



## Weight And Design of School Bags : A Major Concern for Parents and Schools

K. Pant<sup>a</sup>, H. Kaur<sup>b\*</sup> and M. Sidhu<sup>c</sup>

<sup>a, b, c</sup>College of Home Science, PAU, Ludhiana, Punjab, India  
Email Id: harp\_07@rediffmail.com

### Abstract

Heavy school bags are common mode of transporting books and school supplies for school going children from kindergarten to the high school. Every year when schooling starts, children all over the world, ready to go to school are burdened with heavy bags. They pack various books, heavy stationery box, filled water bottle and meals to take during break. Some, who are scared to be scolded, takes all books to school including those which may not be needed that day. Some pack their own bags without any help from parents while others repack after their parents had packed for them for they are too afraid to miss packing any book or material. There is a growing concern these days that children are carrying too much weight on their backs. The school bag is one of the several forms of manual load carriage that provides flexibility and is often used by hikers and soldiers, as well as by school children. Therefore, this study was conducted to know that information regarding awareness for weight and design of school bags among parents and school students of Ludhiana city. It was found that most of the parents were unaware about MASW (maximum acceptable school bag weight) and only 6.67 per cent had information regarding standard MASW which is 10-15 per cent of body weight. Data further depicts that maximum number of respondents perceived their school bags heavy. Therefore, there is a great need to understand by both parents and school authority to make generous plans so that heavy school weights could not adversely affect the spinal column and other bone structures of growing children which are not fully developed.

**Key words:** MASW, transporting, generous plans, spinal column, bone structures

### PAPER/ARTICLE INFO

RECEIVED ON: 14/02/2016  
ACCEPTED ON: 04/06/2016

### Reference to this paper should be made as follows:

K. Pant, H. Kaur and M. Sidhu (2016), "Weight And Design of School Bags : A Major Concern for Parents and Schools", *Int. J. of Trade and Commerce-IIARTC*, Vol. 5, No. 1, pp. 199-206

\*Corresponding Author

## 1. INTRODUCTION

There is a growing concern these days that children are carrying too much weight on their backs. The school bag is one of the several forms of manual load carriage that provides flexibility and is often used by hikers and soldiers, as well as by school children (**Knapik et al 1996**). Each school year, millions of children walk to, from and around school carrying a significantly greater amount of weight in their school bags and for a longer period of time. Children have to carry a full day's class schedule of school books, in addition to other items and supplies, throughout the day (**Siambanes et al 2004**). School bags are used by the school-age children to carry school books, supplies, other articles, and equipment. Students often carry between 4.5-18 kg on their backs to and from school and between classes (**Keeta et al 2002**). School bags can be threatening to the health of students when they are too heavy or worn improperly. The school children carry their school bags in a variety of positions that can adversely affect them physically by affecting their spinal column and other bone structures that are not fully developed. Wearing schoolbags alters the mobility of spine, leading to passive movement (involuntary movement from an outside force), which is a risk factor for back pain (**Vacheron et al 1991**). Literature revealed that the load weight ratio has a positive relationship with many factors like pain, location, kyphosis, and other variables (**Akram and Faqeeh 2009**). Heavy school bags School bags are common mode of transporting books and school supplies for school aged children from kindergarten to the high school. Every year when schooling starts, children all over the world, ready to go to school are burdened with heavy bags. They pack various books, heavy stationery box, filled water bottle and meals to take during break. Some, who are scared to be scolded, takes all books to school including those which may not be needed that day. Some pack their own bags without any help from parents while others repack after their parents had packed for them for they are too afraid to miss packing any book or material. Most importantly, students need to develop an awareness of these issues in order to monitor their own practices. Parents, students, teachers and clinicians have expressed concern about school bags. Problems related to school bags include the weight of the bag, how it is packed, and how it is carried. There is always a blame game among parents and school authorities regarding heavy school bags problems. According to parents school authorities never take serious action against the negative consequences caused by heavy school bags and school authorities put the blame on parents for not checking the time-table and packing all books in the bag. Therefore, it becomes the moral duty of both parents and school authority to join their hands together for this common cause to protect their children from the curse of heavy school bags. Therefore, this study was conducted to know the information regarding awareness for weight and design of school bags among parents and school students of Ludhiana city of Punjab (India).

