PHYSICAL STRESS AMONG SCHOOL CHILDREN DUE TO HEAVY BACKPACKS

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Abstract: The majority of children use a backpack to transport their belongings to school on daily basis. Today in this competitive world students from very young age have to learn numerous subjects and carry heavy school bags. Young children are suffering from back pain, shoulder pain, neck pain, irritation and so many problems and stress, earlier than previous generation and the use of overweight backpacks is a contributing factor. This study was conducted to gather evidence about actual physical problems that our children face due to heavy backpack. This study was conducted on 100 school children aged 10-13 years who were randomly selected and were studying in CBSC, ICSC, UP board. Interview schedule was used for their personal information, physical stress due to carrying backpacks, and weighing machine used to assess their weight and backpack weight. The study showed that level of physical stress was severe in 12-13 years children that was (n=60) 56.66 percent where as children of 10-11 years age faced maximum physical stress (n=40) 42.5 percent. Most of the children reported the occurrence of shoulder pain, back pain, neck pain red marks on shoulder, muscle spam among school children out of total sample was 58.3%, 70%, 61.6%, 67.5%, 53.3% respectively. Age was significantly associated with these symptoms. The results indicated a high prevalence of physical problems among elementary school children. Preventive measures and appropriate guidelines in the form of good quality of backpack and proper carrying of backpack, with regarding selection of backpack for parents and children are needed and must be considered to protect children.

Key words: School backpack, Physical stress, Physical problems.

Introduction:

More than 2.5 million elementary school children carry books bags on their shoulder 5 days in a week for the entire school year. It is known fact that children are the future. Thus the children should be groomed and educated properly. It is estimated that 6.75 million Indian students become sick from sitting and carrying heavy backpacks – children sit up to 10 hours per day. (Mohan M.2006) This is the reason why ergonomic standards for the school as place of work and school backpack must be emphatically demanded.

Recent worldwide attention has focused on the role of backpacks in the development of children non-specific low back pain. Research have explored whether there is critical backpack weight to body ratio that if exceeded affects health. .(Rai, A. Agarwal,S.2013). Studies indicate the incidents of backpacks use by school children in the developed countries is at least 90%.The average loads vary greatly between studies the majority of reports indicate that the loads carried by students greater than the recommended limits. The average daily loads of students over a week ranged from 22% body weight to 27.5% body weight with one student who carried 46.2%.In this group 38.8% carried more than 30% of their body weight**.** (Negrini Carobalona2002)

Voll and Klimt 1977 found that school bags for the 1st graders was one ninth of the body weight, for the 2nd graders it was one eighth, for the 3rd and 4th graders between one eighth and one seventh. More than 50% of the children considered their schoolbags to be very heavy or quite heavy. Backpacks are a convenient way to transport items around, making them popular for military, hiking, and school purposes. Most of the research about backpack loads and their effects on the body have focused on adults, specifically on hiking and military utilization. However, it is critical to understand the effects of increased backpack weight on children on their developing bodies.

Backpacks can cause strain if they are overly heavy or worn improperly. Many students are carrying backpacks that are so heavy they are causing back and arm pain. The BBC Health News reported the following “Rucksacks loaded with school books have been linked to higher levels of back pain in a study of Spanish school children. The findings, reported in Archives of Disease in Childhood, said many pupils had "excessively loaded" backpacks. This was linked to higher levels of back pain in the 1,403 school children taking part in the study. The research took place at Hospital Costa in Burela and University Hospital Son Dureta in Palma. The report's authors said school children should not carry anything which weighs more than 10% of their body weight.” The British Columbia Chiropractic Association launched a campaign called "Pack It Right Pack It Light" in year 2009 to educate parents on the hazards of heavy schoolbags.

They also mentioned "Just like kids, backpacks come in all types of sizes and fashions, but don't be fooled by the biggest and cheapest pack," said Dr. Don Nixdorf, Executive Director of the BC Chiropractic Association. "Function, form, and comfort take precedence over fashion. The schoolbag is a common cause of backache in school going children. A heavy bag may cause a child to compensate by leaning his body forward and this can strain muscles in his neck, shoulders and back. The child may also find it difficult to put the bag on and take it off, or he falls frequently in school while carrying his schoolbag. .(Rai, A. Agarwal,S.2013)
A contributing factor may also lie in the construction of the backpack itself. In military and hiking backpacks there are often internal and/or external frames of support which help to distribute and support the load, whereas school backpacks usually lack this mechanism (Smith et al 2006). Childrens' school bags are also usually chosen based on aesthetics rather than its ergonomics (Kellis and Emmanouilidou 2010) and are often very simply made of thin fabric straps that provide no additional support.

