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### Effects of Heavy School Bag Weight on the Physical Health of Primary Students in Rawalakot

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#### ABSTRACT

Many studies have debated on effects of heavy school bag weight on the physical health of students. This study was conducted in Rawalakot, Azad Jammu and Kashmir, to measure school bag weight and compares it with recommended standards. A sample of 140 students' body and bag weights were measured and 103 students carrying heavy bags were selected as the target group. Data were collected by questionnaire and using weight measurement. The collected data were analyzed in Microsoft Excel using frequencies and percentages. The study revealed that most of the students carried bags exceeding the recommended weight limit.



### Introduction

Education serves as the backbone of a nation, and in Pakistan and Kashmir, children usually begin their educational journey between the ages of four and six. For kids to have a keen interest in learning and enjoy the process, education at this age needs to be interesting and fun (Mushtaq et

al., 2021). People benefit from education in all facets of life, and maintaining a dynamic lifestyle requires its dissemination. Despite numerous developments over time, there are two primary ways that education is transmitted: formally and informally. The formal education system is built upon educational institutions. Pakistan's official education system is divided into several levels, starting with basic school (Shahid et al., 2021).

This is the level where children obtain the required knowledge in various subjects, according to their intellectual capacity, their characters are closely nurtured and their health is given first priority in order to have those lead productive lives in the society. As a formal source of education, these educational establishments are essential to the raising of children Kiani et al. (2023). Instead of depending on alternative forms of education, it is crucial to establish a solid foundation that guarantees balanced development. This could have been done in a number of ways, including through the use of audio-visual aids, effective teaching techniques, and extracurricular and curricular activities. (Tareen & Jalal, 2022).

Furthermore, because it is the key to reaching the intended goals, the curriculum has a very important place. Children must study a variety of courses for this reason throughout their academic careers, beginning in primary school. Unfortunately, students are burdened with a lot of course-related materials to accomplish this goal, such as several textbooks, different copies for grammar and text, classwork, homework, rough work, and other stationery items and lunch boxes. They were eventually forced to carry bulky luggage on a daily basis as a result (Hussain et al., 2022).

Children became frustrated by this circumstance, which could also have negatively impact their physical health by resulting in difficulties including stress, musculoskeletal ailments, back issues, and body pain. Primary school-aged children were in a critical period of both physical and intellectual development, and carrying heavy baggage not only compromised their physical well-being but also increased the risk of psychological and emotional illnesses (Khan H. et al., 2021).

They started to become disinterested in their studies and were more likely to drop out. Students' school bags frequently weighed more than they did, which over time caused a number of health issues. Many of these disorders proved to be long-term and permanent. It was noted that children were the most vulnerable to musculoskeletal diseases, back and neck aches, stress, cervical pains and other challenges in their day to day events (Sheikh and Ahmed, 2012).

The U.S Consumer product safety commission reports that there were more than 22,000 children who were victims and injured in 2013 because of backpacks. Approximately 60 per cent of such children had back pains and most of students had enormous sized backpacks that could be as heavy as 25 per cent of the body. The issue with heavy backpacks was merely expanding every day as it was impacting the lives of children and the effects of the heavy weight of a backpack on their bodies in the long-term (Karim et al., 2021).

One of the frequent complaints of the children was the whereabouts back pain and can easily occur in children. Considering its potential impact on the daily lives of children and adolescents both at home and in school it was important for educators, parents, and guardians to be especially mindful of this issue (Khalafalla et al., 2025). For the benefit of the students, schools have undergone several modifications. Methods of instruction and learning have changed. School surroundings have also changed to reflect the shifts in teaching and learning. One thing that hasn't changed in spite of these developments is how much weight students still have to carry in their school bags. Students frequently carried school bags that were too hefty and frequently larger than their own backs (Layuk et al., 2020).

Research showed that carrying bulky school backpacks had a number of detrimental effects on pupils as they grew older. It was critical that parents and policymakers understood the short- and long-term effects highlighted in these studies (Donkor & Domfeh, 2025). According to compelling assertions, the lumbar spine would have experienced overloading and degenerative changes if it had been reduced and shortened in proportion to the weight of the school bag. These effects were concerning in a number of ways. In the first place, they put a great deal of strain on our healthcare system; some studies had even called them potential healthcare time bombs. Second, since a number of studies clearly indicated a causal relationship between improved student accomplishment and excellent health, children who carried heavy school backpacks might have acquired underdeveloped human capital. Pediatricians observed that this frequently caused growing child to have strained necks and backs, as well as having a detrimental impact on their academic performance.

These factors for a student included a sedentary lifestyle, bad posture when studying and sleeping, and carrying heavy or incorrectly handled school equipment. Since children's motor skills peaked for the first time between ages 7 and 9, there was a significant need for physical activity during this period. Inadequate study spaces at home and at school, carrying too-heavy school bags, and keeping bad postures while at rest were further variables that influenced the development of posture abnormalities. In a study with 410 boys aged ten. Researchers investigated the connection between the weight of backpacks carried at 10%, 15%, and 20% of body weight and the quality of body posture (Mrozkowiak & Stępień-Słodkowska, 2022).

Between the ages of 6 and 16, school-aged children went through a number of physical and psychological developmental phases, including times when their skeleton and soft tissues expanded quickly, especially around puberty. Stress that was experienced repeatedly at this age had consequences that continued into adulthood. Parents, medical professionals, and the media had recently expressed serious concern about the problem of hefty school backpacks. According to certain research, carrying a hefty school backpack increased the chance of developing musculoskeletal problems such as low back discomfort and bad posture (Nazareth et al., 2024).

### **Problem Statement**

Heavy school bags causes' serious health issues in students, such as poor posture, fatigue, shoulder and neck pain and, long- term spinal problems (Brzęk A. et al., 2017). The bag weight limit should not exceed 10 to 15% of student body weight. Why the study is important in Rawalakot? (Such studies are important areas to explore. Educational landscape in Rawalakot is not as much studied for the said phenomenon as needed. So the study is being planned to collect the primary data of school bag weight and its implications on the student's physical and learning outcomes.

### **Objectives of Study**

1. To measure the weight of school bags carried by primary students in Rawalakot.
2. To compare the measured school bag weight with the recommended standards.
3. To examine the physical health effects associated with carrying heavy school bags among primary students.

### **Research Questions**

1. What are the average weights of school bags carried by these students?
2. Do the school bag weights of primary students in Rawalakot exceed the recommended standards?
3. How did the school bag affect the physical health of students?

### **Significance of study**

In Rawalakot, by measuring bag weight and comparing it to global standards, this study shows the consequences of heavy school bags, such as back pain and poor posture. And then provide it to the parents as well as schools and policymakers to take steps to reduce the burden of school bags and improve the well-being of students so that students are burden-free, physically fit, and over all development children.

### **Literature Review**

Due to the needs of the modern, updated curricula, kids must carry big school bags every day, which is one of the major problems in the educational system. Students study multiple subjects each day and are required to carry all related textbooks, notebooks, homework, and other necessary materials according to the daily timetable. Students' luggage became very heavy from carrying all of these things, which can caused a number of health issues include musculoskeletal pain, persistent neck and back pain, and shoulder and hip pain (Khalafalla et al., 2025). Furthermore, carrying heavy baggage can have a detrimental impact on students' emotional and mental health, leading to tension, headaches, and reluctance to study (Karim R. A. et al., 2021).

### **Health Impacts of Heavy School Bags**

Students frequently carried school bags that weighed between 30% and 40% of their body weight each day, but the suggested maximum weight was roughly 10% of a child's body weight .Children who carried this tremendous burden on a daily basis were at risk, particularly during their developmental stage, since it could impair bone formation and cause permanent harm. As anticipated, the musculoskeletal injury issue was also related to the necessity to pull heavy things because the children did not possess the musculoskeletal system yet and undergo the physical development increment without much restraint (Perrone M. et al., 2018).

The complaints of shoulder pain, neck pain and headache pain among the children of the primary school were created an alarm among the parents and other healthcare providers that stood in the pediatrics category. This could be likely because of pulling heavy school Backpacks every day and failing to lift them properly could cause the stress the spine, which would cause musculoskeletal disorders in the long-term (Mongkonkansai J. et al., 2024). As the findings of several studies conducted regarding the topic claimed, children should also be overburdened with backpacks that made the weight exceed the 10 percent of the body weight norm. Student surveillance found that in most instances students packed their bags to the full with all they might have needed or might have wanted and it caused musculoskeletal disorders and in most of them lower back pain (Layuk et al., 2020).

The thesis further suggested that the continuance of high weight bag could have led to the development of children and inverted the existing patterns of posture and gait and predisposed them to lower back pains. Their media coverage made this theme one of the key subjects of the present era because the victim, Nazzal, a 26-year-old resident of Dubai, reported that it hindered her performance as she experienced chronic back pain due to the presence of a synth while she carried a school-backpack that exceeded 7 kg while she was attended in an Indian curriculum school (Noor Nazzal, 2018).

