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**A RESEARCH PROJECT REGARDING THE EFFECTS OF  
HEAVY SCHOOL BAGS ON THE PHYSICAL HEALTH OF  
STUDENTS OF PRIMARY LEVEL IN KARACHI**

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**ABSTRACT**

Education symmetrizes all the facets of an individual's life and education is the only reason behind nations' successes. Development of Pakistan bases upon the increment in its literacy and that part is played by the advancement and updating of educational system. Fortunately Pakistanis also making many progresses for the providence of quality education, but the restill are some common issues which are not yet resolved and they are making students to get offended from getting education or going to school – heavy weighted school bags. Primary education is a key factor for the holistic development of children and to draw out such abilities that help them to learn more actively and motivate towards new activities in a positive manner. As primary level consists of early 5 to 6 years in which child's physical and mental abilities are in full and they develop such characteristics and habits among children that will have effects on their future life. Instead of giving more emphasis on these aspects, the system push them towards stress and anxiety from the beginning by burdening them too much weighing backpacks. This research highlights on the important problem regarding school children, i.e.

effects of loaded backpacks of school children at primary level. As they are becoming the threat to the health of children at every level especially at primary level as it has adverse physical effects on growing children because it damages their spine, causes anxiety, postural problems, physical discomfort, and muscle activity and increases breathing rate. Moreover, some schools are functioning in double storied buildings and students have to carry loaded bags to their concerned classes which further increase the health issues in them. This is a quantitative based study and 50 teachers and 75 parents are selected randomly from private schools in Karachi.

The concerned data further indicate to seek out the opinions and suggestions from concerned schools. Furthermore, practical strategies, facilitations and solutions are given by the researchers for the improvement and betterment regarding appropriate backpacks for school children at primary level.

## INTRODUCTION

Education assists in every sphere of life of a person and its transmission is necessary for a dynamic lifestyle. As far as the transmission of education is concerned; although there have been many ways introduced with the passage of time and with all the advancements being made, but basically there are two general methods; an informal way and other is the formal manner. Educational institutions are the platform for the formal system of education. Formal educational system is divided into different levels which takes initiative from primary level as per the Pakistan educational system. Here in this level students' personality is precisely developed, their health is taken into consideration to make them an active member of the society, and they are given with the very basic knowledge related to many different aspects according to their intellectuality. These educational institutions play an important role in the upbringing of children as a formal source of education. Therefore, it is necessary to provide such a baseline that helps them not to pursue to substitute education but to have balance development among themselves, and it will be done through various facilitations such as curricular, co-curricular activities, teaching methods, and A-V aids etc. Besides, all these curricula have very important place as it works as a key to get desired goals. For which children have to study lots of subjects throughout their academics even from the primary level. But unfortunately for the attainment of this purpose students are burdened with heavy weight

of different course related material, which includes all the books being taught per day, their copies which are further divided into text and grammar copies separately, classwork copies, rough copies, homework copies, and many other stationary related materials as well as the lunch boxes. This eventually makes them to carry heavy bags on daily basis. This situation makes

children to be frustrated and injure their physical conditions such as musculoskeletal disorder to backbone, body pain, and stress. Children at primary level are at the phase of physical and intellectual development and at this stage burdening them with heavy bags would not just effect on their physical health but they would also face psychological and emotional disturbances and disorders. They start to get offended from studies and are more tend to leave from further studies. The weight of students' school bags are even heavier than their body weights which gradually develop health issues in them. Most of such issues become a life-long problem. It has been seen that children are more likely to have chronic back pain disorders, neck pain, stress, cervical pain,

musculoskeletal disorders, posture problems, and many other problems in daily activities. Over 22,000 children suffered backpack related injuries in 2013, as mentioned by U.S consumer product safety commission. The majority of students carry heavy backpacks weighing as much as 25%

of their body weight and 60% of children who carry heavy backpacks experience back pain. Heavy backpack issue is growing every day and is not only affecting children on daily basis but also has long-term effects on their bodies.

## LITERATURE REVIEW

One of the increasing issues among all the existing issues in education system is burdening students with heavy school bags, which they have to carry on routine bases as it has become their requirement because of the updated curricula of this age. Students are taught many subjects every day and for which they are obliged to bring all the books of related subjects along with their text copies, rough copies, homework copies and all the other required material according to the timetable of each day. Assembling all this students' bags become very heavy which are causing many physical disorders and illnesses in them, like musculoskeletal pain, chronic back pain, chronic neck pain, shoulder pain, hip pain, and besides all this, students also become reluctant to studies, as this load of heavy weighted bags also effects them emotionally and psychologically making them stressful and causing headaches as well. According to Mackenzie et al., 2003 (as cited in Perrone, Orr, Hing, Milne, & Pope, 2018) school bags carried by students in a day were as much as 30% to 40% of their body weight, while the recommended weight is around 10% of the child's body weight as a maximum limit. This entire load carried every day is harmful and injurious for the children while they are in their developing stage, as it causes harm to their bones formation and they get firmed with the damage which had been made. Given the loads being carried by children, whose musculoskeletal systems are still developing and are undergoing rapid physical development, it is not surprising that this load carriage has been associated with musculoskeletal injury concerns (Perrone, Orr, Hing, Milne, & Pope, 2018). Frequent complaints from primary students about neck pain, headaches, and shoulders pain is now turning it into an alarming situation and getting attention of parents and kids health care centers which possibly is the reason of carrying heavy bags daily (Saleh, Alassafee, Ahmed, & Ali, 2017). As further stated in their work; daily carriage of heavy bags and their improperly handling burdens the spine which becomes the reason of long-term musculoskeletal issues. Many studies done on this very purpose indicates that students are obliged to carry more weightage backpacks than the recommended 10% of children's body weight. As stated by Layuk, Martiana, & Bongakaraeng (2020), to carry all that has been asked from students, they must have to take them by stuffing their bags with all the required materials and it overloads the backpacks which eventually causes musculoskeletal problems, mainly low back pain. Even more, the constant pressure of heavily weighing bags affects the growth phase, like the child's posture and pattern of walking, subsequently facilitating the vulnerability to low back pain.