## 2. REVIEW OF LITERATURE

A musculoskeletal disorder in school-aged children is highly prevalent and contrary to what one might be assumed, back problems are not confined to the adult population (**Young et al 2006**). Daily backpack carrying is a frequent cause of musculoskeletal discomforts (**Negrini et al 1999**). Musculoskeletal problems were reported by 77.1 per cent of the students. Symptoms were most prevalent in the neck, shoulder, upper back and lower back (**Whittfield et al 2005**). To investigate relation of heavy school bags and availability of lockers and back pain, 1540 students from 3

middle schools were intertwined. Valid questionnaire and physical examination for scoliosis were done (Skaggs *et al* 2006). More than 95 per cent of students reported carrying of backpack almost every day. Whereas, 58 per cent of students underwent screening examination for scoliosis, 82 per cent of children reported carrying of backpack caused back pain or made it worse, 43 per cent of girls reported back pain as compared to 32 per cent of boys. From this study, they concluded that, back pain in early adolescence is more likely to be seen in adults. Also to have acceptable weight of backpack one should see the availability of school lockers and lighter weight backpacks.

In a study done in Northern California on 5th to 12th grade students and their backpacks were weighed (Moore *et al* 2007). Students were individually interviewed about how often they experienced pain while carrying a backpack, the site of their pain, and if the pain had interfered with school activities or led to medical care. Data support the use of a 10 per cent of body weight cut off for safe use of backpacks for all grade levels. Greater relative backpack weight was associated with upper- and mid-back pain reports but not neck or lower back pain; it was also associated with lost school time, lost school sports time, and greater chiropractic utilization. The heavy weight can cause shoulder, neck and back pain. Kids who walk to and from school are also more likely to suffer back pain from heavy packs because duration of use increases the risk of injury (Rageswarihariharan *et al* 2009).

A recent study on weight of school bags showed the average weight of a bag to be around 8 kg. A study was conducted by an NGO covering about 3,000 students in and around Mysore city, attending government and private schools across State, CBSE and ICSE syllabi.

The study covered students from Class V to X. It was observed the instances of school bags weighing 4 kg, particularly on Saturdays and it was up to 11.5 kg in certain cases.

### 3. CRITICAL APPRAISAL OF REVIEW

The review of previous studies done so far indicates that a lot of research has been conducted on School bags" weight, its negative impact on body posture, regarding various risk factors and musculoskeletal problems caused by school bags. Most of these studies have been conducted in foreign countries but very few studies have been conducted in India highlighting this issue. Therefore, the present study was conducted to develop comprehensive management strategy for preventing risk factors associated with school bags.

### 4. MATERIALS AND METHODS

Field survey was conducted on the students of VIth ,VIIth and VIIIth standard of government and private schools of Ludhiana city to evaluate various risk factors associated with carrying of school bags viz; musculoskeletal problems, postural discomfort, schoolbag injuries, exertion etc.

Further, sixty respondents (school children) from government and sixty from the private schools were selected randomly, thus making a total sample of 120 respondents.

**Formulation of interview schedule-** A pre structured interview schedule was used to collect the information regarding awareness for weight and design of school bags among parents and school students.

### 5. RESULTS AND DISCUSSION

**5.1 Parental awareness regarding weight of school bags carried by respondents-Awareness regarding MASW (maximum acceptable school bag weight):** Data enfolded in Table 1 shows

that most of the parents (93.33%) were unaware about MASW and only 6.67 per cent had information regarding standard MASW which is 10-15 per cent of body weight.