Too much load on the body changes static and dynamic posture as the body tries to overcome the posterior shift in the center of mass (Singh and Koh 2009). The shift also causes stride length and stride rate to decrease as a means of maintaining stability and accounting for increased energy expenditure (Hong and Cheung 2003). Over time, this change in posture due to increased load may have detrimental consequences on the health of children's' spines which may negatively affect them throughout their lives (Cavallo et al 2002).

Objective:

To study the physical stress of school children carrying heavy back packs. It is high time that in India we have to gather information regarding the weight carried by the school. Children from various part of the country both urban and rural school levels. And identify the problem regarding the backpack carried by the school children. This will help the school children, parents and public to realize the real depth of the problem and necessity to make rectification in this issue. So, the need of the study was felt on this issue and observational study was conducted.
Descriptive cum experimental and simple random sampling method use for selecting respondents. A total of 100 children from ICSC, CBSC, and UP board school, aged between 10 to 13 years from the class V to VIII from Lucknow city.

The data was collected from their homes. Informed consent was obtained from the children and their parents. In this session the children were given a self made interview schedule. The interview schedule consist personal details like name, age, class, board, distance of school, mode of transportation, physical characteristics like height, weight and bag weight. The subject weight was measured with a weighing scale. Standard height was measured with measuring tape secured to the wall. The school bag was also weighed.

Result and discussion

Table No- 1 Assessment of physical stress among school children carrying heavy backpack according to their age. N=100

Physical problems	Age (in years)					
	10-11(N=40)			12-13(N=60)		
	Sometimes	Frequently	Never	Sometimes	Frequently	Never
Pain in spinal cord	5(12.5)	_	35(87.5)	9(15)	1(1.6)	50(83.3)
Back injuries	20(50)	3(7.5)	17(42.5)	44(73.33)	4(6.6)	12(20)
Backaches	22(55)	14(35)	6(15)	42(70)	11(18.3)	7(11.6)
Musclspams	21(52.5)	13(32.5)	6(15)	32(53.3)	12(20)	16(26.6)
Shoulder pain	22(55)	16(40)	2(5)	35(58.3)	18(30)	7(11.6)
Neck pain	21(52.5)	18(45)	1(2.5)	37(61.6)	19(31.6)	4(6.6)
Irritation	21(52.5)	18(45)	1(2.5)	27(45)	33(55)	_
Fatigue	14(35)	26(65)	_	20(33.3)	35(58.3)	5(8.3)
Deformed body posture	_	_	_	_	_	_
Headache	17(42.5)	21(52.5)	2(5)	30(50)	28(46.6)	2(3.3)
Red marks on shoulder	10(25)	27(67.5)	3(7.5)	21(35)	37(61.6)	2(3.3)
Tingling &numbness on arms	27(67.5)	8(20)	5(12.5)	38(63.3)	9(15)	13(21.6)

(Figures in parenthesis indicates percentage)

Table No.1 explains the physical problems among school children according to their age. It was revealed that most of the respondents 87.5 and 83.3 % of the age group 10-11 and 12-13 respectively said they never had pain in spinal cord, while 50 and 73.3 % were found of 10-11 and 12-13 age group respectively they said sometimes had back injuries. Most of the respondent 50 and 70 % of the age group 10-11 and 12-13 respectively said that they sometimes had backaches while about 53.3% of the age group 10-11 and 12-13 respectively said they sometimes had musclespams. About 55 and 58.3 % age group of 10-11 and 12-13 years respectively said they sometime had shoulder pain while around 52.5 and 61.6 % of age group 10-11 and 12-13

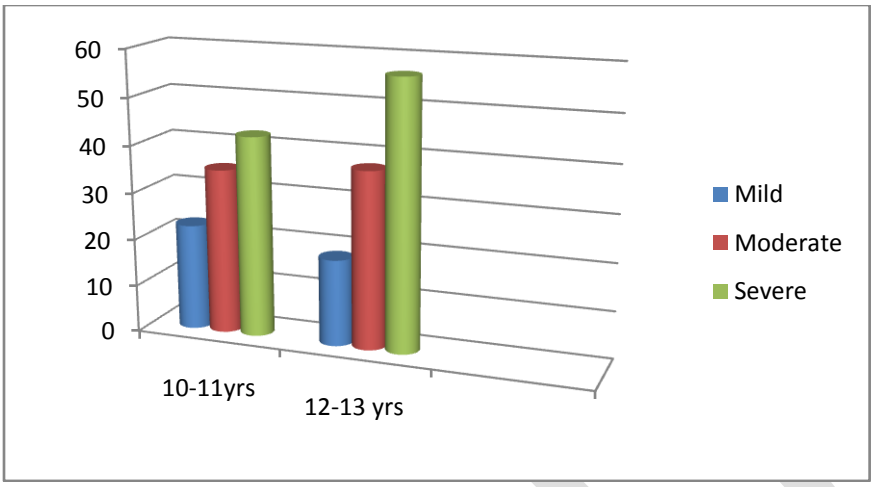
respectively they sometimes had neck pain. Most of the respondents 55% of the age group 10-11 and 12-13 years respectively said they had frequently irritated, while 65 and 58.3 % of the age group 10-11 and 12-13 years respectively said they had frequently faced fatigue. Near about 50% of the respondent aged 10-11 and 12-13 years respectively said they had frequently headache, while 67.5 and 61.6 % of the age group 10-11 and 12-13 years respectively said they had frequently red marks on their shoulder. Most of the respondents 67.5 and 63.3 of the age group 10-11 and 12-13 respectively said they had frequently tingling and numbness on arms.

The result are at par with the results shown by (*Negrini,S; Carabalona, R.2000*)also states that . the weight of backpacks carried by 237 children aged between 11-12 years from a school in Milan, Italy, for 3 weeks. The median average load that the children carried was 9·3 kg, and the median maximum load was 11·5 kg, ranging up to 16·3 kg. No limits for the weight of backpacks in schools have been established, but these weights are beyond the allowed load limits for adults. Rates of lower back pain in children are increasing, and these results suggest that a reduction in backpack weight is advisable, whether (*David L. Skaggs et al, 2006)* had revealed that the prevalence of low back pain it's associated with carrying backpacks among a sample of 1540 school children of 11-14 years ages in a large metropolitan area at Southern California. Over all 37% reported low back pain and in them 87% believed that their backpack either caused or worsened their pain. The result shown the similar result in the (Siambanes et al. 2004) while also states that Seventh and eighth grade students aged 11 to 15 years were participated in a study, to answer a questionnaire identify the prevalence, chronicity, severity, and frequency of back pain. The result showed that over 64% of the students reported having back pain at some time, 41.3% felt this pain when carrying their backpack, and almost all of them reported feeling relief upon taking off their backpack. Eighty seven percent of students reported that their pain was "bad" or "very bad".

Table No-1.2 Physical stress of school children carrying backpack across age. N=100

	Age (in years)		
Level of physical stress	**10-11 (N=40)**	**11-12 (N=60)**	**Total**
Mild	9(22.5)	11(18.33)	20(20)
Moderate	14(35.0)	15(37.5)	29(29)
Severe	17(42.5)	34(56.66)	51(51)
Total	40(100)	60(100)	100

$\chi 2 = 11.33^{**}$ (P=0.000)



Result in fig.1 showed that 56.66% respondent of age group 12-13 and 42.5% respondents of age group 10-11 reported severe physical stress; while 35.5% and 37.5% respondents of the age groups 10-11 and 12-13 years respectively reported moderate physical stress and few 22.5% and 18.33 % respondents of the age group 10-11 and 12-13 respectively reported mild physical stress. (Wiersema et al., 2003) found that children who carried a school bag that is more than 20% of their body weight were at an increased risk of (LBP) Low Back Pain; whereas (Whittfield et al 2001) found the mean weight of school bag to be 6.6 kg and the mean relative school bag weight to be 11.7 % of body weight (13.2% for third- form students and 10.3% for sixth –form students. Most students used backpacks to transport their supplies, and these were predominantly carried on two shoulders. Heavy schoolbags, long carriage durations and lack of access to lockers amongst third formers could contribute to the production or maintenance of physical symptoms.

Conclusion:

The findings of the present study provide additional information about the use of school bags and physical problems among elementary school children. The results indicated that the prevalence of physical complaints among schoolchildren was considerably high. This suggests the need for preventive measures and appropriate guidelines with regard to safe load carriage in schoolchildren to protect this age group. It was shown that children were more likely to complaint from physical problems. In addition, individual factors including age, gender and body mass index was shown to be associated with the presence of physical problems in different body regions. Children would know the proper ways to load their backpacks to prevent back pain and, on the rare occasion they would still experience back pain, they would be able to recognize it and learn to voice their problems to their parents and teachers. The parents and teachers, in turn, would be more aware of such problems faced by the students. Once aware, they would know to take further steps to prevent back pain, such as decreasing the amount of weight carried by the students and/or buying more comfortable backpacks.

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