Impact of Heavy School Bags and its Relationship with Musculoskeletal Discomfort and Back pain

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Abstract

Many changes have been introduced in educational institutions in order to make teaching learning process more effective and meaningful for students. But one thing is still remained unmodified i.e. heavy weight of school bags that our students used to carry to school on daily basis. This was a cross-sectional study carried out in primary schools (private) of University Town, Peshawar. Total schools in the sampled area were 09. Five schools were randomly selected. 50 students were taken from grade 4th and 50 from grade 5th. A self-developed closed-ended questionnaire was administered among the students, with age of (8-12 years). A significant relationship was found between heavy bags, musculoskeletal discomfort and back ache. It was recommended that government may introduce integrated curriculum and proposed policy in which fixed weight may be mentioned for specific grades in order to lighten the weight of heavy bags.

Keywords: Heavy Schoolbag, Musculoskeletal Discomfort

In Eastern Africa region, study by was carried out by Mwaka et al., (2014) on effects of heavy bag on students' health. They concluded that in order to lighten the weight of the school bags, the concerned authorities should provide lockers and cupboards to students for keeping their extra books, copies and belongings and it will also reduce the weight of their heavy bags. Many research scholars have discussed that stress in muscles and back among children approximately 30% to 50%, whereas Neuschwander et al. (2010) narrated that musculoskeletal pain and backache has been reported by children as high as 65%.

Javadivala et al. (2012) mentioned different variables responsible for musculoskeletal symptoms such as length of strap, method of carrying bag and duration of carrying it. Musculoskeletal symptoms are believed to be multifactorial. Whittfield et al. (2001) stated that the carriage of heavy schoolbags is an influencing factor and also a source of daily physical stress for school children. Risk factors for musculoskeletal discomfort is not only link with weight of bags but

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it also involves other factors such as size and shape of bag and time period for carrying it (Chansirinukor et al; 2001).

Now-a- days back ache among students has becoming an alarming issue for all the stakeholders as it is affects and has a negative outcome on children health especially on spinal cord (Dockrell et al., 2006). The identification of back ache in children has more drastic results as compared to adults. This subject needs to be handled seriously but it is observed that this matter has not been tackled seriously and it gives rise to dangerous diseases among children which could not be controlled easily (Henkus et al., 2002). However, back ache is found 30% in school going children but proper medical care is not provided to them (Feldman et al., 2006).

Mohseni (2012) transpired that the students carrying bags having two straps is appropriate for them as compared to one strap as it cut up the weight of heavy bag into two parts. Bags that have a dorsal strap are even better because less pressure is put on the shoulders of the students. Mayank et al., (2006) cited that the children suffer from daily tension is link with carrying heavy bags make students to lean forward their heads and body. Length of time, handling of bag, and technique of carrying bag of students are significant factors connected with prevalence of musculoskeletal disorders and complaints (Puckree et al.,2004; Skaggs, 2006).

A research in China revealed that bags having loaded less than 10% of students weight incline towards forward and complaint of having back ache (Wang et al., 2001). Analysts have indicated that carrying load for long duration on spinal cord increases the occurrence of pain among students, and the most common load is carrying heavy bags from home to school and vice versa (Negrini et al., 2007).

Wong et al., (2009) stated that lower back ache is a burning matter but majority of the people take it lightly without concerning its role in life. All the stakeholders should consider it seriously as this issue is not restricted to a specific age group as anyone could suffer from these disorders. They further added that back ache is found in other people due to having flatter spine as contrast to the healthier s-shape and uncomfortable back posture, long duration of body flexion, and so forth.

Basaran and Benlidayi (2014) opined that the changes happen in spine are dependent on how we keep and use our body for daily practices and for the execution of different tasks. What we need is the constant directions from experts for ignoring flattened spine, which is caused by heavy bag mainly in order to lessen the possibility of lower

back pain among children in their later life. Whittfield et al. (2005) concluded from their findings that students used to carry heavy bags which surpass the acceptable weight limits proves to be one the main cause of developing musculoskeletal disorder or possibly long term back pain.

