Dynamic of primary school age pupils’ physical fitness

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Abstract

Purpose: assessment of 6-9 yrs age pupils’ (1st – 3rd forms) physical fitness level.
Material: in the research pupils of 6-9 yrs age participated (n = 94; boys– 46, girls– 48). The pupils’ physical fitness testing was carried out in compliance with school program norms.
Results: as per the norms of school program most of pupils (60.9%) demonstrated high level of fitness. Exclusion was the boys’ indicators in test for flexibility. Only 12.6% of pupils fulfilled the test without remarks. 9.7% fulfilled the test at average level. 16.7% of pupils fulfilled the test at initial level. So we observed non uniform distribution of results. In the whole, by most of physical fitness indicators we observed gradual increment of result with every year. Significant improvement of results in 2nd and 3rd forms can be explained by more conscious and clear fulfillment of tests’ technique.
Conclusions: we found pupils’ high physical fitness level by norms of school program. But the objectiveness of the program’s norms is doubtful. May be these norms are lowered and require reviewing.
Keywords: pupils, physical qualities, health, tests, program.

Introduction

In modern Ukrainian social-economic conditions great number of schoolchildren has weak health, low motor activity and physical fitness [12]. For example at the moment of entering school 10-20% of children have health problems; at the end of primary school – 50-60 % have the same problems [20]. It is important that just in this period motor functioning is especially required, because it facilitates: smooth character of organism’s functional systems’ reconstructions; physical development and physical qualities’ formation, which will be required in adult age [5].

For physical loads’ rationing the data about pupils’ physical fitness are important because they characterize the level of physical qualities and physical health condition [12, 19]. Physical fitness is a result of human physical activity; his/her integral indicators and to large extent reflects influence of physical education. Constant registration and assessment of physical fitness level permit to speak about physical education effectiveness [5].

Many authors pay attention in their publications to analysis of content, to structure and organization of primary schoolchildren’s physical training [5, 18]. Assessment of physical fitness level of primary [4, 6, 19], secondary [1, 15] and senior schoolchildren [3, 16] has been fulfilled. Nevertheless it shall be constantly paid attention to by scientists; especially informative are researches of dynamic of pupils’ physical fitness. In the mentioned aspect we can stress on the following topics:

− Modeling of schoolchildren’s physical education [9, 24];
− Physical loads’ rationing for schoolchildren [26, 30];
− Tendencies and status of children’s physical fitness in different countries: Australia [21], Brazil [22], China [29], Switzerland [27], Check Republic [33];
− General status of children’s health [35];
− Influence of physical activity on pupils’ health [23, 25];
− Correlation of children health’s different components [28, 31, 32, 34].

The authors note that it is necessary to perfect approaches to children’s health improvement. It is underlined that pupils’ physical fitness is the most important component of their health.

Hypothesis: it is assumed that physical qualities’ increment will permit to judge about positive or negative changes in the definite period of time and form objective norms for schoolchildren.

The purpose of the research was to assess 6-9 yrs age pupils’ physical fitness level.

Material and methods

Participants: in the research pupils of 6-9 yrs age participated (n = 94; boys– 46, girls– 48).

Organization of the research: the work was fulfilled on the base of Lvov comprehensive school № 9, № 13. For objectiveness we followed identification and terms of program tests’ passing: we tested the same children; testing itself was conducted in October (at the beginning of academic year in 1st, 2nd and 3rd forms, children’s age – 6–9 yrs.) in gym conditions.

Testing of pupils’ physical fitness was conducted as per norms, envisaged by school physical culture program [10, 13, 17]. The tests were: long jump from the spot from initial position – feet at shoulder width and toes behind start line. With legs’ bending in knees, the tested waved arms backward and throwing the arms forward – jumps. The result is registered by a distance from start line to the point of heels’ touching the mat. The result is measured in centimeters by the better of two attempts.

“Shuttle” run 4 x 9 meters was fulfilled from high start behind the start line. By command it was necessary to run 9 meters to other line, take one of two cubes, which are inside a circle; then run back, put the cube in start circle and run for the other cube, to put it also in start circle. The result was measured in seconds: from start to the moment of the second cube’s putting in start circle.

Forward torso bending from sitting position: legs – at...
In the 1st form boys jump better than girls by 15.5 cm. In the 2nd form boys improved this indicator by 10.2 cm (p < 0.05). In the 1st form boys jump better than girls by 15.5 cm. In the 2nd form – by 0.7 sec. (see table 2).

Statistically confident difference between boys and girls was registered in “shuttle” run 4 x 9 m (p < 0.01). During 1st form girls improved this result by 0.6 cm. Increment of boys results with every coming year was 2.3 sec. and 0.8 sec. In 1st form boys have better dexterity than girls by 0.8 sec. In 2nd form boys have better dexterity than girls by 0.5 sec. and in 3rd form – by 0.7 sec. (see table 2).

