



# Assessment of motor activity indicators of students of a special medical group

UDC UDC 796.015



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Received by the editorial office on 02.12.2023

## Abstract

**Objective of the study** was to identify the dynamics of daily physical activity of students of a special medical group (SMG), to consider possibilities for its optimization based on motivation and goal setting.

**Methods and structure of the study.** Quantitative and qualitative assessment of motor activity (MA) of SMG students was carried out based on an analysis of the results of a pedometer, heart rate (built-in function in a smart watch/phone) and a survey of methods of physical activity, subjective opinion about its sufficiency and well-being at the end of the day according to SAN data (questionnaire "Well-being, Activity, Mood"). The study involved 566 people, including 376 girls and 190 boys, all belonging to the third health group (A) from two regions of the Russian Federation, the average age at the time of the study was 18.2 years, the experiment lasted 16 months.

**Results and conclusions.** The results obtained indicate that the average values of physical activity indicators in steps per day among SMG students vary from 4500 to 9000 depending on the time of year. The highest results were recorded in July, the lowest in October-November. It was experimentally shown that the results of motor activity in steps in boys and girls do not differ significantly, however, from the 1st to the 3rd course they tend to decrease; in the 2nd and 3rd course the data are relatively stable. The average values in which positive dynamics of well-being, mood and activity were noted were the results in the first year from 6500 to 7200, in the second and third years from 6300 to 6800 steps per day.

**Keywords:** motor activity, students of a special medical group, daily locomotion, motor activity in steps.

**Introduction.** In accordance with the Strategy for the Development of Education in the Russian Federation and the Concept of Demographic Policy of the Russian Federation for the period until 2025, strengthening the health of student youth, the formation of a conscious attitude towards it and, most importantly, independence and initiative in this regard, have been chosen as one of the priority areas of education. Especially against this background, the task of health formation of students with health limitations stands out, according to their indicators of psychophysiological conditions, physical fitness; at the university, for physical education, they are assigned to a special medical group. Health disorders, on the one hand, impose on the teaching staff the need to search for innovative technologies that ensure the formation of the need for

an active lifestyle, and on the other hand, they actualize the student's issues of self-preservation. According to N.A. Rybachuk, self-preservation is determined by the student's conscious activity aimed at maintaining his own moral, physical and psychological well-being and includes compliance with the rules of body culture, occupational hygiene and rest (alternating mental and motor activity), nutrition and behavior in general [6]. Physical activity, essentially, satisfies the requirements of self-preservation, self-preservation and can help improve all health indicators, but only if it is optimal for the student, and especially for those with health limitations.

**Objective of the study** was to identify the dynamics of daily physical activity of students of a special medical group (SMG) and the possibilities for its optimization based on motivation and goal setting.

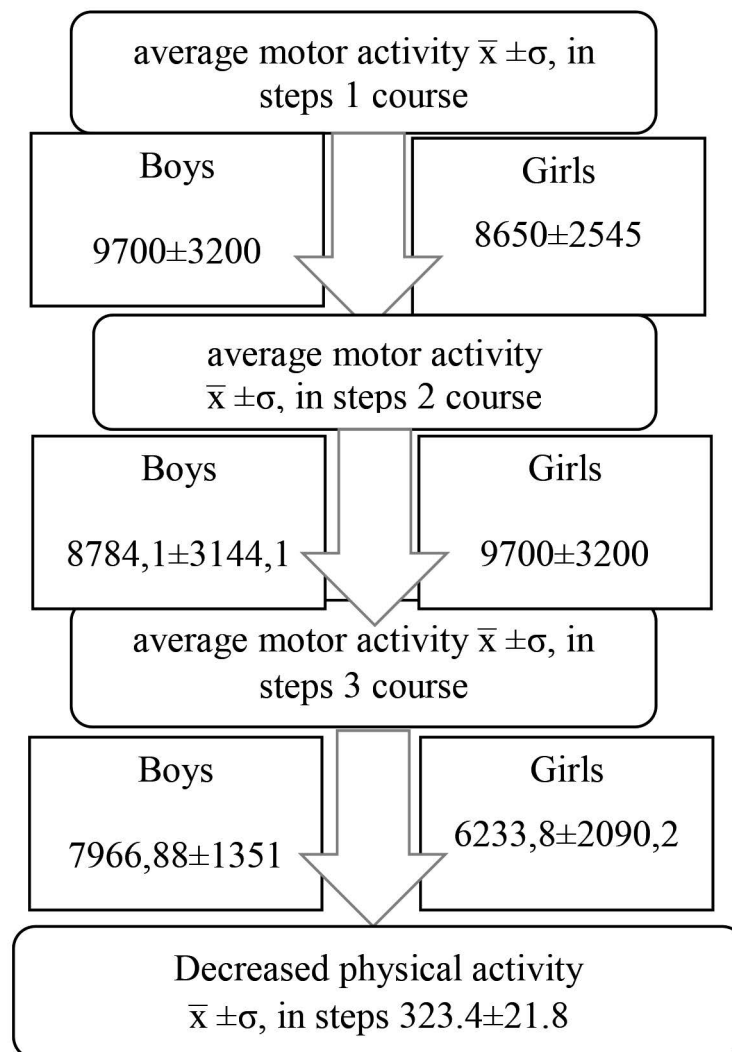


**Methods and structure of the study.** Quantitative and qualitative assessment of motor activity (MA) of SMG students was carried out based on an analysis of the results of a pedometer, heart rate (built-in function in a “smart watch”/phone) and a survey of methods of physical activity, subjective opinion about its sufficiency and well-being at the end of the day according to SAN. The study involved 566 people, including 376 girls and 190 boys, all belonging to the third health group (A) from two regions of the Russian Federation, the average age at the time of the study was 18.2 years, the experiment lasted 16 months.

**Results of the study and discussion.** Currently, the recommendation of 10,000 steps per day has become popular; it appeared in the 1960s in Japan, after the invention of the electronic pedometer. Inventor Yoshiro Hatano chose the name Manpo-kei for the device, which translated means “10,000 steps.”

A scientific and methodological review of available foreign studies on this topic, published between 1980 and 2020, showed that normative data (expected values) in healthy young people (aged 18-29 years) are 70,00-13,000 steps per day. Specifically, Bohannon used a meta-analytic approach to summarize and present the number of steps per day taken by healthy adults (over 18 years of age), identifying 42 studies published between 1983 and 2004. Reported mean values for adults ranged from 5,400 steps per day and up to 18,000 in a sample of men whose average age was 34 years. Excluding the maximum single values in the sample, the author showed that the total average number of steps per day was 9,448 (8899-9996) [7].

Interesting studies, in our opinion, are presented by Tudor-Locke and Bassett, so the NHANES accelerometer data were interpreted and adjusted to facilitate understanding of the average values on the pedom-



*Dynamics of motor activity from the first year to the third, in steps per day*



eter; the authors proposed the concept of a graduated step index for healthy adults: from 5000 steps per day (“sedentary lifestyle”) to  $\geq 12,500$  steps per day (“highly active”). This indicator was revised and received additional support in 2008 as part of an updated review of How Many Steps a Day Are Enough? [8].

Turning to the results of the study, we note that the physical activity of the studied population is at the level of a sedentary lifestyle, and there has also been a negative trend in its decline from the first to the third year (see figure).

As can be seen from the figure, the results we identified are below the recommended ones, this is consistent with the studies of domestic authors, which consider the norms of daily motor activity (DMA) for students from 10-14 thousand to 16-18 thousand locomotions per day [1,4].

It is worth noting that these indicators are recommended for healthy students, while the study population is students with persistent or temporary health problems, on the basis of which they are, in fact, enrolled in a special medical group (SMG). There is an opinion regarding students in this category that the normative for them is motor activity, amounting to 13-15 thousand locomotions on the days of planned physical education training sessions and 10-11 thousand locomotions on the days of their absence [5].