Cook and Neumann (1987) cited that it is generally observed that children are carrying their bags to school on daily basis but the most important thing is to teach them how to carry heavy bags to school properly and what kind of bag may be purchased. Legg (1995) stated that carrying a heavy bag or load on the back is not harmful as long as we follow the proper instructions such as that we should keep our load as close as possible to the body and utilize large muscles of the body in order to control the sufferings of muscle discomforts.

Statement of the Problem

Kids are almost left with no options than to carry heavy school bags to school on daily basis. It is a common exercise to observe children carrying heavy bag more than their weight on regular basis. It is not surprising that children complaint of back pain, neck sprains etc. Throughout the world, many objections and arguments have been received from different shareholders about children carrying heavy bags having more weight as compared to students which contribute in occurrence of musculoskeletal disorders and backache among children. The children of Pakistan are facing the same problem. The children have no choice but to carry the burden of heavy school bags on their shoulders. No one even bothers to come up with a solution to this problem. Many do not consider it a problem at all. In Pakistan, there is very little consideration awarded to analyze and discuss the physical health of children in context of the heavy bags they carry and its impact on their musculoskeletal pain and backache among school going children. This is an increasing alarming issue for all the stakeholders in education about the repeated complaint made by children regarding stress, pain in shoulders, neck and back ache link with carrying heavy bags. Therefore, the researcher decided to conduct research on this very burning issue.

Objectives

- To evaluate the impact of heavy bags on musculoskeletal discomfort and back pain among primary school going children.
- To investigate whether characteristics of school bags are associated with risk factors for musculoskeletal discomfort and back pain.
- To examine the relationship between heavy bags, musculoskeletal discomfort and back pain.

Null Hypotheses

$\boldsymbol{H}_0$1 There is no impact of carrying heavy school bags on musculoskeletal discomfort and back pain among primary school going children.

$\boldsymbol{H}_0$2 There is no significant relationship between characteristics of school bag use and risk factors associated with musculoskeletal discomfort and back pain.

$\boldsymbol{H}_0$3 There is no significant relationship between carrying heavy bags, musculoskeletal discomfort and back pain.

Research Design

This was a cross- sectional study conducted in private primary schools of University Town, Peshawar. Approval from the school principal was taken for the collection of data. There are 09 private primary schools in University Town, Peshawar (BISE, 2018). For sampling technique 05 schools were randomly selected.100 students were randomly chosen from class 4^{th} (50) and (50) from grade 5^{th}. A self- developed closed-ended questionnaire was administered among the students, with age of (8-12 years). In order to maintain validity of the questionnaire, pilot testing was carried out and scholarly comments were recorded by education experts on the exiting tool. A few ambiguities were detected and removed. The questionnaire was slightly changed in the light of the given suggestions and for reliability, Cronbach Alpha has been applied. The value of Cronbach Alpha was .864 which is acceptable level of reliability. The collected data were analyzed using SPSS software, Chi-square and Correlation. Chi-square test was used to determine impact of heavy bag on musculoskeletal discomfort and back pain and correlation was applied in order to examine the relationship of heavy bag with musculoskeletal discomfort

and back pain. Statistical significance was set at 0.05 to test the hypotheses.

Results and Discussions

Table-4.1: To evaluate the impact of heavy bags on musculoskeletal discomfort and back pain among primary school going children.

