THE HYGIENIC EVALUATION OF THE IMPACT OF SCHOOL SUPPLIES ON THE HEALTH OF CHILDREN AT THE PRIMARY SCHOOL

[1]1A.Zh. Moldakaryzova, [1]M.K. Zhelderbayeva, [1]Omarova Roza, [1]Kudiyarova Zhanar, [1]Alikeyeva Galiya, [1]Tekmanova Ainur, [1]Kozhakhmetova Aigul, [2]Kozhakhmetov Nyssangali

[1]Kazakh National Medical University named after S.D.Asfendiyarov

[2]Scientific and Practical Center for Sanitary and Epidemiological Expertise and Monitoring

Email: zhanat_2006@mail.ru

DOI: 10.47750/pnr.2023.14.03.160

Abstract

At present time, the problem of heavy school bags (backpacks) represents one of acute problems and thus requires a quick solution. Schoolchildren carry on their backs schoolbags weighing significantly times higher than the permitted orthopedic limits. The problem of the heaviness of schoolbags is not studied well enough in Kazakhstani, CIS area and in the other foreign scientific literature. The consequences of carrying heavy weights can lead to health problems in schoolchildren that can end up with problems starting from low attention and knowledge acquisition and further incorrect bones cultivation. This study was conducted among pupils of the 3rd and 4th forms at educational institutions of the city of Almaty. The weight of schoolbags with school supplies was measured daily during the working week in winter and in summer.

Keywords: primary school pupils, weight of schoolbags.

INTRODUCTION

One of the tasks educational institutions facing today is the formation of a healthy, capable person, while maintaining his health in deep education and upbringing of a student.

At school, the student spends their 11 years. And a student who comes to school must be in good health and be in good physical shape. After all, school success directly depends on the strength of physical development, health .

If we say that the perfect future is in the hands of an educated person, then for this we need to be attentive to the health of the child. Children make up the majority of the social group of the population. Keeping a child healthy worries both parents and teachers. They try to keep all types of health of the children in a good state (physical, mental and intellectual, personal health, emotional health, spiritual, social) [1].

Thus, health technology plays a special role in maintaining the child's health and increasing motivation to work [2].

However, at first, the child is not yet able to adapt to the new conditions at school, so there are such difficulties in learning: first, the child has difficulty adapting to the conditions of the school (for example, getting up at a certain time, lying down on time, not missing lessons, not learning to sit quietly in silence during classes and carrying heavy books and school supplies). As a result, they can quickly get tired [3].

Therefore, it is necessary to attach importance to this issue from the 1st grade.

Thus, it is necessary to strive to the principle of health–saving education that creates conditions for the development and strengthening of the physical and psychological health of the student [4].

It can be implemented using the following tools:

- health-saving training;
- increase the development of the body;
- promotion of a healthy lifestyle;
- compliance with sanitary and hygienic rules and norms, etc.

In recent years, the problem of heavy school bags (backpacks) represents one of acute problems and thus requires urgent

solution. Often one can see how the primary school students (usually the child of short stature) carry a huge backpack that at times exceeds the permissible load for that student. The reason for this phenomenon is the increase the teaching load leading to an increase in the contents of the backpack (the number of lessons increases thereby there is an increase in the proportion of the growing weight of the backpack) [5]. The primary school stage includes children aged 7-10 years. During this period, the child's body develops significantly, muscles and cartilage, bones are strengthened, the sole is ossified, the spine, all neck, lumbar bends of the back develop.

According to B.Karimova, the Ministry of Education and science has established restrictions on the weight of textbooks. "At the initiative of the Ministry of education and science of the Republic of Kazakhstan, restrictions on the weight of daily training kits have been established. For this purpose, in September 2018, changes were made to the sanitary rules "sanitary and epidemiological requirements for educational facilities", B.Karimova said. According to the additions made, the weight of the daily training kit (EMC, textbooks, necessary reading and writing equipment):

For students of grades 1-3-from 1.5-2 kg;

For students of grades 4-5-from 2-2. 5 kg;

For students of grades 6-7-from 3-3. 5 kg;

For students of grades 8-11 (12) - no more than 4-4.5 kg [6].

