomalies are very serious in such a way that averagely 80% of people's society has skeletal anomalies [2]. The studies show that among different skeletal anomalies, thoracic kyphosis, flat back, kypholordotic posture, Scoliouz, genus varum, genus valgum, foot flat and haluxe valgus are the most common [3]. Studying period causes anomalies in mechanical condition of body especially in spinal cord [4]. *Dehghani et al* (2003), by investigation of intermediate school students in Tehran found that in students who sit behind desk , the percent of Scoliuze and Kayphosis is more than the students who use from individual chair, but the angle of lumbar lordosis is reduced. Performing assignment at home laying on the ground increases the rate of prevalence and using from desk reduces the prevalence the percent in comparison with its average amount [5]. *Hovanloo et al* (2009) in a research concluded that by reduction of adductor muscles' power of upper body such as standing and sitting postures in long time, the amount of kyphosis curvature of back will be increased [6]. *Elison et al* (2007) reported that kyphosis with imposed load on spinal cord has meaningful

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relationship with weakness of back's muscles and reduction of body activities [7]. *Cho* (2008) by investigation of defected posture prevalence in high school students in China reported 36% shoulder's falling and 25% of head up position which are the most prevalent anomalies in height (8). One of factors which are important in shoulder's falling is bags carryings. Different studies showed that children and adults, by regarding to physical and physiological data have only the ability for carrying load about 10-15% of their body weight (BW) [9]. *Suileen* (2012) in a research investigated weight of backpack on neck muscles of employees and suggested that backpack's weight of them should be less than 10% of their weight [10]. The researches show that carrying heavy backpacks may cause muscles' strain, deformation of curves in spinal cord and unequal shoulders and at the end pains and skeletal-muscles disorders in spinal cord [11]. *Akbari and Ghannad* (2006) observed that 80% of children of Zahedan who use from bags on their shoulders suffer from drooping shoulder [12]. *Pakeri et al* (2004) argued that most of children between 12 and 14 use from backpack in both side of their shoulder and type of bag has meaningful relationship with shoulder's pain. Also girls have more pain than boys in their shoulders [13]. *Moradpoor et al* (2012) also showed that among incorrect habits of carrying bag and unequal shoulder and also among wrong habits of sitting at home and Kyphosis there is meaningful relationship [2]. *Kamali et al* [14] and *Farahani et al* [15] investigated the effect of weight on waist lordosis. The results showed a meaningful relationship between weight and obesity on the amount of waist lordosis. By the way, *Neg et al* (2002) had a report about lordosis of waist and reported that there is no meaningful relationship between sizes of full lordosis of waist ad obesity [16]. *Lasjouri and Mirzaii* (2005) found a meaningful relationship between height factor and anomaly of head up [17]. *Kamali et al* (2002) found that there is a meaningful relationship between head up and height anomaly in such a way that in tall people and also in girls this anomaly is more [18]. *Kim et al* (2008) found that carrying heavy backpacks increases angel of head up [19]. *Martinez* (2012) in a research on dental students found that 58% of this population has pain in their neck which was related to their improper posture and long hours of work bending their neck. Also use of non-ergonomic chairs is another cause [20]. *Bahrami et al* (2006) investigated upper and lower body of adolescents and showed that there is a meaningful relationship between sleep habits and waist lordosis and back kyphosis and also between way of carrying bag and drooping shoulder, way of sitting by neck and leg braces and also use of Narrow-toed shoes and high heels with hallux valgus [21]. So many of anomalies of foot are from putting improper shoes in childhood and adolescence and narrow-toed shoes are the main factor for hallux valgus. *Abdolvahab and Aldosari* (2000) showed that 39% of girl students have hallux valgus in both feet and they use often from high heel shoe with round toe, or shoe without heel, narrow-toe shoes, sharp head or normal high heel with narrow toe. 77% of tested students who has hallux valgus used from high heel shoes, narrow-toe shoes and 23% used from shoes without heel or narrow and sharp toe [22]. *Smith* (1999) argued that type of shoe is one of the important factors in hallux valgus in girls [23] *Lis et al* (2005) showed that damages from overuse of lower body members are often related to the repetition of overload and especially to the ability of absorbing shock in feet. It seems that this ability is related to the structure and especially height of inner longitudinal arch of foot [24]. By regarding that so many of anomalies of height are not hereditary and they are Adventitious by regarding to the habits of life and along living, they can be removed by detecting those [25]. Studying and detecting environmental factors threatening for human health especially for adolescents is one of the most important factors of medical and physiological purposes in order to reduction and remove of them from educational environments. If these anomalies couldn't be detected and remedied at time of adolescence they will seek morbidity [21]. Therefore, this study intends to investigate the amount of deformities of height in girls' students of Golestan province and their causes.

