Scholars Journal of Applied Medical Sciences (SJAMS)
Abbreviated Key Title: Sch. J. App. Med. Sci.
ISSN 2320-6691 (Online)
ISSN 2347-954X (Print)

A Unit of Scholars Academic and Scientific Society, India
www.saspublishers.com

Physiology

Risk Factors of Back Pain and Neck Pain in Upper Primary and Secondary School Children

Dr. A.V Suresh Babu MD[1], Dr. V Uma MD[2*], Hanumanth N[3]
[1]Associate Professor in Physiology, Gayatri Vidya Parishad Institute of Health Care and Medical Technology, Marikavalasa, Visakhapatnam – 530048, Andhra Pradesh, India
[2]Associate Professor in Physiology, Rangaraya Medical College, Kakinada 533 003, Andhra Pradesh, India
[3]Lecturer in statistics, Gayatri Vidya Parishad Institute of Health Care and Medical Technology, Marikavalasa, Visakhapatnam – 530048, Andhra Pradesh, India

Original Research Article

***Corresponding author**
Dr. V Uma

Article History
Received: 15.11.2018
Accepted: 25.11.2018
Published: 30.11.2018

DOI:
10.36347/sjams.2018.v06i11.075

Abstract: The school bag weight to body weight ratio is likely to be high, as some students are still quite small but carry loads similar to larger and older children. Children carrying this kind of weight are vulnerable to develop serious back pain and other musculoskeletal problems. A case control study was conducted at private schools of the Kakinada city, Andhra Pradesh. Students having back pain or neck pain regularly those were considered as cases. Students who have no back pain and neck pain those were considered as controls. 50 students in each group were taken in to the study. Pre tested semi structured questionnaire were developed to collect the data. Very few studies were conducted in this area. Hence the main objective of this study is to find risk factors of back pain and neck pain in school children. 72% of the students were carrying greater than 15% of the body weight bag, where as in control group it was 30% and the difference between the groups were showing statistical significance. 64% of the students were going by walk with bag, where as in control group it was 42% and the difference between the groups showing statistical significance. Parents, Teachers and Government should take responsibility to reduce the weight of the school bags and mass communications to create awareness among the Parents and Teachers.
Keywords: Bag weight, Back pain, Neck pain, School children.

INTRODUCTION

In Recent years the weight of student's school bags has become a source of some concern to persons with an interest or involvement in aspects of education.

This concerns centers on the possibility that heavy school bags represent health hazard to pupils whose spines are susceptible to injury during the formative years. There is ongoing concern regarding the weight of children's schoolbags and the negative consequences of such heavy loads on the developing spine. There is particular concern for the junior students in Upper Primary and Secondary schools, as the spine is at a critical stage of development in children between 8 – 12 years of age. This is the stage at which the bag weight to body weight ratio is likely to be high as some students are still quite small but carry loads similar to larger and older children. Children carrying this kind of weight are vulnerable to develop serious back pain, other musculoskeletal and gait problems.

There is still no consensus about a guideline for weight of school bags [1]. As per the Children's Schoolbag Act of 2006, schoolbag should not weigh over 10% of the body weight [2]. Nursery and kindergarten students should carry no schoolbag. A report from Ireland mentions that 10% of body weight is reasonable for school children to carry [3]. A similar limit of 10% of body weight is recommended in Europe [3-5]. This 10% of body weight recommendation is also made by Health Promotion Board of Singapore [7]. The national survey conducted in 10 cities by business chamber Assocham including Delhi, Kolkata, Chennai, Bangalore, Mumbai, Hyderabad, Pune, Ahmedabad, Lucknow, Jaipur and Dehradun says nearly 58 per cent children below the age of 10 suffer from mild back pain [8]. But the reality is**,** children carry over > 10% of their body weight on their backs. A statistical difference was found between walking without a backpack and carrying a backpack on one or two shoulders [9]. The load of a School Bag, as estimated in some of the districts, weighs about 6 to 12 Kgs at Primary level and 12 to 17 Kgs at High School level. This has a severe,

adverse physical affect on the growing children who can cause damage to their vertebral column and knees it also causes anxiety in them. Moreover, in the schools which are functioning in multistoried buildings, the children have to climb the steps with heavy School Bags, which further aggravate the problem and health consequences [13]. The school bags are made very heavy causing health hazards to the Children. Children are made to carry books and note books unnecessarily. No stake holder is interested to look into the issue. Only States of Telangana and Maharashtra took serious note of this pressing issue and issued appropriate guidelines restricting the weight of school bags [14]. Many studies have found that backpacks alter posture and gait significantly, produce modifications in the head–neck angle, shoulder asymmetry and even lumbar lordosis [15]. The weight of school bags after one school year have influenced changes in body posture abnormalities, especially in rotation parameters [16]. The survey conducted by Marryatville Governing Council results show that concerns about the weight of bags is valid [17]. Carrying backpack influence gait kinetics of children [9]. Hence the present study aim is to find the risk factor of back pain and neck pain in school going children between 8 – 12 years of age.