According to the director of the center, textbooks and EMC for Grades 3, 6, 8, issued in 2018, Meet the specified standards. The influence of the weight of the school bags on the occurrence of health problems in children is under-investigated. It should be noted that similar professional studies related to this issue, never have been conducted in the CIS and foreign countries. This problem is quite actual because the consequences of carrying the excessive load through the school bags may lead to various pathologies, such as deterioration of the general state of health, backache, developing curvature of the spine and other [7, 8]. According to the governmental standards (1.12651-10 2.4.7) and technical regulations of the Customs Union (CU TR 007/11) "On the safety of products for children and adolescents," the weight of the schoolbag without school supplies for primary school children should be no more than 600-700 grams. And orthopedic norms, in turn, limit the weight of school bags with school supplies to 10% of the weight of the student [9, 10]. In the reality, the weight of the backpack is several times higher than the permissible standards. Moreover, in addition to the schoolbag the children have to take spare shoes and a change clothes for physical education classes.

At this age, significant changes occur in all organs and tissues of the body. For example, the entire neck of the breast, the lumbar bends of the back develop. However, the hardening of the skeleton is still incomplete, hence its extreme plasticity and fragility [11]. The state of health of a child is determined by many factors, including the assessment of the impact of a hanging bag on the health of students in primary grades due to the social factor and school factor, which we are talking about today, is one of the most pressing issues of our time. Students of the lower grades are forced to sit at a desk, hang heavy hanging bags, and often develop curvature of the vertebrae when lifting them on one shoulder. It is better to prevent, rather than cure, the generally known disease. A body that is not yet fully developed should not be loaded with excess weight. Excess weight can negatively affect the spine with a joint if it puts a strain on the body. The weight given must correspond to the height, weight, age of the child, to the general physique [12]. The weight assigned to students of grades 3-4 of primary school should not exceed 22.5 kg, that is, a hanging bag with equipment should weigh only 10% of the child's weight. For children, it is important that the weight spread over the back and shoulders is even. Children of primary school age should not wear one-shoulder bags, they must wear two-shoulder bags (orthopedic bags). Orthopedic bags strengthen the muscles of the back and thoracic vertebrae of the child. Provides vertical support of the back during rest and movement. Regulates the force of gravity on the spine and joints, which has therapeutic and preventive properties [13]. Flat strap in orthopedic bags provides a strong physiological connection in the neck, back and shoulder joint. All these measures guarantee the rapid work of the body with the musculoskeletal system. Properly choosing a bag and preventing heavy weight helps prevent many diseases in children [14].

Objective: to study the variability of the load of the weight of the primary schoolbags amongst the primary schoolchildren.

MATERIALS AND METHODS.

The study was conducted among students of the 3rd and 4th grade of the secondary school number 2 in Zhetysu district and school number 140 in Bostandyk district of Almaty. A total 416 people were investigated, 214 students were from 3rd form and 202 students from the 4th form. The weight of the schoolbag with supplies was weighted and measured during the working week in winter and in spring. In addition, the body mass of the students was also measured, followed by the distribution by weight into different groups. The mathematical, statistical - calculation of the average relative value (median, mode, arithmetic) were calculated and applied. The participants were divided by sex in groups (Fig.1)

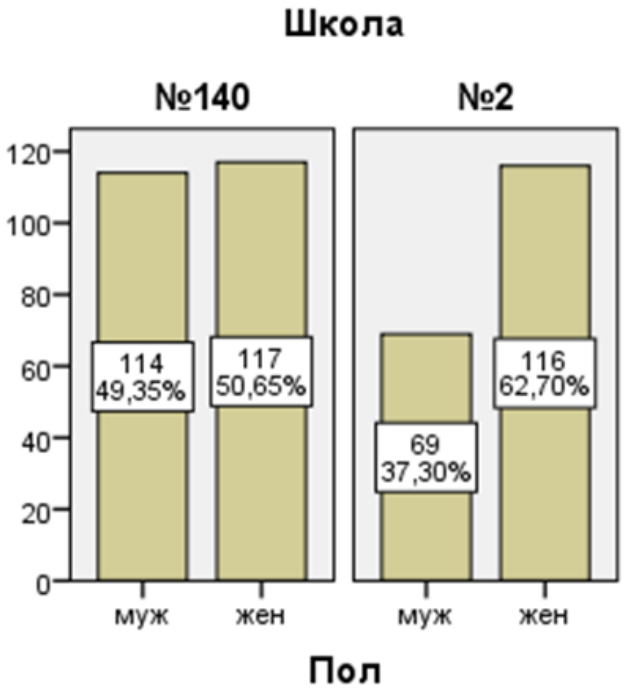

Fig. 1 – The division of the participants into groups by sex.

RESULTS AND DISCUSSION

Table 1 shows the variability of the weight of the schoolbags amongst the primary school students.

Table – 1. The weight of the schoolbags during the working week.

