



## Original Article

## Association of Heavy Bag Lifting Time with Postural Pain in Secondary School Students: A Cross-Sectional Survey

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## ABSTRACT

Posture is the position in which one holds their body in the erect position against gravity.

**Objective:** To determine the association between heavy bag lifting with posture among secondary school students **Methods:** This study was a cross sectional survey. Based on sample of convenience, total 380 Students of both genders belonging to Beaconhouse School System, KIPS School System, Educators School and The Punjab School System were included with an age 14 to 17 years (school grade 9 to 12). The data was collected using the Reedco scale and Grimmer's Questionnaire for assessment of posture and, use of heavy bags and its associated pain, respectively **Results:** The majority of participants in this consisted of young adults above 12 years (39%) and below 12years (34%) with male predominant (54%). 370 students out of 380 were carrying heavy bags. The types of bags they mostly carry were backpacks (51%), satchel (34%) and others (15%). 48% of these students never used lockers and 40% of them often use locker 55% of them never use waist belt to carry bag. Most of the students 48% spend 11 to 20 minutes for carrying bag per day. 61% of them carry extra load (water bottles, lunch boxes, guide books) with them also. Out of 380 students 246 had pain in different body regions due to heavy bags 64% had neck pain and 53% had upper back pain while 19% had shoulder pain. Out of 184 students that carry bag from 11 to 20 minutes, 115 had poor neck posture, 133 had poor shoulder posture 25 had poor head posture and 5 had poor upper back pain and that carry from 21 to 30 minutes out of 167 students 122 had bad neck posture and 132 had poor shoulder posture 50 had poor head posture 105 had poor upper back posture **Conclusion:** There was found significant association between heavy bag lifting and poor posture with related pain in regions of cervical followed by upper back in secondary school students.

## INTRODUCTION

It not only contributes to good appearance, but also prevents backache, fatigue, maintains correct alignment of muscles and prevents the abnormal position of spine [1,2]. Posture is of two types good and bad posture. Good posture is the one in which all of the above points are considered, decreasing the energy expenditure of the body [3]. While, bad posture is that position of the body in which the muscles of the body are forced to work in an abnormal fashion [4]. Heavy backpacks puts excess load on the spine and incorrect posture may progress to irreversible changes [5]. Spinal curves may get deformed in the long run and results in the muscular strain and irritation of spinal joints

[6]. It has been a concerning observation to see the growing weight of the bags of secondary school children and the apparent effects on their body posture. A study was done regarding postural disorders and spinal deformities at primary school for prevention and treatment purposes in which they concluded that heavy backpack, along others, is the reason of common diseases in the period of childhood and adolescence [7]. In another cross-sectional study regarding the adequate weight of school bags in children they suggested that the load limit is within 10% to 15% of the child's body weight [8]. A research concluded that current weight limit is not appropriate for school children

and there should be proper guidelines for the factors influencing the weight of school bag [9]. In a research article on the influence of weight of a school backpack on spinal curvature was examined and they conclude that hollowing of the lumber lordosis can occur by wearing a backpack heavier than 10% [10]. A study was done for implementation of a postural awareness program among elementary school students concluding that there may be reduction in incidence of low back pain if proper back pack carrying habits are adopted [11]. In the assessment of the school bag weight in the elementary students, conclude that private school students carried heavier backpack than those of government ones and they should teach to lighten the load of books and educate them to correctly handle them [12]. The literature across the world has shown a link between heavy bag lifting and its impact on posture in children. However, there was found inconsistency in the intensity and frequency of findings. This may be due to variety of factors such as studied gender, students' body mass index, bag design and weight. In addition, there was large range of methodological differences in past studies. The current study has used simple methodology to determine the association between heavy bag lifting with posture among secondary school students. In this way, it may impact community by planning health promotion, prevention and management of potential musculoskeletal disorders in children which may further improve their academic performance. The study can also help to device ergonomic guidelines for carrying bags [13,14].

## METHODS

This study was a cross sectional survey. Based on sample of convenience, total 380 Students of both genders belonging to Beacon house School System, KIPS School System, Educators School and The Punjab School System were included with an age 14 to 17 years (school grade 9 to 12), between a period of March 2019 to October 2019. While Students with congenital diseases, upper cross syndrome, anemia and psycho-social factors were excluded. The data was collected using the Reedco scale and Grimmer's Questionnaire for assessment of posture and, use of heavy bags and its associated pain, respectively. Statistical Package for Social Sciences, SPSS 20.0 was used to analyze data.