### **Musculoskeletal Disorders**

The main cause of the rapid progression of musculoskeletal pains could be attributed to the forces that were applied to the spine because of weighted bags of school that schoolchildren were trying

to carry (Ismaila, 2018). WHO pointed out that, low back pain was cited as the most relevant leading cause of global disability and musculoskeletal disorders had been the primary cause of impairment on the global level (Organization, 2023).

Musculoskeletal pain conditions affected up to one in three, or one in five, persons, including children. This illness raised the chance of acquiring additional long-term health issues and was frequently linked to depression. Musculoskeletal pain was defined by the International Association for the Study of Pain (IASP) as a disturbing sensory and emotional experience that resulted from real or potential tissue injury (Layuk et al., 2020).

### **Impact on Body Posture**

According to a number of studies, carrying heavy school bags all the time could also alter trunk posture and muscular activation (Ismaila, 2018). They suffered from discomfort, physical injury, and elevated stress as a result. Students' bad posture, which could alter bone structure, was another issue that became more prevalent as a result of heavy bags. These misalignments could become irreversible as kids get older. (Mongkonkansai J. et al., 2024).

A child who was carried a big bag was forced to lean forward, which might have led to bad posture, according to Dr. Patel. The surrounding muscles and ligaments held the spine upright. It was made up of bones called vertebrae that were divided by cartilage called intervertebral discs. The extra weight put strain on the discs, ligaments, and muscles, which could have led to injury. Because the spine tended to adjust and remodel in response to posture and weight, carrying heavy school bags might have affected the spine's alignment and orientation (Hossain & Tonima, 2017).

### **Back Pain and Spinal Stress**

Children's bodies and general physical health were impacted by hefty backpacks for a number of reasons. The primary school curriculum comprised a range of subjects. Books on each subject were usually between 80 and 100 pages long. Exercise books, notebooks, workbooks, and reference books were also necessary in addition to these. When taken as a whole, these items greatly increased the weight of school backpacks. Furthermore, teachers rarely offered advice on this topic, and parents frequently lacked complete knowledge of the proper school bag requirements (Ahmed et al., 2024; Alsiddiky et al., 2019).

A spokesperson for the American Occupational Therapy Association (AOTA), which organized a School Backpack Awareness Day, Dr. Karen Jaws, a clinical professor at Boston University, stated "We had seen backpacks getting bigger and heavier since at least 1998, often disproportionate to children's sizes." (AOTA, 2023).

The absence of a suitable schedule for pupils was another factor contributing to the weight of their bags. Even if the teacher only intended to cover one subject on a particular day, students were frequently expected to bring all of their books and notebooks for all of their subjects. The National Centre for Biotechnology Information (2010) had shown that the continual weight of backpacks had been compressing the spinal cord and causing severe back discomfort in a small group of 11-year-old children (Perrone et al., 2018).

According to the results of the tests, the backpacks weighed up to 26 pounds. "26 pounds was actually on the lighter side," said Dr. Harvinder Sardhu, a spinal surgeon at the Hospital for Special Surgery in New York (Outridge, 2017). Muscle sprains and strains, which frequently arose from playing, moving heavy objects, and unintentional falls, were the main cause of back discomfort in children (Cancelliere et al., 2020).

The extra equipment needed for different activities and projects, such as drawing and painting projects was another factor contributing to large backpacks. Along with standard school supplies, these activities frequently called for the carrying of goods like posters and thermopiles. Children therefore sustained injuries to their shoulders and necks, which could progress to persistent pain in these regions. Additionally, youngsters who carried heavy bags often experienced frequent headaches due to the continuous strain on their muscles and veins (Ismaila, 2018).

### **Cervical and Neck Problems**

Students had to study a variety of courses throughout the primary school curriculum in order to be prepared for later, more complex coursework. Despite the necessity of offering the students a superior, an excel education, there were issues as far as workloads on them were concerned, which were very common in the school schedules, especially when they had to get the heavy backpacks on their hands. These triggered various problems of both the body like bending forward, deformation to either side or side, or being curved and impacting the body psychologically like anxiety, sadness (Khalafalla et al., 2025).

Children not only suffered from serious psychological issues like worry, stress, and sadness, but they also had poor physical development, which resulted in a number of disabilities and neck pain. Identified eight causes of neck discomfort, emphasized the importance of posture and mobility, structural and mechanical aspects, emotional states, and sleeplessness and exhaustion. The main cause of neck pain was bad posture (Walton et al., 2012). It was the most prevalent musculoskeletal problem that prompted primary care visits globally, second only to back pain (Binder, 2007).

Various postures were adopted by children as they attempted to balance their backpacks. Some students leaned to one side as a result of carrying their luggage over one shoulder, which can caused postural issues. Students were more prone to suffer from neck pain if they carried high weights because it could also cause cervical problems. In addition to affecting the neck and shoulders, cervical pain can triggered symptoms including disorientation and neurological breakdowns, which in extreme situations could result in unconsciousness (Ahmed N. A. et al., 2024).

"Backpacks could do more than just injure your back; they also often affected your neck and shoulders," said Dr. David Nelles, a California orthopedic spine surgeon. Students' back pain, trunk posture, shoulder alignment, and spinal curvature were all impacted by this. Because of this, boys frequently showed a decrease in the craniocervical angle (CCA), while girls were more likely to develop dorsal discomfort (Karim et al., 2021).

It had been proposed that youngsters attending school may experience pain and incapacity as a result of everyday, repetitive, aberrant postural modifications. For example, lugging a bulky bag on one shoulder for the entire twelve years of school might have caused long-term back problems that could last until adulthood. Muscle strain, a change in the natural curve of the spine, and shoulder rounding were among the possible hazards (Shahbaz et al., 2024).

The necessity of setting weight restrictions for students' school backpacks had been brought to light by lower back pain brought on by carrying them. Students' lives are impacted by this suffering in a number of ways, including physical injury and missed time for everyday activities .Carrying a schoolbag is a common practice for most kids, and a lot of research has been done to figure out how much weight is safe for them to carry (Amin S. , 2023). However, there was still disagreement regarding the ideal weight for a schoolbag and the variables associated with carrying it (Dockrell et al., 2013) .

## **Research Methodology**

### **Study design**

The research was designed as a descriptive cross-sectional study. The purpose of this research was to judge how students' health was damaged due to heavy school bags in Rawalakot. There are two types of information were collected numerical data (weight of body and bag and the students' opinions of health issues). This information made the data more reliable (Creswell & Creswell, 2018; Hanif S. et al., 2024; Takona, 2024).

### **Population**

In Rawalakot the participants were third-grade pupils from both private and public School. The purpose of choosing this grade students' was because students of this age were more sensitive and also in an important growth stage.

### **Sample**

Current research was included 140 students. The sampling was identified in two steps in step one the whole 140 students were included for body weight and bag weight using universal sampling technique (Hoyle, 2018). In Step two the students identified on the basis of bag weight differences according to recommended standards. On step two only 103 students were selected using purposive sampling technique whose bag weight was exceeded the standards. Selected as the target group. Purposive sampling was applied; meaning students were selected based on easy access and school approval (Etikan et al., 2016).

| <b>S/NO</b> |        | <b>Sampling technique</b> | <b>Sample Size</b> |
|-------------|--------|---------------------------|--------------------|
| 1           | Step 1 | Universal sampling        | 140                |
| 2           | Step 2 | Purposive sampling        | 103                |

### **Research instruments**

A calibrated scale was commonly used to check the mass of the body of each child with respect to the weight of their school bag. Before every measurement the machine was reset to zero. To avoid error and for accurate results, the children were weighed without shoes and heavy clothing. Their age details were also written down. (Whitsel et al., 2020; Notebook, 2025). Used structured questionnaires Students completed the questionnaire that carried heavy bags as compared to the suggested limit (Hanif S. et al., 2024).

### **Data collection**

The collected information was completed in two stages: weight assessment and questionnaires. Permission from the school's head was taken. For correct data, each student body and school bag were weighed three times. And a more accurate result, if the difference between reading was greater than 0.5kg, another measurement was taken and the more accurate closest two readings were averaged. The ratio between bag weight and body weight was calculated with the help of Excel to check whether the bag exceeded the recommended 10-15% of body (Dockrell et al., 2015).

Students who filled out the questionnaire and had heavy school bags then suggested limit. Students were guided properly by trained data collectors. The whole procedure was done during school timing and in a friendly and non-stressful setting (Takona, 2024).

### **Ethical consideration**

The study was conducted by following proper ethical standards. The school head's approval was secured .All the students were informed of the aim and purpose of the research, and they all voluntarily and happily took part in it. All the information remained confidential and only used for academic purposes. Schools were referred to as(A, B...H) to maintain privacy .The supervisor checked the survey tools to ensure they were accurate ,age -appropriate and ethically safe (Resnik, 2018).

### **Analysis of Data**

All the information was entered into Microsoft Excel for analysis .Descriptive methods were applied such as percentage, and frequencies .Bag loads were compared to body weight and students' responses and questionnaires about health issues were summarized (Dimić et al., 2019).

### **Data Analysis**

The following tables are related to the research objective number 1 which was: To measure the weight of school bags carried by primary students in Rawalakot.

