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BACKPACK WEIGHT AND ANTHROPOMETRIC MEASURES: A CROSS-SECTIONAL STUDY OF FIFTH-GRADE STUDENTS IN TASHKENT CITY

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Abstract. This study investigated the weekly variations in school backpack weight and anthropometric measurements of 40 fifth-grade students (20 boys and 20 girls) at School No. 312 in the Uchtep District of Tashkent City. The primary objective was to assess adherence to recommended backpack weight guidelines (specify guidelines used, e.g., percentage of body weight) and to identify correlations between backpack weight, anthropometric measurements (height, weight, body mass index), and reported musculoskeletal symptoms (e.g., back pain, shoulder pain, neck pain). Data were collected using a combination of direct backpack weight measurements taken on five consecutive school days, and anthropometric measurements obtained using standard procedures. Students also completed a questionnaire assessing the frequency and severity of any musculoskeletal discomfort experienced during the week. Descriptive statistics were used to characterize the data, and correlations between variables were analyzed using appropriate statistical methods (specify methods). The findings, including the prevalence of backpacks exceeding recommended weight limits and the relationship between backpack weight and reported musculoskeletal symptoms, are presented and discussed in the context of relevant literature. The study concludes with practical recommendations for preventative measures aimed at promoting musculoskeletal health and enhancing academic performance among schoolchildren, including strategies for reducing backpack weight, improving backpack design and usage, and implementing school-based interventions.

Keywords: School backpack weight, backpack weight limits ,musculoskeletal health, children's health, anthropometric measurements, fifth-grade students, elementary school students, ergonomics, physical activity, academic performance

The aim of study. The purpose of study was to conduct a quantitative and qualitative analysis of school backpack weight among a sample of fifth-grade students, to assess compliance with established weight guidelines, to determine the association between excessive weight and potential health consequences, and to formulate practical recommendations for the prevention of musculoskeletal problems associated with heavy backpacks.

Materials and methods. This cross-sectional study was conducted at School No. 312 in Uchtepa District, Tashkent City, Uzbekistan. The study population comprised 40 fifth-grade students (21 male, 19 female) from one classroom (5-V).

Data Collection:

1. Backpack Weight Measurement: Over a one-week period (Monday-Saturday), the total weight of each student's backpack was measured using a calibrated digital scale (accuracy ± 0.01 kg) at the beginning of the school day. The weight of textbooks and other materials was recorded separately.

2. Anthropometric Measurements: Height and weight were measured for each student using standard anthropometric techniques. Height was measured to the nearest 0.1 cm using a stadiometer, and weight was measured to the nearest 0.1 kg using a calibrated scale. Body Mass Index (BMI) was calculated.

3. Surveys: Separate questionnaires were administered to parents and teachers. Parent questionnaires assessed their awareness of recommended backpack weight guidelines, their involvement in packing backpacks, and their children's reported physical discomfort. Teacher questionnaires explored classroom practices related to textbook usage and assignments.

4. Data Analysis: Descriptive statistics (mean, standard deviation, percentage) were used to summarize the data. The proportion of students carrying backpacks exceeding recommended weight limits (defined as exceeding 10-15% of body weight, according to WHO guidelines) was calculated for each day of the week and overall. Correlation analysis was used to explore the relationship between backpack weight and anthropometric measurements. Qualitative data from surveys were analyzed thematically to identify recurring themes and patterns.

Results. The average recommended backpack weight was 3.755 kg (10-15% of the average student weight). Total backpack weight fluctuated daily. The heaviest average weight was recorded on Monday (6.075 kg), with 29 students (72.5%) exceeding the recommended limit. The lightest average weight was observed on Thursday (3.43 kg), with no students exceeding the limit.