**Table 1: Parental awareness regarding weight of school bags carried by respondents.**

Awareness regarding MASW(maximum acceptable school bag weight)	Government School (n=60)		Private School (n=60)		Total (N=120)	
	Number	Percentage	Number	Percentage	Number	Percentage
Yes	-	-	08	13.33	08	06.67
No	60	100.00	52	86.67	112	93.33
<b>Awareness regarding problems caused by heavy bags</b>						
Yes	37	61.67	52	86.67	89	74.17
No	23	38.33	08	13.33	31	25.83
<b>Perception regarding school bags</b>						
Not heavy	19	31.66	19	31.67	38	31.67
Heavy	28	46.67	33	55.00	61	50.83
Very heavy	13	21.67	08	13.33	21	17.50
<b>Selection of school bags according to*</b>						
Mother	41	68.33	30	50.00	71	59.17
Child	31	51.67	31	51.67	62	51.67
Both parents	19	31.67	15	25.00	34	28.33
<b>Checking of the contents of child's school bag*</b>						
Always	35	58.33	40	66.67	75	62.50
Some times	15	25.00	15	25.00	30	25.00
Never	10	16.67	05	8.33	15	12.50
<b>Children followed parental advice regarding weight of school bags</b>						
Yes	38	63.33	47	78.33	85	70.83
No	22	36.67	13	21.67	35	29.16
<b>Steps taken by parents if their advice not followed</b>	<b>Government (n=22)</b>		<b>Private (n=13)</b>		<b>Total (N=35)</b>	
	Counseling	07	31.82	07	53.85	14
Scolding	15	68.18	06	46.15	21	60.00
<b>Complaining to school authority regarding weight of school bags</b>						
Yes	-	-	28	46.67	28	23.33
No	60	100.00	32	53.33	92	76.67
<b>*Multiple responses</b>						

Source: own survey

**5.2 Awareness regarding problems caused by heavy school bags:** Table 1 highlighted that more than half of parents (74.17%) were aware about the problems caused by heavy school bags followed by 25.83 per cent still unaware for the repercussion caused by heavy school bags.

**5.3 Perception regarding school bags:** It was observed from Table 1 that half of the parents (50.83%) felt that their wards carried heavy school bags whereas 31.67 per cent parents felt that the weight of school bags of their wards was not heavy. Nearly 17.50 per cent parents had complaint of very heavy school bags carried by their wards.

**5.4 Checking of the contents of child's school bag:** Table 1 highlighted that majority of parents (62.50 %) had checked their wards "school bags at regular interval and 25.00 per cent of parents checked it rarely while only 12.50 per cent parents were not bothered about the checking of the contents of school bags.

**5.5 Children followed parental advice regarding weight of school bags:** Table 1 also indicates that maximum number of parents (70.83%) admitted that their wards followed their advice regarding weight of school bag, in contrast of this 29.16 per cent said no for it. Out of 29.16 per cent of parents 40.00 per cent of parents counsel their child about the bad effect of heavy school bags while 60.00 per cent parents were scolding their child.

**5.6 Complaining to school authority regarding weight of school bags:** From Table 1, it was viewed that most of the parents (76.67%) were not complaining to school authority regarding weight of school bag, nearly 23.33 per cent parents had complained to school authority against it. This table also depicts that only parents of private school wards were making complain to school authority while parents of government schools wards had not made any complain to school authority. The main reason behind this may be lack of awareness and hesitation to complain to school authority.

## **6. DESIGN PARAMETERS OF SCHOOL BAGS CARRIED BY RESPONDENTS**

**6.1 Types of school bag:** Regarding types of school bags majority of respondents (70.83%) were carrying two straps bag followed by shoulder bag (24.17%) and only 5.00 per cent of respondents were having rolling school bags (Table 2).

**6.2 Ease of adjustment in shoulder straps:** Table 2 shows that maximum number of respondents (83.33%) had ease of adjustment in shoulder strap and rest 16.67 per cent respondents did not have this facility in their school bags.

**6.3 Size of school bags:** It is further observed from Table 2 that nearly half of respondents (51.67%) carried normal size school bags followed by large size school bags (26.67 %) and 21.66 per cent carried small size school bags.