MATERIALS AND METHODS

This study is a descriptive cross-sectional study to determine the prevalence of spinal deformity in knees and feet among all the students in Golestan province. Study subjects were 153555 students in three educational sections in 2009-2010 educational years that were studied in governmental and non-governmental schools of Golestan province. Sampling of subjects was multi-stage clustering one which was performed respectively at cities, schools, classes and students randomly. Sample volume was estimated 400 people by regarding to the performed researches and based on Morgan table. After offering enough descriptions about the way of performing test and selection of samples among students and introducing them with a brief history of skeletal anomalies and justifying them by researcher and completing satisfactory form, a questionnaire was offered to them to receive some personal information, family background and other cases. After entering of subjects to the place of test, their height, weight were measured and dominated hand and foot were determined and recorded in examined leaves. After that they were asked to stand up with their sitting position and don't compares their muscles. Based on the pictures of New York chart, subjects were evaluated from two views of back and sides in three level of good, average and weak. In this test, back kyphosis, head up, Skolyosis, waist lordosis and drooping shoulder were measured. After this step the interval of two epicondils of hip were measured while person was in full extension of knees and legs stuck together and patella bone was forward. Hallux valgus also was investigated at this step. To analyze of data and accepting or rejecting the hypotheses of this research, measuring indexes were compared with each other and then it was used

from descriptive and interferential statistics in order to analysis of hypotheses. Also to statistical computation it was used from SPSS software.

RESULTS

This research is cross-sectional type whose statistical society were girl students 9-18 years old in Golestan province. Statistical sample includes 400 people whose individual characteristics are in the following table.

**Table1. Average age, height, and weight in three educational sections**

age	9	10	11	12	13	14	15	16	17	18	total
weight (Kg)	36	33	36/2	46/6	53/6	55/5	57/2	52/9	53/8	48/3	45/2
height (cm)	139/2	137/9	143/1	149/8	155/1	158/7	158/8	162/9	163/7	164/8	151
number	12	92	54	36	28	72	40	24	30	12	400

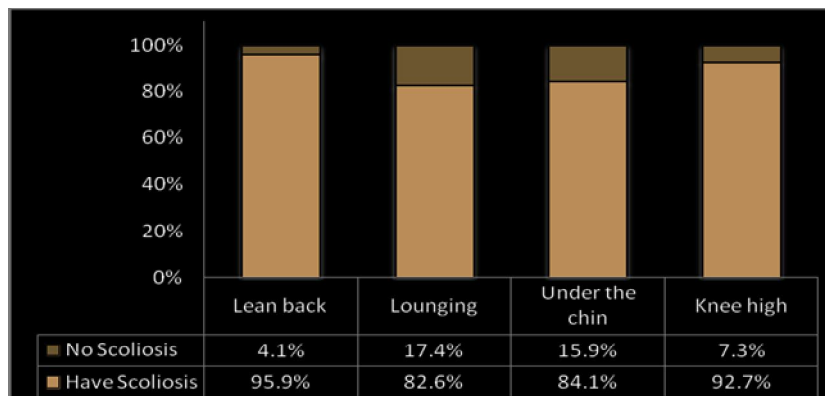**Diagram1. Abundance of healthy students (without kyphosis) and diseased one in %**
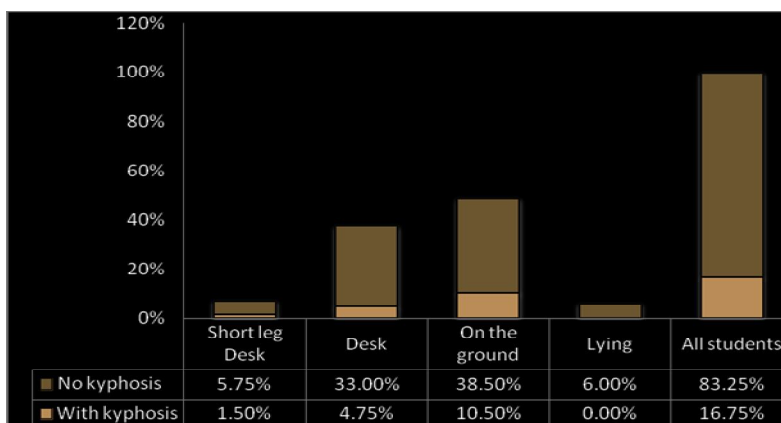
The findings of research showed that the relationship of kyphosis and the way of doing assignments is meaningful. So the way of performing assignments has important role in kyphosis.