This issue has become the most concerned matter these days and even media is contributing in voicing this trouble, as Nazzal (2015) mentioned in the report about a Dubai resident child who has been suffering from the back pain even after getting 26 years old, which was caused because of carrying school bag weighing 7kg plus in the school days at an Indian curriculum school and it caused the unending damage. As reported in the news, Dr. Sanjay Kumar Sureen, specialist orthopedic surgeon says that carrying the backpacks more than 10% to 15% heavier than the students' body weight is dangerous for them, and hanging it over one shoulder could worsen it even more. Carrying excess weight all day long back and forth to school could cause

extreme damages and could even lead to abnormal curvature of spine. Published in Dawn (2018), wearing heavy backpacks by children is not just found in elite private schools but government schools are also not an exception across Pakistan. The deputy medical

superintendent at Karachi's Abbasi Shaheed Hospital wrote a letter to school principal stating them that heavy backpacks are the cause of neck, back, and shoulder pains in students.

Many

students carry their heavy bags over one shoulder which double the risks on bodies and health of students by becoming the reason of muscular sprain and scoliosis. Dr. Komal Rizwan stated while being interviewed by a private news channel that, children are more tend to get dispassionate from going to school just because of the stress of carrying loaded backpacks. Keeping the bag down and carrying it, is very harmful for a developing spine and while constantly walking with static weight; further stated by the doctor (Urdu Point, 2018). Carrying weighted school backpacks is a lot risky for children's health and body as it causes muscles strain, development of spine in wrong direction, stress on the middle back, ribs and lower back which causes many spinal disorders, back pain, neck and shoulder pain, and even roots for the cervical problem. It also puts effects on the body posture, walking style, lumbar pain, and also makes an imbalance body on the long terms. This issue has been voiced by many people since many years and many researches are being done, doctors, governmental officials

and even media is raising this issue so that it could be resolved but still no steps are taken from the educational institutions, at least not at a large extent. TG & Parameshwaran (2017) stated in their study that this heavy carriage of bags forces the spine which is under the developing period in children between 8-12 years of age. At this age students are small heighted and have to carry more weighted bags which certainly have greater ratio in accordance to the height. This situation is likely to develop back pain and other musculoskeletal problems, muscle strain, distortion of the natural curve of the spine, rounding of the shoulders, chronic shoulder pain, and neck pain. Children often lean forward as to manage the weight which develops the poor posture with their growth and this wrong posture while bending and lifting could also ground for the rupture of the disc.

### **Musculoskeletal Disorder**

Heavy school bags pressurize the spine directly while retaining the body balance simultaneously and in all this, it starts effecting body and reasons in musculoskeletal issues (Ismaila, 2018). Musculoskeletal pain is drastically increasing in school children and the main cause is the heavy weight of school bags. According to WHO (2019), musculoskeletal conditions are the leading contributor to disability worldwide, with low back pain being the single leading cause of disability globally. Up to one in three and one in five people (including children) live with a musculoskeletal pain condition. This condition is commonly linked with depression and increase the risk of developing other chronic health conditions. According to the International Association for the Study of Pain (IASP), (as cited in Layuk, Martiana, & Bongakaraeng, 2020) musculoskeletal pain is a disturbing emotional and sensory subjective sensation which is the result of actual or potential tissue damage.

### **Body Posture**

Many researches have enlightened that continuous carriage of weighted school bags may also lead to changes in trunk posture and muscle activity (Ismaila, 2018). As children are

burdened due to various subjects whom they have to study at primary level, not only this but they have to bear the heavy load of books in their bags which they have to carry on daily basis. This makes them to suffer physical damage and pain as well as stress. Another increasing problem caused by heavy bags is wrong postures among students which also disturb the bone structures and with the growth of children their wrong bones arrangements become firm. Bad posture is a well-known problem in children and adolescents, and it has a negative effect in adulthood. It can be hypothesized that due to bad posture, changes in the body's position cause changes in standing balance (Nagyaté, Takács, & Kiss, 2018). According to Dr. Patel: "To carry a heavy bag, the child has to lean forward and this leads to develop a bad posture, The spine is stuck between bones called the vertebral column with the bones separated by a cartilage called the inter-vertebral disc and held upright by the muscles and ligaments around it. The excess weight puts under stress on the muscles, ligaments and disc thus damaging them. The alignment of the column is also disturbed causing it to bend, mostly forwards or sideways." Having a bad posture is something which is ignored many times and people do not emphasize on correcting the posture. But it is a frightening situation as having a wrong posture repeatedly could cause some serious chronic disorders, it could cause in lower back pain, and it is found that those having lower back pain had flatter spines as opposed to the natural S-shape. Wearing excessively weighted school backs affect the spine alignment and direction as the spine is tend to change and remold according to the posture and weight carried upon it (Hossain & Tonima, 2017).

