# THE LEVEL OF MOTOR ABILITIES IN CONSIDERATION OF HEALTH CONDITIONS OF SELECTED YOUTH GROUPS 

Key words: health condition, dispensary groups, EUROFIT, motor abilities.


#### Abstract

In Poland over one third of school students experience health problems. Their health condition is constantly monitored. In the case of some children serious health problems are an obstacle to their full participation in physical education classes. Other children with minor health problems choose to attend these classes. The purpose of this research was to find the answer to the following question: To what extent is the students' health condition related to their fitness? 615 boys and girls aged 11-15 years were constituted the study sample. The subjects were divided into two groups: Group A consisting of healthy students, and Group B comprising students with various health conditions that allowed them, however, to attend physical education classes. After taking measurements of the students' height and weight we carried out five EUROFIT fitness tests. In the younger pupils, especially among girls, a significant correlation was observed between the lower fitness level and worse state of health. In older age groups the differences in fitness between Group A and Group B were leveled out. It is an effect of receiving good health care (despite economic problems of state health care institutions in Poland) by students and parents' increasing awareness of the importance of prophylactic activities.


## INTRODUCTION

According to the norms of the World Health Organization (WHO) human "health" can be described as a good physical, mental and social state, and not merely a life without diseases. A good health condition determines, among many things, children's achievement of good school results. Good health care is both an individual and social matter [4].

Physical education in an educational system is strictly associated with the so-called health education. Students' health condition is monitored by way of balanced evaluation and screening in schools. Monitoring schemes cover children and teenagers from their birth until their $18^{\text {th }}$ birthday. A proper health balance for a particular age accounts for individual development of a student.

The results of various studies serve as a basis for classification of school children into dispensary and counselling groups [6]. Eleven dispensary groups are distinguished marked with Roman numerals; the present study has taken into account groups III - XI:
III - chronic nutritional disorders and deficiency states
IV - somatic and mental development disorder
V - sight diseases and defects
VI - hearing and speech impairment
VII - chronic disorders of the respiratory system
VIII - diseases and disorders of the cardiovascular system, rheumatism
X - permanent damage of the vestibular apparatus XI - other chronic diseases requiring active counselling

[^0]The word dispensary (from French "dispensaire") means prophylactic health care and medicalsanitary care offered to groups of people, especially children and teenagers [14].

Qualifying pupils to a dispensary group does not necessarily mean their exemption from attending physical education classes. In the case of major diseases this, however, can be true. Many students assigned to dispensary groups take up physical education, except that they come under special recommendation and are included in certain groups or subgroups (A, B, C). Assignment to groups is based on an assumption that Group A includes only students who are completely healthy and Group B - students who belong to dispensary groups, however, participating in PE classes with medical restrictions or requiring corrective exercises. Group C consists of students with diseases that do not allow them to take part in physical education classes. A PE teacher should have good knowledge about students’ assignment to the particular groups.

According to some authors at least one third of children and teenagers in Poland face health problems [8, 19]. Among the young people from some regions of Poland or attending certain schools, the number of people with posture defects or other illnesses is even bigger [16, 17]. There are also students with more than one serious health conditions. Some of the illnesses have a significant impact on students’ performance at school. It was indirectly pointed out by Sowa [13] who linked ill health with insufficient verbal skills and poor results at school. The common opinion prevails that a worse health condition can be directly connected with poor fitness. Is it really the case in reference to school physical education? The question is whether and to what extent the young people who take up physical education at school differ in terms of their somatic features and motor abilities, taking into consideration their health conditions and inclusion into dispensary groups? The purpose of the study was to mark differences in the mentioned features among boys and girls aged 11-15, classified according to their age and health condition.