**6.4 Material of school bags:** Table 2 highlights that 55.00 per cent of respondents school bags were made of heavy material followed by light material (34.17%) and only 10.83 per cent respondents school bags were made up of itchy material which causes rashes to their shoulders.

**6.5 Accessories available with school bags:** Data from Table 2 reveals such that bags of all the respondents (100.00 %) were having zips followed by buckles (87.50%) and pockets (79.17%). While 16.67 per cent of respondents were having school bags with waist straps which helps in holding the school bag close to the body and leads to less stress.

**6.6 Shoulder straps:** Table 2 shows that majority of respondents (69.17%) had padded shoulder strap in their school bags and less number of respondents (30.83%) had non padded school bags.

**6.7 Sufficient space for different things in bags:** It is evident from Table 2 that majority of respondents (70.00%) felt that they had sufficient space in their school bags whereas, 30.00 per cent felt insufficient space in their school bags.

**Table 2: Design parameters of school bags carried by respondents**

Design parameters	Government School (n=60)		Private School (n=60)		Total School (N=120)	
	Number	Percentage	Number	Percentage	Number	Percentage
Types of school bags						
Two strap bag	40	66.67	45	75.00	85	70.83
Shoulder bag	20	33.33	09	15.00	29	24.17
Rolling bag	-	-	06	10.00	06	5.00
Other type of bag	-	-	-	-	-	-
<b>Ease of adjustment in shoulder straps</b>						
Yes	45	75.00	55	91.67	100	83.33
No	15	25.00	05	8.33	20	16.67
<b>Size of school bags</b>						
Normal size	29	48.33	33	55.00	62	51.67
Large size	19	31.67	13	21.67	32	26.67
Small size	12	20.00	14	23.33	26	21.66
<b>Material of school bags</b>						
Heavy material	35	58.33	31	51.67	66	55.00
Light material	15	25	26	43.33	41	34.17
Itchy material	10	16.67	03	5.00	13	10.83
<b>Accessories available with School bag*</b>						
Zips	60	100.00	60	100.00	120	100.00
Buckles	50	83.33	55	91.67	105	87.50
Pockets	41	68.33	54	90.00	95	79.17
Waist strips	02	3.33	18	30.00	20	16.67
<b>Shoulder straps</b>						
Padded	40	66.67	43	71.67	83	69.17
Non padded	20	33.33	17	28.33	37	30.83
<b>Sufficient space for different things in bags</b>						
Yes	37	61.67	47	78.33	84	70.00
No	23	38.83	13	21.67	36	30.00

\*Multiple responses

Source: Own survey

**7. PERCEPTION REGARDING SCHOOL BAG WEIGHT OF RESPONDENTS**

Table 3 depicts that maximum number of respondents (45.98%) perceived their school bags heavy followed by very heavy (20.84%) and 20.83 per cent perceived their school bags" weight as moderate. Only 12.50 per cent felt that school bags were not at all heavy. Chansirinukor *et al* (2001), made a cross- sectional study of 237 sixth-graders in Milan, Italy and found that children reported that their backpacks were heavy (79%) and caused fatigue (65.7%) and back pain (46.1%).

**Table 3: Perception regarding school bag weight of respondents**

	Very heavy	Heavy	Moderate	Not at all heavy
Government School (n=60)	25.00	50.00	16.67	8.33
Private School (n=60)	16.66	41.67	25.00	16.67
Total School (N=120)*	20.84	45.98	20.83	12.50

Source: Own survey

**8. INFORMATION REGARDING WORKING SYSTEM OF SELECTED SCHOOLS**

**Working features:** Table 4 highlights that 41.67 per cent of selected schools had provision of yoga and exercise classes followed by judicious plan of time table (33.33%) and 20.83 per cent of selected schools conducted lectures on maintenance of good postures in their schools. Sensitization of parents and teachers regarding long-term effects of carrying heavy school bags had done by 16.67 per cent of selected schools. It was observed only 3.33 per cent of selected schools had provision of lockers and provision of two sets of books (2.50%). **Whittfield *et al* (2001)** reported that heavy schoolbags, long carriage durations and lack of access to lockers could contribute to the musculoskeletal symptoms.