S.NO	Statements	SA	A	UD	DA	SDA	P-value
1.	Do you ever lean forward during carrying heavy bag?	09	36	16	09	30	.000
2.	Do you feel pain in your neck due to carrying heavy school bag?	12	08	14	19	47	.000
3.	Do you feel pain in your upper back due to carrying heavy school bag?	20	23	11	13	33	.004
4.	Do you feel pain in your lower back due to carrying heavy school bag?	37	27	12	09	15	.000
5.	Do you feel pain in upper shoulder due to carrying heavy school bag?	27	35	08	23	07	.000
6.	Do you feel pain in lower shoulder due to carrying heavy school bag?	09	26	22	12	31	.002
7.	Do you have enough space on your chair to sit with your bag?	32	29	17	14	08	.000

8.	Can you focus on your lectures due to little space available to you on your chair because of heavy bag?	26	23	29	11	11	.006
9.	Do you think that your bag is too heavy for you to carry to school?	27	32	18	11	12	.002
10.	Do you easily carry all books and notebooks in your bag for the school?	26	38	13	14	09	.000
11.	Do you want to reduce the numbers of school books?	35	49	04	08	04	.000
12.	Do you have a pick and drop facility for your school?	21	31	23	15	10	.012
13.	Do you go to school by foot?	19	38	16	18	09	.000
14.	Can you carry your bag to your school easily?	19	37	13	12	11	.000
15.	Your classroom is placed on the ground floor.	24	32	19	14	11	.005
16.	Your classroom is placed upstairs.	46	37	04	06	07	.000
17.	It's hard for you to carry bag upstairs to the class.	42	33	14	06	05	.000

Discussion

Table- 4.1 shows that responses of all item is significant which is less than 0.05. It means that all these statements support the objective. So, the $H_0 1$ is rejected.

Table-4.2 To investigate whether characteristics of school bags are associated with risk factors for musculoskeletal discomfort and back pain**.**

S. No	Statements	SA	A	UD	DA	SD A	P-V
1	School bag has padded back and strips	34	44	09	06	07	.000
2	You carry your bag on one shoulder	17	33	29	10	11	.000
3	You carry your bag on both shoulder	16	22	16	11	35	.003
4	You use hand-carry bag for school.	17	32	24	12	15	.009
5	You use single strip bag for the school.	26	24	23	07	20	.020
6	You use double strip bag for the school	17	32	24	12	15	.009
7	You use rolling trolley by hand	20	23	11	13	33	.004

Significant value x^2 at 0.05 level df=4 Table

Discussion

Table- 4.2 shows that responses of all item is significant which is less than 0.05. It means that all these statements support the objective. So, the $H_0 2$ is rejected.

Table-4.3 There is no significant relationship between carrying heavy bags, musculoskeletal discomfort and back pain.

Correlation between Heavy Bags, Musculoskeletal Discomfort and Back Pain

		Heavy bag	Musculoskeletal discomfort	Back pain
Heavy bags	Pearson Correlation	1	.612**	.550**
	Sig. (2-tailed)		.000	.000
	N	100	100	100
Musculoskeletal Discomfort	Pearson Correlation	.612**	1	.619**
	Sig. (2-tailed)	.000		.000
	N	100	100	100
Back pain	Pearson Correlation	.550**	.619**	1
	Sig. (2-tailed)	.000	.000	
	N	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

The analysis of the data shows that the value of r is .550 which is smaller than the level of significance 0.01 which shows that there is strong correlation between the heavy bag and back pain. The relationship between heavy bag and musculoskeletal discomfort shows positive and strong relationship. The value of r is .612 which also shows strong correlation among both the variables. So, $H_0$3 is rejected.

Conclusion and Recommendations

The study concluded that there is a strong relationship between heavy school bags, musculoskeletal discomfort and back pain among primary school going children. Due to heavy bags, the students were not able to focus on their studies as they were suffering from pain in their neck, shoulders and back. This daily practice also affects their academic performance.

The study made some recommendations also which includes that weight of the bag may be less than 10% of child's body weight. The parents and teachers may teach the students about the correct use of carrying bag because it is an important factor to promote good posture and minimize effort in carrying school bags. Suitable lockers and cupboards with shelves may be provided by the school to the students so that they may keep their extra books and belongings in these lockers. Proper time table may be written by the teachers in the students' dairies so that they will bring the books according to the given time table. Different educational seminars and workshops may be arranged for teachers as well as for parents so they will supervise their children not to carry unnecessary books and things to schools. The government can also play very effective role in lighten the load of heavy bag by introducing integrating curriculum in schools as this practice is already been implemented in abroad and the government may also pass a legal act regarding fix weight of bags and also take initiative to introduce tablets instead of books in schools .