The following table summarizes daily backpack weight and the number and percentage of students exceeding recommended weight limits:

Day	**Textbook Weight (kg)**	**Total Backpack Weight (kg),**	**Number of Students Exceeding Limit**	**Percentage of Students Exceeding Limit (%)**
Monday	4.085	6.075	29	72.5

Tuesday	3.595	5.585	19	47.5
Wednesday	2.77	4.765	5	12.5
Thursday	1.435	3.43	0	0
Friday	2.66	4.655	4	10
Saturday	2.96	4.955	6	15

Average Anthropometric Measurements and Recommended Backpack Weight:

Average Height: 137.4 cm
Average Weight: 37.2 kg
Recommended Backpack Weight (Optimal): 3.755 kg (10% of average weight)
Recommended Backpack Weight (Maximum): 5.59 kg (15% of average weight

Discussions.This study highlights a significant problem: a substantial proportion of fifth-grade students carry backpacks exceeding recommended weight limits. This has potential implications for musculoskeletal health, potentially leading to back pain, scoliosis, kyphosis, postural deviations, and upper extremity discomfort. The excessive weight may also negatively impact academic performance due to fatigue and discomfort.

To mitigate these risks, interventions focusing on lighter textbooks, ergonomic backpacks, school-based storage solutions, and educational initiatives for both students and parents are crucial. Regular health screenings are also recommended to monitor for musculoskeletal issues. A multi-faceted approach involving school administration, teachers, and parents is necessary to address this widespread problem effectively.

Addressing the problem of excessive backpack weight: solutions and recommendations

The findings indicate a significant proportion of 5th-grade students carry backpacks exceeding recommended weight limits. This poses considerable risks to their musculoskeletal health, potentially contributing to back pain, postural deviations (scoliosis, kyphosis), and headaches. The added strain can also negatively impact academic performance due to increased fatigue and reduced concentration.

To mitigate these risks, the following multi-pronged approach is recommended:

The burden of heavy backpacks on schoolchildren is a growing concern, impacting their physical health and academic performance. This essay will explore the multifaceted problem of excessive school backpack weight and propose a comprehensive strategy incorporating several key interventions to mitigate its negative effects. The core issue lies in the daily transportation of often excessive quantities of textbooks, supplementary materials, and other items, leading to musculoskeletal strain and discomfort. Addressing this requires a multi-pronged approach involving school administration, teachers, parents, and the students themselves.

One crucial element is the enhancement of school library systems. Readily available access to leave textbooks and supplementary materials at school would significantly reduce the daily load carried home. This requires sufficient storage space within the school, a robust library management system, and clear communication to both students and parents about the availability of this resource. This simple change could dramatically lessen the weight students carry daily.

Furthermore, a transition towards lighter textbooks and materials is paramount. The utilization of digital textbooks, readily accessible via tablets or laptops, should be prioritized. Where print versions remain necessary, publishers should be encouraged to produce lighter-weight editions, using thinner paper and more compact binding. This requires collaboration between schools, publishers, and educational authorities to ensure accessibility and affordability.

Ergonomic considerations are also vital. Implementing programs that encourage the use of ergonomic backpacks with features like padded back support, adjustable straps, and weight-distributing designs is essential. Schools could offer workshops or educational materials demonstrating the proper way to select and use ergonomic backpacks, ensuring appropriate fit and weight distribution.

Effective communication and collaboration with parents are crucial. Educating parents about the risks associated with heavy backpacks and their role in monitoring their children's loads empowers them to actively participate in solutions. School-parent meetings and informational pamphlets could highlight the importance of regularly checking backpack weight, encouraging proper packing techniques, and promoting open communication between students and parents regarding any physical discomfort.

Educational initiatives within the school curriculum are also necessary. Implementing programs that teach students proper backpack packing techniques and lifting/carrying strategies can significantly reduce the risk of injury. This could involve practical demonstrations and interactive sessions that emphasize correct posture and weight distribution. Students should also be taught how to identify and report any physical discomfort related to carrying their backpacks.

Daily backpack weight planning, a collaborative effort between students and teachers, can optimize the load carried each day. Teachers can work with students to

identify which materials are absolutely necessary for each day's classes, reducing unnecessary weight. This involves clear communication and a system for students to leave non-essential materials at school.

Finally, regular musculoskeletal screenings are essential for early detection and intervention. Routine checks by school nurses or healthcare professionals can identify students experiencing musculoskeletal issues stemming from heavy backpacks. This allows for early intervention, preventing long-term health problems. Students exhibiting symptoms should be promptly referred to specialists for appropriate assessment and treatment

Conclusion. This study underscores the urgency of addressing excessive school backpack weight. The implementation of the recommended interventions, through a concerted effort by school administration, teachers, and parents, is crucial for protecting students' health and promoting optimal academic performance. A holistic approach is vital for effective problem resolution.

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