**Table1: the weight of school bags carried by primary students in Rawalakot.**

| <b>S/No</b> | <b>Schools</b> | <b>Average bag weight carried</b> |
|-------------|----------------|-----------------------------------|
| 1           | A              | 5.958335                          |
| 2           | B              | 3.833333                          |
| 3           | C              | 4.1875                            |
| 4           | D              | 5.597222                          |
| 5           | E              | 3.75                              |
| 6           | F              | 3.75                              |
| 7           | G              | 3.5                               |
| 8           | H              | 4.57143                           |

The table above indicates that the average weight carry by primary students in Rawalakot, without comparing it to the standard maximum school bag weight (A), is 5.9583 kg, while the minimum school bag weight (G) is 3.5 kg for both girls and boys.

The following tables are related to the research objective number 2 which was: Measured school bag weight with the recommended standards (10 to 15 % of body weight).

**Table 1 Measured school bag weight with the recommended standards (10 to 15 % of body weight) School A.**

#### **Boys**

| <b>Students</b> | <b>Age</b> | <b>Actual body weight(kg)</b> | <b>Recommended bag weight(kg)</b> | <b>Actual Bag weight(kg)</b> | <b>Difference R –Actual</b> | <b>Average bag w(kg)</b> |
|-----------------|------------|-------------------------------|-----------------------------------|------------------------------|-----------------------------|--------------------------|
| 1               | 9          | 30                            | 4.5                               | 5                            | 0.5                         | 16.66667                 |
| 2               | 10         | 26                            | 3.5                               | 5                            | 1.5                         | 19.23077                 |
| 3               | 10         | 28                            | 4                                 | 6                            | 2                           | 21.42857                 |
| 4               | 10         | 33                            | 5                                 | 5                            | 0.01                        | 15.1515                  |



**Girls**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 5        | 10  | 25                     | 3.5                        | 7                     | 3.5                           | 28         |
| 6        | 9   | 29                     | 4                          | 6                     | 2                             | 20.68966   |
| 7        | 10  | 26                     | 3.5                        | 7                     | 3.5                           | 26.92308   |
| Total    |     |                        |                            |                       |                               | 21.66%     |

The table above indicates that students at Rawalakot School (A) carry bags weighing between 5 to 7 kg, with the majority carrying 5 kg. Overall percentage of school is 21.66% shows that school (A) student's bag weight is more than 15% of their body weight.

Table 4.2 Measured school bag weight with the recommended standards (10 to 15 % of body weight School B.

**Boys**

| Student | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|---------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 1       | 10  | 23                     | 3                          | 4                     | 1                             | 17.3913    |
| 2       | 9   | 24                     | 3.5                        | 3                     | 0                             | 12.5       |
| 3       | 10  | 25                     | 3.5                        | 4                     | 0.5                           | 16         |
| 4       | 10  | 25                     | 3.5                        | 3                     | 0                             | 12         |
| 5       | 10  | 20                     | 3                          | 2                     | 0                             | 10         |
| 6       | 9   | 25                     | 3.5                        | 4                     | 0.5                           | 16         |
| 7       | 9   | 23                     | 3                          | 4                     | 1                             | 17.3913    |
| 8       | 10  | 32                     | 4.5                        | 3                     | 0                             | 9.375      |
| 9       | 8   | 19                     | 2.5                        | 3                     | 0.5                           | 15.78947   |
| 10      | 12  | 26                     | 3.5                        | 4                     | 0.5                           | 15.38462   |

**Girls**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w (kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|--------------------------------|------------|
| 11       | 9   | 39                     | 5.5                        | 4                     | 0                              | 10.25641   |
| 12       | 10  | 27                     | 4                          | 3                     | 0                              | 11.11111   |
| 13       | 10  | 27                     | 4                          | 6                     | 2                              | 22.22222   |
| 14       | 10  | 29                     | 4                          | 4                     | 0                              | 13.7931    |
| 15       | 10  | 29                     | 4                          | 4                     | 0                              | 13.7931    |
| 16       | 9   | 30                     | 4.5                        | 7                     | 2.5                            | 23.33333   |
| 17       | 10  | 31                     | 4.5                        | 4                     | 0                              | 12.90323   |
| 18       | 10  | 27                     | 4                          | 6                     | 2                              | 22.22222   |
| 19       | 10  | 36                     | 5                          | 4                     | 0                              | 11.11111   |
| 20       | 10  | 25                     | 3.5                        | 3                     | 0                              | 12         |
| 21       | 10  | 24                     | 3.5                        | 4                     | 0.5                            | 16.66667   |
| 22       | 10  | 38                     | 5.5                        | 4                     | 0                              | 11.42857   |

|       |    |    |     |   |     |          |
|-------|----|----|-----|---|-----|----------|
| 23    | 9  | 24 | 3.5 | 4 | 0.5 | 16.66667 |
| 24    | 10 | 31 | 4.5 | 3 | 0   | 9.677419 |
| 25    | 11 | 26 | 3.5 | 4 | 0.5 | 15.38462 |
| Total |    |    |     |   |     | 14.51%   |

#### Girls

The table above shows that Rawalakot school (B) students carry bags weighing 2 to 7 kg; very few students carrying 6 or 7 kg. The majority of students' bag weight is 3 kg, but the overall percentage of 14.51% shows that school B students' bag weight is within the limit of the recommended standards.

**Table4.3** Measured school bag weight with the recommended standards (10 to 15 % of body weight School C.

#### Boys

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 1        | 10  | 28                     | 4                          | 4                     | 0                             | 14.28571   |
| 2        | 9   | 30                     | 4.5                        | 5                     | 0.5                           | 16.66667   |
| 3        | 11  | 24                     | 3.5                        | 2                     | 0                             | 8.333333   |
| 4        | 11  | 24                     | 3.5                        | 5                     | 1.5                           | 20.83333   |
| 5        | 10  | 25                     | 3.5                        | 4                     | 0.5                           | 16         |
| 6        | 10  | 27                     | 4                          | 4                     | 0                             | 14.81481   |
| 7        | 9   | 24                     | 3.5                        | 5                     | 1.5                           | 20.83333   |
| 8        | 9   | 23                     | 3.5                        | 5                     | 1.5                           | 21.73913   |

#### Girls

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 9        | 10  | 25                     | 3.5                        | 4                     | 0.5                           | 16         |
| 10       | 10  | 26                     | 3.5                        | 5                     | 0.5                           | 19.23077   |
| 11       | 10  | 28                     | 4                          | 4                     | 0                             | 14.28571   |
| 12       | 10  | 27                     | 4                          | 5                     | 1                             | 18.51852   |
| 13       | 9   | 22                     | 3                          | 4                     | 1                             | 18.18182   |
| 14       | 10  | 27                     | 4                          | 4                     | 0                             | 14.81481   |
| 15       | 9   | 25                     | 3.5                        | 3                     | 0                             | 12         |
| 16       | 10  | 21                     | 3                          | 4                     | 1                             | 19.04762   |
| Total    |     |                        |                            |                       |                               | 16.59%     |

The table above shows that students at Rawalakot School (C) carry bags weighing between 2 to 5 kg, with the majority carrying 4 kg; however, the overall percentage of 16.59% indicates that the bag weight of students at School (C) exceed the recommended standards.

**Table4.4** Measured school bag weight with the recommended standards (10 to 15 % of body weight School D.

**Boys**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage of bag weight(kg) |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------------------------|
| 1        | 10  | 25                     | 3.5                        | 4                     | 0.5                           | 16                           |
| 2        | 9   | 26                     | 3.5                        | 4                     | 0.5                           | 15.38462                     |
| 3        | 11  | 31                     | 4.5                        | 3                     | 0                             | 9.677419                     |
| 4        | 9   | 27                     | 4                          | 7                     | 3                             | 25.92593                     |
| 5        | 10  | 26                     | 3.5                        | 7                     | 3.5                           | 26.92308                     |
| 6        | 9   | 27                     | 4                          | 7                     | 3                             | 25.92593                     |
| 7        | 9   | 24                     | 3.5                        | 5                     | 1.5                           | 20.83333                     |
| 8        | 10  | 25                     | 3.5                        | 5                     | 1.5                           | 20                           |
| 9        | 10  | 29                     | 4                          | 5                     | 1                             | 17.24138                     |
| 10       | 9   | 25                     | 3.5                        | 6                     | 2.5                           | 24                           |