### **Back pain**

There are many reasons of heavy backpacks that affect children's body as well as their physical health. The educational curriculum in schools has a list of subjects at primary level. The books contain maximum of 80-100 pages of each subject, besides books, exercise books, text books, copies, workbooks and reference books are also included accordingly, all these books and copies are the main reason of heavy backpacks, on the other hand parents are also not fully aware of the requirements of school bags nor teachers are instructing them regarding it. "Since at least 1998, we have noticed backpack getting bigger and heavier, and not in proportion to the kids' sizes" says Dr. Karen Jawbs, a clinical professor at Boston University and spoke person for the American Occupational Therapy Association (AOTA), which sponsors a school backpack awareness day. There is also another reason for the heavy backpack is a lack of proper timetable for students. Students are restricted to bring all concerned books and copies for each subject even if the teacher has to teach only one from the concerned subject. According to the study on a small test group of children around the age of 11, by the national center for biotechnology information (2010), found that the constant weight of the bag was actually causing spinal cords to compress and cause significant back pain. This tests conclude that backpacks were at their heaviest, about 26 pounds. Dr. Harvinder Sardhu, a spinal surgeon at the hospital for special surgery in New York, says "26 pound is on the lighter side. School children these days are carrying these huge backpacks with around 40 to 60 pounds of weight." Commonly the reason behind the back pain is muscle sprain and strain in children which usually happens because of the weighted bags' carriage besides playing and having fallen down (Farhood, 2013). Another reason for heavy bags is the accessories which are required for different activities and projects, drawing and art activities etc., such activities require more things,

like posters and thermopiles to be carried by the students along with their heavy bags and it results in damage to their shoulders and neck which end up getting harmed and develop chronic pains in those particular areas. Children are also tending to have constant headaches because of all the stretching and strain of muscles and veins by wearing heavy bags.

### **Cervical and neck problems**

The curriculum at primary level demands students to study many subjects and prepares them for the further advanced studies. Being said that, it is not the issue to provide students with good quality and advanced education but the problem arises when because of the schedule designed by schools offer a great burden on students in the way of carrying excessively loaded school backpacks which results in the emotional disturbances in the form of anxiety and depression and wrong body structures like curving or bending of spine towards the ground or on sideways. Despite being anxious, stressed, and depressed which are the huge psychological issues, children have to suffer from unhealthier bodily structure which causes many disabilities and because of these two issues they also suffer from neck pain. Walton, Balsor, & Etruw (2012) mentioned in their study the eight causes of neck pain among which posture and movement, structure and mechanism, emotions, and fatigue and insomnia are also the main reasons behind the neck pain. Mostly neck pains are caused by the postural problems. After back pain, neck pain is the most frequent musculoskeletal cause of consultation in primary care worldwide. (Binder, 2007). In the effort of balancing bags on their backs children put them in many different postures, some students also hang their bags over one shoulder and it causes them to bend over one side which results in postural problems. Carriage of heavy weights also causes cervical problems and students are likely to develop cervical pains as well. Cervical pain affects neck and shoulders and it could also cause nervous breakdown, dizziness which could also make one unconscious, according to Dr. David Nelles, an orthopedic spine surgeon in California says, "Backpacks can do more than injure your back, they also frequently affect the neck and shoulders." This influences backbone curves, shoulder levels, trunk alignment and back pain in students. It results in girls to suffer from dorsal pain (DP) and boys to suffer from decrease in angle called Craniocervical Angle (CCA)."

### **PURPOSE OF THE STUDY**

The primary education play more important role in the whole span of life. The basic education develop the strong personality, it not only provides knowledge but also develops and social, moral, physical and periodical development. For getting this profusion of knowledge children carry heavy bags on their backs which causes long-term physical and psychological issues. The idea of this research is generated from the daily complains heard from the children as they have many physical health issues caused by carrying heavy bags. The researchers need to investigate the effects of heavy backpacks on students' health. This problem causes a major effect as chronic back pain, chronic neck pain, shoulder pain, leg pain and hip pain etc. Moving towards the psychological domain, it causes frustration, anxiety, depression and stress. The poor posture also causes the major issues for girls especially. This research study has the following hypotheses:

H: There will be no awareness of physical health related to heavy backpack.

H: There will be mental stress among children due to heavy backpack.

H: There will be rare diseases and disorders on the musculoskeletal due to heavy backpack.

H: There will be a psychological stress among students due to heavy backpack.

## METHODOLOGY

To know the effects of heavy backpacks on students' physical health the quantitative research study is conducted.

### Participants

The participants for this study comprised 20% out of 100 private schools which means 20 schools of 10 different Towns in Karachi. The data collected from the 100 teachers and 150 parents which were randomly selected for the research. One questionnaire filled by two different respondents, 21 questions filled by teachers and parents both.

### Instrument

The close ended questionnaire used to collect the data from teachers and parents. Twenty one questions finalized and the three options were given. The permission letter was attached with the questionnaire.

### Data analysis

Close ended questionnaire used to gather data from teachers and parents both. All results were simply analyzed by percentage.

## RESULTS

The results have revealed that average school bags weighted 6 kg that was almost 50% of the students' total body weight. Such heavy school bags frequently cause low back and shoulder pains among students. Besides this, majority of students reported muscles shoulder pain due to heavy bags as well as headache, leg pain, height issues and mental stress. The data was gathered by the samples of teachers and parents selected randomly from 20 schools of 10 Towns each from Karachi city. Each questionnaire consists of 21 questions. The simple formula used for finding the percentage. The responses were in this form, agree, disagree and neutral as the only three options are given by the researchers, (See Table1).