The weight of schoolbags by workdays (kg)	Minimum	Maximum	Average
Monday	1,1	8,0	4,05
Tuesday	1,5	7,5	4,02
Wednesday	1,6	8,0	4,07
Thursday	1,1	7,5	3,89
Friday	1,7	9,9	3,87
Saturday	1,0	7,0	2,64

As can be seen from the table 1, the minimum and the maximum weight of the schoolbag varied from 1 to 9,9 kilograms. The majority of the students' weight was within the 29-35 kilograms (See Table 1), whereas the average weight of the schoolbag was 4 kilograms which was higher the orthopedic limits and it composed 14 % of the body weight.

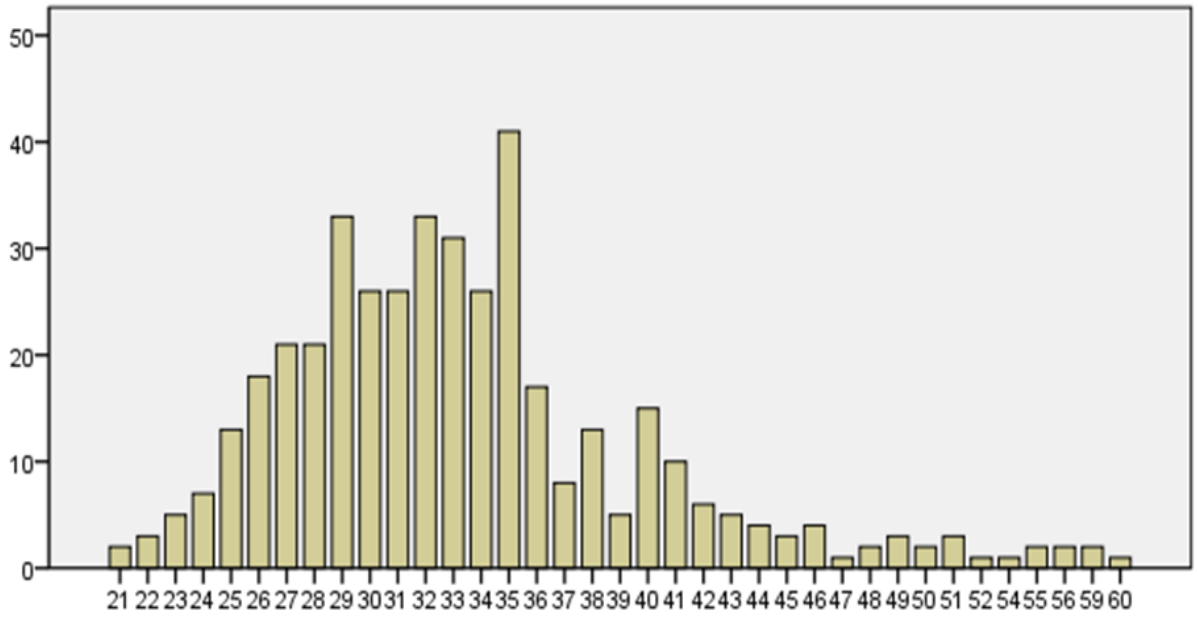

Figure 2 – The distribution of the schoolchildren depending on the body weight (% (y) and the body mass (x) (kg).

It should be noted that girls had heavier schoolbags compared to boys The average schoolbag weighted 2,6-4,1 and 2,7-4,0 kilograms in girls and boys respectively (See Fig.2). Moreover, the weight of the schoolbag was dependent on the season, for instance, in winter the majority of the bags weighted 3,1-5 kilograms (79 %), 14% weighted up to 3 kilograms and 7% more than 5 kilograms. In spring, 50% of the schoolbags weighted 3,1-4 kilograms, 23% 2,1-3 kilograms, 25% 4,1-5 kilograms and 2 % with more than 5 kilograms. In winter, in 40% of the children the schoolbag weights more than 4 kilograms which exceeds the orthopedic limits; whereas in spring, approximately 27% exceeded the permitted limits (Figure 3).

