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Original Research Article

Prevalence of Physical Stress on the School Going Students in Relation to Their Body Weight and Heavy Backpack

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Abstract: The Aim of the Study was to determine the Prevalence of physical Stress on the School going students in relation to their Body Weight and Heavy Backpack. A cross-sectional study was conducted In the Primary Schools (Private) in the Kodad, region among randomly Selected 600 Students from the Nursery Class students to the LKG classes. The survey focused on gathering information about elementary students habits of backpack carrying and effects of these habits whether students experienced pain, and if so, when, where, and how often Co-relation with Bag weight and body weight were studied among randomly selected 40 students from nursery to seven class students and it was found that students of the Nursery to LKG students Suffer more back pain due to regular carrying of School bag of high weight. Awareness should be created among health care professionals, teachers, parents to restrict backpack load less than 15% of bodyweight by using school locker shelves. Improper use of backpacks is not healthy for anyone, especially for children who are more susceptible to injury because their bodies are growing and developing. Students, staff, and families need to be educated about backpacks contribution to back pain and taught appropriate interventions to reduce injury**.**
Keywords: Bag, Body weight, Backpack, stress, Weighing balance, back pain

INTRODUCTION

In recent years the weight of pupil's schoolbags has become a source of some concern to the persons with an interest or involvement in aspect of education. This concern center's on possibility that heavy schoolbags represent a health hazard to pupils whose spines are susceptible to injury during the formative years (Balague F *et al*, 1988). It is common today to see school children buckling from weight of their school bags many children bear the burden of carrying school bags that are too heavy for their body frames that might end up facing a number of health problems (Farhood H.F., 2013). A backpack should not weigh more than 15% of a child's total body weight. Backpack is the best type of bag for students.

Consequences of heavy backpacks in children

Overloaded book bags aren't only responsible for back injuries, although that is the main concern but heavy book bags have also been found to cause neck pain, shoulder strain, headaches and a general exhaustion. Book bags that weigh too much may also be to blame for some ankle injuries as they cause their carriers to walk improperly under their oppressive weight. Backpacks can cause pain in the head, neck or face, as well as the hands, the wrists, the elbows, the shoulders, the feet and the ankles and increase the children's lumbar dint and their posture deform (Singh, T., & Koh, M. 2009).

Curvature of the Spine

Heavy backpack worn over one shoulder might cause your child to lean to one side, causing his spine to curve and causing him pain. A study investigated that the influence of backpacks on spinal curves, shoulder level, trunk alignment and back pain in adolescent, the result showed that girls suffered from Dorsal Pain (DP) more often and of much more intensity than boys (Hong, Y., & Cheung, C. K. 2003).

Shoulder and Neck Injury

According to the American Occupational Therapy Association backpack straps can apply pressure to the blood vessels and nerves in your child's shoulder and neck. The pressure can cause pain and tingling in his arms, hands, legs and neck. Well-padded straps can prevent too much pressure (Mackie H. W *et al*, 2005).

Muscle Strain

A backpack worn improperly can cause strain or damage to back and stomach muscles. If the

backpack is worn loosely, the weight can pull your child backward. If it is not the right size for your child, it will cause uneven distribution of weight and deformed the posture of your child and crest many problems related to posture (Whittfield J, *et al*, 2005).

Chronic Back and Neck Pain

According to children's Health heavy backpacks can cause upper and lower back pain and neck strain. Poor posture caused by the backpack and the back pain can worsen the problem. Upper back pain was associated with school bag weight, school furniture features, emotional problems and previous treatment for musculoskeletal disorders. Low back pain was associated with school furniture features, emotional problems, family history and previous injury or accident.

Accidental Injuries

According to children's Health Students carrying heavy backpacks can cause injuries to others if the backpack hits or falls on a child. A heavy backpack can interfere with the way your child walks, causing him to trip or fall (Rai, A., & Agarawal, S. 2013).

AIM AND OBJECTIVES

Aim

The Aim of the Study is to determine the Prevalence of physical Stress on the School going students in relation to their Body Weight and Heavy Backpack.

Objectives

- ✓ To find out the Cause of the physical stress on the School going students.
- ✓ To find out the relation of Heavy Backpack to physical stress.
- ✓ To find out how to relief from different types of Stress.
- ✓ To study how to reduce physical stress on School going students.

MATERIALS AND METHODS

Materials

By using weighing balance.

Study design

This is a cross-sectional study.

Study setup

This study is conducted in the Primary Schools (Private) in the Kodad, region.

Sampling

Random sampling technique is used for selection of samples.

Sample size

600 subjects were randomly selected for the study.

Statistical technique

The demographic data of 600 subjects was analyzed by statistical software, SPSS version 17.0.

Methods

The study was done by measuring the weight of bag and body weight of the Students and by asking different questionnaires' related to the day to day life among the randomly selected students from various schools. The weight of student and his/her bag weight were measure by using weighing balance. The questionnaires' base methods were also used to know the different types stress on school going students in daily life. This is done by preparing a set of the question for the students like-

- ✓ Back Pain due to weight of the bag.
- ✓ Shoulder injury.
- ✓ Chronic Back and Neck Pain.
- ✓ Muscle Strain.
- ✓ Headache.
- ✓ Insomnia.
- ✓ Confusion.
- ✓ Poor concentration.

The response of both the weight of bag in relation to body weight and questionnaires' were recorded and compare with the standard weight as per given by the World Health Organization (WHO) and determine the level of stress like physical, mental, emotional and behavioral stress face by the school going students.

RESULTS

Table-1 represents the distribution of body weight and bag weight among the students from Nursery to class seven. Body weight, bag weight calculated from randomly selected 40 students from each class. They are represented in mean with Standard deviation (SD). Co-relation of bag weight with body weight is calculated in percentage (%) and it is found the bag weight of nursery class is 32.42% of their body weight and similarly for LG (34.47%), One (31.60%), Two (29.01%), Three (25.09%), Four (24.65%), Five (23.91%), Six (20.18%), Seven (18.35%).

Table-1: Distribution of Body weight and Back pack weight among the students.

Sl. no	Class	No. of student	Body Weight		Bag Weight		% of Bag weight to body weight
			Mean	S.D	Mean	S.D	
1	Nursery	200	11.75	1.427	3.81	0.514	32.42
2	KG	200	14.33	1.084	4.94	0.487	34.47
3	One	200	16.675	1.384	5.27	0.594	31.60
4	Two	200	17.85	1.09	5.18	0.451	29.01
5	Three	200	22.475	1.33	5.64	0.341	25.09
6	Four	200	23.32	2.01	5.75	0.285	24.65
7	Five	200	26.97	1.77	6.45	0.176	23.91
8	Six	40	35.92	3.33	7.25	0.439	20.18
9	Seven	40	44.45	4.23	8.16	0.56	18.35

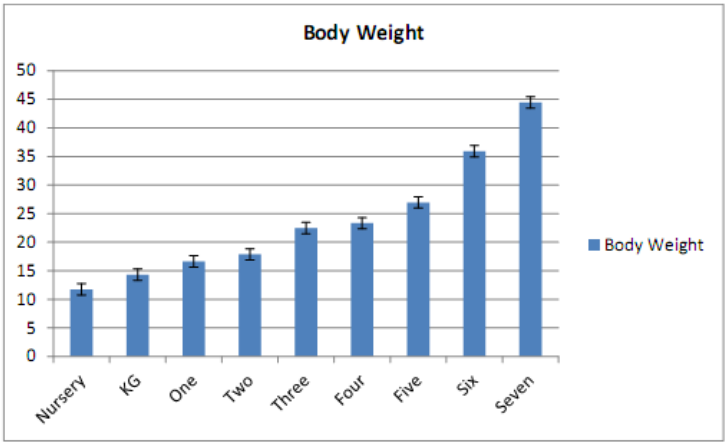

Fig-1: Distribution of Body weight among the students

Figure-1 represent Distribution of body weight among the Students and it was found that as the body weight increases consequently from the Nursery to Class seven.

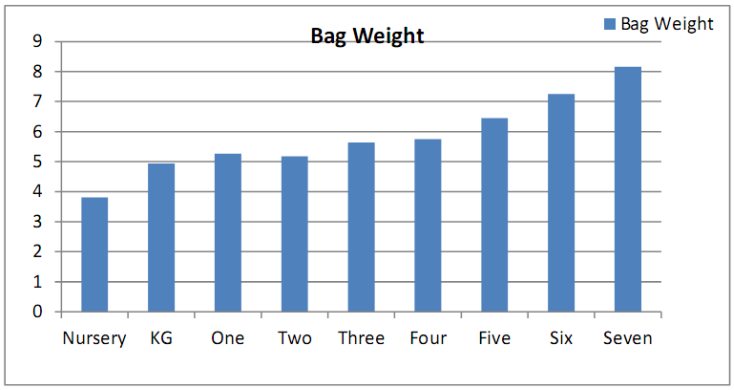

Fig-2: Distribution of Bag weight among the students

Figure 2 represent the Distribution of Bag weight among the students and it was found that the Bag weight increase with classes from Nursery to Seven Classes.

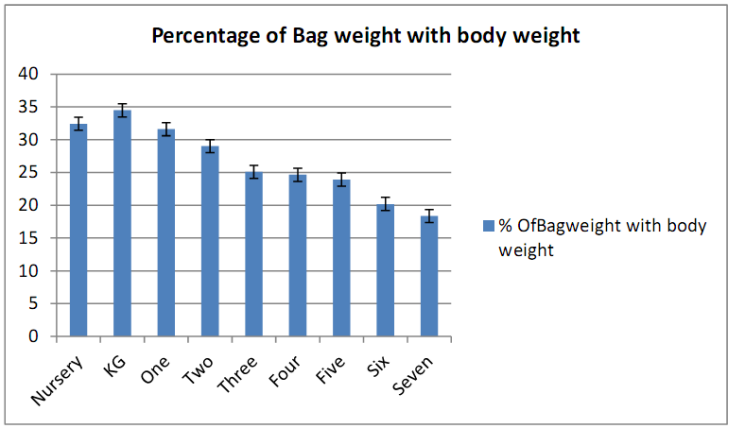

Fig-3:-Percentage of bag weight with body weight

Figure 3 represent Percentage of bag weight with body weight and it was found that the % of bag weight with body weight decrease consequently with increase the classes.

Table-2: Effects of Back Pack weight as Back Pain among the students

Sl. no	Class	No. of student	Back pain		% OF Student suffering From Back Pain
			No Student responded	No of Students suffering	
1	Nursery	40	28	23	82.14
2	KG	40	32	26	81.25
3	One	40	35	24	68.57
4	Two	40	33	29	87.87
5	Three	40	37	30	81.08
6	Four	40	40	31	77.5
7	Five	40	40	33	82.5
8	Six	40	40	36	90
9	Seven	40	40	35	87.5

Table-2 represents the Effects of Back Pack weight as Back Pain among the students among the students from Nursery to class seven. Number of the Student responded and suffering from the back pain was calculated from randomly selected 40 students from each class. Co-relation of bag pack weight with Back pain is calculated in percentage(%) and it is found the bag Pain of nursery class is 82.14% and similarly for LG (81.25%),One 68.57%),Two (87.87%),Three (81.08%),Four (77.5%),Five (82.5%),Six (90%),Seven 87.5%).

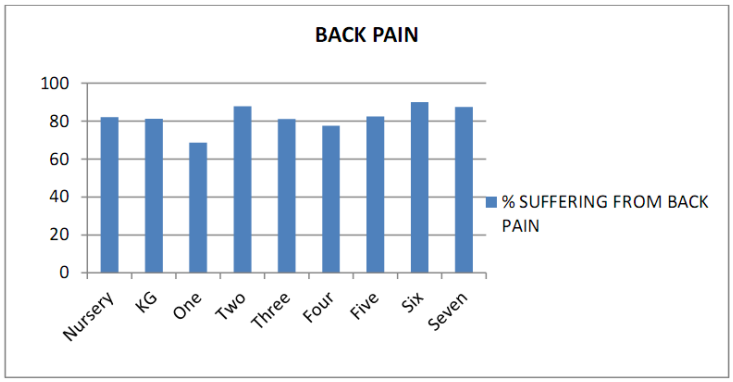

Fig-4: Effect of back pack as back pain among the students

Figure 4: represent effect of back pack as back pain among the student and it was found that six classes student suffer maximum back pain (90%) and class one student suffer least back pain (68.57%).

Table-3: Effects of Back Pack weight as Shoulder Pain among the students

Sl.no	Class	No. of student	Shoulder Pain		% OF Student suffering From Back Pain
			No Student responded	No of Students suffering	
1	Nursery	40	28	21	75
2	KG	40	32	19	59.375
3	One	40	35	22	62.857
4	Two	40	33	24	72.72
5	Three	40	37	29	78.37
6	Four	40	40	32	80
7	Five	40	40	33	82
8	Six	40	40	34	85
9	Seven	40	40	31	77.5

Table-3 represents the Effects of Back Pack weight as Shoulder pain among the students from Nursery to class seven. Number of the Student responded and suffering from the Shoulder Pain was calculated from randomly selected 40 students from each class. Co-relation of bag pack weight with Shoulder Pain is calculated in percentage(%) and it is found the Shoulder Pain of nursery class is 75% and similarly for LKG (59.37%), One (62.85%), Two (72.72%), Three (78.37%), Four (80%), Five 82%), Six (85%), Seven (77.5%).

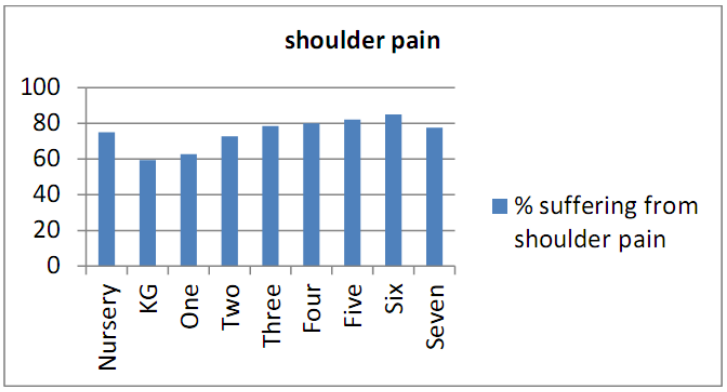

Fig-5: Effect of Shoulder Pain among the students

Figure-5 represent the Effect of Back pack as Shoulder pain among the students and it was found that six cases student suffer maximum Shoulder pain(85%) and LKG student suffer least shoulder pain(59.37%).

Table-4: Effects of Back Pack weight as Muscle Strain among the students

Sl.no	Class	No. of student	Muscle Strain		% Of Student suffering
			No Student responded	No of Student suffering	
1	Nursery	40	28	16	57.14
2	KG	40	32	15	46.87
3	One	40	35	19	54.28
4	Two	40	33	17	51.51
5	Three	40	37	24	64.86
6	Four	40	40	23	57.5
7	Five	40	40	29	65
8	Six	40	40	28	70
9	Seven	40	40	20	50

Table-4: represents the Effects of Back Pack weight as muscle strain among the students from Nursery to class seven. Number of the Student responded and suffering from the muscle strain was calculated from randomly selected 40 students from each class. Co-relation of bag pack weight with muscle strain is calculated in percentage (%) and it is found that the muscle strain of nursery class is 57.14% and similarly for LKG (46.87%), One (54.28%),Two

(51.51%), Three (64.86%), Four (57.5%), Five (65%), Six (70%), Seven (50%).

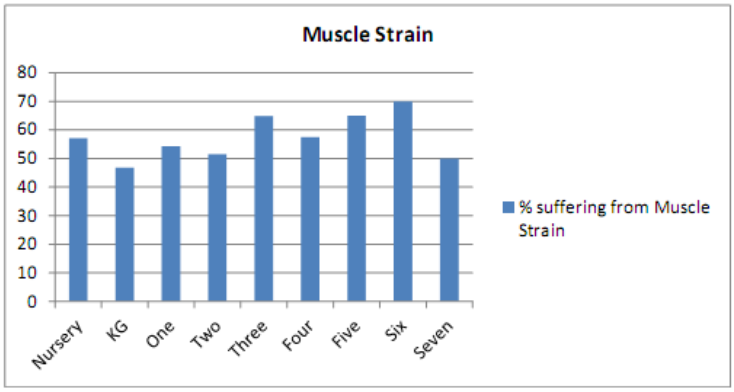

Fig-6: Effect of Back packs as Muscle Strain among the students

Figure 6 represent the Effect of back pack as Muscle Strain among the student and it was found that Class Six student suffer maximum muscle strain (70%) and LKG student suffer least muscle strain (46.87%).

DISCUSSION

The health and wellbeing of students is a priority subject carrying school bags in a concern from some students and families, the prevention of back pain and other musculoskeletal injuries is important for student's current wellbeing and long term health (Daneshmandi, H *et al,* 2008).

There have been many studies that confirm the effects of back pain due to carrying heavy loads. Heavy backpack weight has been correlated with pain and musculoskeletal development. These conditions may require treatment and lead to lost school time among other things (Moore M. J, *et al,* 2007).

In recent years, heavy backpack weight has become an issue of increasing significance, since it is known to have serious effects on health. Pain and other problems induced by heavy backpacks can affect an individual's quality of life in many ways; for instance, it may result in disruptions in daily activities and lost school time. The purpose of the study was to determine whether there was a correlation between relative backpack weight and back pain and the prevalence of back pain in NYC elementary school students. The field research consisted of surveys that were given to parents/guardians and interviews of teachers and measuring their bag weight ratio with body weight of School students (Chen K, *et al,* 2011).

The survey focused on gathering information about elementary students habits of backpack carrying and effects of these habits whether students experienced pain, and if so, when, where, and how often Co-relation with Bag weight and body weight were studied among randomly selected 40 students from Nursery to Seven Class Students and it was found that students of the Nursery to LKG students Suffer more back pain due to regular carrying of School bag of high weight (Brackley, H. M. *et al,* 2004).

According to American Chiropractic Association, weight of elementary students' bags should be less than 10 percent of their body weight but from our survey it was found that KG students used to carry the bags which are 34.47%of their total body weight and Class seven Students used to carry the bag which are 18.35% of their total body weight which leads to the common problems like Postural discomfort, Back pain, Shoulder pain, Chronic neck and back pain, Headache, Insomnia etc. Carrying heavy backpacks can lead to pain and injury that prevent students from participating in everyday activities. Many reasons can cause this problem. One of them can be related to their educational curriculum. First grade students usually take all their books to school and do not pay much attention to their curriculum. In this case parents should be taught to be careful about filling their child's bag. Other reason for heaviness of bags is related to water bottles that all the students carry these full bottles of water. And they also put their further things like that, and jacket into their bags. So students should be trained to fill their bottles up just before starting their classes and put their excess equipment in a handbag. It was estimated that in 2001, there were seven thousand injuries related to the use of backpacks (Ross, M. P. *et al,* 2008).

It is also possible that pain resulting from heavy backpack weight may hinder a student's performance in classes by distracting the student (D'arcy, Y, 2006). An unhealthy backpack weight is determined by finding the relative backpack weight, the ratio between backpack weight and body weight (Siambanes, D, *et al,* 2004). In addition to overall loss of school time, chronic back pain may interfere with other aspects of daily life. Treatment, such as chiropractic care and medication, may be time

consuming and expensive. It was found that students with a 15% relative backpack weight were more likely to receive chiropractic care than those with a 10% relative backpack weight (Gengler, A. M. 2014).

From this finding, it is suggested that heavier backpacks induce greater pain. As described previously, pain of the neck, shoulders, and back may be related to the carrying of heavy backpacks (Korovessis, P, *et al*, 2005). Carrying too many books puts a great amount of stress on the shoulders. The American Chiropractic Association recommends that relative backpack weight should not exceed 10 to 15%. In Recent study most students experienced low to moderate pain in regions of the shoulders and back, with others also experiencing pain in the head, abdomen, legs, and hands. Those who carried more than 15% of their weight were more likely to experience these symptoms.

It was concluded that younger students were more at risk for developing back pain. As body weight increased with age, backpack weight did not vary significantly between different ages; meaning younger children generally had greater relative backpack weight than older students. Many reasons can cause this problem. One of them can be related to their educational curriculum. First grade students usually take all their books to school and do not pay much attention to their curriculum. In this case parents should be taught to be careful about filling their child's bag. Other reason for heaviness of bags is related to water bottles that all the students carry these full bottles of water. And they also put their further things like that, and jacket into their bags. So students should be trained to fill their bottles up just before starting their classes and put their excess equipment in a hand bag. In this project it has been seen that almost 30% of students use one-side backpacks. In addition to their backpack's heaviness, way of carrying can also harm student's spine.

CONCLUSION

Students carry heavy schoolbags with a significant proportion of them carrying school bags of more than 25-30% of their body weight. There were multiple factors of school bag usage that were associated with lower back pain. Awareness should be created among health care professionals, teachers, parents to restrict backpack load less than 15% of bodyweight by using school locker shelves. Students, staff, and families need to be educated about backpacks contribution to back pain and taught appropriate interventions to reduce injury. Furthermore, students should train to use both shoulder straps distributing the weight evenly. Wearing backpack on only one shoulder may cause them to lean to one side. In this way the head automatically leans forward, and this shifts the centre of gravity towards the neck to counterbalance the weight on the back.

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