**Table 1: Teachers' questionnaire consisting of 21 questions related with the effects of loaded backpacks on students' physical health**

Question No.	Questions	Agree (%)	Disagree (%)	Neutral (%)
1	Are you satisfied with the weight of students' bags?	17.3%	55.7%	26.9%
2	Are students' complaining time to time regarding headache, neck pain, and legs pain?	48%	19.2%	32%
3	Do students endure from shoulder pain and muscular pain by lifting heavy bags?	61.53%	15.38%	23%
4	Do students suffer from spinal cord pain due to additional heavy weight of bags?	25%	38.4%	36.5%
5	Do you think by lifting heavy bags spinal cord gets affected?	53%	21.1%	25%
6	Do you think lifting additional heavy bags can effect physical growth?	67.3%	25%	7.69%

7	Do you think continuously lifting heavy bags can cause negative effects on child's physical Structure?	53.8%	21.1%	25%
8	Do you think additional books are the reason of heavy bags?	75%	15.3%	9.61%
9	Is your child suffering from agony due to additional heavy bags?	48%	17.3%	34.6%
10	Does the physical pain of carrying heavy bags cause a child to become bored with educational activities?	50%	17.3%	32.6%
11	Does your child show a reluctance to go to school by carrying the extra weight of the bag?	28.8%	30.7%	40.38 %
12	Do you think objects used in curricular and co-curricular activities are the cause of heavy backpacks?	40.38 %	30.7%	28.8%
13	Does your child feel tired or burdened at school?	28.8%	28.8%	42.3%
14	Does continuous mental stress caused by heavy bags effect your child's creative skills?	32.6%	30.7%	36.5%
15	Do you think by carrying heavy bags your child is showing frustration?	48%	19.2%	32.6%
16	Do you think the way of carrying bag affects your child's physical health?	51.9%	17.3%	30.7%
17	Does your child carry the whole weight on one shoulder?	26.9%	42.3%	30.76 %
18	Do the negative effects over the health of students double up because of the extended duration of carrying heavy backpack?	40.38 %	17.3%	42.3%
19	Do you think that burdening minor students with the carriage of heavy bags is just as fatal as over then?	67.3%	13.46%	19.2%
20	Is there any proportion between your child's weight and your child's backpacks weight?	21.1%	48%	30.76 %
21	In your opinion what are the ways to avoid this physical torture?	82%	18%	0

The higher number of percentages in every column shows that majority of teachers were in favor of the asked questions. (Question 1) shows that the teachers were not satisfied with the weight of the bag. (Questions 2, 3, 4) show that it actually effects the students' health as students do complain about the back pain, neck pain, muscular pain, leg pain and mostly spinal cord pain. Looking closely to (questions no 5 and 6) 53% and 67.3 % of teachers agreed that the result of lifting heavy bags may include short height and displacement of spinal disk among the students. (Questions 8, 9 and 10) most of the teachers accepted that the reason of the heavy weight of bags are course books that can cause students to get annoyed from studies. (Question 11), shows most of the teachers probably agreed (neutral) that due to the heavy backpacks, students lose interest in studies. According to (question 12), most of the teachers consider that the co-curricular activities can be one of the reason of heavy backpacks. (Question no 13, 14 and 15) show that the mental issues and psychological issues are also caused by heavy backpacks. (Question 16, 17, 18 and 19) totally discuss



about the bad ergonomic structure of students due to improper way of carrying bags. (Question 20) shows that if the proportion between the child and the bag is equal or not and most of the teachers did not agree. At last to find out how to overcome this issue, 82% teachers gave theirsuggestions.

**Table 2: Parents’ questionnaire consisting of 21 questions related with the effects of loaded backpacks on students’ physical health.**

Question No.	Questions	Agree (%)	Disagree (%)	Neutral (%)
1	Are you satisfied with the weight of student’s bags?	14.66%	57.33%	28%
2	Are students’ complaining time to time regarding headache, neck pain, and legs pain?	81.33%	6.66%	12%
3	Do students endure from shoulder pain and muscular pain by lifting heavy bags?	68%	6.66%	25.33%
4	Do students suffer from spinal cord pain due to additional heavy weight of bags?	34.6%	37.33%	28%
5	Do you think by lifting heavy bags spinal cord gets effected?	73.33%	6.66%	20%
6	Do you think lifting additional heavy bags can effect physical growth?	65.33%	14.66%	20%
7	Do you think continuously lifting heavy bags can cause negative effects on child’s physical Structure?	60%	18.66%	21.33%
8	Do you think additional books are the reason of heavy bags?	81.33%	6.66%	12%
9	Is your child suffering from agony due to additional heavy bags?	61.33%	20%	18.66%
10	Does the physical pain of carrying heavy bags cause a child to become bored with educational activities?	46.66%	29.33%	24%
11	Does your child show a reluctance to go to school by carrying the extra weight of the bag?	40%	30.6%	29.3%
12	Do you think objects used in curricular and co-curricular activities are the cause of heavy backpacks?	45.3%	29.33%	25.33%
13	Does your child feel tired or burdened at school?	57.33%	22.66%	20%
14	Does continuous mental stress caused by heavy bags effect your child’s creative skills?	38.66%	32%	29.33%
15	Do you think by carrying heavy bags your child is showing frustration?	45.33%	21.33%	33.33%
16	Do you think the way of carrying bag effects your child’s physical health?	60%	18.66%	21.33%
17	Does your child carry the whole weight on one			

	shoulder?	33.33%	45.33%	21.33%
18	Do the negative effects over the health of students double up because of the extended duration of carrying heavy backpack?	52%	21.33%	26.66%
19	Do you think that burdening minor students with the carriage of heavy bags is just as fatal as over then?	81.33%	9.33%	9.33%
20	Is there any proportion between your child's weight and your child's backpacks weight?	21.33%	52%	26.66%
21	In your opinion what are the ways to avoid this physical torture?	69.33%	30.66%	0

The same questionnaire was filled by the parents and their reviews were similar to the teachers' responses.