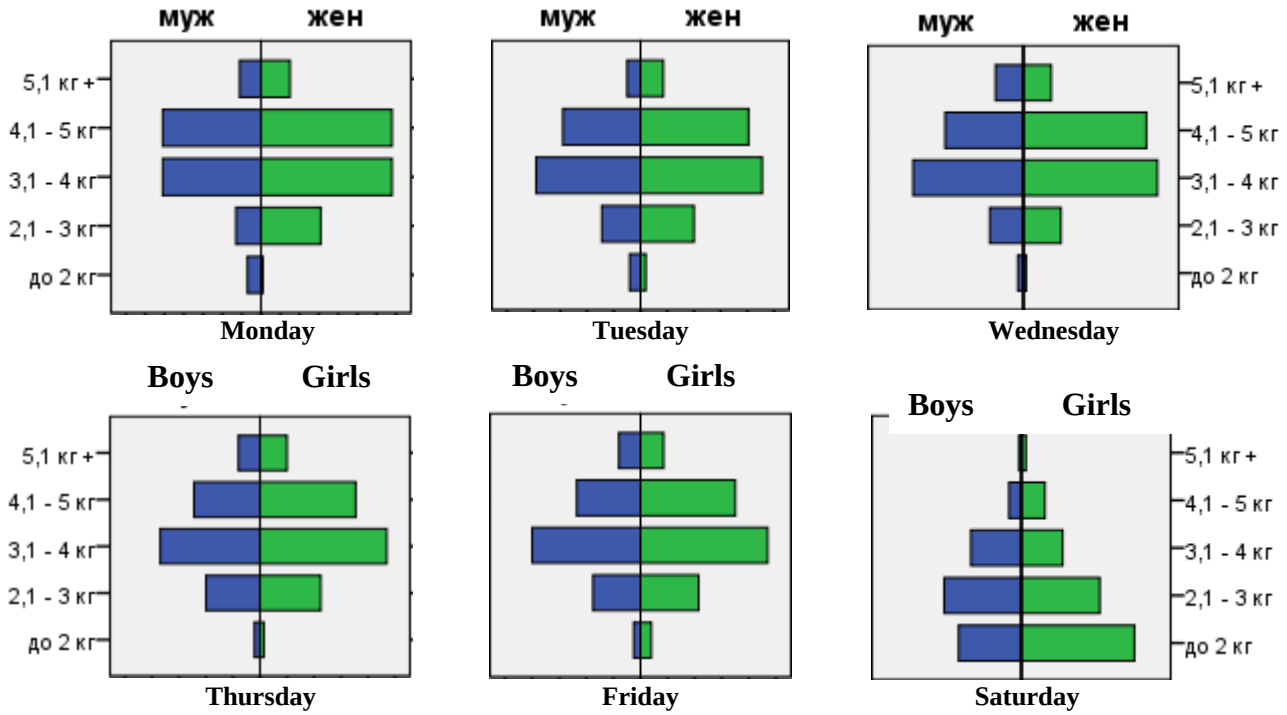

Figure 3 –The weight of the schoolbag in winter and spring

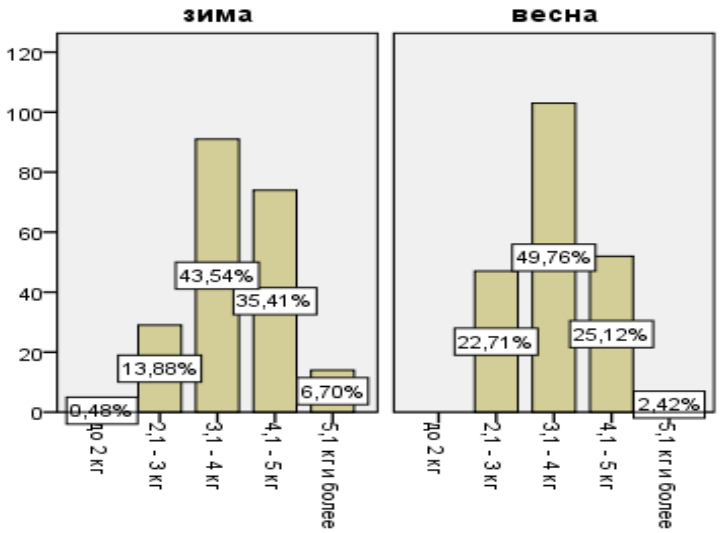

Figure 4 –The weight of the schoolbag depending on the body mass of the students.

The figure 4 shows the distribution of the weight of the schoolbag depending on the body mass of the students. In the group up to 30 kilograms, approximately 77% of the students exceed the permitted limits, in the 31-40 kilograms body mass group 37% exceeded the standards, in the group of 41-50 kilograms approximately 5% and in the group over than 50 kilograms approximately 8% exceeded the standards.

CONCLUSION

By our results it can be concluded that:

1. The average weight of the schoolbag exceeded the permitted orthopedic limits (10%) as well as it composed 14 % of the body mass.

2. In average, girls have heavier bags than boys do.

3. More than 40% and 27 % children of the schoolchildren had their schoolbag overweighing more than 4 kilograms in winter and in spring respectively.