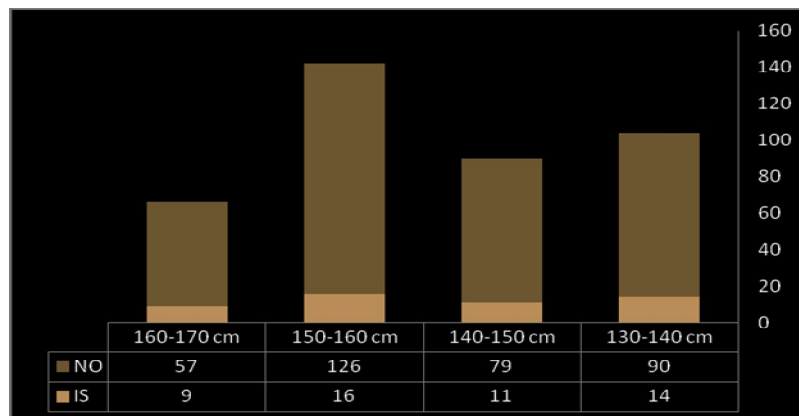**Diagram2. Abundance of students in terms of suffering from lordosis**
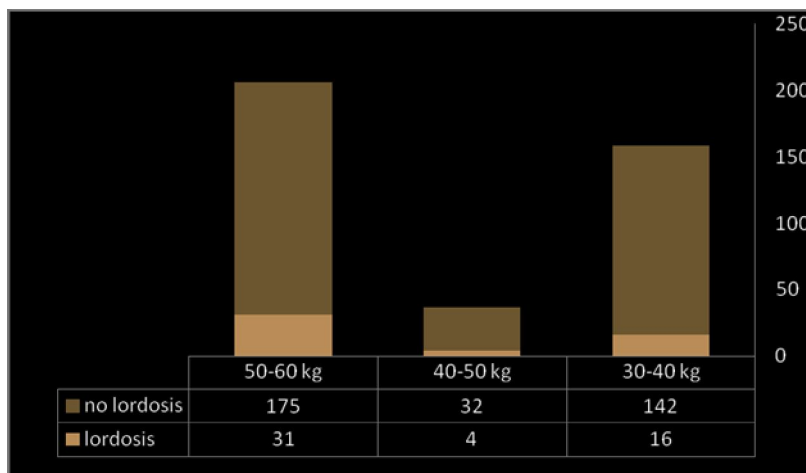
Also there was a meaningful relationship between lordosis and weight in girl students in three educational periods. It means that the amount of suffering from lordosis in people who have higher weight was more.

Diagram3. Abundance of healthy students and people who have scolyosis based on %

|	Lean back	Lounging	Under the chin	Knee high
No Scoliosis	4.1%	17.4%	15.9%	7.3%
Have Scoliosis	95.9%	82.6%	84.1%	92.7%

There is a meaningful relationship between suffering from scolliosis and way of sitting.

Diagram4. Abundance of healthy students and people who have head up based on %

|	160-170 cm	150-160 cm	140-150 cm	130-140 cm
NO	57	126	79	90
IS	9	16	11	14

The relationship of height with amount of head up is not meaningful.

