METROLOGICAL ASSURANCE SYSTEM CONTROL TEST IN SPECIAL MEDICAL GROUPS IN HIGHER EDUCATIONAL ESTABLISHMENTS

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Annotation. Carried out theoretical and methodological analysis of the conformity of the level of testing physical fitness of students. The theoretical analysis and compilation of more than 25 references on control of special medical groups was done. Highlighted theoretical and methodological aspects of metrological provision of tests and detailed their essence. The existence of a conflict between the degree of elaboration of scientific and methodological principles of metrology requirements and level of maintenance of the test control system for special medical groups. To improve the reliability of informative tests should eliminate the reasons that cause an increase in variability of the measurements. In some cases it is advisable to increase the number of attempts to test and attract more experts. It is noted that the use of tests for special medical groups requires them to adapt to the objective characteristics of the contingent of those groups.

Keywords: student, testing, metrology, validity, reliability requirements.

Introduction

One of the problems, which are to be solved by researchers in the field of physical education of special health groups' (SHG) students, is a need in total reconstruction of test control system for its upgrading, for implementation of innovative approaches and modern pedagogic technologies of its organization. The difficulty of control system's upgrading in special health groups of HEE is conditioned by applying of innovations' system to extremely complex, rather inert traditional system, which does not ensure appropriate level of control and does not meet modern requirements [1, 7, 8]. Upgrading of test process stipulates re-orientating of aims, considering individual morpho-functional and psychological features of students with health problems. In this connection the problem of control over quality of testing became still more urgent. Solution of this problem is of theoretical and practical importance for improvement of physical education system in special health groups in general.

In the opinion of leading specialists in the field of theory and methodic of physical education [6, 7, 11, 14-17, 21, 22, 24], one of perspective directions of improvement of physical education system of SHG students is development and practical realization of new, highly efficient means, methods, technologies of complex control over this process.

Analysis of existing as on to-day scanty scientific researches, devoted to control system in special health groups [1, 2, 6, 14, 22] showed the absence of complex approach to development of innovative approaches and modern pedagogic technologies of this system's organization in students' with health problems physical education at HEEs. Carrying out of control of physical education of special health groups' students in compliance with acting system of tests is impossible: information content and reliability of indicators are rather low. The urgency of our research is conditioned by decisive, for efficient physical education of such students, significance of methodic of complex control system's formation on the one hand and insufficiency of scientific foundation on the other hand. First of all it requires observance of methodological requirements to testing process.

Metrological provision and its categorical apparatus are considered to be methodology of scientific foundation of test control [4, 5, 23]. Methodic tools of this provision are ensuring of authenticity of tests, which compose control system of students with health problems. Efficiency of test control is ensured only if tests correspond to main metrological requirements [5, 12, 13].

The urgency of research of test control system's metrological provision in SHG HEE is determined, from practical point of view, by importance of obtaining and studying of confident information about students' physical level on certain stage of training for its improvement. As on to-day there are a lot of questions concerning efficiency of control system in special health groups. It should be noted that these problems have not been studied sufficiently yet in scientific-methodic literature as on to-day. The works, in which metrological principles of test control of students, having health problems, would be regarded, are unknown. At the same time, there is an urgent need in establishing: to what extent theoretical principles of methodological requirements are applied in practice and to what extent practice confirms theoretical principles. With obvious theoretical and practical significance of the mentioned problem – as on to-day it has been being remained practically unstudied.

The urgency and significance of the mentioned questions for successful functioning of tests' control system in special health groups, its insufficient level of development as well as objective need in optimizing of its technology conditioned our choice of direction and topic of the research.

The work has been fulfilled as per plan of scientific & research works of National university "Lvivska polytechnica".

Purpose, tasks of the work, material and methods

The purpose of the work is to fulfill theoretical-methodic analysis of metrological provision's state of tests' control system in special health groups of HEE.

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The methods of the research: analysis and generalization of scientific-methodic and special literature's data, general-scientific methods of theoretical level, such as: analogy, analysis, synthesis, abstracting, induction.

Results of the research

In the base of existing tests, which are used in practice of special health groups' physical education there are motion tasks [6, 7]. In these tests motion achievements are the results: time of a distance's passing, quantity of repetitions, the length of distance and so on. Actually test – is a tool, which consists of qualimetrically verified system of test tasks, standardized procedure of fulfillment and developed beforehand technology of results' processing and analyzing [4, 5, 23].

Metrological provision of tests means application of scientific and organizational principles, technical means, rules and norms, which are required for achieving of uniformity and accuracy of measurements in physical education. In the opinion of scientists [4, 5, 13, 23], tests have sense only, when they are correctly fulfilled and purposefully interpreted, i.e., when they meet metrological requirements. The main metrological requirement to tests is their compliance with the theory of tests. As per theory of tests, tests, which are applied in physical education, shall meet the following metrological requirements:

1) there must be purpose of test's application specified;
2) standardized methodic of results' measurements and tests' procedure shall be developed;
3) the level of tests' authenticity shall be studied;
4) the system of results' evaluation shall be developed [3-6, 9].

It should also be noted that application of tests in special health groups requires their adapting to objective peculiarities of these groups. Considering these principles, we regard testing methodic of common knowledge in order to their compliance with the above mentioned requirements.

Correct determination of test's purpose facilitates correct selection of tests and determined certain requirements to building of tests. Complex of tests shall include indicators, which characterize students' motion abilities, which influence on general physical level. The same should be considered with determination of tests' scope for every physical quality [3, 11, 14-17]. However, in practice there is complete absence of all mentioned above. As on to-day for evaluation of students' physical preparedness about 7 exercises are used, every of which is purposed for estimation of definite motion quality. Determination of any motion quality's level with the help of one exercise is not possible. That is why it is necessary to have such tests that include students' motion abilities' indicators, which determine the level of their physical preparedness. The same should be considered with determination of tests' scope for every of physical quality. The above mentioned requires further work on composing of tests' complexes, considering students' nosology.

Standardizing of measuring procedures of students' physical preparedness stipulates their systematic fulfillment: it permits to compare indicators of different trainings' stages and, depending on dynamics of test results' increment, dose loads [6, 13, 18]. Efficiency of dosing depends on accuracy of control results, which, in its turn, depends on to what extent tests' fulfillment and results' measuring were standardized [4, 5]. However, no one from existing tests envisages choice of technical means of measurements, which would be able to ensure standardizing of testing procedure and exclude subjective evaluation of an instructor, who carries out the test. I.e., tests' results are dependent on personal qualities of an instructor and, therefore, influence on coordination of test that is a necessary condition of its reliability. It is also obvious that existing tests can be fulfilled with different technical details and it significantly reduces their efficiency. In this case variability of SHG students' motion abilities are not considered, variability, which conditioned pathologic changes in their health. Differences in results, which appear owing to such reasons, are inadmissible. They can be eliminated only by standardizing of testing methodic. For this purpose it is necessary to ensure equality of current state of students and equal level or preparedness before testing. Analysis of theoretical researches in this direction [3, 8, 9] and available practical experience revealed existing contradictions between need in standardizing of testing procedure and the absence of opportunities for this in case if special health group was formed without considering students' nosology.

In compliance with theory of tests, test can be considered authentic only if it is possible to prove by methods of mathematical statistics that it meets sufficiently the criteria of reliability and validity [4, 5, 9].

In most cases there are used tests, coefficient of reliability of which was determined beforehand by specialists in the field of sports metrology [11]. However, available in manuals values of tests' reliability can not always be generalized, because they were obtained in certain conditions, in certain groups. It should be noted that coefficient of reliability depends on abilities of a sample of tested, by the results of which it was obtained. That is why potential tests' users shall be sure that determined coefficient of reliability of certain test was obtained from a sample similar to the group, in which this test will be applied [8]. But as far as in practice of physical education, as on to-day, there are used tests, which were adapted to contingent of main groups, their application in special health groups requires additional researches, considering nosological peculiarities of these groups' contingent. I.e. there is an objective need in re-estimating of tests' reliability with consideration of students' nosology. As per opinion of scientists, the level of tests' reliability depends on: coordination of test, parameters of measurement's means and stability of measured characteristic [4-6, 12, 13]. Reliability of tests' measurements is understood as level of accuracy, with which certain characteristic can be measured, i.e. determination, to what extent it is possible to trust the results of a certain test. Coordination of tests is evaluated by independence of test results from personal features of an instructor, who carries out testing. Analysis of existing tests, concerning this characteristic, proves their non-compliance with the above mentioned [1, 2]. The reason is in impossibility to strictly standardize the procedure of existing tests and different motion perception abilities of

specialists. Non-controlled changes of students' physical state, conditioned by pathologies in their health, psychic stress, tiredness also facilitate variability of tests' results, which are not considered at all in work with special health groups' students.

Considering the fact that special health groups' students are different by objective characteristics, which are conditioned by different pathologies, certain requirements shall be set to tests: they shall be simple by their technique, can be executed in plain conditions and have simple and objective measuring system [6, 7]. In our opinion it is possible to realize in the following way:

1) develop tests for every nosological group of students, with undoubted informative character;

2) process the obtained results with the help of factor analysis.

In the base of this method there is a principle that tests' results depend on factors, which are conditioned by special health group students' state of health and which, as on to-day, are not considered at all in the process of test control. As a result we can observe a situation, when control with the help of not-reliable tests results in mistakes in estimation of students' physical level. Consequently, if these wrong results are used as the base for planning of further trainings, these training will also lead to mistakes. That is why it is necessary to strive for increasing of reliability of tests' informational content for their correct evaluation. For this purpose it is necessary to remove the reasons, which cause increasing of variability of measuring. In some cases, besides fulfilling of metrological requirements, it is necessary to increase the quantity of attempts in test and use the help of more experts for evaluation. Reliability of evaluation of controlled indicators also increases with applying more quantity of equivalent tests [4, 5], that is not observed in practice.

Validity of tests – is a concept, which describes what test measures and with which quality it is done. It is a complex characteristic, which is determined by tests' parameters and procedure of measurement as well as by properties of physical quality, which is studied. Validity of tests is differentiated by the following criteria: validity of content, prognostication validity and functional validity [4, 5, 13].

Validity of content determines if tests comply with all aspects of the studied quality [9]. In case of using only one exercise for evaluation of physical quality, it is practically impossible to do it. Tests, which are used as on to-day in practice of special health group students' physical education, are purposed foe evaluation of certain kind of physical qualities and, that is why, the obtained results do not permit to evaluate their general level.

Validity of prognostication is determined by studying of correlation between test's indicators and a criterion, which characterizes the measured physical quality, but after some time [10]. Accordingly, it permits to judge about changes in student's state of health. However, all criteria, which up to the present have been used in practice of physical education, are adapted only for contingent of main groups. That is why, additional researches for searching of criteria, which would be adapted for special health groups' contingent, are required.

In case of testing of special health group students' physical level, tests shall meet optimal level of difficulty for every nosological group of students. This is understood as functional validity. Considering functional disorders in SHG students' state of health, which are conditioned by the presence of certain diseases, both by main and accompanying, functional validity can not be a priori equal for all students. So, one more problem, which requires solution in this aspect, is the fact, that up to the present no scientifically grounded criteria of tests' validity, according to students' nosology, have been being determined. As on to-day, in practice of special health groups' physical education there are no criteria of its determination, considering specificity of disease. It is necessary to note that according to the fulfilled researches of this problem, the mentioned above peculiarities of special health groups' contingent have statistic character. It means that in great majority of cases tests' results of students of different nosologies will be substantially different.

And, finally, let us stress that tests, besides their reliability and validity, shall be objective and give statistically coinciding results [12]. The problem of measurement methods and means' accuracy, which ensures objectiveness of test, also belongs to methodological problems. The existing data of studying of testing procedure of SHG students' physical level is characterized by inaccuracy of terminology, by absence of informational and standard description of their structure; most of them are not common-accepted. In general these methodologies do not permit to obtain confident indicators because of great number of non-controlled variables and absence of continuous registration of tests' results. Analysis of theoretical researches revealed existing contradictions between the need in testing objectivity and the absence of opportunity to realize it. Therefore, there is a need in principally new approach to solution of this question.

The carried out analysis of existing tests of special health groups' students of HEE concerning compliance of existing tests with metrological requirements does not pretend to be complete in all the aspects. However, the presented facts convincingly point at the necessity of further research and development scientifically grounded methodic of testing of students, who have health problems in order to solve the mentioned above problems.

Summary

Regarding theoretical-methodic principles of test control's metrological provision, it should be noted that there is an obvious contradiction between the level of these principles' scientific-methodic development and the level of test control system's provision in special health groups of HEE. The carried out analysis of available scientific-methodic literature, devoted to compliance of existing test control in special health groups of HEE with metrological requirements, revealed a number of problems, which showed the absence of clear concept concerning this aspect. If not

to start solution of the problems of existing test metrological compliance just now, it could be impossible to expect improvement of efficiency of educational-health improving process.

The further researches envisage analysis of qualimetrical indicators of control system in special health groups of HEE.

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