Variables	N=380 (100%)	
	Frequency	Percentage
<b>Age</b>		
14 years	103	27.1
>14 years	130	34.2
<14 years	147	38.7

<b>Gender</b>		
Male	205	53.9
Female	175	46.1
<b>Bag Carrying Time</b>		
<5 minutes	1	.3
5 to 10 minutes	27	7.1
11 to 20 minutes	184	48.4
21 to 30 minutes	167	43.9
>30 minutes	1	.3
<b>Pain Status</b>		
Yes	246	64.7
No	134	35.3

**Table 1:** Age, Gender, Bag carrying time and pain status

<b>Percentage of Pain Distribution across body regions</b>	
Headache	39.50
Neck pain	63.70
Upper back	53.00
Lower back	60.00
Shoulder pain	18.75
Hip pain	37.90
Knee pain	36.40
Ankle and foot pain	16.80

**Table 2:** Distribution of pain across body regions

Variable	Association/ p-value
Sort of bag used and presence of pain	.000
Time for carried bag and presence of pain	.051
Times spent in carrying bag and neck posture	.000
Times spent in carrying bag and shoulder posture	.000
Times spent in carrying bag and upper back posture	.000
Times spent in carrying bag and head posture	.000

**Table 3:** Associative bag carrying with pain and posture

A large amount of the included students were less than 14 years of age while majority of them were males. All student carry bag for different duration but most of them carry it for 11 to 20 minutes. Out of 380 students two forty-six students had pain. Neck, upper back and lower region was painful in most of the students while headache, hip and knee pain was present in few students. There was a positive association of the sort of bag used and the time for which it was carried with the presence of pain. Neck, shoulder, upper back and head posture were also associated with the time spent in carrying bag.

## DISCUSSION

Heavy bags one of the major causes of back and shoulder problems among school children this issue need more

attention from health professionals. The results of my study showed the association of heavy bag lifting with bad posture in secondary school students. Students were taken in which 51.1% carry backpack 33.9% carry satchel and 15% carry other types of bag it was also considered that how much time they spend in carrying bag and most of them 48.4% spend more than 20 minutes in order to carrying bag which causes neck pain 63.7% and upper back pain 53% in most of the students. Body posture changes were studied in primary school students and the weight difference between girls and boys bag were considered and their similar effect on their posture in 2019. While the results of my study focused on the secondary school students and no difference is considered regarding different gender. In this research a tendency to carry slightly heavier school bags was noted in boys. The increase of torso rotation and kyphosis angle exceeding norms was observed in 35.2% of girls and in 60.9% of boys [17]. A similar study was conducted by Zakeri on heavy bag lifting. Findings showed that 36.9% of public-school students' backpacks and 55.1% of private school students' backpacks were non-standard with respect to weight while my research focused on time spend on carrying heavy bag as the consequence of bad posture. A significant relationship was also found among school children and this issue needs leads to dropped shoulders, kyphosis and lordosis ( $P < 0.05$ ) among students [15]. In another study regarding "Carrying heavy backpacks and handbag among elementary students' findings" in contrast to my study he considered the weight of the backpack while the results of my study focused on the time spend on carrying the bag. The results of his study showed that 87.30 percent of examined students take weight which is more than 10 percent of their body weight [16]. In a semi-practice in Iran, it was revealed that carrying of heavy bags and heavy tools in long term caused high incidence of shoulder asymmetry among Iranian students and collegians, which is consistent with our study. In another study performed in some schools in Shiraz on physical problems caused by bag weight, it was reported that most of these problems were observed in the shoulder area while in my study I observed the whole-body symmetry and posture [18]. Macias et al. (2008) concluded that perceived pain in the low back was significantly higher while wearing the backpack on one shoulder versus two shoulders and if one looks at the evidence, the systematic reviews had conflicting conclusion he didn't considered all factors in their evaluation and analysis [19]. In contrast to my study there are researches which considered other factors for the prevalence of bad posture and back pain there may be other issues that ergonomically effect their posture besides weight of bags. Nearly 20% of students had inappropriate chairs In 74% of the classes, students sat

with their side facing the teacher and in 35% students sat with their backs. In 6% of schools, no physical activity is offered at recess. Evidence-based guidelines can be provided to schoolchildren, parents, and teachers for the school bag weight limit. It is suggested that general guidance may be more effective and helpful than a single load limit guidelines [20].

## CONCLUSION

A positive association was found between heavy bag lifting and its consequences on posture in secondary school students as 50 students out of 167 had poor head posture and 105 had poor upper bad posture after carrying bag for 21 to 30 minutes per day.

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