Diagram5. Abundance of students in carrying bag and suffering from drooping shoulder

	Carrying a hand	Carrying two hand
NO	23	54
IS	105	208
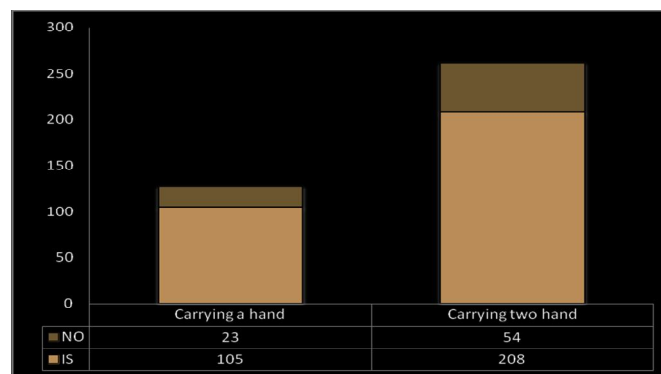
There was a meaningful relationship between drooping shoulder and carrying bag and book.

Diagram6. Abundance of total healthy students and those who suffering from genu varum in terms of sitting

	Lying	Frog	On the sofa	Cross-legged
No Genu varum	26	89	122	17
Genu varum	12	25	42	61
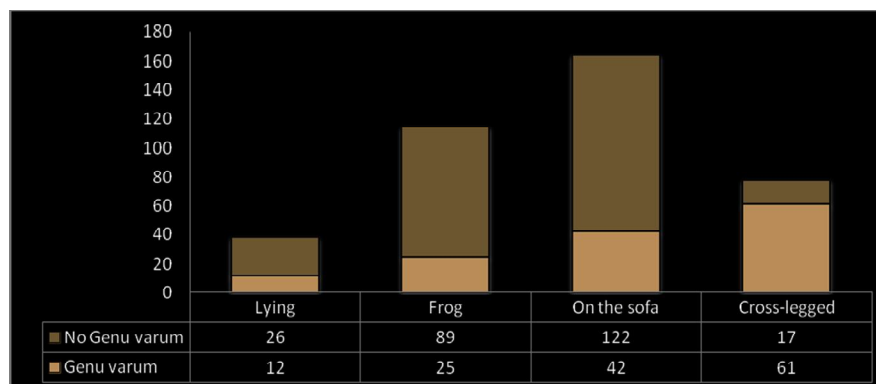
As shown in Diagram 6 abundance of students in carrying bag and suffering from drooping shoulder by Qui-square test which is (P value>0.05). The way of students sitting has no meaningful relationship with the amount of genu varum.
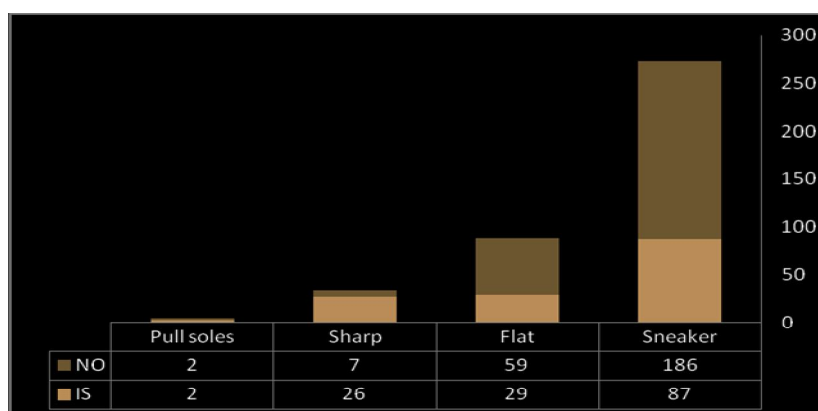
Diagram7. Abundance of students with hallux valgus in terms of shoe type

	Pull soles	Sharp	Flat	Sneaker
NO	2	7	59	186
IS	2	26	29	87

Diagram 7 shows the relationship of shoes' type with the amount of hallux valgus in the students.

