



ANALYSIS OF THE PHYSICAL FITNESS OF STUDENTS IN THE SPECIALTY "KINESITHERAPY" AT THE MEDICAL UNIVERSITY – SOFIA

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ABSTRACT

The discipline "Sports for All" is mandatory in the curriculum of the specialty "Kinesitherapy". At the beginning of the present study to school year 2015/2016 she has a work schedule of 60 hours per year for the entire period of study. Then there are a lot of changes, at this stage it is taught only in the first year and at the end of the study students take a semester exam.

The purpose of the study is to analyze the state of physical fitness of students and to make a proposal for the inclusion of professionally oriented activities in the discipline "Sports for All" in the education of students.

Tasks: 1) Analysis of the results of the semester exams in the discipline "Sports for All" of students majoring in "Kinesitherapy". 2) To reveal the average level and variability of the indicators characterizing the physical fitness of the students. 3) To make conclusions and suggestions for the inclusion of professionally oriented activities in the education of students.

The obtained results inform us about the physical preparation of the students and allow us to make the necessary adjustments in the curriculum of the discipline "Sports for All".

Key words: Kinesitherapy, sports, students, physical fitness.

INTRODUCTION

The discipline "Sport for All" is mandatory in the curriculum of the specialty "Kinesitherapy". At the beginning of the observation period of the present study (academic year 2013/2014) to academic year 2015/2016 the discipline had a determined number of 60 hours per year for the entire period of study program. Later, a lot of changes were introduced, and at the moment, the discipline is taught only during the first year of studies, which is extremely insufficient.

At the end of the academic year in which the discipline is taught, students take a semester exam through which can be reported the

development of motor skills, which are professionally important for students – Kinesitherapists. It was found in our previous studies that for successful implementation of their professional activities, kinesitherapists are required to be in good general physical and health condition and to have achieved basic physical qualities and abilities - strength, endurance and coordination (1).

Motor qualities are the basis of every human activity. Our efforts are focused on the development and maintainance of the necessary motor skills during the higher education study period and gaining knowledge of organized or independent sports activities to help the future professional realization of the graduates after completing their studies.

The goal of this study is to analyze the state of physical fitness of students and to make suggestions for inclusion of professionally

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oriented exercises in the discipline "Sport for All" in student training.

MATERIALS AND METHODS

In order to achieve this goal, the following **tasks** were set: 1) To analyze the results of the semester exams in the discipline "Sport for All" of students in the specialty "Kinesitherapy". 2) To establish the average level and variability of the indicators that characterize the physical fitness of students. 3) To make conclusions and suggestions for the inclusion of professionally oriented activities in the student training.

The study was conducted in the period 2014 - 2019 with a total of 137 students majoring in Kinesitherapy, who study at the Faculty of Public Health at the Medical University - Sofia. Of these, 73 are women and 64 are men.

The research methodology includes testing students on four indicators – Standing long jump,

Straightening from a supine position to a seat for 30 seconds, Folding and unfolding the arms in a support for 30 seconds, Grip strength (comfortable hand), measured with a force gauge. These indicators are included in the semester exam of the students at the end of their training in the discipline "Sport for All". The number of students who have passed their semester exams is presented by academic years and by gender in **Table 1**. This number also includes students enrolled in the specialty "Kinesitherapy" after initial study in other universities or other specialties of the Medical University - Sofia for the respective academic year; this is the reason for the differences in the initial number of newly admitted students. In the distribution by gender we observe a slight predominance of women, with the largest number in the academic year 2015/2016 - 24.

Table 1. Study participants (semester exam)

Number of students Academic year	Number of women	Number of men
2014/15	12	15
2015/16	24	22
2016/17	8	10
2017/18	10	7
2018/19	19	10
Total:	73	64

To process the collected information about the level of physical fitness of students, future specialists Kinesitherapists, mathematical and statistical methods for quantitative assessment of the studied indicators have been applied.

RESULTS AND DISCUSSION

Table 2 present the main mathematical parameters of the variation analysis. The calculated arithmetic mean (\bar{X}), standard deviation (S), coefficient of variation (V), respectively for men and women, for the studied period and the added minimum and maximum values for each attribute allow, in relation to certain criteria, to perform comparisons and analyzes, as well as to make appropriate conclusions about the average level of physical fitness of students - Kinesitherapists.

