

## Original Article

### Experimental results of the psychophysical endurance development of military professionals

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Published online: April 30, 2021

(Accepted for publication April 15, 2021)

DOI:10.7752/jpes.2021.s2135

#### Abstract

The article deals with the results of experimental study of the development of psychophysical endurance in future professionals of military administration (PMA) at the stage of operational-tactical training. We present the statistical results of the statement and formative experiments for each component – value and motivation, cognitive, emotion-and-will, profession-and-activity and subjective components, received in the result of diagnosing their psychophysical endurance development. (Rudenko V., 2012). There is given the hypothesis of the research, aimed at revealing the statistically important differences in the results of experimental research. We have shown the experimental data concerning the levels (low, average, sufficient, high) of their psychophysical endurance development. There are characterized assessment criteria and factors of psychophysical endurance development in future PMA and the block of methods for incoming and outgoing diagnosing of its development. IBM SPSS Statistics 22 software was used for statistical processing of data (Oderov A. et al., 2020; Khatsayuk A. B., 2011). The experimental study covered 38 students of operational and tactical level of training, which were divided into experimental ( $n_1 = 19$ ) and control ( $n_2 = 19$ ) groups. Arithmetic mean value of all scales was calculated for each component of psychophysical endurance, and their generalization confirms the positive tendency towards psychophysical endurance development in EG: the high level had increased from 5.26% to 26.32%, the sufficient – from 21.05% to 47.37%, the average – decreased from 47.37% to 15.78% and the low – from 6.32% to 10.53%, respectively. In the result of statistical processing of the received experimental data, the statistical hypothesis of the research ( $H_1$ ) was confirmed. Thus, the proposed model and methodology for the development of psychophysical endurance of future PVU led to statistically significant changes in the development of psychophysical endurance of future PVU, which, first, can be extended to the whole population; secondly, they depend on the effectiveness of experimental pedagogical measures. The conducted statistical analysis of the results of ascertaining and shaping experiments and their comparison shows the positive dynamics of the development of psychophysical endurance of future military management professionals in EG and confirms the statistical hypothesis of the study ( $H_1$ ). Thus, our proposed pedagogical conditions - the model and method of developing their psychophysical endurance - have led to statistically significant results that can be extended to the whole population

**Key words:** experiment, military personnel, criterion, Statistical results, pedagogical conditions, experimental results.

#### Introduction

Important highly responsible governmental tasks concerning keeping together the country, subjectivity and restoration of territorial integrity of our state are solved directly by the officers of operational-tactical and operational-strategic sectors of administration who take the positions in the middle and higher sector of administration in the Armed Forces (hereinafter- AF) of Ukraine (Klymovych V, Olkhovyi O. & Serhii Romanchuk, 2016; Olkhovyi A.N., 2013). Today they go through tough times and need replenishment with professionals in these very sectors of administration with a corresponding good-quality professional military and special types of training in the system of military education (Oderov A., Korchagin M. & Romanchuk S., 2020; Klymovych V.B., Turchinov A.V., Shemchuk V.A., Oderov A.M., Samorok M., 2020). One of the promising directions of this scientific issue solution is a method of pedagogic modelling of their military professional

training, which consists in creation of the model of military professional of operational-tactical administration sector, and the model of his/her military professional training in the system of postgraduate military education (Serhii Romanchuk S. and all., 2020; Klymovych V., Oderov A., Korchagin M., Olkhovy O and., Romanchuk S., 2019). One of its main tasks is the development and improvement of their professionally important qualities, including psychophysical endurance as a reliable basis for the successful professional military activity in extreme conditions of military life. For its development, we have prepared the correspondent model and method implemented to the educational process of Ivan Cherniakhovskyi National Defence University of Ukraine (Klymovych V., Oderov A., Korchagin M., Olkhovy O., Romanchuk S., 2019.) Thus, it will be topical to prove statistically the relevance of their use in the educational process for professional training of future PMA. (Khatsayuk A.B., 2019) The goal of the article is to analyse and generalize the results of pedagogical experiment concerning the development of psychophysical endurance of future PMA on the stage of operational and tactical training. (Yagupov, V. & Kostiv, S., 2019).