## METHODS

The research was carried out among students from a number of towns in the Wielkopolska Region in Poland, who took physical education classes three hours per week. They did not participate in any additional classes organized by their schools. On the basis of the students' health records
and general regulations concerning their ability to attend physical education classes, they were divided into two groups: Group A (completely healthy students) and Group B (students attending PE classes with some restrictions). In total 659 boys and girls aged 11-15 participated in the study. Group A consisted of 278 schoolgirls and schoolboys, which made up $45.2 \%$ of the whole sample; Group B comprised 337 students (54.8\%); the remaining 44 boys and girls exempted from attending physical education classes constituted Group C (6.7\%). Students' height and weight were measured as basic somatic features. Five EUROFIT fitness tests [3] were carried out: standing broad jump measuring explosive strength of lower limbs; shuttle run $10 \times 5 \mathrm{~m}$ measuring speed and agility; standing on one foot measuring general body balance; plate tapping test measuring speed of hand movements; and dynamic strength of stomach muscles. Basic descriptive statistics were calculated. The differences between average values were estimated using variance analysis with the level of statistical significance at $\mathrm{p}<0.05$.

## RESULTS

The height and weight measurements (Table 1 and Table 2) show similar values in particular age groups regardless of students' health condition. The only exception was the statistically lower average height of the 13 -year-old girls from Group B as compared with Group A.

The level of fitness in the case of explosive strength of lower limbs (Table 3) is higher in Group A in almost all age categories except girls aged 13, where the difference between Group A and B was statistically significant. Also, with almost no exception, slightly faster movements are characteristic for the boys and girls from Group A. A similar correlation can be observed in the balance test (Table 5), however, the oldest students from Group B appeared to obtain higher values of the examined feature than their peers with no health problems (Group A). The speed of hand movements (Table 6) does not show a correlation with the students’ affinity to a particular group. The dynamic strength of stomach muscle (Table 7) is at a higher level among younger boys and all girls from Group A, and only among older boys in Group B.

Table 1. Subjects' height characteristics (cm)

| sex | age | health category | N | min. | max | M | $\delta$ | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| boys | 11 | A | 21 | 135 | 158 | 145.30 | 6.29 | 0.2556 |
|  |  | B | 32 | 135 | 160 | 147.50 | 6.81 |  |
|  | 12 | A | 12 | 143 | 162 | 149.80 | 5.13 | 0.9084 |
|  |  | B | 30 | 138 | 162 | 150.10 | 7.26 |  |
|  | 13 | A | 46 | 149 | 176 | 164.18 | 8.01 | 0.6951 |
|  |  | B | 62 | 139 | 177 | 159.37 | 10.01 |  |
|  | 14 | A | 40 | 158 | 175 | 171.40 | 6.91 | 0.3689 |
|  |  | B | 27 | 162 | 200 | 173.11 | 8.51 |  |
|  | 15 | A | 29 | 161 | 184 | 171.96 | 5.28 | 0.8107 |
|  |  | B | 21 | 166 | 183 | 171.50 | 5.19 |  |
| girls | 11 | A | 15 | 136 | 153 | 144.80 | 6.53 | 0.9053 |
|  |  | B | 31 | 131 | 159 | 144.40 | 7.22 |  |
|  | 12 | A | 19 | 140 | 164 | 149.60 | 6.48 | 0.5941 |
|  |  | B | 22 | 138 | 163 | 151.04 | 6.46 |  |
|  | 13 | A | 40 | 152 | 170 | 163.18 | 4.49 | 0.0047* |
|  |  | B | 62 | 142 | 175 | 159.07 | 8.25 |  |
|  | 14 | A | 39 | 153 | 178 | 164.74 | 6.21 | 0.6357 |
|  |  | B | 36 | 154 | 184 | 164.06 | 6.04 |  |
|  | 15 | A | 17 | 155 | 176 | 166.65 | 5.74 | 0.1459 |
|  |  | B | 14 | 157 | 167 | 162.00 | 4.08 |  |

Table 2. Subjects' weight characteristics (kg)