Thus, it turns out that the recommended values in the literature we studied and the data obtained in the study population differ, since the volume of physical activity was reduced almost by half.

At the same time, an attempt was made to study the psychophysiological reactions to the current volumes of DMA in students of a special medical group.

In the period from September 2022 to December 2023 (16 months), SMG students from 1st to 3rd year kept health diaries in which, among other things, they noted such indicators as: the number of daily locomotion in steps, average heart rate and took the SAN questionnaire once a month. Note that the data ( $x \pm$ ) were obtained based on mathematical calculations of the normal distribution on the Gaussian scale.

During the analysis of the results obtained, it turned out that the most active months are May, July and August, so the maximum values of DMA of 20-23 thousand steps were recorded for 15.5% of students, the least active are November and March, the minimum results are 350-4570 steps for 13, 2%. It was noted that a surge in DMA is observed among first-year stu-

dents in September, which is quite understandable (10-12 thousand locomotions in 87%), then active adaptation to the psychophysical stress associated with the beginning of training occurs and DMA indicators stabilize and reach average by the end of December values 2-3 courses.

Despite the importance of individual regulation and the search for optimal values of daily physical activity, the leading feature is age norms, which are considered as recommended from the standpoint of satisfying the biological (vital) need of the body for movement. Thus, the above-mentioned and scientifically based values of 10-15 thousand locomotions per day help improve health.

At the same time, as the study showed, the DMA of students by a special medical group is at a low, almost critical level, but comfortable judging by the results of the physiological reaction of the body and psycho-emotional state. During the study, a survey was conducted among the students participating in the experiment, asking them to answer the question: “why do you think your physical activity is low?” Various reasons were given, but in general they boil down to the following meanings: “not enough time” (49.2%); “no desire” (27.3%); “no company” (15.3%); “health difficulties” (8.2%).

A qualitative analysis of the survey results on the content of physical activity showed that in most answers it is defined by the word “walked”, in the park, along the street, in second place in the frequency of answers among SMG students was “the road to the institute” and only in third place specifically organized physical activity: “jogging, active walking, skateboarding/skiing/rollerblading, etc.”

VC. Balsevich noted in his scientific works that systematic physical activity, at a reasonably necessary and sufficient level, is possible only when its organization satisfies internal and external requirements. External motivation includes motivation for motor activity, aimed at developing, maintaining and improving one’s own kinesiological potential; it is formed depending on the stimuli presented. To the internal ones - goal setting, as a conscious choice that the student makes on the basis of the available space of options, so that motor activity acts not only as a natural necessity of the body, but also as a socially determined need of the individual to maintain homeostasis, ensure morphological, functional and psychological well-being. Based on this, the implementation of genetic and sociocultural programs of human development in ontogenesis



consists of overcoming factors that hinder it: laziness, apathy, lack of company, etc. [2, 3].

At the same time, the content of physical activity, according to V.K. Balsevich should consist of his systematic motor activity in the form of the use of diverse physical exercises, which are based on purposeful motor actions.

Based on the above, we assume that the possibilities of optimizing the daily physical activity of SMG students can be realized if the following conditions are met: stimulating motivation for physical activity and encouraging goal-setting in matters of health formation as a personal, significant intention based on a conscious choice of means and methods of physical activity.

**Conclusions.** Indicators of daily physical activity (in steps) among students of a special medical group have a negative downward trend from the first to the third year, while they have a comfortable functional (in terms of the reaction of the cardiovascular system) and psycho-emotional state. It was noted that the quantitative results of the daily motor activity of boys and girls do not differ significantly, as well as its qualitative content, since it is of a primitive impulsive nature and serves rather to satisfy the natural need for movement and partly for communication. In our opinion, the issues of strict regulation of motor activity in steps remain debatable, and therefore there is an alternative to consider the possibilities of optimizing it based on the individual characteristics of the SMG student. In the course of studying the scientific literature, it turned out that daily physical activity can be optimized on

the basis of persistent motivation for physical activity through awareness in defining goals and the possibility of developing an individual route to achieve them.

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