Analysis of scientific works concerning diagnosing the development of professionally important qualities of different specialists had shown the necessity of using the methods of mathematical statistics for analysis of the received experimental data, as well as for proving their statistical significance as the result of experimental influence. Namely, it is such scientists: N. Verbyn for the statistical proof of the results of experimental research of the development of psychophysical endurance of future Masters in military administration (Verbyn, 2019); V. Veselov – for the results of psychophysical qualities formation in cadets of High military education institution (HMEI) basing on endurance development (Veselov, 2002); V. Kyva – for the results of formative stage of pedagogical experiment concerning the development of informationally-communicative competence of lecturers in military education system (Kyva, 2020); N. Orlenko – for the results of research in handling physical competence of future pilots (Orlenko, 2010); L. Fedotova – the results of development of professionally important qualities and psychoemotional condition of future state service managers (Fedotova, 2006); V. Shemchuk – the results of experimental research of the development of managerial thinking of the future Masters in military administration (Shemchuk, 2012; Klymovych V.B., Tkachuk P.P., Romanchuk S.V., Afonin V.M., Andreychuk V.Y., Oderov A.M., 2019). Nevertheless, the psychophysical endurance development of future PMA in the system of postgraduate education and experimental clarification of its development levels was not experimentally researched before and their effectiveness was not proved by methods of mathematical statistics. (Oderov A., Klymovych, V., Romanchuk, S., Lesko, O., & Korchagin, M., 2019).

The purpose – analysis and generalization of the results of the pedagogical experiment on the development of psychophysical endurance of future professionals of military management at the stage of operational and tactical training.

## **Methods**

### *Participants*

38 students of operational-tactical training level of Ivan Cherniakhovskyi National Defence University of Ukraine participated in the experimental research; they were divided in the experimental (EG) and control (CG) groups. The students of CG (<sup>b</sup>n=19) studied under the program of educational course "Physical education, special physical training", and the students of EG (<sup>a</sup>n=19) on the top of exercises provided by the program of educational course, performed the psychophysical exercises defined in the method of the development of psychophysical endurance of future PMA.

*Data collection and interpretation means-* With help of questionnaires, tests and methods, we have received experimental results of the research. Questioning allowed to find out the attitude of future PMA to their military-professional activity and to define important professional qualities, which should be developed for the solution of tasks in extreme situations with a high quality. During the tests and methods application, we have received empirical data concerning psychophysical endurance development in future PMA at the incoming and outgoing stages of the experiment. Software IBM SPSS Statistics 22 i Microsoft Office Excel was used for statistical and empirical data processing.

*Method of carrying out and analysis* - Experimental research consisted of statement and formative stages. At the first stage there was found out the levels of maturity of each component of psychophysical endurance development in future professionals of military administration in EG and CG. Basing on the results received on this stage, we have checked their division into CG and EG. Empirical and critical Mann-Whitney U-test was defined for independent samplings. Their comparison favoured the confirmation of EG and CG homogeneity and caused us to consider empirical data being not statistically significant. At the second stage we have analysed the maturity dynamics of components of EG and CG psychophysical endurance before the experimental research and after it. We have also defined empirical and critical Mann-Whitney U-test for independent samplings. Confirmation of statistical inhomogeneity of EG and CG and defining statistically significant empirical data became the result of these criteria comparison. Empirical data received during statement and formative stages of the experiment is given in the tables, and the dynamics of development levels of psychophysical endurance development in future PMA before and after the formative experiment is shown in the figures.

## Results

Final stage of implementation of pedagogical conditions for development of psychophysical endurance of future PMA consists in carrying out the statistical analysis of the results of statement and formative experiments. The goal of the experiment is to compare the results of the experimental (EG) and control (CG) groups before formative experiment and after it, as well as to check the veracity of the advanced hypothesis.

Corresponding to the goal, there were set the following research tasks:

-at the beginning of the pedagogical research to formulate the hypothesis concerning development of psychophysical endurance of future PMA in the postgraduate education system via implementation of author's experimental groundwork;

-to find out the levels of maturity of psychophysical endurance of the students in EG and CG at the statement stage of the experiment and to allocate the students according to the results received for CG and EG;

-to analyse the dynamics of the development of the components of psychophysical endurance of EG and CG before and after the experimental research and to define the statistical significance of the received empirical data.