| sex | age | health category | N | min. | max | M | $\delta$ | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 11 | A | 21 | 24 | 50.5 | 38.76 | 7.00 | 0.2227 |
|  | 11 | B | 32 | 27 | 61 | 41.50 | 8.42 | 0.2227 |
|  | 12 | A | 12 | 33.5 | 53.5 | 43.33 | 7.17 | 0.7954 |
|  | 12 | B | 30 | 25 | 64.5 | 44.17 | 7.89 | 0.7954 |
| boys | 13 | A | 46 | 36 | 85 | 54.16 | 9.52 | 0.2992 |
| boys | 13 | B | 62 | 33 | 85 | 53.15 | 10.65 | 0.2952 |
|  | 14 | A | 40 | 41 | 105 | 60.18 | 12.67 | 0.2972 |
|  |  | B | 27 | 45 | 115 | 63.55 | 13.16 | 0.2972 |
|  | 15 | A | 29 | 50 | 83 | 60.96 | 8.05 | 0.6331 |
|  |  | B | 21 | 50 | 93 | 62.90 | 11.24 |  |
| girls | 11 | A | 15 | 31 | 52 | 43.70 | 7.77 | 0.5245 |
|  |  | B | 31 | 26 | 60 | 41.27 | 7.83 |  |
|  | 12 | A | 19 | 33 | 55 | 39.72 | 7.72 | 0.7599 |
|  |  | B | 22 | 29 | 64 | 40.72 | 8.42 |  |
|  | 13 | A | 40 | 35 | 65 | 51.23 | 6.46 | 0.4396 |
|  |  | B | 62 | 30 | 82 | 52.92 | 12.74 |  |
|  | 14 | A | 39 | 42 | 74 | 54.68 | 7.03 | 0.4446 |
|  |  | B | 36 | 33 | 105 | 56.68 | 14.52 |  |
|  | 15 | A | 17 | 46 | 76 | 56.11 | 7.45 | 0.9780 |
|  |  | B | 14 | 48 | 67 | 56.00 | 8.20 |  |

Table 3. Standing broad jump test results (cm)

| sex | age | health <br> category | N | min. | max | M | $\delta$ | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| boys | 11 | A | 21 | 116 | 187 | 152.58 | 21.30 | 0.1232 |
|  |  | B | 32 | 102 | 183 | 143.15 | 21.52 |  |
|  | 12 | A | 12 | 127 | 175 | 161.75 | 12.97 | 0.1758 |
|  |  | B | 30 | 107 | 188 | 152.96 | 20.40 |  |
|  | 13 | A | 46 | 120 | 245 | 195.75 | 31.95 | 0.2358 |
|  |  | B | 62 | 108 | 245 | 184.13 | 34.67 |  |
|  | 14 | A | 40 | 152 | 250 | 204.07 | 26.36 | 0.3039 |
|  |  | B | 27 | 142 | 245 | 210.85 | 26.08 |  |
|  | 15 | A | 29 | 135 | 238 | 198.96 | 26.18 | 0.1464 |
|  |  | B | 21 | 100 | 239 | 182.70 | 39.27 |  |
| girls | 11 | A | 15 | 139 | 162 | 147.02 | 8.98 | 0.3135 |
|  |  | B | 31 | 72 | 166 | 136.87 | 21.66 |  |
|  | 12 | A | 19 | 152 | 168 | 160.57 | 5.03 | 0.0030* |
|  |  | B | 22 | 115 | 162 | 145.28 | 13.68 |  |
|  | 13 | A | 40 | 105 | 204 | 156.42 | 20.08 | 0.0123* |
|  |  | B | 62 | 105 | 185 | 147.11 | 16.54 |  |
|  | 14 | A | 39 | 107 | 197 | 157.39 | 14.99 | 0.1114 |
|  |  | B | 36 | 129 | 181 | 152.41 | 11.18 |  |
|  | 15 | A | 17 | 138 | 207 | 164.05 | 20.04 | 0.6739 |
|  |  | B | 14 | 142 | 175 | 159.5 | 13.82 |  |

Table 4. Speed test - shuttle run $10 \times 5 \mathrm{~m}$ (s)