**Table 4 : Information regarding working system of selected schools**

Working features*	Government School (n=60)		Private School (n=60)		Total School (N=120)	
	Number	Percentage	Number	Percentage	Number	Percentage
Provision of yoga and exercise	20	33.33	30	50.00	50	41.67
Judicious plan of time table	15	25.00	25	41.67	40	33.33
Lecture on maintenance of good posture	05	8.33	20	33.33	25	20.83
Sensitization of parents and teachers regarding long-term effects of carrying heavy school bags	05	8.33	15	25.00	20	16.67
Provision of lockers	-	-	04	6.67	04	3.33
Provision of two sets of books	-	-	03	5.00	03	2.50
<b>Multiple responses*</b>						

Source: Own survey

## **CONCLUSION**

It is concluded that both design and weight of the school bags play important role in affecting the posture and general health of growing school children. Therefore, both parents and school authorities should shoulder the responsibility to suggest certain feasible plans to ease out the burden of school bags and reduce its adverse effects on the health of the children.

## **REFERENCES**

- [1]. Akram, A. and Faqeeh Al, A. (2009). "The Effect of school bag weight on pain, posture, and vital capacity of the lungs of three elementary schools in Bethlehem District in Palestine Middle East". *Family Medicine* 7: 7-14.
- [2]. Chansirinukor, W., Wilson, D., Grimmer, K. and Dansie, B. (2001). "Effects of backpack on students/ Measurement of cervical and shoulder posture". *Aust J Physio* 47: 110-16.
- [3]. Keeta, D.L., Bonnie, J. and Bear, A. (2002). "Manual of school health". Elsevier Health Sciences. P 614. 2nd Ed.
- [4]. Knapik, J., Harman, E., and Reynolds, K. (1996). "Load carriage using packs: a review of physiological, biomechanical and medical aspects". *Applied Ergonomics* 27: 207-16.
- [5]. Moore, M.J., White, G.L. and Moore, D.L. (2007). "Association of relative backpack weight with reported pain, pain sites, medical utilization and lost school time in children and adolescents". *J Sch Health* 77: 232-39.
- [6]. Negrini, S., Carabalona, R. and Sibilla, P. (1999). Backpack as a daily load for school children", *Lancet* 354: 1974-94.
- [7]. Rageswariharan, A., Zechariah, J. and Madhumathi, K. (2009). "Backpack-Bad pack an issue, backpack usage and its implications on Indian school children and observational study". *Physiotherapy and Occupational Therapy J* 2: 5-11.
- [8]. Siambanes, D., Martinez, J., Butler, E. and Haider, T. (2004). "Influence of school backpacks on adolescent back pain". *Pediatric Orthopedic J* 24: 211-17.
- [9]. Skaggs, D., Early, S.D., Ambra, P., Tolo, V. and Kay, R. (2006). "Back pain and backpacks in school children", *Pediatric Orthopedic J* 26: 358-63.
- [10]. Vacheron, J.J., Povmart, G., Ghandeszoon, R. and Vanneville, G. (1991). "Changes of the counter of the spine caused by load carrying", *Surgical Radiological Anatomy* 21: 109-13.
- [11]. Whittfield, J., Legg, S.J. and Hedderley, D.I. (2005). "Schoolbag weight and musculoskeletal system in New Zealand secondary schools", *Applied Ergonomics* 36: 193-98.
- [12]. Whittfield, J.K., Legg, S.J. and Hedderley, D.L. (2001). "The weight and use of schoolbags in New Zealand secondary schools", *Ergonomics* 44: 819-24.
- [13]. Young, I.A., Haig, A.J. and Yamakawa, K.S. (2006). "The association between backpack weight and low back pain in children", *J Back and Musculoskeletal Rehabilitation* 19: 25-33.