References

Basaran,S. and Benlidayi,I.C.(2014). Comparative study of lumbosacral alignment in elderly versus young adults: data on patients with low back pain. *Aging Clinical and Experimental Research*, vol. 27, no. 3, pp. 297–302, 2014

Chansirinukor, W. Wilson, D. Grimmer, K. and Dansie, B. (2001). Effects of backpacks on students: measurement of cervical and

shoulder posture. *Australian Journal of Physiotherapy.* 47. 110-116.

Cook, T.M., Neumann,D.A.(1987). The effects of load placement on the EMG activity of the low back muscles during load carrying by men and women. *Ergonomics.* 30, 1413 (1987)

Dockrell, S., C. Cane, and O'Keeffe,E.(2006).Schoolbag weight and effect of schoolbag carriage on secondary school students . *Meeting Diversity in Ergonomics*, 9th- 14th …, iea.cc Downloaded from http:// www.iea.cc/ ergonomics 4 children/pdfs/art0212.pdf

Feldman, D.S., Straight, J.J. Badra, M.I. et al.(2006). Evaluation of an algorithmic approach to pediatric back pain. *J. Pediatr Orthop*.26(3):353-7.

Henkus, H.E., Bessems, J.H. Wurzer, J.A. et al;(2002). [Too young for a twisted painful back]; *Ned Tijdschr Geneeskd.*;146(44):2069-72.

Javadivala, Z., Allahverdipour, H., Dianat, I. & Bazargan, M. (2012).Awareness of parents about Characteristics of a healthy school backpack. *Health Promotion Perspective*, 2, 166-172.

Legg, S.L.,Ramsey,T. D. J. Knowles, D.J.(1992).The metabolic cost of backpack and shoulder load carriage. *Ergonomics* 35,1063.

Mohseni, K.h.(2012). The best bag and its features [Persian]. Tehran: Soroush Educational Center; Tehran.

Mayank, M. Upendar, S. Nishat, Q.(2006). Effect of backpack loading on cervical and shoulder posture in Indian school children. *Indian J. Physiotherapy Occupational Therapy.*1: 3-12.

Mwaka et al.(2014). Musculoskeletal pain and school bag use: a cross-sectional study among Ugandan pupils. BMC Research Notes, 7, 222 doi:10.1186/17560500-7-222.

Negrini, S. & Negrini, A. (2007). Postural effects of symmetrical and asymmetrical loads on the spines of school children. *Scoliosis*. 2.8:8. Health Reference Academic Center.

Neuschwander, T.B., Cutrone, J., Macias, B.R., Cutrone, S., Murthy, G., & Chambers, H. (2010). The effect of backpacks on the lumbar spine in children: a standing magnetic resonance image study. *Spine*, 35(1):83-88

Skaggs, D.L., Early, S.D., D'Ambra, P. Tolo, V.T., Kay, R.M.(2006). Back pain and backpacks in school children. *J Pediatr Orthop.* 26(3):358-63.

Wang, Y.T., Pascoe & Weimar(2001). Evaluation of bag pack load during walking. *Ergonomics* Young, I., Haig, A., & Yamakawa, K. (2006). The association between backpack weight and low back pain in children. *Journal Back Musculoskeletal Rehabilitation*., 19(1):25-33

Whittfield,. J. Legg,S.L. and Hedderley,D.I.(2005a). School bag weight and musculoskeletal symptoms in New Zealand secondary schools. *Appl. Ergono.* 36, 193.

Whittfield, J., Legg, S. and Hedderley, D.I.(2001b). The weight and use of schoolbags in New Zealand secondary schools. *Ergonomics*. 44. 819-824.

Wong, K.C., Lee, R.Y. and Yeung, S.S. (2009). The association between back pain and trunk posture of workers in a special school for the severe handicaps. BMC *Musculoskeletal Disorder*:10(43).