| sex | age | health category | N | min. | max | M | $\delta$ | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| boys | 11 | A | 21 | 21.19 | 32.39 | 25.40 | 2.97 | 0.0622 |
|  |  | B | 32 | 21.17 | 30.09 | 23.95 | 2.19 |  |
|  | 12 | A | 12 | 21.92 | 31.02 | 24.28 | 2.42 | 0.2063 |
|  |  | B | 30 | 21.60 | 38.02 | 25.94 | 4.16 |  |
|  | 13 | A | 46 | 18.40 | 33.00 | 22.84 | 2.74 | 0.8117 |
|  |  | B | 62 | 18.00 | 33.35 | 24.05 | 3.04 |  |
|  | 14 | A | 40 | 17.00 | 28.56 | 21.18 | 2.40 | 0.6000 |
|  |  | B | 27 | 17.30 | 23.82 | 20.90 | 1.62 |  |
|  | 15 | A | 29 | 20.00 | 25.60 | 22.34 | 1.54 | 0.0263* |
|  |  | B | 21 | 20.40 | 36.30 | 24.69 | 4.93 |  |
| girls | 11 | A | 15 | 22.86 | 27.73 | 24.21 | 1.99 | 0.1324 |
|  |  | B | 31 | 22.98 | 29.72 | 25.53 | 1.75 |  |
|  | 12 | A | 19 | 21.93 | 23.37 | 22.64 | 1.49 | 0.0005* |
|  |  | B | 22 | 21.78 | 25.76 | 24.09 | 1.06 |  |
|  | 13 | A | 40 | 19.20 | 28.40 | 23.10 | 2.33 | 0.3275 |
|  |  | B | 62 | 19.40 | 30.82 | 23.57 | 2.31 |  |
|  | 14 | A | 39 | 18.60 | 30.24 | 23.07 | 2.75 | 0.2073 |
|  |  | B | 36 | 19.10 | 29.60 | 23.83 | 2.31 |  |
|  | 15 | A | 17 | 21.20 | 26.20 | 23.42 | 1.66 | 0.7467 |
|  |  | B | 14 | 22.00 | 27.2 | 23.14 | 2.88 |  |

Table 5. Flamingo balance test results (number)

| sex | age | health category | N | min. | max | M | $\delta$ | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| boys | 11 | A | 21 | 1 | 15 | 8.09 | 5.75 | 0.6084 |
|  |  | B | 32 | 1 | 15 | 7.31 | 5.17 |  |
|  | 12 | A | 12 | 1 | 14 | 6.42 | 5.07 | 0.0461 |
|  |  | B | 30 | 1 | 15 | 10.00 | 5.10 |  |
|  | 13 | A | 46 | 1 | 15 | 6.59 | 4.33 | 0.7097 |
|  |  | B | 62 | 1 | 15 | 8.62 | 4.48 |  |
|  | 14 | A | 40 | 2 | 24 | 6.98 | 3.81 | 0.7963 |
|  |  | B | 27 | 2 | 12 | 7.20 | 2.45 |  |
|  | 15 | A | 29 | 1 | 14 | 6.69 | 3.62 | 0.4434 |
|  |  | B | 21 | 2 | 13 | 5.68 | 3.33 |  |
| girls | 11 | A | 15 | 3 | 10 | 7.20 | 2.28 | 0.3924 |
|  |  | B | 31 | 1 | 15 | 8.96 | 4.40 |  |
|  | 12 | A | 19 | 2 | 12 | 6.55 | 3.13 | 0.0175* |
|  |  | B | 22 | 1 | 15 | 10.45 | 4.17 |  |
|  | 13 | A | 40 | 1 | 17 | 5.98 | 3.05 | 0.0294* |
|  |  | B | 62 | 1 | 15 | 7.59 | 3.90 |  |
|  | 14 | A | 39 | 2 | 11 | 5.94 | 2.12 | 0.0837 |
|  |  | B | 36 | 2 | 12 | 6.85 | 2.29 |  |
|  | 15 | A | 17 | 3 | 13 | 6.71 | 2.79 | 0.1381 |
|  |  | B | 14 | 2 | 10 | 4.22 | 3.32 |  |

Table 6. Plate tapping test results (s)

| sex | age | health category | N | min. | max | M | $\delta$ | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| boys | 11 | A | 21 | 11.89 | 16.95 | 14.05 | 1.47 | 0.1896 |
|  |  | B | 32 | 11.79 | 19.59 | 14.76 | 2.13 |  |
|  | 12 | A | 12 | 11.76 | 18.69 | 14.12 | 1.84 | 0.4460 |
|  |  | B | 30 | 11.16 | 19.29 | 13.65 | 1.72 |  |
|  | 13 | A | 46 | 9.00 | 23.00 | 13.32 | 2.93 | 0.5431 |
|  |  | B | 62 | 9.50 | 21.20 | 13.06 | 1.97 |  |
|  | 14 | A | 40 | 9.40 | 18.70 | 11.72 | 1.84 | 0.2849 |
|  |  | B | 27 | 8.80 | 16.25 | 13.11 | 1.78 |  |
|  | 15 | A | 29 | 8.10 | 14.00 | 10.84 | 1.38 | 0.7805 |
|  |  | B | 21 | 8.30 | 14.60 | 10.69 | 1.78 |  |
| girls | 11 | A | 15 | 13.57 | 16.95 | 14.81 | 1.33 | 0.3456 |
|  |  | B | 31 | 13.72 | 20.67 | 15.49 | 1.52 |  |
|  | 12 | A | 19 | 12.46 | 14.75 | 13.10 | 0.74 | 0.2644 |
|  |  | B | 22 | 12.28 | 14.85 | 13.43 | 0.72 |  |
|  | 13 | A | 40 | 8.50 | 14.10 | 11.08 | 1.49 | 0.3844 |
|  |  | B | 62 | 8.70 | 18.80 | 12.86 | 1.68 |  |
|  | 14 | A | 39 | 8.60 | 15.00 | 11.17 | 1.38 | 0.0352* |
|  |  | B | 36 | 8.10 | 16.50 | 11.94 | 1.70 |  |
|  | 15 | A | 17 | 9.20 | 13.60 | 10.89 | 1.08 | 0.4511 |
|  |  | B | 14 | 9.80 | 11.40 | 10.45 | 0.75 |  |

Table 7. Abdominal muscles 30 s strength test (sit-ups) results (number)

| sex | age | health category | n | min. | max | M | $\delta$ | P |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| boys | 11 | A | 21 | 15.0 | 26.0 | 21.90 | 3.12 | 0.0798 |
|  |  | B | 32 | 10.0 | 26.0 | 19.97 | 4.26 |  |
|  | 12 | A | 12 | 19.0 | 28.0 | 24.00 | 3.07 | 0.1312 |
|  |  | B | 30 | 12.0 | 29.0 | 21.63 | 4.93 |  |
|  | 13 | A | 46 | 17.0 | 34.0 | 27.08 | 4.32 | 0.7535 |
|  |  | B | 62 | 11.0 | 38.0 | 24.37 | 4.93 |  |
|  | 14 | A | 40 | 16.0 | 35.0 | 26.77 | 4.85 | 0.7626 |
|  |  | B | 27 | 14.0 | 36.0 | 27.14 | 5.05 |  |
|  | 15 | A | 29 | 15.0 | 33.0 | 23.93 | 4.67 | 0.3038 |
|  |  | B | 21 | 20.0 | 31.0 | 25.70 | 4.47 |  |
| girls | 11 | A | 15 | 15.0 | 22.0 | 19.00 | 2.64 | 0.8477 |
|  |  | B | 31 | 10.0 | 23.0 | 18.67 | 3.55 |  |
|  | 12 | A | 19 | 19.0 | 24.0 | 21.11 | 1.69 | 0.1184 |
|  |  | B | 22 | 14.0 | 24.0 | 19.45 | 2.87 |  |
|  | 13 | A | 40 | 8.0 | 31.0 | 23.22 | 4.89 | 0.0000* |
|  |  | B | 62 | 3.0 | 29.0 | 17.94 | 6.32 |  |
|  | 14 | A | 39 | 11.0 | 27.0 | 21.68 | 3.15 | 0.0000* |
|  |  | B | 36 | 2.0 | 26.0 | 15.91 | 6.42 |  |
|  | 15 | A | 17 | 18.0 | 27.0 | 21.29 | 2.51 | 0.2686 |
|  |  | B | 14 | 16.0 | 24.0 | 19.50 | 4.12 |  |

## DISCUSSION

The study aimed at evaluation of the fitness level of 11-15-year-old children alongside general evaluation of their health condition as indication for participation in systematic physical education classes. The age range in question is a period when important changes take place, both in body formation and fitness. The problem of the level of fitness depending on health condition concerns only schoolchildren that have been allowed to participate in physical education and additional courses. It has been assumed that a better health condition determines a better level of fitness, as good state of health preconditions sports achievements. Therefore, the question remains whether the application of the health condition criterion based on the affinity to dispensary groups, which is widely used in qualification of schoolchildren to attend physical education classes, is necessary. The commonly used EUROFIT tests were applied to evaluate students' fitness. EUROFIT is a common fitness tool used for assessment of results alone or along with the health condition. No single component of the test can evaluate general fitness in its entirety, [5] and that is why several fitness tenets were tested.