## DISCUSSION

The results of the conducted study conceded that heavy backpacks resulted to physical complication, threat to health, and as well as mental stress among students at primary level as the study was purposed to acknowledge the effects of heavy school bags on students' health. The results indicate that burdening students with loaded school bags at primary level while it being an important stage in students' life for the attainment of future goals, immensely effects on their health and causes many disturbing issues including physical, psychological, and emotional problems. Students studying at primary level frequently complain about headaches, neck pain, and legs pain because of carrying heavy bags daily; as found by the results, many students are also having shoulder pain, muscular pain, and spinal cord problems. Students who carry heavy bags are prone to develop many physical issues and it is also proven by many priory conducted studies, as in the study conducted by Perrone, Orr, Hing, Milne, &

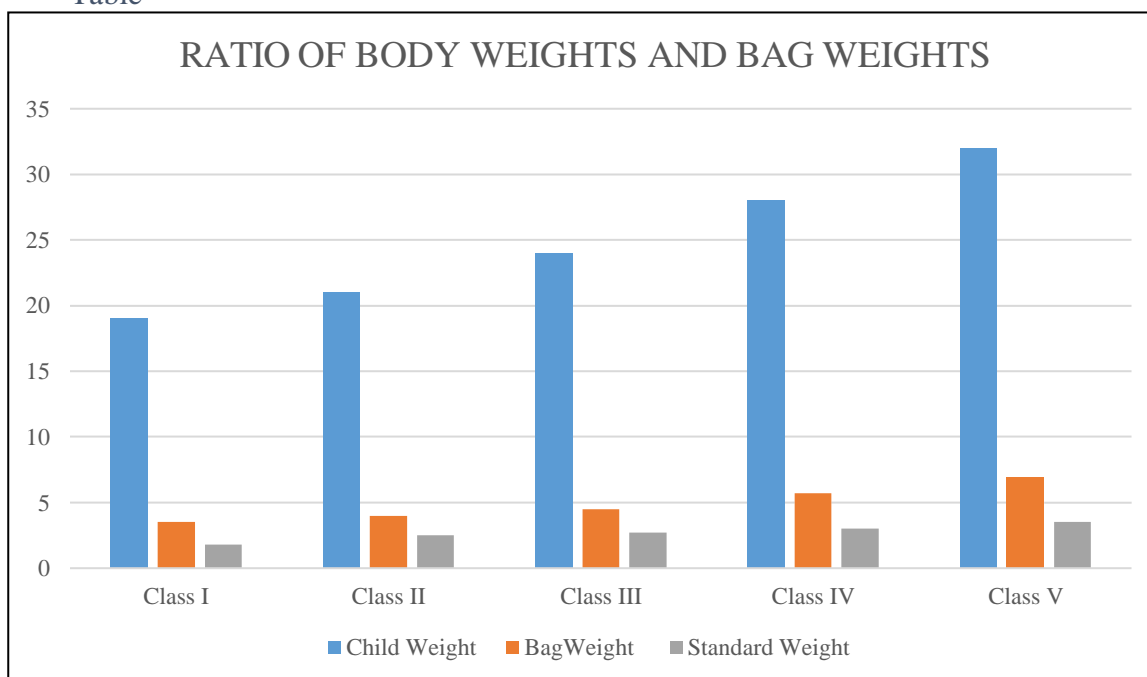
Pope (2018) also showed that the heavy backpack carriage by the students with the average of over 15% of their own body weight resulted in the biomechanical and physiological problems which further worsen to musculoskeletal injury risk, fatigue, redness, swelling and discomfort. As

mentioned by Pawaskar, Patil, Patel, Dhaliwal, & Wagh (2018) in their study that many studies previously conducted had also shown the highly occurrence of musculoskeletal symptoms, which was associated to the bearing of loaded backpacks. A study conducted in Chennai, India shows that 60.6% male and 65.7% female primary students were facing with the musculoskeletal pain (Balamurugan, 2014).

The study also revealed that the bags primary students were carrying had the heavier ratio than their body weights. By weighing the students' weights and their bags' weights it showed that students of class I weighted 18 – 20kg, while the bags were weighing 3.5 – 4.0kg, class II students' weighted 18 – 23kg, while the bags weighing 3.5 – 5.0kg, students of class III weighted 22 – 27kg and their bags had 4.0 – 5.5kg weights, class IV students were weighted 28 – 30kg while they were carrying bags of 5.0 – 6.0kg weights, and lastly students of class V weighted 30–35kg while the bags were weighing 5.5–7.5kg, all these bags' weights in each class have high ratio with the students' weight (see table and chart below), whereas the bags' weight should not increase than 1.5kg upto second primary, and 3kg for class III to V students, as recommended by the Human Resource Development (HRD) Ministry of Jammu (Sharma, 2019).