4. In the body mass group to 30 kilograms, 77% of the students exceeded the orthopedic limits, in the 31-40 kilograms 37 % exceeded the weight, 5% exceeded in the group 41-50 kilograms and 8% exceeded the limit in the above 50 kilograms group.

Concerning the type of the backpack, Zh. Bekshin advised that it should be made of solid construction, so that it does not sink into the shoulders and adjust the child's gait. The holder for the schoolgirls' bag should be worn on both shoulders, it is desirable that they are flat and soft. The bag should not exceed one kilogram when empty," Zh. Bekshin said at a press conference in the CCS. The sanitary doctor also gave advice regarding the weight of textbooks. "Textbook weight is normalized depending on the age of the child. Textbooks for children in grades 1-4 should not exceed 300 grams. It is recommended that the schoolbag should weigh 500 gram, the width must be 360 mm, the belt's length must be 85 cm, and the width of the highest part has to be not less than 35 mm [15].

REFERENCES

1. Górna, S., Pazdro-Zastawny, K., Basiak-Rasala, A., Krajewska, J., Kolator, M., Lesiuk-Krajewska, A., . . . Zatoński, T. (2022). Assessment of the elementary school students' schoolbag weight in the urban environment in poland: A cross-sectional study carried out as a part of the 'lightweight schoolbag' and 'let's get the kids moving' projects. Work, 73(1), 121-129. doi:10.3233/WOR-210788.
2. Kong, L., Zhou, X., & Fang, M. (2022). Effects of schoolbags use on musculoskeletal health among adolescents. Chinese Journal of School Health, 43(2), 308-311. doi:10.16835/j.cnki.1000-9817.2022.02.034.
3. Ramadan, M. Z., Al-Tayyar, S. N., Alhaag, M. H., Soliman, A. T., & Abdelgawad, A. E. (2022). Evaluation of an ergonomically designed schoolbag: Heart rate variability and body discomfort rating. Work, 72(2), 539-552. doi:10.3233/WOR-205152.
4. Tahirbegolli, B., Obertinca, R., Bytyqi, A., Kryeziu, B., Hyseni, B., Taganoviq, B., & Shabani, B. (2021). Factors affecting the prevalence of idiopathic scoliosis among children aged 8–15 years in prishtina, kosovo. Scientific Reports, 11(1) doi:10.1038/s41598-021-96398-1.
5. Alfageme-García, P., Calderón-García, J. F., Martínez-Nova, A., Hidalgo-Ruiz, S., Basilio-Fernández, B., & Rico-Martín, S. (2021). Association between the use of backpack and static foot posture in schoolchildren with static pronated foot posture: A 36-month cohort study. Children, 8(9) doi:10.3390/CHILDREN8090800.
6. Lee, J. C. N., Li, S. S. W., & Chow, D. H. K. (2021). School backpack design: A systematic review and a summary of design items. International Journal of Industrial Ergonomics, 84 doi:10.1016/j.ergon.2021.103166.
7. Anambayeva A.I., Alimova N.E. The hygiene of children and teenagers. A teaching toolkit. Almaty, 2007. –p. 70.
8. Hygiene: Textbook / Kenessariyev – Almaty: Samara-Print, 2013. –P. 688.

9. Technical regulations of Customs Union (TRCU 007/11) «Quality requirements of products for children and teenagers».
10. How much should weight the schoolbag or how heavy is the modern education? – URL: http://www.vedu.ru/news-skolko-dolzhenvesit-ranec-shkolnika/ (last update: 24.08.2014).
11. What should be the weight of school textbooks? Internet news agency site “Qazaly.kz” URL: https://qazaly.kz/kogam/4400-mektep-oulytaryny-salmay-anday-boluy-tis.html (request date 16.01.2023).
12. Akberdieva A. Sanitary and hygienic assessment of children's accessories. URL: https://ppt-online.org/33264 (request date 16.01.2023).
13. Kędra, A., Plandowska, M., Kędra, P., & Czaprowski, D. (2021). Non-specific low back pain: Cross-sectional study of 11,423 children and youth and the association with the perception of heaviness in carrying of schoolbags. PeerJ, 9 doi:10.7717/peerj.11220.
14. Chen, Y. -., Nguyen, H. -., & Chen, Y. (2021). Influence of school bag loads and carrying methods on body strain among young male students. International Journal of Industrial Ergonomics, 82 doi:10.1016/j.ergon.2021.103095.
15. Joshi, R. K., Mahajan, S., Rao, A. Y., Polisetty, L., & Kanitkar, M. (2020). Weight of schoolbags among indian schoolchildren in pune and hyderabad. Indian Pediatrics, 57(10), 910-913. doi:10.1007/s13312-020-1993-5.