**Girls**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage of bag weight(kg) |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------------------------|
| 11       | 8   | 21                     | 3                          | 7                     | 4                             | 33.33333                     |
| 12       | 9   | 32                     | 4.5                        | 5                     | 0.5                           | 15.625                       |
| 13       | 10  | 27                     | 4                          | 5                     | 1                             | 18.51852                     |
| 14       | 10  | 22                     | 3                          | 6                     | 3                             | 27.27273                     |
| 15       | 9   | 23                     | 3.5                        | 4                     | 0.5                           | 17.3913                      |
| 16       | 9   | 23                     | 3.5                        | 5                     | 1.5                           | 21.73913                     |
| 17       | 8   | 28                     | 4                          | 5                     | 1                             | 17.85714                     |
| 18       | 8   | 24                     | 3.5                        | 8                     | 4.5                           | 33.33333                     |
| 19       | 9   | 37                     | 5.5                        | 7                     | 1.5                           | 18.91892                     |
| 20       | 8   | 25                     | 3.5                        | 5                     | 1.5                           | 20                           |
| 21       | 9   | 24                     | 3.5                        | 7                     | 3.5                           | 29.16667                     |
| 22       | 9   | 23                     | 3.5                        | 7                     | 3.5                           | 30.43478                     |
| 23       | 9   | 40                     | 6                          | 5                     | 0                             | 12.5                         |
| 24       | 9   | 21                     | 3                          | 6                     | 3                             | 28.57143                     |
| 25       | 9   | 19                     | 2.5                        | 7                     | 4.5                           | 36.84211                     |
| 26       | 8   | 30                     | 4.5                        | 4                     | 0                             | 13.33333                     |
| 27       | 9   | 39                     | 5.5                        | 6                     | 0.5                           | 15.38462                     |
| 28       | 9   | 25                     | 3.5                        | 5                     | 1.5                           | 20                           |
| 29       | 9   | 20                     | 3                          | 5                     | 2                             | 25                           |
| 30       | 9   | 20                     | 3                          | 6                     | 3                             | 30                           |
| Total    |     |                        |                            |                       |                               | 21.72%                       |

The table above shows that Rawalakot school (D) students carry bags weighing 3 to 8 kg; most students' bags weighing 5 kg. The overall percentage of 21.72% shows that school (D) students' bag weights significantly exceed recommended standards.

**Table4.5** Measured school bag weight with the recommended standards (10 to 15 % of body weight School E.

**Boys**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage of bag weight(kg) |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------------------------|
| 1        | 11  | 25                     | 3.5                        | 3                     | 0                             | 12                           |
| 2        | 12  | 36                     | 5                          | 3                     | 0                             | 8.333333                     |
| 3        | 9   | 19                     | 2.5                        | 4                     | 1.5                           | 21.05263                     |
| 4        | 11  | 20                     | 3                          | 4                     | 1                             | 20                           |

**Girls**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 5        | 9   | 24                     | 3.5                        | 5                     | 1.5                           | 20.83333   |
| 6        | 11  | 26                     | 3.5                        | 4                     | 0.5                           | 15.38462   |
| 7        | 11  | 33                     | 5                          | 4                     | 0                             | 12.12121   |
| 8        | 10  | 21                     | 3                          | 3                     | 0                             | 14.28571   |
| Total    |     |                        |                            |                       |                               | 15.50%     |

The table above shows that Rawalakot school (E) students carry bags weighing 3 to 5 kg; the majority of students carrying 4 kg. The overall percentage of 15.50% shows that school (E) students' bag weights little exceed the recommended standards.

**Table 4.6** Measured school bag weight with the recommended standards (10 to 15 % of body weight School F.

**Boys**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 1        | 12  | 28                     | 4                          | 1                     | 0                             | 10.71429   |
| 2        | 8   | 20                     | 3                          | 2                     | 0                             | 20         |
| 3        | 9   | 24                     | 3.5                        | 3                     | 0                             | 12.5       |
| 4        | 8   | 24                     | 3.5                        | 2                     | 0                             | 8.3333     |

**Girls**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 5        | 8   | 21                     | 3                          | 3                     | 0                             | 14.28571   |
| 6        | 9   | 24                     | 3.5                        | 4                     | 0.5                           | 16.66667   |
| 7        | 10  | 20                     | 3                          | 5                     | 2                             | 25         |
| Total    |     |                        |                            |                       |                               | 15.76%     |

The table above shows that Rawalakot school (F) students carry bags weighing 1 to 5 kg; the majority of students carrying 3 kg. The overall percentage of 15.76% shows that school (F) students' bag weights little exceed the recommended standards.

**Table4.7** Measured school bag weight with the recommended standards (10 to 15 % of body weight School G.

**Boys**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 1        | 9   | 24                     | 3.5                        | 3                     | 0                             | 12.5       |
| 2        | 11  | 31                     | 4.5                        | 5                     | 0.5                           | 16.12903   |
| 3        | 10  | 26                     | 3.5                        | 3                     | 0                             | 11.53846   |
| 4        | 9   | 21                     | 3                          | 3                     | 0                             | 14.28571   |
| 5        | 9   | 23                     | 3.5                        | 3                     | 0                             | 13.04348   |
| 6        | 11  | 41                     | 6                          | 4                     | 2                             | 19.04762   |
| 7        | 11  | 31                     | 4.5                        | 2                     | 0                             | 6.451613   |
| 8        | 11  | 63                     | 9                          | 4                     | 0                             | 6.349206   |
| 9        | 14  | 35                     | 5                          | 4                     | 0                             | 11.42857   |
| 10       | 8   | 31                     | 4.5                        | 4                     | 0                             | 12.90323   |
| 11       | 11  | 29                     | 4                          | 4                     | 0                             | 13.7931    |
| 12       | 11  | 30                     | 4.5                        | 3                     | 0                             | 10         |
| 13       | 8   | 24                     | 3.5                        | 4                     | 0.5                           | 16.66667   |
| 14       | 9   | 26                     | 3.5                        | 3                     | 0                             | 11.53846   |
| 15       | 10  | 25                     | 3.5                        | 3                     | 0                             | 12         |
| 16       | 9   | 27                     | 4                          | 4                     | 0                             | 14.81481   |
| 17       | 9   | 23                     | 3.5                        | 3                     | 0                             | 13.04348   |
| 18       | 9   | 27                     | 4                          | 3                     | 0                             | 14.81481   |
| 19       | 9   | 23                     | 3.5                        | 3                     | 0                             | 13.04348   |
| 20       | 8   | 23                     | 3.5                        | 3                     | 0                             | 13.04348   |
| 21       | 9   | 23                     | 3.5                        | 4                     | 0.5                           | 17.3913    |
| 22       | 10  | 34                     | 5                          | 4                     | 0                             | 11.76471   |
| 23       | 10  | 30                     | 4.5                        | 4                     | 0                             | 13.33333   |
| 24       | 12  | 36                     | 5                          | 3                     | 0                             | 8.333333   |
| 25       | 11  | 32                     | 4.5                        | 4                     | 0                             | 12.5       |
| 26       | 12  | 33                     | 5                          | 3                     | 0                             | 9.090909   |
| Total    |     |                        |                            |                       |                               | 12.64%     |

The table above shows that Rawalakot school (G) students carry bags weighing 2 to 5 kg; the majority of students' bag weight is 3 kg, but the overall percentage of 12.64% shows that school (G) students' bag weight is within the limit of the recommended standards.

**Table4.8** Measured school bag weight with the recommended standards (10 to 15 % of body weight School H.

**Boys**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 1        | 11  | 29                     | 4                          | 4                     | 0                             | 13.7931    |
| 2        | 11  | 30                     | 4.5                        | 3                     | 0                             | 10         |
| 3        | 9   | 21                     | 3                          | 3                     | 0                             | 14.28571   |
| 4        | 10  | 27                     | 4                          | 4                     | 0                             | 14.81481   |

**Girls**

| Students | Age | Actual body weight(kg) | Recommended bag weight(kg) | Actual Bag weight(kg) | Difference R-Actual bag w(kg) | Percentage |
|----------|-----|------------------------|----------------------------|-----------------------|-------------------------------|------------|
| 5        | 10  | 20                     | 3                          | 4                     | 1                             | 20         |
| 6        | 9   | 21                     | 3                          | 5                     | 2                             | 23.80952   |
| 7        | 10  | 22                     | 3                          | 5                     | 2                             | 22.72727   |
| 8        | 12  | 34                     | 5                          | 4                     |                               | 11.76471   |
| 9        | 10  | 22                     | 3                          | 6                     | 3                             | 27.27273   |
| 10       | 10  | 30                     | 4.5                        | 3                     | 0                             | 10         |
| 11       | 9   | 27                     | 4                          | 5                     | 1                             | 18.51852   |
| 12       | 11  | 27                     | 4                          | 4                     | 0                             | 14.81481   |
| 13       | 9   | 21                     | 3                          | 6                     | 3                             | 28.57143   |
| 14       | 9   | 23                     | 3.5                        | 4                     | 0.5                           | 17.3913    |
| 15       | 10  | 22                     | 3                          | 6                     | 3                             | 27.27273   |
| 16       | 10  | 25                     | 3.5                        | 4                     | 0.5                           | 16         |
| 17       | 11  | 26                     | 3.5                        | 6                     | 2.5                           | 23.07692   |
| 18       | 11  | 32                     | 4.5                        | 4                     | 0                             | 12.5       |
| 19       | 10  | 25                     | 3.5                        | 5                     | 1.5                           | 20         |
| 20       | 11  | 23                     | 3.5                        | 5                     | 1.5                           | 21.73913   |
| 21       | 12  | 33                     | 5                          | 6                     | 1                             | 18.18182   |
| Total    |     |                        |                            |                       |                               | 18.40%     |

The table above shows that Rawalakot school (H) students carry bags weighing 3 to 6 kg; the majority of students' bag weight is 4 kg, but the overall percentage of 18.40% shows that school (H) students' bag weight crosses the recommended standards.

Table 4.9 Percentage of all school bags carried by students in Rawalakot is compared with the 10 to 15% recommended standards.

| S.No | Schools | Comparison with standards |
|------|---------|---------------------------|
| 1    | A       | 21.66181                  |
| 2    | B       | 14.51058                  |
| 3    | C       | 16.5991                   |
| 4    | D       | 21.72614                  |
| 5    | E       | 15.50136                  |

|   |   |          |
|---|---|----------|
| 6 | F | 15.76885 |
| 7 | G | 12.64803 |
| 8 | H | 18.41764 |

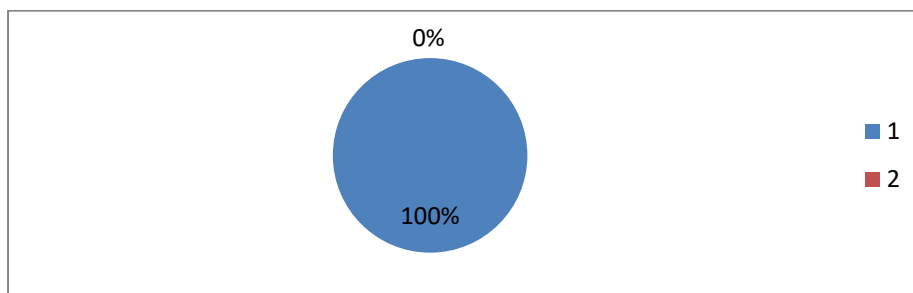
The table shows that the percentage of all school bags carry by students in Rawalakot is compare with the 10 to 15% recommended standards. The maximum schoolbag weight exceeds the safe limit. Few numbers of school bags weigh according to the prescription.

he following tables are related to the research objective number 3 which was: To examine the physical health effects associated with carrying heavy school bags among primary students.

**Table 4.10** Statement: I carry my school bag every day.

|            | <b>Yes</b> | <b>No</b> |
|------------|------------|-----------|
| Frequency  | 103        | 0         |
| Percentage | 100%       | 0%        |

**Figure 4.1** (Statement 4.11)

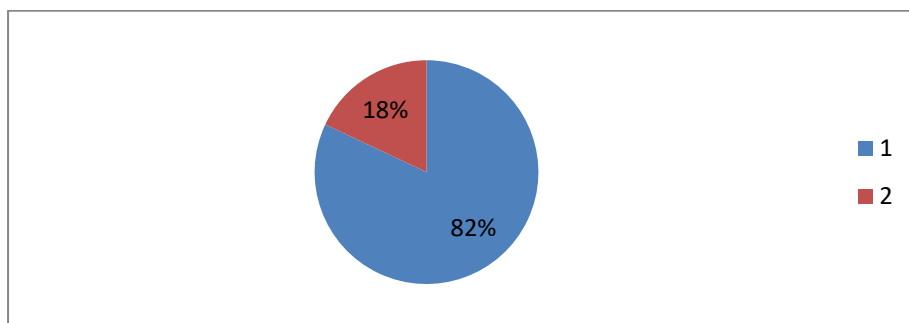


The above table and percentage graph show 100% of students carry their bag daily to school.

**Table4.11** Statement; I feel my school bag is heavy.

|            | <b>Yes</b> | <b>No</b> |
|------------|------------|-----------|
| Frequency  | 84         | 19        |
| Percentage | 82%        | 18%       |

**Figure4.2(Statement 4.12)**

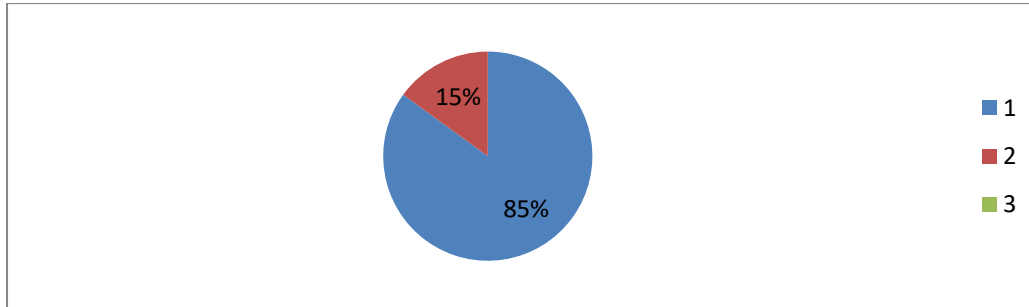


The above table and graph show that 82% of students feel their bag are heavy, while 18% feel their bag are not heavy.

**Table4.12** Statement: I feel tired after carrying my bag.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 88  | 15  |
| Percentage | 85% | 15% |

**Figure4.3** (Statement 4.13)



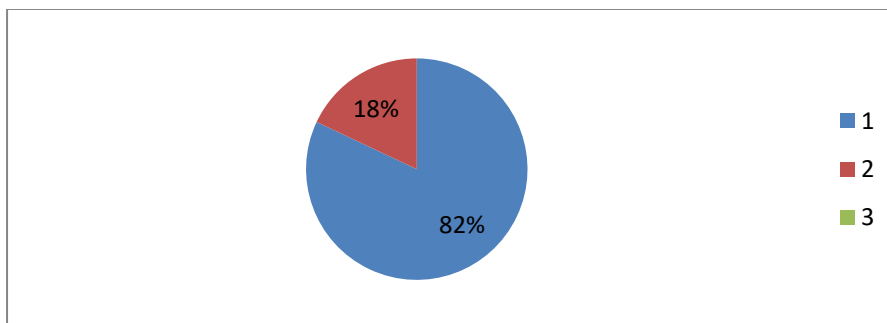
The above table and graph show that the majority of respondents, 85%, tired after carrying their bag. However, 15% do not feel tired.

**Table4.13** Statement; My shoulders feel tired after school.

|            | Yes | NO  |
|------------|-----|-----|
| Frequency  | 84  | 19  |
| Percentage | 82% | 18% |

**Figure4.4**(Statement 4.14)

The above table and graph show that 82% feel tired shoulders, while 18% report not Feeling tired in their shoulders.

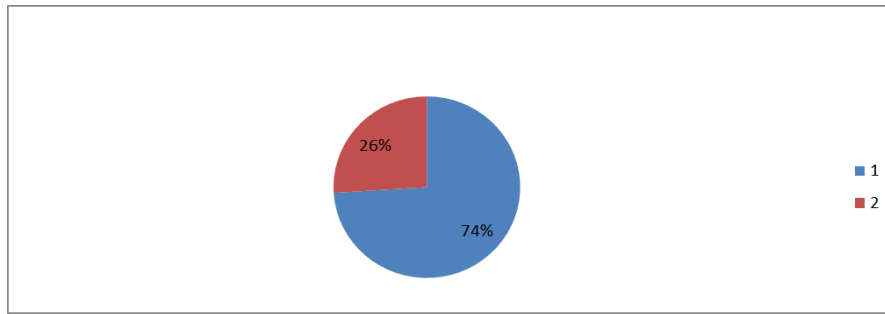


**Table4.14**Statement: I feel pain in my shoulders.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 76  | 27  |
| Percentage | 74% | 26% |



Figure4.5(Statement 4.15)

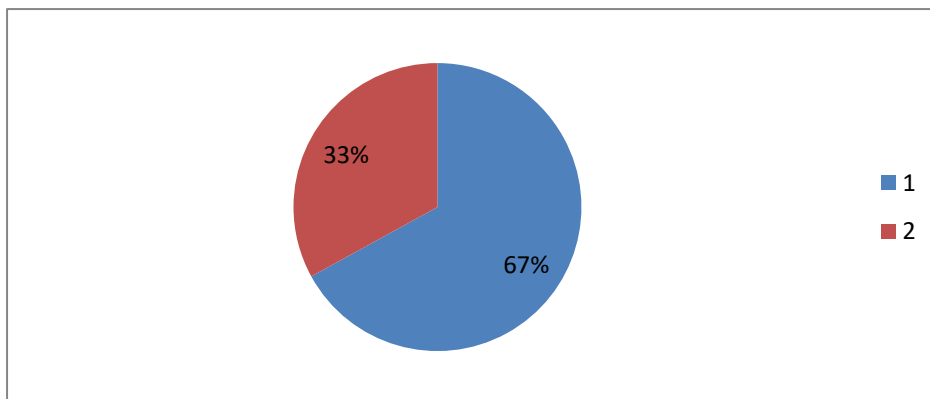


The above table and graph show that 74% of students report pain in their shoulders. And 26% do not report any pain in their shoulders.

**Table4.15** Statement: I feel pain in my neck.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 69  | 34  |
| Percentage | 67% | 33% |

Figure4.6 (Statement 4.16)

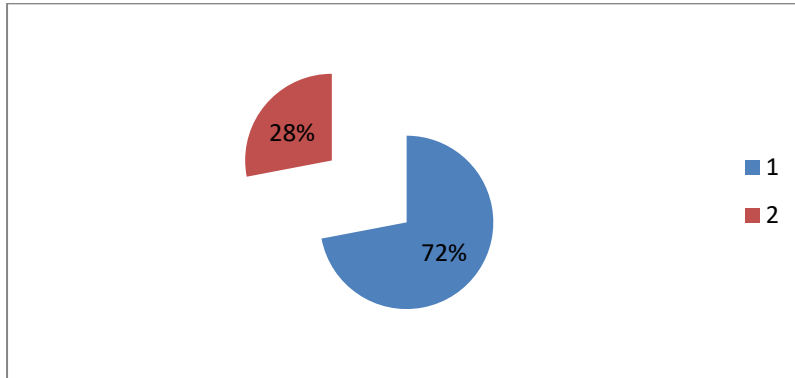


The above table and graph show that 67% of students feel pain in their neck, while 33% do not feel pain.

**Table4.16** Statement: feel pain in my back.

|            | Yes | NO  |
|------------|-----|-----|
| Frequency  | 74  | 29  |
| Percentage | 72% | 28% |

**Figure4.7(Statement 4.17).**

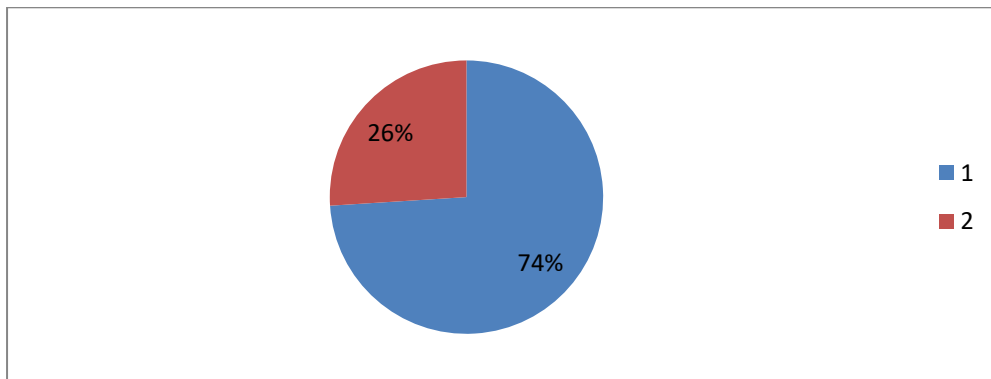


The above table and graph show that 72% feel pain in their back, while 28% do not feel pain in their back.

**Table4.17** Statement: I feel pain in my legs.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 76  | 27  |
| Percentage | 74% | 26% |

**Figure4.8** (Statement 4.18)

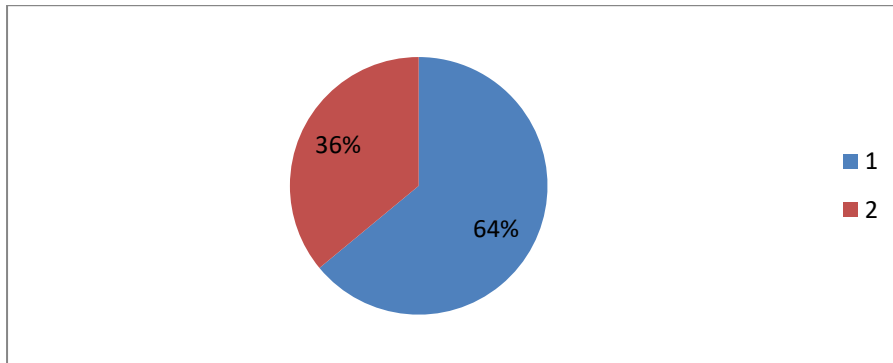


The majority of respondents feel pain in their legs (74%), while 26% do not report any pain in legs.

**Table4.18** Statement: I feel pain in my arms or hands.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 66  | 37  |
| Percentage | 64% | 36% |

**Figure4.9(Statement 4.19)**

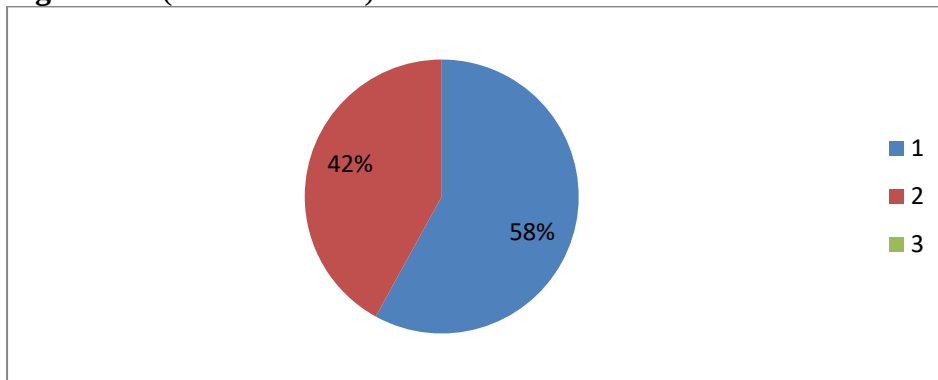


The above table and graph show that 64% of students answer yes; however, 36% respond no to the statement "I feel pain in my arms and hands."

**Table4.19** Statement: I see red marks on my shoulders after removing my bag.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 60  | 43  |
| Percentage | 58% | 42% |

**Figure4.10** (Statement 4.20)

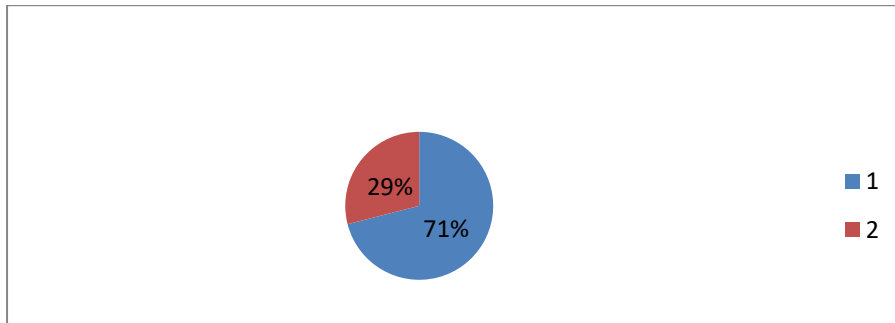


The above table and graph show 58% of students answer yes to seeing red marks on their shoulders, while 42% respond no; they do not see red marks on their shoulders.

**Table4.20** Statement: I bend forward when I carry my bag.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 73  | 30  |
| Percentage | 71% | 29% |

**Figure4.11**(Statement 4.21)

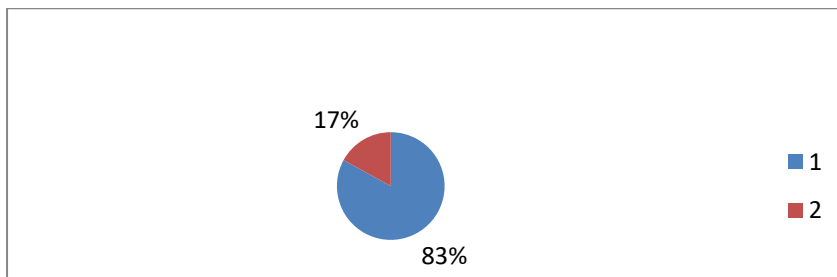


The above table and graph show that 71% of students bend, while 29% do not bend with the bag.

**Table4.21** Statement: I feel very tired when I reach school.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 85  | 18  |
| Percentage | 83% | 17% |

**Figure4.12**(Statement 4.22)

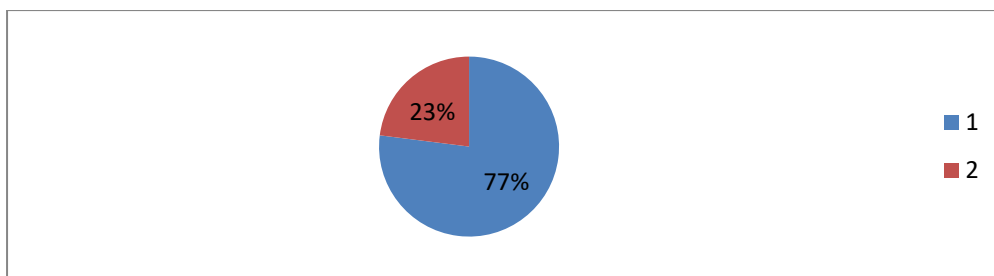


The above table and graph present that 83% of students feel tired when they arrive at school; however, 17% do not feel tired.

**Table4.22** Statement: I feel tired when I reach home.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 79  | 24  |
| Percentage | 77% | 23% |

**Figure4.13** (Statement 4.23)



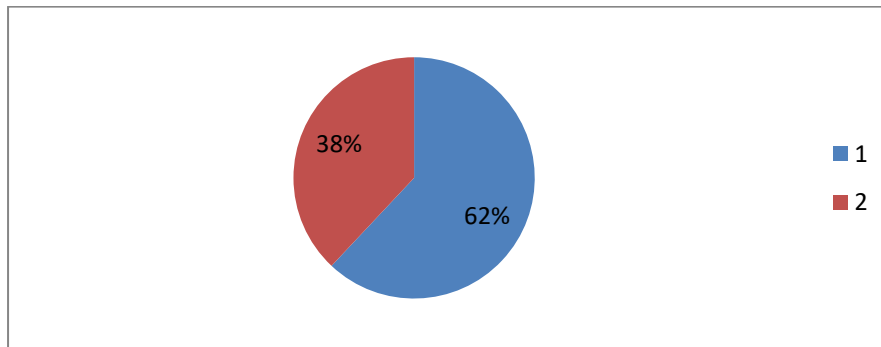
The above table and graph present that 77% of students feel tired when they reach home, while

23% do not feel tired.

**Table4.23** Statement: I miss school because of pain or tiredness.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 64  | 39  |
| Percentage | 62% | 38% |

**Figure4.14(Statement 4.24)**

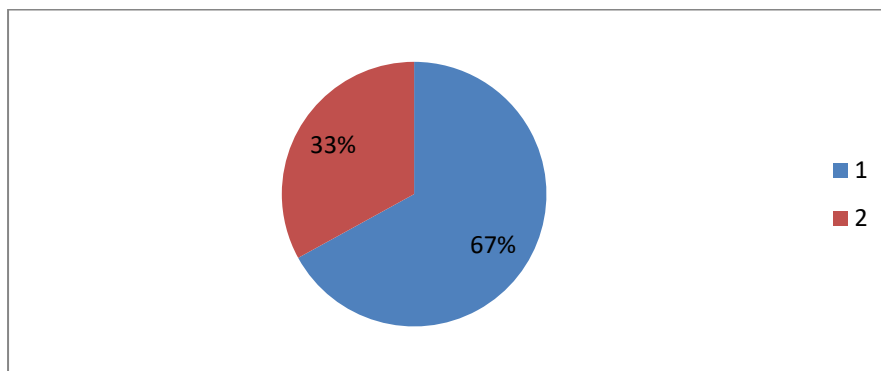


The above-mentioned table and graph show that 62% of students missed school when they feel tired, while 38% do not miss.

**Table4.24** Statement: I have trouble standing straight after taking off my bag.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 69  | 34  |
| Percentage | 67% | 33% |

**Figure4.15** (Statement 4.25)

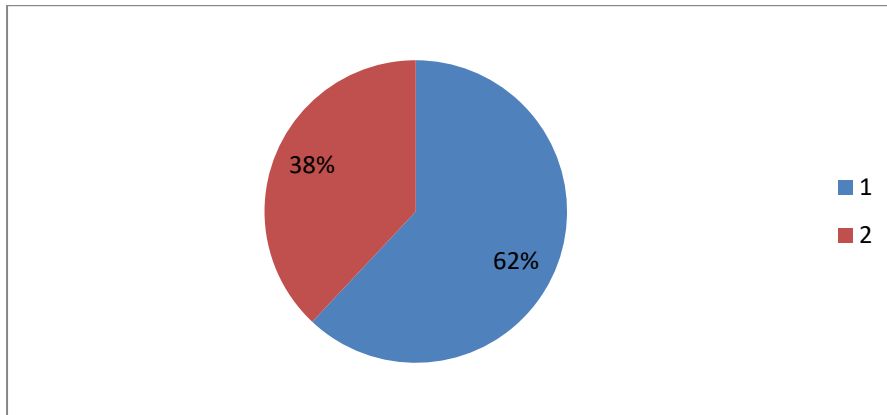


The above table and graph show that 67% of students feel difficulty in standing straight; however, 33% do not have trouble in standing straight.

**Table4.25** Statement: I feel pain while sitting in class.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 64  | 39  |
| Percentage | 62% | 38% |

**Figure4.16** (Statement 4.26)

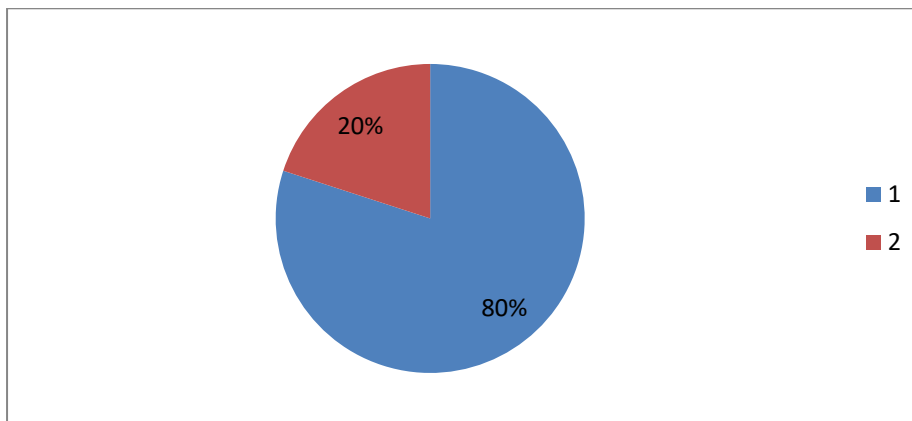


The table and graph show that 62% feel pain during class, while 38% do not feel pain during class.

**Table4.26** Statement: I feel pain while walking with my bag.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 82  | 21  |
| Percentage | 80% | 20% |

**Figure4.17**(Statement 4.27)

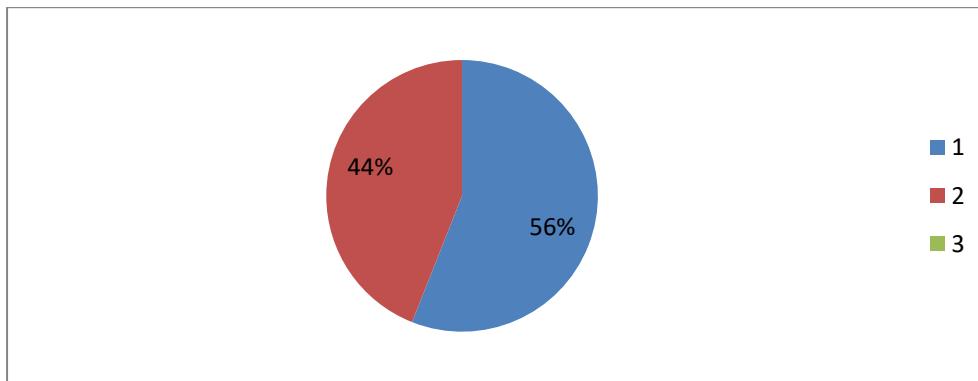


The above table and graph show that 80% of students experience pain walking with a bag, and 20% do not feel it.

**Table4.27** Statement: I ask someone to help me when my bag is heavy.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 58  | 45  |
| Percentage | 56% | 44% |

**Figure4.18**(Statement 4.28)

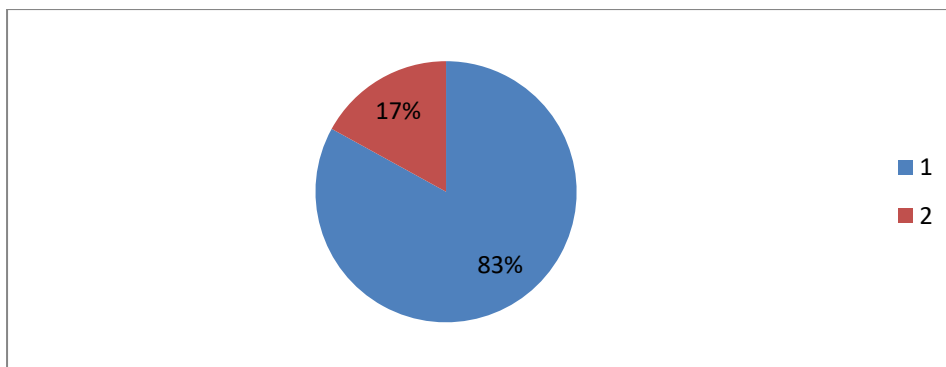


The above-mentioned graph and table present that 56% take help for carrying bags, while 44% do not need any help.

**Table4.28** Statement: I take off my bag during class to feel better.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 86  | 17  |
| Percentage | 83% | 17% |

**Figure4.19**(Statement 4.29)

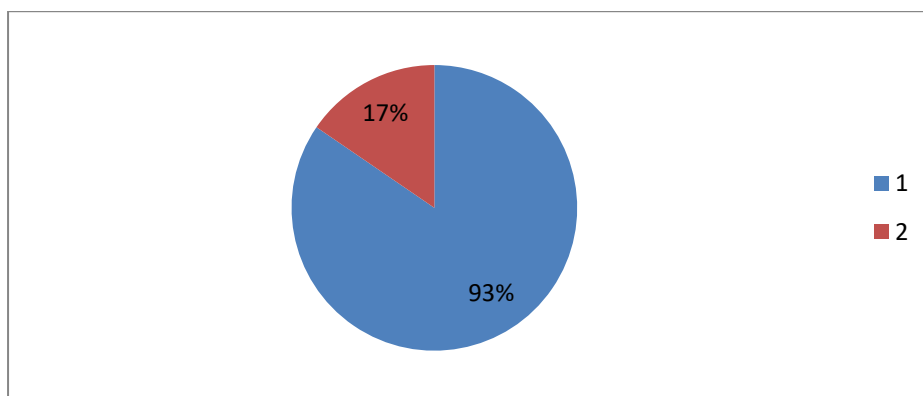


The above table and graph show that 83% of students take off their bags in class, while 17% do not.