The obtained results were similar to those achieved by Osinski and Biernacki in their study of
children from Poznań [11]. The study showed there was no mutual conditioning of physical development and state of health regardless of gender and age. The level of fitness evaluated on the basis of the performed tests seems to be correlated with health condition only partially. It concerns mostly younger children of both sexes. It should be mentioned that regardless of health condition, there is a higher relationship in younger groups (5-7 years old) between the students' level of fitness and age rather than sex [5]. Among the children from Group A motor abilities tests requiring involvement of great muscle groups (standing broad jump, forward bend from back lying position) demonstrated a higher level of fitness. When local muscles were engaged however, e.g. movement within one joint, the differences between groups were not significant. At the age of 14-15 differences between Groups A and B levelled out, and in some fitness features children with health restrictions even gained advantage. However, this concerns more boys then girls. This fact is quite surprising, although similar examples can be found in other studies, e.g. Owczarek [12] in which the so-called "simple obesity" was found as a factor restricting fitness, but at the same time it was proven that the existing posture defects did not prevent the subjects from achieving the level of fitness above the average.

Different studies demonstrate even more proofs concerning the positive effect of physical activities not only on healthy people but also on those with health problems. Enhanced physical activity is a good way of reducing the so-called health risk factors, such as high cholesterol level, high blood pressure or higher then average amount of fatty skin folds. This was revealed in Denmark [2] and confirmed in a cross-sectional research carried out later in Sweden [10]. These two Scandinavian countries rank among the leading ones in the field of health prophylaxis. In recent years the positive influence of rationally enhanced and controlled physical effort on health has been shown in a number of studies, even in subjects with such serious illnesses of the respiratory system as asthma. Approximately 40 years ago the effects of breathlessness combined with the fear of asthma attack usually led to avoidance of physical exercise [15]. Recently, however, it was revealed that regular physical exercise under medical supervision improves respiratory parameters of asthmatic children [1, 15]. Some illnesses seem to be naturally associated with decreased physical activity, e.g. the number of physically active epileptics is three times smaller then their healthy counterparts [18]. However, there is a considerable number of programs aimed to encourage people with epilepsy to undertake any physical activity [18].

Even though this study did not focus on the health condition of children and teenagers practising sports it is worth mentioning that different authors disagree with the common views about the harmful influence of sport on health. For example, long-term tests on the influence of football training on health and physical development of young boys did not show any negative effects on the subjects' health [7]. This process, however, must be constantly controlled by institutional medical services [9]. If we look at human health from the standpoint of fitness (in its general meaning, not only in the sense of motor results), we will see this matter as some kind of equivalency to human biological value.

The present study of younger children of both sexes shows noticeably higher levels of fitness in completely healthy children. In the older age groups these differences level out. It can be assumed that the natural process of physical development contributes to the compensation of retardation of motor fitness. It is also supported by the cumulated effect of extra corrective-compensative exercises, often implemented on parents’ initiative. Also the socio-cultural factor plays a significant role at the age when body care, shape
and willingness to attract peers of the opposite sex become very significant. The research proves that young people's health condition is rather poor, even in such an economically leading region of Poland as Wielkopolska.
Conclusions:

1. Physical development of boys and girls from all age groups does not seem to be particularly connected with their health condition.
2. The level of motor ability reflecting various, but not all motor abilities, is similar in particular age groups divided according to subjects’ health condition. There are bigger differences among girls from dispensary groups. In boys, especially older ones, participating in various forms of health prophylaxis, some motor abilities appear to be at a higher level.
3. The highly unsatisfactory health condition of children and young people that has been revealed in the study does not reflect a particularly low level of motor ability. It seems that despite numerous imperfections, education and health care systems work in a quite cohesive way, and therefore children with some health problems can benefit from them. In many cases, we can assume that parents' awareness plays an important role as they can muster their energies in order to fight off their children's illnesses by way of systematic and reasonable physical exercises.

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