Significant results’ improvement in 2nd and 3rd forms can be explained by more conscious and accurate tests’ fulfillment as well as quick increase of dexterity, which

### Table 1. Comparative characteristics of pupils’ physical fitness in period from 1st to 3rd forms (n = 94)

| School norms                      | Statistical characteristics | Boys (n = 46) |          |          | Girls (n = 48) |          |          |          | P*       |
|-----------------------------------|----------------------------|--------------|----------|----------|---------------|----------|----------|----------|----------|
|                                   |                            | 1st form     | 2nd form | 3rd form | 1st form     | 2nd form | 3rd form |          |          |
| Long jump from the spot (cm)      | M                          | 108.5        | 122.1    | 132.3    | 90.1          | 106.6    | 122.8    |          |         |
|                                   | SD                         | 16.5         | 17.5     | 20.5     | 13.9          | 16.5     | 16.3     |          | <0.001   |
|                                   | V, %                       | 15.2         | 14.3     | 15.5     | 15.4          | 15.5     | 13.3     |          |          |
| “Shuttle” run 4x9 m with carrying objects (sec.) | M                          | 14.7         | 12.4     | 11.6     | 15.5          | 12.9     | 12.3     |          |          |
|                                   | SD                         | 0.9          | 0.9      | 0.9      | 1.1           | 1.1      | 1.0      |          | <0.001   |
|                                   | V, %                       | 6.4          | 7.0      | 8.0      | 7.1           | 8.2      | 7.9      |          |          |
| Forward torso bending in sitting position (cm) | M                          | 1.8          | 2.3      | 2.7      | 4.7           | 6.5      | 7.9      |          |          |
|                                   | SD                         | 2.8          | 2.4      | 2.6      | 4.8           | 4.6      | 5.2      |          | <0.001   |
|                                   | V, %                       | 151.1        | 104.9    | 98.7     | 100.5         | 70.7     | 65.7     |          |          |

*p – difference between boys’ and girls’ physical fitness results.
progresses in primary school age. In this age period new motor skills and abilities to reconstruct them successfully are easily formed [5, 11].

We can state that boys and girls’ speed power abilities by indicators of “long jump from the spot” and “shuttle run 4 x 9 m (except 1st form)” correspond to high level. This level meets school program norms (see table 2).

The girls’ flexibility indicators in “Torso bending in sitting position” are at high level. In boys these indicators are at sufficient and high level.

Discussion
As numerous studies show, recent time there has been a tendency to children’s health, physical fitness and physical workability worsening [22, 28, 35]. By our data increment in speed-power abilities, flexibility and dexterity points are positive changes. It is explained by natural changes in child’s organism and influence of physical culture lessons. Physical fitness results, presented by us, coincide with results, received in other works [6, 8, 14, 18].

According to school program most of pupils (60.9%) demonstrate high level of fitness. Exclusion was boys in test for flexibility. Sufficient level was achieved only by 12.6% of pupils. 9.7% fulfilled the test at average level and 16.7% - at initial level. Non uniform distribution is observed. It causes doubts about objectiveness of program

Table 2. Comparison of physical fitness mean indicators of 1st – 3rd forms pupils according to school norms

| Form   | Sex | Data   | Peleshenko I. [13] | Vlasiuk O. [6] | Golovata O. [8] | Titarenko A. [17] | High level (as per program) |
|--------|-----|--------|-------------------|----------------|-----------------|-----------------|-----------------------------|
|        | Girls | 90.1   | 101.2             | 117.5          | –               | –               | > 90                        |
| 1 form | Boys  | 108.5  | 110.6             | 122.5          | –               | –               | > 100                       |
| 2 form | Girls | 106.6  | 109.7             | 136.4          | 99.9            | 108.0           | > 95                        |
|        | Boys  | 122.1  | 122.4             | 145.7          | 109.0           | –               | > 105                       |
| 3 form | Girls | 122.8  | 121.9             | 141.8          | –               | 123.4           | > 100                       |
|        | Boys  | 132.3  | 131.9             | 157.9          | –               | –               | > 110                       |
|        | Girls | 4.7    | 5.5               | 1.6**           | –               | –               | > 4                         |
| 1 form | Boys  | 1.8*** | 4.5               | - 1.3*         | –               | –               | > 2                         |
| 2 form | Girls | 6.5    | 7.6               | 4.9            | 3.1**           | 7.2             | > 4                         |
|        | Boys  | 2.3    | 6.8               | 2.3            | 1.1**           | –               | > 2                         |
| 3 form | Girls | 7.9    | 7.9               | 5.3            | –               | 9.9             | > 5                         |
|        | Boys  | 2.7*** | 5.8               | 2.8***         | –               | –               | > 3                         |
|        | Girls | 15.5*  | 14.7**            | –              | –               | –               | < 14.1                      |
| 1 form | Boys  | 14.7** | 14.9*             | –              | –               | –               | < 13.6                      |
| 2 form | Girls | 12.9   | 13.2              | –              | 14.0***         | 13.1            | < 14.0                      |
|        | Boys  | 12.4   | 14.0**            | –              | 13.7**          | –               | < 13.5                      |
| 3 form | Girls | 12.3   | 12.9              | –              | –               | 12.5            | < 13.2                      |
|        | Boys  | 11.6   | 12.8***           | –              | –               | –               | < 12.6                      |

Notes, level of achievements: * – initial; ** – average; *** – sufficient.
norms. May be the norms were artificially lowered and require reviewing. The same situation exists with norms for secondary and senior school age children [3, 15, 16].

Results of our work supplement the data of other authors [24, 26, 30] about optimization of physical loads for pupils. It facilitates strengthening of children’s health. Our results prove that there is demand in critical analysis of existing physical fitness norms for pupils. In other researches [9, 24] such approaches are also mentioned.

Conclusions
1. In the period from 1st to 3rd forms there happens improvement (p < 0.001) of physical fitness by all the tests in boys and girls. Boys’ results in tests for dexterity and speed power qualities were better than girls’. But girls had ahead in test for flexibility.

2. High level of pupils’ results in practically all the tests may be explained by lowered school norms that requires their reviewing.

Conflict of interests
The authors declare that there is no conflict of interests.

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