**Table4.29** Statement: I want my school bag to be lighter.

|            | Yes | No  |
|------------|-----|-----|
| Frequency  | 96  | 7   |
| Percentage | 93% | 17% |

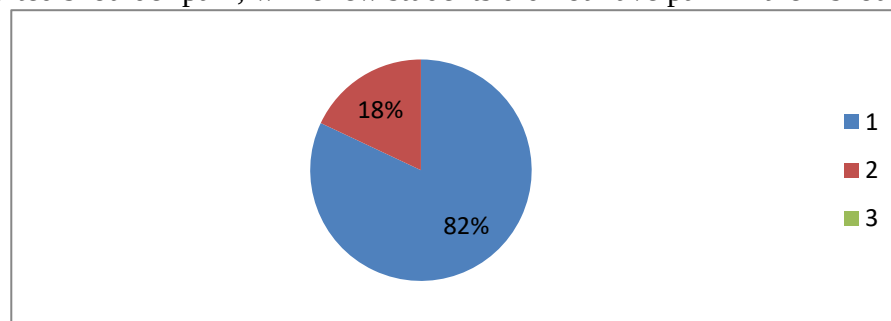
**Figur4.20** (Statement 4.30)



The above table and graph show that 93% want to reduce their bag weight, while 17% do not want a lighter bag weight.

### Finding

1. The finding showed that students of 8 schools in Rawalakot were carrying an average bag weight between 3.5 and 5.96 kg (**Error! Reference source not found.**).
2. A comparison of Rawalakot's eight school students' bag weights with recommended standards. Students of School (B) and School (G) were carrying bag weight according to the recommended standards (Table 4.2 & Table 4.7). School (C, E, F) minor exceeds, and school (A, D, H) significantly exceeded from the recommended bag weight (The following tables are related to the research objective number 2 which was: Measured school bag weight with the **recommended standards** (10 to 15 % of body weight)).
3. Table 1 to Table 4.8).
4. Overall, the percentage of the school's bag weight in Rawalakot exceeded the recommended standards. (Table 4.9)
5. Every student (103, 100%) carried a school bag on a daily basis. (Table 4.9)
6. The majority of respondents, 84 students (82%), agreed. A smaller number of students denied the statement that their schoolbag was not heavy. (Table 4.11)
7. A majority of 88 students (85%) felt tired after carrying their bags. Few students did not. (Table 4.12)
8. A majority of students 84 students (82%) reported fatigue of the shoulder, and 76 students (74%) reported shoulder pain, while few students did not have pain in their shoulders.



(Table 4.13-

9. **Table 4.14)**



10. The majority of 69 students 67% found pain in their neck, and 74 students (72%) found pain in their back. A lesser number of students disagreed that they had not pain in their neck and back. (Table4.15-Table4.16)
11. Leg pain was stated by 76 students (74%), and pain in the arms or hands was stated by 66 students (64%). Only a few students denied any pain. (Table4.17-Table4.18)
12. The majority of students, 60 students, 58%, responded that they saw the red marks on their shoulder very a small number of students did not see them. (Table4.19)
13. The majority of students, 73 students (71%), said they lean forward when carrying their bags. While few students did not curve. (Table4.20)
14. A majority of students 85 students (83%) felt very tired in school; 79 students (77%) complained about fatigue at home. while some were not tired (Table4.21-Table4.22)
15. A majority of students 64 students (62%) of the schools were found absent in school due to pain or tiredness. A lesser number of students disagreed with the statement. (Table4.23)
16. A majority of students 69 students (67%) stated that they faced postural difficulties after taking off their bag. Few students disagreed with the statement. (Table4.24)
17. A majority of students, 64 students (62%), felt pain in class; however, 82 students 80% experienced pain during walking.(Table4.25-Table4.26)
18. A majority of student's 58 students (56%) wanted help in relation to carrying their heavy schoolbags, 86 students (83%) felt relaxed after the removal of school bags during lessons. Few students did not need any help and did not remove their bag. (Table4.27-Table4.28)
19. The large number of students, 96 students, representing 93%, agreed they would go for a lighter bag. However, there was very little disagreement. (Table4.29).

## **Discussions**

This research was done in Rawalakot. The purpose of this study was to examine the weight of school bags among different pupils of different schools and then compare it with the internationally recommended standard of 10%-15% of body weight (Pediatrics, 2023).

During the study the noticeable thing was students from Schools B and G carried bags with average weight and within the recommended limit students from School A, C, D, F and H were burdened as their school bag's weights exceeded the limit. Overall, it was observed that students from Rawalakot carried schoolbags out of the recommended limit. It seemed educational institutions had burdened the students. They reported that almost 60% of students globally carried bags out of limit (Pardede & Sobandi, 2024).

Students suffered back pain due to heavy school bags. And the most common complication added neck pain, arm pain and leg pain hands pain. These finding were consistent with (Al-Saleem S. A. et al., 2016; Rai & Agarwal, 2014).

Assessing the Effect of Postural Discomfort on School Going Children Due to Heavy Backpacks J Ergonomics highlighted that heavy back pain led to muscular discomfort (Brzęk A. et al., 2017). And students also found reddish vertical marks on their shoulders due to bag straps supported by (James M Barsi & Brian C Lynch, 2025). Students also found difficulty in bending and leaning while carrying school bags, which was consistent with the literature on postural changes and spinal stress caused by heavy backpacks related with study of (Rai & Agarwal, 2014).

Students felt tiredness when they reached home and also when they reached school in the morning and they didn't feel fresh as they began their day with courage. And this pain led to absenteeism

and loss of study (George et al., 2015). Which was reflected the impact of heavy bags on daily functioning and overall well-being as reported by these previous studies (Dockrell et al., 2015).

Students also faced difficulties as they were not standing well during class and didn't respond better as they could. They also suffer in pain while they were walking. And they were not properly took part in sports due to body aches. These experiences were similar to research showing that heavy backpacks induced fatigue, altered gait mechanics and increased muscular effort in the trunk, neck and shoulder muscles (Suri et al., 2020; Gonzalez & Smith, 2023; Drzał-Grabiec J. et al., 2015; Oka et al., 2019; Choudhary et al., 2022).

Students applied different strategies to reduce the weight as bringing books day by day change it or put some books in school. Which aligned with recommendations in the literature were reducing backpack load and using ergonomic practices (Nanehkeran & Nourbakhsh, 2025).

At last, it was concluded that students from Rawalakot schools substantiated the global evidence that heavy school bags had negative impacts. It has serious health issues such as physical health damage, posture, and difficulty in engaging daily activity supported by these studies (George et al., 2015; Donkor & Domfeh, 2025; Nanehkeran & Nourbakhsh, 2025).

## **Summery**

This study was conducted in Rawalakot to measure the effects of heavy school bag weight on the physical health of student's. The descriptive cross-sectional study used. Data was collected in two ways: bag weight and body weight of student's measure using a calibrated weighing machine and through questionnaires. All the information was entered into Microsoft Excel for analysis. Descriptive methods were applied, such as percentage, and frequencies. Bag loads compared to body weight and students' responses and questionnaires about health issues were summarized. In Rawalakot a sample of 140 students' body and bag weights were measured and 103 students carrying heavy bags were selected as the target group.

The result showed that students carried an average bag weight was 3.5 to 5.96 kg with school A, D, and H significantly exceeded recommendation limit and C, E, F minor exceed. On other hand schools B and G were within safe standards. Almost all students carried school bags daily. And almost 82% felt heavy bag and 85% reported fatigue after carrying them.

The research found a significant health impact. 82% shoulder fatigue. 74% had shoulder pain, 72% had back pain, 67% had neck pain, and 74% had leg pain, 71% reported bent forward while walking, and almost 67% had difficulty standing straight and 62% missed school due to pain in their backside and tiredness. 58% observed red shoulder marks, and 80% experienced pain while walking within the bag. Almost 93% of students were in favor of lighter bags and 83% felt well after removing their bags during class.

## **Recommendations**

1. It is recommended that schools may check bag weight regularly and ensure they are within the limit of 10 to 15% of body weight.
2. Curriculum developers may introduce digital or lighter textbooks.
3. Educational policymakers may set guidelines for schoolbag weight.
4. School may organize awareness sessions and seminars for students' parents as well as for teachers to tell them the consequences of heavy school bags.

5. At least one time in week the school may examine the posture problems, and back pain issues.
6. Light exercise may be included in the daily school routine.
7. Parents may check school bags daily and remove unnecessary items.

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