Before solving the tasks of the experimental research and diagnosing its results, we shall clearly define the criterion and indicators of assessment of psychophysical endurance development of groups in general and by components of psychophysical endurance. To achieve that, we have substantiated the following criteria:

-value-motivating criterion, the main indicators of which are the values of military professional activity and motivation to psychophysical endurance development of future PMA in the postgraduate system;

-cognitive – knowing by future PMA how to develop their psychophysical endurance and the peculiarities of nervous system functioning, as well as the course of mental condition in standard extreme situations in their activity;

-emotional-and-will – emotional state, stress resistance and social adaptedness of future PMA;

-profession-and-activity – physical endurance of applied military nature, condition of the nervous system, mental lability of future PMA;

-subjective – self-estimation and general internality of future PMA concerning the development of their psychophysical endurance (Yagupov, 2019).

According to these criteria and factors there were defined the methods for incoming and outgoing diagnosing of the psychophysical endurance development in future PMA (Table 1).

**Table 1. Criteria and factors of diagnosing of the psychophysical endurance development of future PMA and its methods**

No.	Criteria	Factors	Methods of diagnosing
1	Value-motivating	Values of the professional military activity	Questionnaire for definition of values of their professional military activity
		Motivation in development of psychophysical endurance	Questionnaire for definition of their motivation concerning the development of psychophysical endurance
2	Cognitive	Knowledge of development of psychophysical endurance	Questionnaire for diagnosing the levels of their knowledge concerning their psychophysical development
		Knowledge of peculiarities of nervous system functioning	Questionnaire for diagnosing the levels of their knowledge concerning their psychophysical development
		Knowledge in peculiarities of the course of mental conditions	Questionnaire for diagnosing the levels of their knowledge concerning their psychophysical development
3	Emotional-and-will	Emotional state	Wessman-Ricks method of emotional state self-estimation
		Stress resistance and social adaptedness	Method for definition of stress resistance and social adaptedness by Holmes and Rahe
4	Profession and activity	Physical endurance of the applied military nature	The tables on crediting grade points for exercise in physical training (temporary order on physical training (ТНФП) 2014)
		Nervous system condition	Method for definition of nervous system properties according to psychomotor qualities (tapping-test)
		Mental lability	Method "Intellectual lability" modification S.N. Kostromin)
5	subjective	Self-estimation	Method for self-estimation of state and trait anxiety level by Spielberg- Hanin
		General internality	Method for definition of "Locus of control" (by O.H. Ksenofontova)

To solve the first task of the experimental research it is necessary to formulate the hypothesis concerning development of psychophysical endurance of future PMA. In psychological and pedagogical researches, the scientists single out scientific and statistical hypothesis. V. Yahupov states, that "the hypothesis of military pedagogic research shall provide which forms of pedagogical activity are best for solution of a certain military

pedagogic task, which conditions are leading and which of them are correcting, what means for military pedagogic task solution is effective...”(Yahupov, 2019). So, the scientific hypothesis shall be formulated in the process of thinking on the goal of the research work, which provides finding out the relations between the studied phenomena for the hypothetical solution of a certain pedagogical problem; in our case it is the development of the components of psychophysical endurance under the experimental influence, and finding out their maturity under the influence of the author's experimental conditions. (Khatsayuk A.V., Olenchenko V.V, Korolev A.I., Kravchenko A.V., 2019.) Namely, statistical hypothesis consists in tracing connections between the sampling population (EG and CG) basing on recording results of pedagogical experiment and confirmation of statistically significant difference of the experimental results received from EG comparing to CG with help of mathematical statistics methods. In our research, the statistical hypothesis provides the comparison of EG and CG in the development of psychophysical endurance before and after the formative experiment in general and by its components, and defining the statistically significant differences, received results as the impact of implemented experimental conditions. (Klymovych V.B., Morgunov A.A., Yareshchenko A.A., Oderov A.M., 2019). We shall note that the process of statistical interpretation of the received experimental data is reduce itself to estimation of their equivalences and differences. While testing statistical hypothesis there are used only two hypothesis:

$H_0$  – hypothesis on common character of the received experimental data between two groups – experimental and control ones, where the researcher supposes that the new methodology, new method, practice or technology has no advantages, that is why from the very beginning the researcher is ready to take the scientific position "the difference between the new and old method is zero";

$H_1$  hypothesis on the present differences between two groups – experimental and control ones, when we suppose that the new method has advantages comparing to the present ones, i.e. EG had shown statistically significant changes.