DISCUSSION AND CONCLUSION

The findings of research show that the way of performing assignments in the present study has role in kyphosis. In this research the worst way of performing assignments is bending on the ground. In this method of studying spinal cord is bend for a long time and it is clear that it causes extension and weakness of muscles in spinal cords. *Hovanlou et al* (2009) also argued that by reduction of abductor muscles of upper body and shoulder because of different reasons such as standing and sitting postures in long time, the amount of kyphosis curve will be increases [6]. *Dehghani et al* (2003) argue that performing assignments at home bending on the ground increases the percent of kyphosis and using from desk reduces the percent of kyphosis in the students [5]. The best way of studying is laying position although this is not a standard method but data showed that it has at least effect on kyphosis. It causes reduction of back curve but increases pressure and probability to waist lordosis. *Berijer et al* (1989) reported that kyphosis in sitting position on the flat chair has the most amount and on the sloped chair (65 degree) has the least amount for it [27]. Investigation of lordosis prevalence and its relationship with weight in this research showed that by increasing the amount of weight, suffering from lordosis will be increased. *Kamali et al* (2004) concluded that obesity is effective in the amount of lorosis. Also *Farahani et al* (2012) investigated the relationship of weight percent of body with lordosis anomaly and found that the percent of body's fat has meaningful relationship with lordosis anomaly [15] which is in accordance with the results of the present study. By the way, *Neg et al* (2002) reported that there is no meaningful relationship between the amount of full lordosis of waist and obesity [16]. The findings of research showed that there is a meaningful relationship between scolysis and the way of sitting on the bench. *Dehghani et al* (2003) investigated the students of intermediate schools of Tehran and found that in students who sat on the bench the percent of scoliosis and kyphosis was more in comparison with the students who use from individual chairs, but the angle of waist lordosis was reduced [5]. There is a meaningful relationship between drooping shoulder and carrying of bag and books in girls students in three educational periods. In carrying bag by

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hand 18% of danger in drooping shoulder was increased. *Akbari and Ghannad* (2006) observed that 80% of Zahedan children who carry bag on their shoulder have drooping shoulder. This type of bags creates drooping shoulder [12]. *Pakeri et al* (2004) argued that most children of age 12-14 use from both side backpacks and type of bag has meaningful relationship with shoulder pain. Also girls have more pain from boys in their shoulder [13]. *Hang* (2005) argue that when students carry their pack bags have more freedom to work, while carrying bag on one shoulder causes unequal shoulder because of positioning of bag on one side (28). The researches show that carrying heavy backpacks may cause to strain of muscles, deformation of spinal curves and unequal shoulders [11]. The relationship of height with amount of head up prevalence in this research is not meaningful. It means that by increase of height, the amount of head up is not increased. *Lasjoori and Mirzaii* (2005) argue that there is a meaningful relationship between height and prevalence of head up [17]. *Kamali et al* also argued that there is a meaningful relationship between height and head up [18]. There is this probability that other reasons such as improper situation of study, watching television or working with computer, carrying heavy bags, cultural or genetic conditions are reasons for suffering from forward head of Golestan students. The results showed that there is no meaningful relationship between the methods of sitting of students with amount of curve neck prevalence. The students were categorized in terms of sitting to 4 groups which among these a number of them suffering from genu varum which are related to their position of sitting. These results were unrelated to the researches of *Bahrami et al* (2006) [21]. It is necessary that other factors for the cause of abnormal prevalence of genu varum in these students are not investigated. Inclination of foot by pressuring of force on it and reduction of capacity for tolerance of pressure individually can cause disorder. In this research there was a meaningful relationship between hallux valgus and use of narrow-toe shoe and high heel shoes. Sport shoes and without heel have protective effect and sharp toe shoes have destructive effect. *Bahrami et al* (2006) related use of narrow-toe shoe and high heel shoe with hallux valgus [21]. *Abdolvahhab and Aldosar* (2000) showed that 77% of subjects with hallux valgus use from high heel shoes and narrow-toe shoes [23]. Also, *Smith* (1999) argued that one of the important reasons for hallux valgus is the type of shoes that girls put [24]. In the present study there was a meaningful relationship among some anomalies and improper habits of students for correct position of body at the time of study, doing assignments, sitting and also putting improper shoes and wrong carrying of objects. Therefore, it is expected that related responsible people, teachers and experts pay more attention to this case to enter healthy people to the society and also reduction in cost of medicine. As so many of skeletal anomalies are not hereditary and they are grow along the life by life style of people, it should be use from different researches from physical condition of people's society for help to prevent from causes of disorders by correction of movements.

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