The studied indicators provide information about the level of development of basic physical qualities necessary for students and especially those that would be influenced by students' sports activities during the semester.

Some of the mentioned tests are invariably present in the test batteries of other sports researchers from higher schools as having proven their importance for studying the professionally applied effectiveness of physical education and sports for students in different specialties (2-8). I. Stavreva reveals in her dissertation work that the professional compliance of the training in the discipline "Physical Education and Sports" (PES) in higher education has not been subject to comprehensive considerations, there is a lack of scientifically based theory, curricula and

experimental methods developed in relation to the results of practical training in PES classes in non-specialized sports higher schools (7). The lack of such research in the University of Mining and Geology "St. Ivan Rilski" and other related technical universities on the "applicability" of the available main sports encouraged specialists to conduct such studies. S. Stavrev & I. Stoilov examined the physical capacity of 97 men - students who participated in basketball and football classes once a week and one of the tests

was "Grip strength - manual dynamometry". The study shows a slight predominance of achievements in favor of basketball players which according to the authors is understandable given the specifics of the game and its rules - all actions with the ball are performed with the hands. These results are not statistically supported (8). Later in the analysis we will make a comparison, as far as the tests allow, with the results of the mentioned studies.

Table 2. Mean values and variability of fitness indicators

No	Test (Unit of measure)	Gender	min.	max.	\bar{x}	S	V
1.	Standing long jump (cm)	men	133	270	207,14	23,98	11,58
		women	93,00	205,00	161,44	23,27	14,42
2.	Straightening from a supine position to a seat (Count)	men	22	45	32,08	4,19	13,08
		women	17,00	45,00	26,88	5,32	19,79
3.	Folding and unfolding the arms in a support (Count)	men	27	66	47,20	7,62	16,14
		women	5,00	39,00	24,26	5,84	24,07
4.	Grip strength (comfortable hand)(kg)	men	30,7	80	53,36	9,21	17,26
		women	21,40	42,30	31,54	4,60	14,60

We tested 64 first-year students, majoring in Kinesotherapy, at the end of their training in the discipline "Sport for All". Their average score in relation to the indicator №1 "Standing long jump" for the studied period is $\bar{x} = 207.14$ cm, which indicates a good level of explosive force of the lower extremities under horizontal forces (Table 2). To check how homogeneous the studied group is in terms of the level of development of physical

qualities, it is necessary to analyze the coefficients of variation - V. With this indicator the group is relatively stable ($V = 11.58$), according to the norms of sports statistics (9).

The dynamics of this sign for the respective study year of students in the specialty "Kinesotherapy" is presented in Figure 1. The average values are close as the best result is achieved in academic year 2016/2017 - 219 cm.

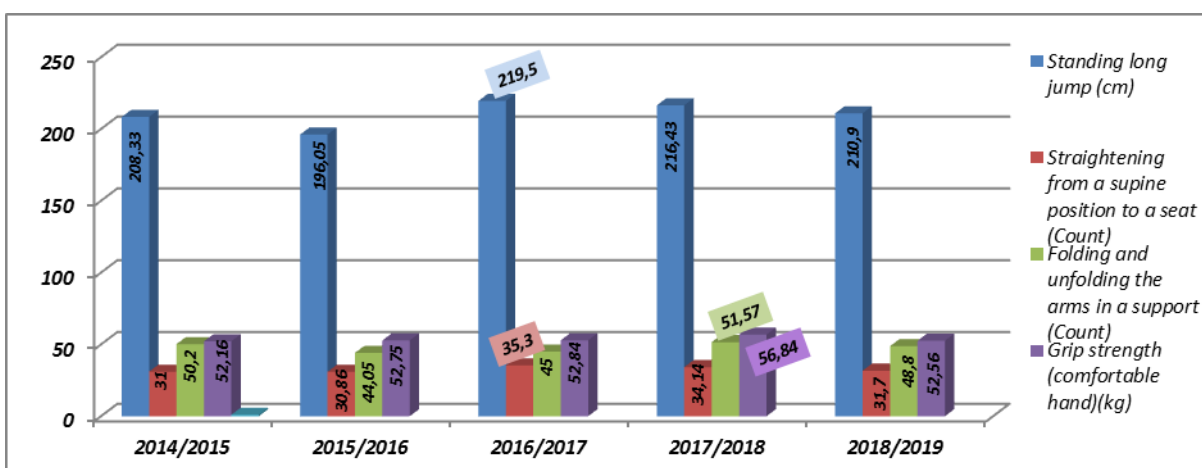


Figure 1. Dynamics of indicators (men)

The strength of the abdominal muscles was measured with the indicator №2 "Straightening from a supine position to a seat". The average value for the studied period is $\bar{X} = 32.08$, and the group is relatively homogeneous ($V = 13.08$) (**Table 2**). In the dynamics of achievements (**Figure 1**) we observe a significant increase in the results since the beginning of the study, academic year 2014/2015, up to academic year 2016/2017 respectively from $\bar{X} = 31$ up to $\bar{X} = 35.3$ repetitions. In the next two conducted tests the achievements marked a slight decrease to = 31.7 repetitions for the last year.

The analysis of the indicator №3 "Folding and unfolding the arms in support" used to demonstrate the explosive force of the arms and the shoulder girdle shows for men an average value of $\bar{X} = 47.20$ repetitions for the study period. With regard to the variation (V) of the same indicator, it was found that the sample is relatively homogeneous ($V = 16.14$) (**Table 2**). It can be seen from **Figure 1** that the dynamics of the indicator moves in waves as the lowest average values are in the middle of the period, during the academic year 2015/2016 ($\bar{X} = 44.05$) and 2016/2017 ($\bar{X} = 45$ r.). The other results are in the range of 48.8 r. up to 51.57 r. which is around and above the average score for students (47.20 repetitions, **Table 2**).

Specialists in the field of physical education and sports increasingly include in their studies Strength tests of the comfortable hand using the test "Manual dynamometry" (8, 10-14, etc.). For example, the authors S. Stavrev & I. Stoilov determine in their study the degree of development of basic motor skills of students at the University of National and World Economy, including the strength of the comfortable hand, and the impact it has on the skills improvement in practicing two traditional sports - basketball and football (8).

In the study of our students on the indicator №4 "Grip strength" an average result of $\bar{X} = 53.36$ kg and relative homogeneity of the group on the indicator of the strength of the comfortable hand ($V = 17.26$) (**Table 2**).

The comments on the dynamics of the indicator presented in **Figure 1** is that during the whole study period the achievements show approximately the same values (from $\bar{X} = 52.16$ kg to $\bar{X} = 52.84$ kg). An exception is the result of students for the academic year 2017/2018 which is $\bar{X} = 56.84$ kg, i. e. with 4.68 kg higher than the lowest result.

For comparison, the students from the University of Forestry have achieved lower results on this indicator than those of the students - Kinesitherapists. Their achievements are $\bar{X} = 47.67$ kg at their first testing at the beginning of the academic year and $\bar{X} = 51.16$ kg at the second test at the end of the study period (15).

The average result of the indicator №1 "Standing long jump" in women for the period of the study is $\bar{X} = 161.44$ cm. The variation coefficient is $V = 14.42$ which, according to the criteria of sports statistics, defines the group as relatively stable (9) (**Table 2**).

The dynamics of the indicator moves gradually with a sharp decline in the academic year 2015/2016, after which there is a definite improvement and retention of the results (**Figure 2**). There is a significant reduction in the achievement compared to the previous year (academic year 2014/2015) with 19.42cm, reaching to $\bar{X} = 146.33$ cm. The results for the last three years are close in values, during the academic year 2016/2017 - $\bar{X} = 173.5$ cm (the best result), the acad. year 2017/2018 - $\bar{X} = 167$ cm and during the acad. year 2018/2019 - $\bar{X} = 169.79$ cm. All of them are above the average value for the indicator of explosive power of lower limbs under horizontal forces (**Table 2**).

The average value of the strength of the abdominal muscles in female students for the studied period (indicator №2 "Straightening from a supine position to a seat" is $\bar{X} = 26.88$; the group is relatively homogeneous with $V = 19.79$) (**Table 2**).

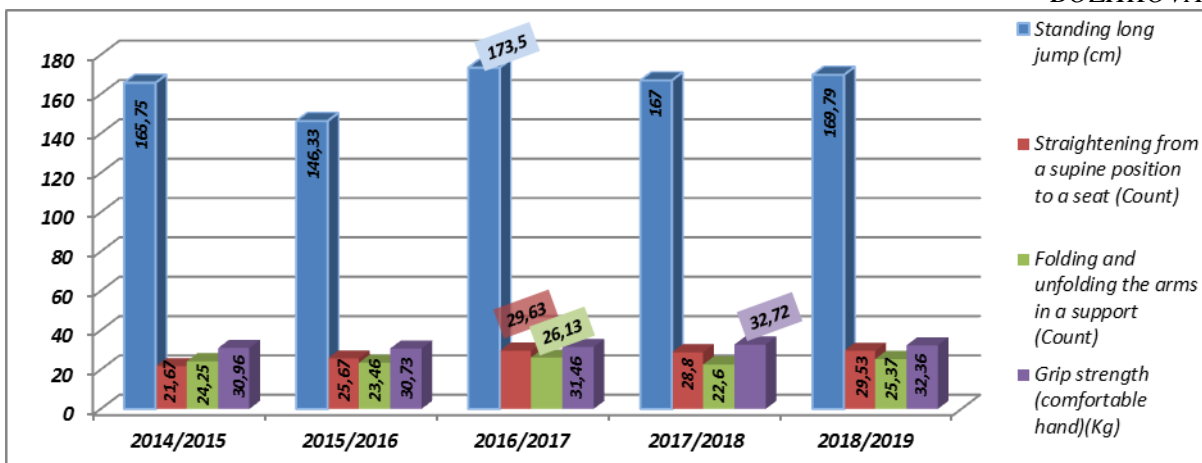


Figure 2. Dynamics of indicators (women)

The dynamics of the achievements is shown in **Figure 2**, where we observe a gradual increase in comparison of the results from the beginning of the study. During the academic year 2014/2015 the average value is $\bar{X} = 21.67$ sit-up repetitions, during the academic year 2015/2016 their number increased to $\bar{X} = 25.67$ and in the academic year 2016/2017 increased to $\bar{X} = 29.63$ which is the best result. During the next two years of the studied period the testing results are kept around the highest achieved value, respectively $\bar{X} = 28.8$ and $\bar{X} = 29.53$ sit-up repetitions.

The analysis of indicator №3 "Folding and unfolding the arms in support" for the explosive force of the arms and the shoulder girdle, for women shows an average value for the studied period of $\bar{X} = 24.26$. With regard to the variation (V) of the same indicator it was found that the sample is relatively homogeneous ($V = 24.07$) (**Table 2**).

Figure 2 shows that the dynamics of the indicator is in the range of $\bar{X} = 22.6$ sit-ups during the acad. year 2017/2018 to $\bar{X} = 26.13$ during the year 2016/2017, i. e. with a number of 3.53 repetitions more which is the biggest difference. The results of the testing of the students according to the indicator № 4 "Grip strength" show an average result of $\bar{X} = 31.54$ kg and relative homogeneity of the group according to the indicator for strength of the comfortable hand with $V = 14.60$ (**Table 2**).

Our comment on the dynamics of the indicator presented in **Figure 2** is that in the period of the study the achievements are close in value - $\bar{X} = 30.73$ kg in academic 2015/2016 year to $\bar{X} = 32.72$ kg during the academic year 2017/2018 which is the highest achieved result.

For comparison, the students from the University of Forestry showed in the first testing at the beginning of the academic year an achievement of $\bar{X} = 27.40$ kg, which in the second test, at the end of the study, was improved to $\bar{X} = 29.77$ kg (15). Both results are lower than those of the students (women) - Kinesitherapists.

CONCLUSIONS

Physical preparation of students, including students in Kinesitherapy has a positive impact on their better professional realization. Students - Kinesitherapists show good results of their basic motor skills in the study.

We recommend that the classes of "Sport for All" discipline included in the curriculum of the specialty enrich their contents with kinds of sport that maintain and improve the physical and health status of students, future Kinesitherapists.

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