Confirmation of the alternative hypothesis witnesses that the statistical statement  $H_1$  is correct and the confirmation of the main one tells about the absence of differences. The alternative hypothesis play the main role in the algorithm of evaluation of pedagogical novelties effectiveness when using non-parametric statistical methods (Goncharenko, 2008; Morgunov A.A., Yareshchenko A.A., Khatsayuk A.V., Beloshenko Yu.K., 2018).

To check the statistical significance of the received results concerning the psychophysical endurance development of future PMA at the statement and formative experiment stages we have used Mann–Whitney U-test for independent samplings. This method defines the zone of value between two crossing sequences of numbers and consists in that the lower is the empirical meaning of  $U_{emp}$  the higher is the possibility that the differences are true. Let us form the statistical hypothesis of the experimental research. The main ( $H_0$ ) hypothesis is accepted if there are *no statistically significant* differences between the levels of psychophysical endurance development, which we monitor in the EG and CG; the alternative one ( $H_1$ ) is accepted if the differences in the levels of its development in the EG and CG are *statistically significant*. The solution of the following task concerning finding out the maturity of psychophysical endurance of future PMA at the statement experiment stage lies in the measurement and calculation of its results. In the result of statistical processing of the received data such tendencies were revealed: 26.32% EG and 31.57% CG had the low level of its maturity, 47.37% EG and 42.11% CG had the average level, 21.05% EG and 15.79% CG had the sufficient level and 5.26% EG and 10.53% CG had a high one. The analysis of the received results of EG and CG by each component has shown that the low and average levels are ahead opposed to the sufficient and high levels of its maturity (Table 2).

**Table 2. Statistical results of the statement and formative experiment concerning the maturity of psychophysical endurance of future PMA**

The components of psychophysical endurance	Groups	Levels of psychophysical endurance maturity							
		High		Sufficient		Average		Low	
		Quantity	%	Quantity	%	Quantity	%	Quantity	%
Value-motivating	EG	2	10.53	4	21.05	10	52.63	3	15.79
	CG	2	10.53	4	21.05	9	47.37	4	21.05
Cognitive	EG	1	5.26	3	15.79	10	52.63	5	26.32
	CG	1	5.26	2	10.53	10	52.63	6	31.58
Emotional-and-will	EG	1	5.26	3	15.79	10	52.63	5	26.32
	CG	1	5.26	3	15.79	9	47.37	6	31.58
Profession-and-activity	EG	1	5.26	4	21.05	7	36.84	7	36.84
	CG	2	10.53	4	21.05	7	36.84	6	31.58
Subjective	EG	2	10.53	4	21.05	7	36.84	6	31.58
	CG	3	15.79	3	15.79	7	36.84	6	31.58
Maturity of psychophysical endurance	EG	1	5.26	4	21.05	9	47.37	5	26.32
	CG	2	10.53	3	15.79	8	42.11	6	31.57

Note. EG: experimental groups, CG: control groups.

To compare the results of incoming diagnosing of psychophysical endurance maturity of the tested it is necessary to define the empirical  $U$ -test factor and the critical  $U$ -test factor. With the help of BM SPSS Statistics 22 program we have calculated its maturity (Table 2) and defined the empirical  $U$ -test factor,  $U_{emp}=176$ , and the critical  $U$ -test factor was taken from the table of critical values of Mann–Whitney  $U$ -test for the level of statistical significance  $p \leq 0.05$ ,  $U_c=123$  (Rudenko, 2006). As  $U_{emp}=176 > U_c=123$ , we accept the main hypothesis  $H_0$ . We shall note, that the  $U$ -test of  $H_0$  is accepted under the condition  $U_{emp} > U_c$ .