S. No.	CLASS	CHILD WEIGHT (AVERAGE)	BAG WEIGHT (AVERAGE)	STANDARD WEIGHT (AVERAGE)
1	CLASS I	18 – 20kg	3.5 – 4.0kg	1.8 – 2.0kg
2	CLASS II	18 – 23kg	3.5 – 5.0kg	1.8 – 2.5kg
3	CLASS III	22 – 27kg	4.0 – 5.5kg	2.2 – 2.7kg
4	CLASS IV	28 – 30kg	5.0 – 6.0kg	2.8 – 3.0kg
5	CLASS V	30 – 35kg	5.5 – 7.5kg	3.0 – 3.5kg

Table



Chart

Bags' weights are exceeded than the students' body weight as per the standard weights of the bags. In 2009, the American Occupational Therapy Association and the American Physical Therapy Association recommended that bags' weights should not exceed more than 15% of the student's body weight which was latter redefined and set on 10% of student's weight in 2012.

Government of Maharashtra also set the bag's weight limit to the 10% of student's body weight (Pawaskar, Patil, Patel, Dhaliwal, & Wagh, 2018). Burdening innocent students with loaded bags makes them way more lethargic and they get so worn out and fatigued for being creative and start losing interests in studies. Covering the given homework already becomes so hard for them that they are not able to take part in other activities so actively. It starts making them less social and they could not socialize and broaden their horizon. The results of this study exposed that 32.6% of parents' responses favored that the children are losing their creative skills because they get very fatigued after coming back to home and are unable to do something productive on their own or to polish their natural talents. Children are showing frustrated behavior and are reluctant to go to school as what results approved by conducting the study. Many students are carrying school bags over one shoulder; showed the results, which is very disturbing because it affects spinal cord and results in the inclination of the spine to opposite direction and a loss in its natural S – curved shape and also causes back pain and poor posture, just as results showed by a study conducted on 127 school going students with the heavy bag carriage exceeding the maximum limit of the recommended 15% of the body weight, the students were having an affected posture (Kasović, Zvonar, Gomaz, Bolčević, & Anton, 2018). Practicing this also puts pressure on the shoulder muscles and they get sprained in the result, moreover it also presses and pressurizes the nerves of that area, which are linked to the brain crossing from the shoulder and results into many cervical problems and headaches as well, according to the Australian Physiotherapy Association; as mentioned in the study of Chua, Marquez, & Mendez (2019), around 70% of school going children are enduring from back pain because of the improper school bags.

School bags are the only source of carrying study related material to the school throughout the school life of children which makes them carry all the stuff to school every day (Al-Saleem, Ali, Ali, Alshamrani, Almulhem, & Al-Hashem, 2016), despite of them being heavier than their own body weight, and even despite of them being a threat to students' physical and psychological health. But, after getting enlightened by all the problems the carriage of heavy backpacks could cause, paves the necessity of taking some serious steps in the resolution of this vastly growing alarming situation. Schools' administration should sincerely take notice of all this as the heavy bags are the cause of the things which are demanded by schools' curriculum. Students are obliged to bring text books of all their subjects, along with the text books there are note books, journals, reference books, stationary, and some other materials like lunch boxes, water bottles, arts and craft supplies, and also sports kit in some schools. A study conducted in Hilla city in Babylon governorate in Iraq, where data was collected by 242 primary school students, and the study stated that students complained about their bags being heavy. Heavy weighted backpacks mark the lower back pain and neck and shoulder pain in students (Farhood, 2013). In the view of all these circumstances, it is needed to take positive and curative steps across the country. Schools should provide the lockers for students' use for the materials which are required daily like, reference books, rough copies, drawing materials, and other stuff which would not be needed to take back home daily, similarly, Pawaskar, Patil, Patel, Dhaliwal, & Wagh (2018) have also indicated that the absence of lockers in schools is the cause of these issues to be increased. As published in, The Express Tribune (2018), a case filed by lawyer Moammar Jalal, heard in Peshawar High Court (PHC), voicing for the reduction of weighted backpacks as it caused strained backs and detrimental health issues. The

lawyer suggested government to ensure that school bags are not exceeding from 10% of the child's body weight, Jalal further added that regarding this matter the law have already been conveyed by neighboring countries; India in 2006 and fellow South Asian Association for Regional Cooperation (SAARC) member Sri Lanka in 2011. Later, in a news published in DAWN, it is revealed that the Khyber Pakhtunkhwa government passed the "KP School Bags Act 2019", according to which, school bags should be weighing 15% of the child's body weight in public and private both schools, a fine of 200,000 would be charged on private schools in case of the violation of the law (Babar, 2019). Hopes are high that in near future this problem could be solved country wide as it looks like the initiatives have been taken. In this regard, apart from making it possible to not increase the weight from 10% - 15% in ratio with the child's body weight, it would be advised to the parents that they should take children for a proper check-up of their backs, in case if something would be developing while the child being unaware of it. Chua, Marquez, & Mendez (2019), in their study have also proposed that the bone structure, posture, mental health and overall physical health of students must be checked by the doctors. With every passing day world advanced and changed, and it is a fact that when change occurs in one aspect of the world it gradually start embracing other parts as well. Similarly, it also influenced educational field and education became very advanced all around the world and now the use of Information Technology (IT) in schools have become a very common practice. In developed countries students are even allowed to bring such gadgets in schools for the study purpose like; laptops, phones, and tablets, and along with this internet facility has also boosted up the educational activities and quality of education, besides, it also helps in the reduction of weighted bags, but still being an underdeveloped country Pakistan could not offer such education system because not all schools could provide these expensive facilities to their every single student and neither all the parents are financially stable enough to provide such things to their children even if the schools allow their student to bring such gadget to school. But still, there is another way which also has been working in developed and advanced countries which is online system, and it is a good omen that Pakistan also adopted this system and many organizations started providing many different courses through online system; commonly introduced e-Learning, but earlier it has been used only for the distance education but swiftly it paved its way to the regular study system as well in the way of Learning Management System (LMS). Although higher educational institutes provided this facility to their regular students as well through which they kept linked with students for any sudden updates or for the uploading of lectures even after the school time, but vastly, there was no such concept of providing students with LMS at primary level so far. Then with the drastic pandemic of COVID-19, many schools started to shift to this system as well and continued the studies through online system. But unfortunately it has only been seen in the private schooling systems and government schools are still far behind in this race. So, here it is recommended to school to utilize the online system with any sources, like WhatsApp, LMS, Zoom or any other such system. And on the second note, there is an app developed by the students of Jinnah University for Women which scan the complete books and turn them into PDF files and could store many books at a time, this makes learning broader and easier without excessively burdening students by making them to bring extra books along. Utilizing this app would immensely decrease the bag load and studying would be easier this way, it is suggested to school to make a step towards it considering developing students' health and to actually make these suggestions come true as this is a real alarming situation increasing day-by-day.