METHODOLOGY

Study design: Case Control study

Case: Students who are sometimes or always suffering from Neck pain, Joint and Back pain

Control: Students who are not suffering from Neck and Back pain

Sample Size: A sample of 50 cases and 50 controls were included in the study

Study Population: Upper Primary and Secondary school children aged between 8-12 years

Study Area: Private schools, Kakinada, E.G. District, Andhra Pradesh.

Study questionnaire: Pre tested semi structured questionnaire was used to collect the data.

Materials: Weighing machine, Height measuring stand and Salter's baby weighing scale.

STATISTICAL ANALYSIS

Data were entered in MS-Excel and analyzed in SPSS V22. Descriptive statistics were represented with frequencies and percentages, Odds Ratio, 95% Confidence Intervals, Chi-square / Fisher exact test were applied to find significance. P<0.05 was considered as statistically significant.

RESULTS

Table-1: Risk factors of back and neck pain

Variable	Category	Case		Control		OR (95% CI)	P-value
		Count	%	Count	%		
Gender	Female	29	58%	23	46%	1.62 (0.74-3.57)	0.23
	Male	21	42%	27	54%		
Bag weight	> 15% of body weight	36	72%	15	30%	6.0 (2.53-14.24)	<0.001
	10-15% of body weight	14	28%	35	70%		
Transport	By walk	32	64%	21	42%	2.46 (1.1-5.49)	0.03
	By Bus	18	36%	29	58%		
Keeping books in the bag as per the daily time table	No	28	54%	16	32%	2.7 (1.2-6.11)	0.02
	Yes	22	46%	34	68%		

In the case group males were 42% and females were 58% where as in control group males and females were 54% and 46% respectively.

72% of the students were carrying greater than 15% of the body weight bag where as in control group it was 30%, the Percentage difference between the groups were showing statistical significance.

Students who were carrying bag which was more than 15% of body weight were six times more chance to develop neck and back pain than the students who carrying bag weight 10-15% of body weight.

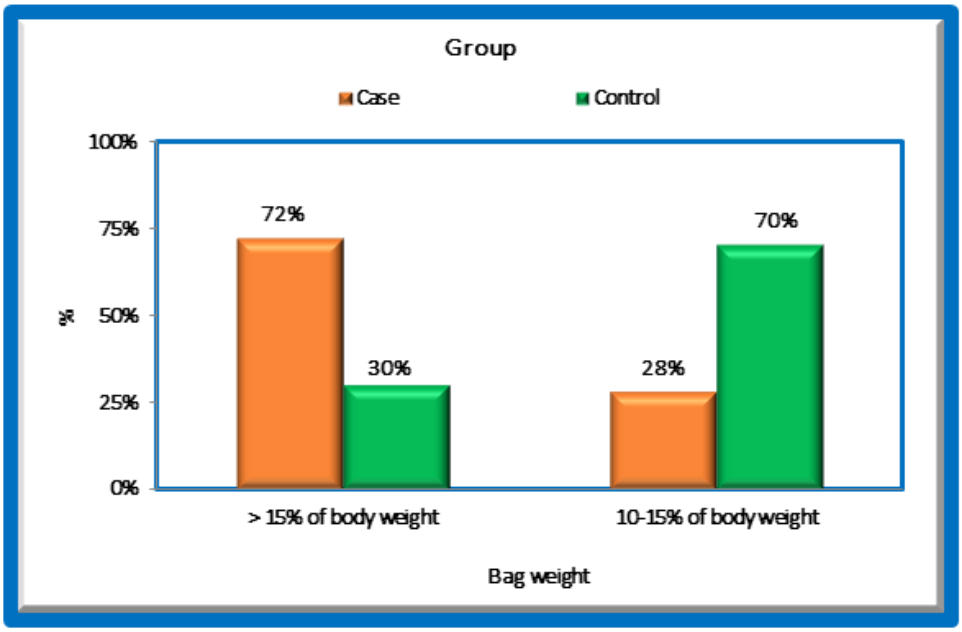
64% of the students were going by walk with bag where as in control group it was 42% and the difference between the groups showing statistical significance.

54% of the students were not following time table they were taking all the books daily in the case group where as in control group it was 32% and the difference between the groups showing statistical significance.