So, the accepted  $H_0$  at the level of statistical significance 0.05 allows to assume, that psychophysical endurance maturity in EG and CG has no statistically significant differences, i.e. the groups are equally allocated and homogeneous.

After the formative experiment EG and CG were re-diagnosed under the same criteria and factors that after the statement experiment. The analysis of the formative experiment results concerning the psychophysical endurance development of future PMA and clarification of its level had shown the following results:

10.53% EG and 21.05% CG – the low level, 15.79% EG and 47.37% CG – the average level, 47.37% EG and 21.05% CG – the sufficient level and 26.32% EG and 10.53% CG – the high level respectively (Table 3). In the result of comparison of the received statistical data from diagnosing psychophysical endurance of the tested ones with the data of statement stage, we observe that in the EG the number in high and sufficient levels of its development has increased, and the number in average and low levels has decreased sufficiently comparing to CG.

**Table 3. Results of the formative experiment concerning the development of psychophysical endurance of future PMA**

The components of psychophysical endurance	Groups	Levels of psychophysical endurance development							
		High		Sufficient		Average		Low	
		Quantity	%	Quantity	%	Quantity	%	Quantity	%
Value-motivating	EG	6	31.58	8	42.11	3	15.79	2	10.53
	CG	3	15.79	4	21.05	8	42.11	4	21.05
Cognitive	EG	5	26.32	9	47.37	3	15.79	2	10.53
	CG	2	10.53	4	21.05	9	47.37	4	21.05
Emotional-and-will	EG	5	26.32	8	42.11	4	21.05	2	10.53
	CG	2	10.53	5	26.32	9	47.37	3	15.79
Profession-and-activity	EG	6	31.58	9	47.37	3	15.79	1	5.26
	CG	2	10.53	5	26.32	9	47.37	3	15.79
Subjective	EG	5	26.32	9	47.37	3	15.79	2	10.53
	CG	3	15.79	4	21.05	8	42.11	4	21.05
Development of psychophysical endurance	EG	5	26.32	9	47.37	3	15.78	2	10.53
	CG	2	10.53	4	21.05	9	47.37	4	21.05

Note. EG: experimental groups, CG: control groups

To compare the received results of formative experiment in EG and CG it is necessary to define the empirical  $U$ -test factor and the critical  $U$ -test factor. After the interpretation of the data concerning the levels of development of psychophysical endurance of future PMA in the IBM SPSS Statistics 22 program we have defined the empirical factor of  $U$ -test ( $U_{emp}=106.5$ ), and the critical factor of  $U$ -test according to the table of critical values of Mann–Whitney  $U$ -test makes  $U_c=123$  ( $p \leq 0.05$ ) (Rudenko, 2006). Let us compare the empirical and critical factor of  $U$ -test. As  $U_{emp}=106.5 < U_c=123$ , we accept the main hypothesis ( $H_1$ ). We shall note, that the  $U$ -test of  $H_1$  is accepted under the condition  $U_{emp} < U_c$ .

For more clear reflection of the changes in levels of development of psychophysical endurance of future PMA we need to analyse and compare the results of statement and formative experiments by all scales of each its component. Namely, the analysis and generalization of empirical and experimental data of the value-motivation component of EG and CG students had shown essential changes in its scales factors (Table 4), especially in EG, namely as follows:

-the high level of “values of the professional military activity” scale in EG increased after the formative experiment from 10.53% to 31.58%, the sufficient – from 21.05% to 42.11%, the average one decreased from 57.89% to 15.79%, the low stayed without changes 10.53%, and for students in CG the high level increased from 10.53% to 15.79%, and the sufficient one from 15.79% to 21.05%, it means insignificantly increased, the average (from 52.63% to 47.37%) and low (from 21.05% to 15.79%) – insignificantly decreased;

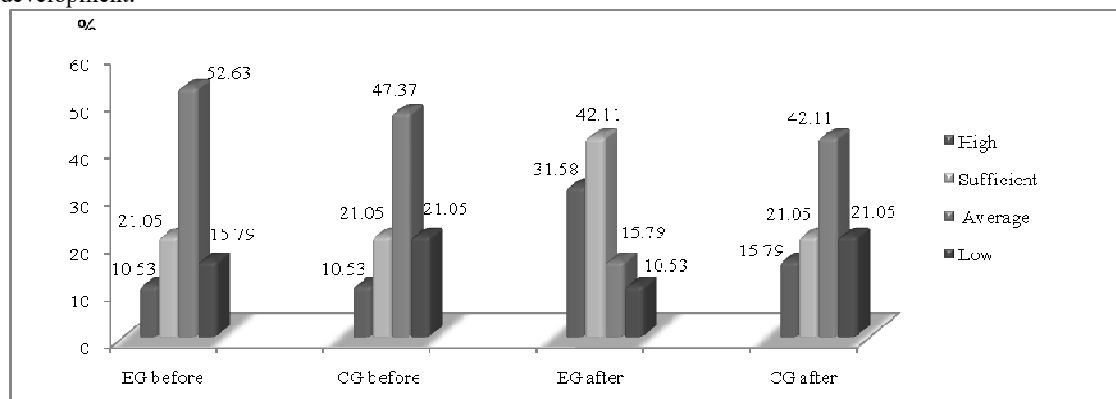
-the high level of “motivation in development of psychophysical endurance” scale in EG increased from 15.79% to 26.32%, the sufficient – from 21.05% to 42.11%, the average decreased from 47.37% to 21.05%, the low – from 15.79 to 10.53%, and in CG the high level decreased from 15.79% to 10.53%, and the sufficient one from 26.32% to 21.05%, the average level increased (from 36.84% to 42.11%) and the low from 21.05% to 26.32%, it means insignificantly increased;

**Table 4. The levels of development of scales of value-motivating component of psychophysical endurance development of future PMA before and after the formative experiment**

Scales	Levels	Before				After			
		EG		CG		EG		CG	
		<sup>a</sup> n=19	%	<sup>b</sup> n=19	%	<sup>a</sup> n=19	%	<sup>b</sup> n=19	%
Values of the professional military activity	High	2	10.53	2	10.53	6	31.58	3	15.79
	Sufficient	4	21.05	3	15.79	8	42.11	4	21.05
	Average	11	57.89	10	52.63	3	15.79	9	47.37
	Low	2	10.53	4	21.05	2	10.53	3	15.79
Motivation in development of psychophysical endurance	High	3	15.79	3	15.79	5	26.32	2	10.53
	Sufficient	4	21.05	5	26.32	8	42.11	4	21.05
	Average	9	47.37	7	36.84	4	21.05	8	42.11
	Low	3	15.79	4	21.05	2	10.53	5	26.32
Development of value-motivating component	High	2	10.53	2	10.53	6	31.58	3	15.79
	Sufficient	4	21.05	4	21.05	8	42.11	4	21.05
	Average	10	52.63	9	47.37	3	15.79	8	42.11
	Low	3	15.79	4	21.05	2	10.53	4	21.05

Note. EG: experimental groups, CG: control groups

In Figure 1 we observe that EG undergone the essential increase of the number of students with high (from 10.53% to 31.58%) and average (from 21.05% to 42.11%) levels of value-motivation component development, we as well see the positive dynamics in decrease of its average (from 56.63% to 15.79%) and low (from 15.79% to 10.53%) levels respectively. In CG, there happened no statistically significant changes in its development.



**Figure 1. The dynamics of development of value-motivating component of psychophysical endurance development of future PMA before and after the formative experiment in %. EG – experimental groups, CG – control groups**

Analysis and statistical processing of empirical data of cognitive component had shown the statistically significant changes in its scales in EG after the formative experiment (Table 5). Namely, the following ones:

the high level of “knowledge of development of psychophysical endurance” scale in EG increased from 10.53% to 26.32%, the sufficient – from 15.79% to 47.37%, the average decreased from 52.63% to 15.79%, the low – decreased from 21.05% to 10.53%, and in CG the high level stayed without changes 10.53%, the sufficient increased from 5.26% to 26.32%, the average level decreased from 63.16% to 47.37% and the low from 21.05% to 15.79%; the high level of “knowledge of peculiarities of nervous system functioning” scale in EG increased from 10.53% to 21.05%, the sufficient – from 10.53% to 47.37%, the average decreased from 42.11% to 15.79%, the low – from 36.84% to 15.79%, and in CG the high level increased from 5.26% to 10.53%, and the sufficient one from 10.53% to 21.05%, and the average level decreased from 47.37% to 42.11%, and the low from 36.84% to 26.32%; the high level of “knowledge of peculiarities of the course of mental conditions” scale in EG increased from 5.26% to 26.32%, the sufficient – from 15.79% to 47.37%, the average decreased from 52.63% to 21.05%, the low – from 26.32% to 5.26%, respectively, and in CG the high level increased from 5.26% to 10.53%, and the sufficient one from 10.53% to 21.05%, i.e. insignificantly increased, the average level decreased from 47.37% to 42.11%, and the low from 36.84% to 26.32%.

## Conclusions.

The conducted statistical analysis of the results of ascertaining and shaping experiments and their comparison shows the positive dynamics of the development of psychophysical endurance of future military management professionals in EG and confirms the statistical hypothesis of the study (H1). Thus, our proposed

pedagogical conditions - the model and method of developing their psychophysical endurance - have led to statistically significant results that can be extended to the whole population.

### References

- Fedotova, L. (2006). Methods of development of professionally important psychophysical qualities at future managers of public service by means of physical culture. [Candidate Dissertation, Federal state institution VPO "Far Eastern state academy of physical culture"]. Library of dissertations and abstracts of Russia. <https://dilib.net>.
- Goncharenko, S. (2008). Pedagogical research: Methodological advice to young scientists.
- Khatsayuk A.V., Olenchenko V.V., Korolev A.I., Kravchenko A.V., (2019). Formation of military-applied skills of hand-to-hand combat in future officers of the National Guard of Ukraine. *Innovative pedagogy*. Odessa, Vol. 2 (№ 17), 215-226.
- Khatsayuk A.B. (2011). Special physical training servicemen of the internal troops of the Ministry of Internal Affairs Ukraine: textbook. allowance. ABB of the Ministry of Internal Affairs of Ukraine. Kharkiv, 180 p.
- Khatsayuk A.B., (2019). The essence and structure of readiness future officers of NSU to perform tasks by appointment by special means physical training. *Pedagogy of formation personalities in higher and general education schools*. Zaporozhye, Vol. 2 (№ 65), 144-155.
- Klymovych V., Olkhovyi O. & Serhii Romanchuk (2016). Adoption of youth's bodies to educational conditions in higher educational institutions. *Journal of Physical Education and Sport (JPES)*, 3(1), 620-622.
- Klymovych V.B., Morgunov A.A., Yareshchenko A.A., Oderov A.M. (2019). Formation of skills of application of measures of physical influence by the future officers of law enforcement agencies of Ukraine with the use of modern pedagogical technologies. *Pedagogy of creative personality formation in higher and general education schools*. Zaporozhye, Vol. 2 (№ 66), 68-72.
- Klymovych V.B., Turchinov A.V., Shemchuk V.A., Oderov A.M., Samorok M. (2020). Pedagogical model formation of skills of hand-to-hand combat of future officers to actions in extreme conditions. *Current issues of the humanities*. Zaporozhye, Vol. 4 (№ 28), 190-198.
- Klymovych V., Oderov A., Korchagin M., Olkhovyi O. and, Romanchuk S. (2019). The Influence of the System of Physical Education of Higher Educational School on the Level of Psychophysiological Qualities of Young People. *Sport Mont Journal*. Montenegro, Vol. 17 (№ 2), 93-77.
- Klymovych V.B., Tkachuk P.P., Romanchuk S.V., Afonin V.M., Andreychuk V.Y., Oderov A.M. (2019). Physical education, special physical training and sports of servicemen: a textbook. On his own. Lviv., 291 p.
- Klymovych V., Oderov A., Korchagin M., Olkhovyi O., Romanchuk S. (2019). Optimization of the content of the physical training program of cadets gunners. *International Journal of Recent Scientific Research*. India, Vol. 10 (№ 7), 33340-33343.
- Kyva, V. (2020). The results of the formative stage of the pedagogical experiment on the development of information and communication competence of teachers of the military education system. *Bulletin of Cherkasy National University named after Bohdan Khmelnytsky*, 1, 135-146. doi: 10.31651 / 2524-2660-2020-1-135-146
- Morgunov A.A., Yareshchenko A.A., Khatsayuk A.V., Beloshenko Yu.K., (2018). Development of hand-to-hand combat techniques fight of militiamen of the Ministry of Internal Affairs of Ukraine in systems special physical training. *Honor and law*. Kharkov, № 4 (67), 67-74.
- Oderov A. and all. (2020). Functional State of Military Personnel Engaged in Unarmed Combat. *Sport Mont Journal*, 18 (1), 99-101. ISSN 1451-7485, eISSN 2337-0351, (DOI 10.26773/smj.200218).
- Oderov A., Klymovych, V., Romanchuk, S., Lesko, O., & Korchagin, M. (2019). Motivation of Forming Students' Healthcare Culture on Principles of Interdisciplinary Integration. *Sport Mont*, 17(3), 79-83. doi: 10.26773/ smj.191017
- Oderov A., Korchagin M. & Romanchuk S. (2020). Correlation of Physical Fitness and Professional Military Training of Servicemen. *Sport Mont Journal*. – 2020. – Vol. 18 (2) – PP. 79-82. – ISSN 1451-7485, eISSN 2337-0351, (DOI 10.26773/smj.200612).
- Orlenko N., (2010). Professional and applied physical training of future pilots in higher educational institutions. Candidate Dissertation, National Aviation University. Google Scholar. <https://scholar.google.com.ua/citations?user=BL7LapQAAAAJ&hl=ru>.
- Olkhovyi A.N., (2013). Theoretical and methodological bases systems of physical training of cadets of higher of military educational institutions: Author's abstract. dis. to obtain science. degrees of Dr. Science with Phys. education and sports: 24.00.02. Kiev, 40 p.
- Romanchuk S. and all. (2020). The impact of mass sports work in educational institution on the formation of cadets' value attitude towards the physical education. *Sport Mont Journal*, 18 (1), 81-86. – ISSN 1451-7485, eISSN 2337-0351, (DOI 10.26773/smj.200214).

- Rudenko, V. (2012). Mathematical statistics. *Center for Educational Literature*. Retrieved from <http://chtyvo.org.ua>
- Shemchuk, V. (2012). Pedagogical conditions of development of administrative thinking of future masters of military management in system of postgraduate education. [Candidate Dissertation, National University of Defense of Ukraine]. Google Scholar. [https://scholar.google.com.ua/citations?hl=uk&user=HvTJi\\_IAAAAJ&view\\_op=list\\_works&sortby=pubdate](https://scholar.google.com.ua/citations?hl=uk&user=HvTJi_IAAAAJ&view_op=list_works&sortby=pubdate).
- Verbin, N. (2019). Development of professional endurance of future military management masters in the process of operational and tactical training. [Candidate Dissertation, National Defense University of Ukraine named after Ivan Chernyakhoskyi]. Google Scholar. <https://scholar.google.com.ua/citations?user=tCJwV0AAAAAJ&hl=uk&oi=sra>
- Veselov, V. (2002). Formation of psychophysical qualities at cadets of the higher military educational institutions on the basis of development of endurance. [Candidate Dissertation, Tula State Pedagogical University named after L. Tolstoy]. Library of dissertations and abstracts of Russia. <https://dslib.net>.
- Yagupov, V. (2019). Theory and methodology of military pedagogical research. *National Defense University of Ukraine named after Ivan Chernyakhoskyi*. Retrieved from <https://elib.nuou.org.ua/katalog/tmvpd-iaj.html>
- Yagupov, V. & Kostiv, S. (2019). Diagnosing the development of psychophysical endurance of military officers at the stage of operational and tactical training. *Science and Education a New Dimension. Pedagogy and Psychology*, 207(84), 11–17. <https://doi.org/10.31174/SEND-PP2019-207VI84>.