Thus, some immediate rules are needed to be formulated and enforced, and accessible measures should be set up to secure the further damage to happen and proper treatments must be taken by the already damaged ones.

## CONCLUSION AND RECOMMENDATIONS

Education is necessary and a milestone for successes ahead in life and so is its deliverance. This important process gradually grows up and broadens and offers the knowledge related to the past lives, present scenarios, and paves ways for the betterment of future. Among all the

levels of education the very basic one is primary education, and it also holds the responsibility of the development of a child's personality, as it is that age when children are at their developmental stages. Children's physical, intellectual, emotional, and social life is in the developing stage at this level and they are required with proper and quality education. But in

Pakistan's educational institutions, primary levels are just like a nightmare for students because of the entire load they are burdened with, in the way of heavy weighted backpacks. It has been

seen rapidly and students themselves are complaining for the heavy bag they have to carry on the daily bases back and forth the school, and unfortunately this situation is resulting in worsen health conditions. Loaded bags; more than 10% - 15% of the child's body weight ratio, mark the alarming health issues in students as they result in many physical disturbances; back pain especially lower back pain, headaches, musculoskeletal disorders, cervical problems, shoulder

pain, leg pain, neck pain, poor posture, inclination of spinal cord to either opposite direction or sideways, and disturbances in the natural S – curve of the spinal cord. Other than the physical issues children also suffer from many psychological and social adjustment problems, like they get so stressed, anxious, and depressed, that it makes them reluctant to the studies, they do not show any interests in enhancing their naturally built talents or to interact with other people as they become so fatigued to do any other activity after getting back from school and having their

homeworks done. These circumstances are arising the need to put a stop to this wrong practice of loading little students with excessively loaded bags, and this calls for the serious steps and measures to be taken and successfully implemented, and policies must be formulated and applied all across the country just as the government of Khyber Pakhtunkhwa passed the KP School Bags Act 2019, which restricts the public and private schools to make their students carry weighted bags more than 15% of the child's weight and a violation of the act by private schools fines 200,000 Rupees. Apart of making policies another way to reduce this load could be the utilization of the online education system and the use of the mentioned app in the conducted research project. Further, some recommended efforts could also be taken as:

1. Schools administration and children's parents should conduct a complete physical check-up of the children by doctors.
2. Students must be trained to carry bags in a proper manner; that it should not be hung over one shoulder, instead must be worn on both shoulders.
3. Parents must consult teacher to make sure that only essential books and exercise copies are being asked to bring by the children.
4. Lockers must be provided within the schools' premises for students to put their books and copies in them instead of carrying them along everyday.
5. Educational technologies must be applied such as e-mail/app to reduce the burden for students.

6. Online learning management system (LMS) must be adopted by the schools and its providence should be made possible, where every day's required material could be uploaded as to reduce the extra items to be carried by students.
7. Teachers can allow students to carry only one exercise book for each subject having portions in it for different work purpose.
8. Timetables must be designed in such a manner that only concerned subjects' essential materials would be carried instead of bringing all the stuff daily.