DISCUSSION

This study was conducted in private schools. In this study 28% of the students were carrying 10-15% of the body weight bag and 72% of the students were carrying greater than 15% of the body weight bag heavy enough to damage their spine and shoulders. Many other studies in America, Poland and Spain have also observed this burden was 68% [10], 79% of boys and in 64% of girls [16] and 61.4% of participants carried school bags exceeding 10% of their body weight & 18.1% exceeded the 15% of their body weight [15] respectively. Another study performed in Italy by Negrini S and Negrini A [18] found that 11-year-old

children carried backpacks as heavy as 20% of their body weight. The survey conducted by Marryatville Governing Council in Australia results showed that concerns about the weight of bags was valid [17]. Cottalorda J, Rahmani A and Diop M *et al*. [9] in France observed that backpack carrying on gait kinetics in children statistical difference was found between walking without a backpack and carrying a backpack on one or two shoulders. In India it was 82% [8] and 86% [11]. The overall burden was ranging from 64% [16] to 86% [11] including all studies worldwide.



Graph-1: Distribution of Bag weight in case and control groups

The present study results are similar to that of earlier studies conducted by S. Dockrell, C. Kane, E. O'Keeffe [10], Anna Brzęk and Tarja Dworrak *et al*. [16]. Alberto Ruano-Ravina, Mónica Pérez-Ríos and Francisco Blanco García *et al*. [15], Deccan Herald [8], Siddalingappa H and Murthy N, Kulkarni P *et al*. [11].

The present study indicates the association of back pain and neck pain with carrying greater weight bag heavy enough to damage their spine and shoulders in school going children between 8 – 12 years of age. Gender wise comparison did not reveal much significance. But Anna Brzęk and Tarja Dworrak *et al*. [16] reported girls are more prone to experience back pain and back pathology than boys, although there are no differences on backpack weight by gender.

All the students were carrying backpack type school bags carried over both the shoulders. Rural children were carrying heavier bags, because they had to carry all the books as they had to finish most of the work at school since they could not get help from their illiterate parents once they return to their village. To add to the weight of the books, in all the schools most of the children carried water bottles and lunch boxes from home.

There is need to educate parents and teachers to bring the awareness and prevent the negative consequences of heavy loads on the students developing spine reported by Manisha Malik. Deepa Vinay [12].

Based on the warnings from Health Experts and complaints from parents, the State of Telangana Government issued a G.O.Ms.No.22,dated 18.07.2017 listing out guidelines to limit the weight of school bags of students and further prohibits giving any home works for the students of classes I to V. The circular states that the spine of young children is most susceptible to "hazards" such as back pain, muscle pain, shoulder pain, fatigue in extreme cases, distraction of spinal cords and shoulders. The maximum weight of school bags with text books and note books should not exceed 1.5 kg for children in classes I and II and 2 to 3 kg for children studying in Classes III to V, 4 kg for classes VI and VII, 4.5 kg for classes VIII and IX and 5 kg for class X whereas in reality the children are forced to carry weight up to 6 to 12 kg at primary level and up to 17 kgs at Higher Secondary School Level as per New Report.

The Maharashtra Government issued a circular in March 2016 prescribing limits for weight of school bags carried by students and directed the officers to implement School bag policy, 2015 which states that the bags should not exceed 10% of the child's weight.

A study conducted by the Associated Chamber of Commerce and Industry of India [ASSOCHAM] found that almost 65% of Indian School Children aged between 7 to 13 years develop chronic backaches, spondylitis, postural scoliosis on early degeneration of the spine owing to the heavy backpack as majority of these children carry over 45% of the body weight in the form of bags, kits, sports equipments, instruments or study apparatus every alternate day. Heavy and uneven loads on the young children could easily lead to irreversible back problems and spinal deformation.

CONCLUSION

72% of case group and 30% of control group school students were carrying school bags heavier than permitted. As per Children's Schoolbag Act of 2006, schoolbag should not weigh over 10% of the body weight. In this study 100% of case and control group school students were carrying school bags heavier than permitted. The present study concluded that heavier school bags were responsible for back pain and Neck pain in Upper Primary and Secondary School Children. This is the present scenario in the schools and even in the junior colleges also. Parents, Teachers and Government should take responsibility to reduce the weight of the school bags for **"**Healthy pupils - Wealthy Country".

RECOMMENDATIONS

Teachers should encourage minimum pages note books and strictly follow time table. Educate the teachers and Principals of the schools during workshops, monthly or quarterly review meeting by the district administration respectively.

Educate the parents regarding the health hazards of carrying heavy weight bags and also regarding the time table of their ward during parent teacher meetings. Schools should provide lockers to each student to keep their books. Government should introduce semester system so that text book size will be reduced.

The state Governments should take initiative for strict implementation of "Children's Schoolbag Act of 2006". Active participation of mass communications in creating general awareness regarding the Children's Schoolbag Act of 2006 and health hazards of carrying heavy weight bags among the Parents and Teachers in order to solve this issue.

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