## REFERENCES

- Al-Saleem, S. A., Ali, A., Ali, S. I., Alshamrani, A. A., Almulhem, A. M., & Al-Hashem, M. H. (2016). A Study of School Bag Weight and Back Pain among Primary School Children in Al-Ahsa, Saudi Arabia. *Epidemiology (Sunnyvale)* 6(1).  
DOI: [10.4172/2161-1165.1000222](https://doi.org/10.4172/2161-1165.1000222)
- Babar, S. (2019, November 19). Heavy School Bags. DAWN. Retrieved from <https://www.dawn.com/news/1517608>
- Balamurugan, J. (2014). School Bags and Musculoskeletal Pain among Elementary School Children in Chennai City [PDF File]. *International Journal of Medical Science and Clinical Invention* 1(6). Retrieved from <file:///C:/Users/DELL/Downloads/99-Article%20Text-193-1-10-20171229.pdf>
- Binder, A. I. (2007). Cervical Spondylosis and Neck Pain. *BMJ* 334(7592). DOI: [10.1136/bmj.39127.608299.80](https://doi.org/10.1136/bmj.39127.608299.80)
- Chua, C. T., Marquez, G. A. B., & Mendez, T. B. (2019). A Study of the Design for Trolley School Bag of Elementary Children in Grades 1-3 Using the National Institute for Occupational Safety and Health (NIOSH) Lifting Equation [PDF File]. Retrieved from <http://www.ieomsociety.org/ieom2019/papers/132.pdf>
- DAWN. (2018, March 26). Heavy School Bags. Retrieved from <https://www.dawn.com/news/1397603>
- Farhood, H. F. (2013). Low Back Pain in Schoolchildren: The Role of School Bag Weight and Carrying Way [PDF File]. *Journal of Natural Sciences Research* 3(8). Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1002.8031&rep=rep1&type=pdf>
- Hossain, F. M. A., & Tonima, M. A. (2017). A Study on the Effects of Heavy Backpack and Development of a Preventative Prototype. *Journal of Sensors*. Retrieved from <https://www.hindawi.com/journals/js/>
- Ismaila, S. O. (2018). Safe Backpack Weight Limit for Secondary School Students in Ibadan, Southwestern Nigeria. *Alexandria Engineering Journal* 57(2). Retrieved from <https://www.sciencedirect.com/journal/alexandria-engineering-journal>
- Kasović, M., Zvonar, M., Gomaz, L., Bolčević, F., & Anton, V. (2018). Influence

- of Schoolbag Carriage on Pattern Changes in Plantar Pressure during Walking among First-Grade Schoolchildren. *Kinesiology* 50(2). DOI: <https://doi.org/10.26582/k.50.2.14>
- Layuk, S., Martiana, T., & Bongakaraeng, B. (2020). School Bag Weight and the Occurrence of Back Pain among Elementary School Children. *Journal of Public Health Research* 9(2). DOI: [10.4081/jphr.2020.1841](https://doi.org/10.4081/jphr.2020.1841)
- Nagymáté, G., Takács, M., & Kiss, R. M. (2018). Does Bad Posture Affect the Standing Balance? *Cogent Medicine* 5(1). Retrieved from <https://www.tandfonline.com/toc/oamd20/current>
- Nazzal, N. (2015, August 16). Dangers of Carrying Heavy School Bags. *Gulf News*. Retrieved from <https://gulfnews.com/uae/health/dangers-of-carrying-heavy-school-bags-1.1567643>
- Pawaskar, R. S., Patil, S. S., Patel, R., Dhaliwal, P. K., & Wagh, A. V. (2018). A Cross- Sectional Study to Assess Effects of Schoolbag Weight and Musculoskeletal Health Problems in Primary School Students of Kolhapur [PDF File]. *National Journal of Community Medicine*. Retrieved from <http://www.njcmindia.org/uploads/879-883.pdf>
- Perrone, M., Orr, R., Hing, W., Milne, N., & Pope, R. (2018). The Impact of Backpack Loads on School Children: A Critical Narrative Review. *International Journal of Environment Research and Public Health* 15(11). DOI: [10.3390/ijerph15112529](https://doi.org/10.3390/ijerph15112529)
- Saleh, K. N., Alassafee, A. K., Ahmed, A. H., & Ali, R. T. (2017). Effects of Backpack Weight on Primary School Students. Retrieved from [https://www.researchgate.net/profile/Abdulrahman\\_Suliman/publication/322909884\\_Effects\\_of\\_Backpack\\_Weight\\_on\\_Primary\\_School\\_Students/links/5a7575d8aca2722e4ded4222/Effects-of-Backpack-Weight-on-Primary-School-Students](https://www.researchgate.net/profile/Abdulrahman_Suliman/publication/322909884_Effects_of_Backpack_Weight_on_Primary_School_Students/links/5a7575d8aca2722e4ded4222/Effects-of-Backpack-Weight-on-Primary-School-Students)
- Sharma, V. (2019, November 11). Parents for Strictly Implementing Schoolbag Relief for Children. *The Tribune*. Retrieved from <https://www.tribuneindia.com/news/archive/j-k/parents-for-strictly-implementing-schoolbag-relief-for-children-859038>
- TG, D., & Parameshwaran, M. (2017). A Study of Effects of Heavy Schoolbag on Students and to Develop a New Bag Concept for Reducing Difficulties. *International Research Journal of Engineering and Technology* 4(6). Retrieved from <https://www.irjet.net/>
- The Express Tribune. (2018, October 14). Weighted Down: PHC Takes Notice of heavy Schoolbags. Retrieved from <https://tribune.com.pk/story/1823023/weighted-phc-takes-notice-heavy-schoolbags>
- Urdu Point. (2018, September 14). Carrying Heavy Weighted School Bags can Cause Serious Spinal Deformities: Expert Warned. Retrieved from [https://www.urdupoint.com/en/pakistan/carrying-heavy-weighted-school-bags-can-cause-432370.html#:~:text=Medical%20experts%20on%20Friday%20warned,for%](https://www.urdupoint.com/en/pakistan/carrying-heavy-weighted-school-bags-can-cause-432370.html#:~:text=Medical%20experts%20on%20Friday%20warned,for%20)



[20school%20going%20innocent%20kids.](#)

Walton, D. M., Balsor, B., & Etruw, E. (2012). Exploring the Causes of Neck Pain and Disability as Perceived by Those Who Experience the Condition: A Mixed-Methods Study. International Scholarly Research Notices. Retrieved from <https://www.hindawi.com/journals/isrn/>

WHO. (2019). Musculoskeletal Conditions. Retrieved November 20, 2020, from <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions>