

Original Article

Influence of kettlebell lifting classes on the level of professionally important psychological qualities and the emotional state of cadets from higher military educational institutions

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Abstract:

The influence of kettlebell lifting classes on the level of professionally important psychological qualities, emotional state and mental performance of cadets during the studying process was analyzed in this article. The study was attended by cadets from 1st to 5th grades (n=474), who were engaged in the current system of physical training (group A, n = 416), and also of those cadets who during usual studying process were involved in the kettlebell lifting section (group B, n=58). The research was conducted according to the following methods: the test of finding numbers (distribution and volume of attention, emotional stability), the method of operation with numbers (short term and involuntary memory), the «Complex associations» method (peculiarities of thinking), the proofreading Burdon-Anfimov test (concentration of attention, mental performance), the method of Ch. D. Spielberger, J. L. Hanin (situational anxiety), the method of A. Wessman and D. Rick (self-esteem of the emotional state). The best indicators of mental performance and emotional state of group B cadets on the senior courses ($p < 0.05 - 0.001$) were established, which testifies to the effectiveness of kettlebell lifting exercises.

Keywords: professionally important psychological qualities, emotional state, cadet, kettlebell lifting.

Introduction

The transition of the Armed Forces of Ukraine to contractual service, dictated by the modern requirements of the development of military theory and practice is closely tied to the changes in the military and political situation in the world [2, 9]. Improvement and emergence of new methods and forms of armed struggle, carrying out of the Antiterrorist Operation in the east of Ukraine, equipping the army with new types of armaments and carrying out strategic tasks by small but well-prepared armed formations require increasing demands to studying and training cadets from higher military educational institutions (HMEI). The first of all attention to training future officers should be put on their professionalism, personal physical, methodical and psychological readiness.

The analysis of the research results of many scientists [1, 4, 5] shows, that due to the influence of adverse factors of combat activity there are significant negative changes in bodies of servicemen. In addition, the lack of systematic physical training in the Antiterrorist Operation zone and of proper material base causes such effects as: metabolic disorders and body weight gain (overweight), reducing of physical fitness and deterioration, increasing traumatism (especially musculoskeletal system), emergence of various diseases, deterioration of indicators of psycho-emotional state.

Scientists [1, 5, 10] mention that each type of activity and each profession have their own specifics and characteristics according to which there are always special requirements for specialists. Before performing the tasks of the chosen profession, a person has to be prepared both physically and psychologically. So in order to maintain the high efficiency of educational activities, in addition to the development of physical qualities, improvement of the morphofunctional state and health promotion, it is necessary to achieve a high level of psychological qualities that have the most effective influence on training and future professional activity. Professionally important psychological qualities of cadets include volume, distribution and concentration of attention. In addition, educational activity puts high demands on the functions of memory and thinking, emotional stability and emotional state of cadets – future officers [1, 4]. It is mentioned in the works of scientists

[1, 8, 9] that systematic physical exercises and sport positively influence the professionally important psychological qualities of a person, improve the emotional state and working efficiency of the brain. Analysis of literature sources [2, 3, 6, 7] showed that an effective mean of psychophysical training of cadets for future military-professional (combat) activity may be kettlebell lifting, which has such advantages as: lack of significant material costs; inventory compactness; possibility of training in limited space as well as in the open area; possibility of conducting both self-training and simultaneous classes with a large group of people; a wide range of simple and accessible exercises eliminates the possibility of adaptation to the same type of load; opportunity to conduct classes simultaneously with servicemen who have different levels of physical fitness, high efficiency in the development of physical and psychological qualities; prevention of injury. However, the issue of studying the impact of kettlebell lifting on psychological qualities, emotional state and mental working capacity of cadets in the process of study remained beyond the attention of scientists.

Materials and methods

The study was attended by cadets from 1st to 5th grades (n=474) of S. P. Koroliov Zhytomyr Military Institute, who were engaged in the current system of physical training (group A, n = 416), and also of those cadets who during usual studying process were involved in the kettlebell lifting section (group B, n=58).

The research was conducted according to the following methods: the test of finding numbers (distribution and volume of attention, emotional stability), the method of operation with numbers (short term and involuntary memory), the «Complex associations» method (peculiarities of thinking), the proofreading Burdon-Anfimov test (concentration of attention, mental performance), the method of Ch. D. Spielberger, J. L. Hanin (situational anxiety), the method of A. Wessman and D. Rick (self-esteem of the emotional state).

During the researches the authenticity of difference between the indicators of cadets of groups A and B by means of Student's criterion has been determined. The dynamics of indexes in each of groups has been also estimated. The purpose of study is to analyze an influence of kettlebell lifting classes on the level of professionally important psychological qualities, emotional state and mental performance of cadets during the studying process. Research methods: theoretical analysis and generalization of scientific and methodical literature, pedagogical observation, testing, methods of mathematical statistics.

Results

The research on psychological qualities of cadets with a help of the test of finding numbers indicates that the level of distribution and volume of attention at the 1–3rd grades in both groups is significantly identical ($p>0.05$) (Table 1). At the 4th and 5th years, the rates of the cadets who practiced kettlebell lifting appeared to be better than those who were engaged in the current system of physical training, on 0.22 points and 0.51 points, respectively, but the difference is unreliable ($p>0.05$).

The analysis of the indicators of emotional stability, the level of which was researched on the results of the re-testing of cadets by the test of finding numbers (but on another blank), showed that after repeated testing (against the background of fatigue) in group A, the rates for all the courses were worse than after the first test by 0,76 points at the 1st grade, by 0,31 points at the 2nd grade, by 0,27 points at the 3rd grade, by 0,26 points at the 4th grade, by 0,25 points per 5th grade ($p>0,05$) (Table 1). In Group B at the 1–3rd years, the results of the re-testing are worse than after the first one ($p>0,05$), and at the 4th and 5th grades are better 0.08 points and 0.15 points ($p>0.05$) respectively. Comparing the results of distribution and volume of attention after re-testing it should be noted that at years 1–3 there was no significant difference between groups A and B ($p>0.05$). At the 4th and 5th years the results in group B are significantly better than in group A with a score of 0.56 and a score of 0.61 points ($p<0.05$). This suggests a greater effect from kettlebell lifting in comparison with the current system of physical training, it shows the improvement of emotional stability of cadets to the negative effects of educational activities.

The analysis of the indicators of visual short term and involuntary memory of cadets according to the method of operation with numbers showed that the average results of cadets of groups A and B do not differ significantly in all years ($p>0.05$). At the same time, at the 1–4th years, the indicators which characterize memory functions were better for cadets of group A than in group B, then on the 5th year, the rates of cadets who were involved in kettlebell lifting were better at 0.29 points ($p>0.05$) (Table 1), which allows us to speak about the positive influence of kettlebell lifting exercises on the memory functions of cadets. The study of changes in the memory of cadets showed their positive dynamics in both groups: the rates of cadets in the 5th year in group A are better than the 1st at 2.35 points ($p<0.001$), and in group B – for 2.56 points ($p<0.01$). In general, the level of memory rates for cadets of both groups at junior HMEI is estimated as average, while for elderly cadets – as high (the results of cadets of the 4th and 5th years fluctuate within the range of 7.16–7.88 points at the maximum assessment – 9 points).

By studying the peculiarities of thinking of cadets with the help of «Complex Associations» method, we established a tendency similar to the previous indicators – improvement of the results with year-to-year transition. The rates of cadets in the 5th year in group A are better than the 1st at 1.84 points ($p<0.001$), and in group B – by 2.03 points ($p<0.05$) (Table 1). Comparing the cadets of groups A and B with each other, we found

no significant difference in all years of study, despite the fact that group B grades are better than group A in all years by 0.6–0.25 points ($p>0.05$).

Table 1. Dynamics of indicators of attention, memory and thinking among cadets who were engaged in the current system of physical training (group A), and the ones who were involved in kettlebell lifting (group B)

Year of study	Group A (n=416)		Group B (n=58)		The authenticity of difference
	n	X±m	n	X±m	
<i>Finding numbers test (distribution and volume of attention), points</i>					
1 st year	62	5.93±0.28	16	5.87±0.57	P>0.05
2 nd year	112	6.39±0.20	9	6.25±0.55	P>0.05
3 rd year	91	7.02±0.17	14	6.91±0.43	P>0.05
4 th year	76	7.54±0.15	12	7.76±0.29	P>0.05
5 th year	65	7.92±0.14	7	8.13±0.33	P>0.05
<i>The results of a repeated finding numbers test (emotional stability), points</i>					
1 st year	62	5.17±0.31	16	5.02±0.61	P>0.05
2 nd year	112	6.08±0.22	9	5.87±0.58	P>0.05
3 rd year	91	6.75±0.19	14	6.89±0.44	P>0.05
4 th year	76	7.28±0.15	12	7.84±0.23	P>0.05
5 th year	65	7.67±0.14	7	8.28±0.27	P<0.05
<i>Method of operation with numbers (visual memory), points</i>					
1 st year	62	5.24±0.25	16	5.32±0.46	P>0.05
2 nd year	112	6.07±0.19	9	5.95±0.52	P>0.05
3 rd year	91	6.63±0.20	14	6.58±0.48	P>0.05
4 th year	76	7.30±0.18	12	7.16±0.49	P>0.05
5 th year	65	7.59±0.20	7	7.88±0.51	P>0.05
<i>«Complex associations» method (peculiarities of thinking), points</i>					
1 st year	62	4.85±0.31	16	4.91±0.52	P>0.05
2 nd year	112	5.13±0.23	9	5.37±0.54	P>0.05
3 rd year	91	5.97±0.21	14	6.08±0.50	P>0.05
4 th year	76	6.24±0.22	12	6.41±0.45	P>0.05
5 th year	65	6.69±0.19	7	6.94±0.49	P>0.05
<i>Bourdon-Anfimov test (concentration of attention),%</i>					
1 st year	62	88.09±0.47	16	87.14±0.95	P>0.05
2 nd year	112	89.15±0.38	9	88.07±0.91	P>0.05
3 rd year	91	90.27±0.42	14	89.91±0.79	P>0.05
4 th year	76	91.56±0.36	12	92.05±0.81	P>0.05
5 th year	65	92.12±0.39	7	93.49±0.84	P>0.05

The concentration of attention was determined as the accuracy of the work. Cadets, looking at the lines of the letters horizontally, highlighted the letter «K» on the letterhead and struck out «И» for 10 minutes. Taken into account: the total number of correctly processed characters, erroneously marked letters and missing letters K and И. The result was determined as a percentage. Thus, the analysis of the results of the proof-reading test showed that the concentration of attention of group A cadets in the 1st–5th years is better than the one of group B cadets, but the difference between them is unreliable ($p>0.05$) (Table 1). The study of the dynamics of the indicators of attention during the period of study shows that in both groups there is a reliably stable tendency to improve the indicators – the difference between the 1st and 5th year rates is 4.03% in group A ($p<0.001$) and 6.35% in group B ($p<0.001$). At the cadets of both groups at the first year, the level of concentration and sustainability of attention is assessed as «middle», and in the senior year – as «higher than average».

An important indicator of the effectiveness of educational activities of cadets is mental performance. The mental working capacity (performance) of the cadets was investigated for the Burdon-Anfimov test and determined as the product of the accuracy index and the total number of processed signs of the corrective table. Thus, at the 1st–3rd year there was no reliable difference between the indicators of mental performance of the cadets of groups A and B. The 4th and 5th years in the group of cadets-lifters showed the best indicators of mental performance at 67.09 points ($p<0.05$) and 68.09 points ($p<0.05$) than in the group of cadets who were engaged in the current system of physical training (Table 2), which indicates a positive effect of kettlebell lifting exercises. The analysis of the dynamics of the performance indicators of cadets during the training process showed improvement of the indicators in both groups – the 5th year rates are the best. The difference between the average values of mental performance of cadets of the 5th and 1st year in group A is 168.72 points ($p<0.001$), while in group B – 319.28 points ($p<0.001$) (Table 2).

An analysis of the minute-to-minute corrective test by cadets at the 5th year indicates that the level of mental performance of the cadets of group B is higher than all group A during the studied minutes, however, the results of the cadets of the two groups did not significantly differ from the 1st to the 6th minute ($p>0.05$), at the 7th, 8th and 9th minutes the rates of the cadets-kettlebell lifters are significantly better at 17.10, 19.22 and 20.82

points respectively ($p < 0.05$). By comparing the indicators of mental performance of cadets at the first and last minutes of performing a proof-reading, it can be stated that in group B the difference is 13.46 points and is reliable ($p < 0.05$), and in group A – 1.28 points ($p > 0.05$) This indicates that the cadets, who systematically engage in physical exercises (in particular, kettlebell lifting), have high levels of mental performance and the stability of the nervous system to external stimuli.

Table 2. Dynamics of indicators of mental performance among cadets who were engaged in the current system of physical training (group A), and the ones who were involved in kettlebell lifting (group B)

Year of study	Group A (n=416)		Group B (n=58)		The authenticity of difference
	n	X±m	n	X±m	
1 st year	62	1097.54±15.22	16	1015.02±29.40	P>0.05
2 nd year	112	1139.68±11.98	9	1122.87±29.05	P>0.05
3 rd year	91	1185.79±12.35	14	1197.39±27.86	P>0.05
4 th year	76	1215.53±13.24	12	1282.62±27.53	P<0.05
5 th year	65	1266.23±12.07	7	1334.32±27.19	P<0.05

Investigation of situational anxiety of cadets during studying by method of Ch. D. Spielberger, J. L. Hanin testify that at the 1st and 2nd years cadets of groups A and B did not differ significantly ($p > 0.05$). At the same time, on the 1st year in both groups, the level of anxiety was evaluated as high, and on the 2nd – as moderate (optimal). At the 3rd – 5th years, the level of anxiety of the cadets was significantly lower ($p < 0.05-0.01$) than in the cadets who were engaged in the current system of physical training (Table 3).

Table 3. Changes in the indicators of situational anxiety among cadets who were engaged in the current system of physical training (group A), and the ones who were involved in kettlebell lifting (group B)

Year of study	Group A (n=416)		Group B (n=58)		The authenticity of difference
	n	X±m	n	X±m	
1 st year	62	52.7±1.51	16	54.2±3.08	P>0.05
2 nd year	112	44.3±0.73	9	41.5±2.39	P>0.05
3 rd year	91	37.4±0.61	14	32.3±1.74	P<0.05
4 th year	76	34.2±0.59	12	29.6±1.11	P<0.05
5 th year	65	36.9±0.74	7	31.7±2.31	P<0.05

Analysis of the indicators of the emotional state of the cadets using the method of A. Wessman and D. Rick (self-esteem of the emotional state), which was determined on a 10-point scale, showed that at the 1st–3rd year no significant difference was found between the groups A and B ($p > 0.05$). At the 4th and 5th years, the rates of the cadets-lifters proved to be significantly better than those of group A cadets at 0.73 ($p < 0.05$) and 1.09 points ($p < 0.001$) respectively (Table 4). The study of changes in the self-esteem of the cadets' emotional state during the period of study indicated a positive dynamics of indicators in both groups – at the 5th year, the rates of A group cadets by 1.36 points were higher than those of the 1st year cadets, and in the group B by 2.56 points.

Table 4. Changes in the indicators of the emotional state among cadets who were engaged in the current system of physical training (group A), and the ones who were involved in kettlebell lifting (group B)

Year of study	Group A (n=416)		Group B (n=58)		The authenticity of difference
	n	X±m	n	X±m	
1 st year	62	4.62±0.12	16	4.51±0.27	P>0.05
2 nd year	112	4.89±0.10	9	5.08±0.30	P>0.05
3 rd year	91	5.53±0.09	14	5.93±0.28	P>0.05
4 th year	76	6.08±0.10	12	6.81±0.24	P<0.05
5 th year	65	5.98±0.13	7	7.07±0.23	P<0.001

Discussion

Analyzing changes in distribution of indicators and volume of attention, memory, thinking in each group, it is worth noting that in both groups the indicators are significantly increasing in the process of learning – the best value is recorded at the 5th year. The difference between the rates of 1st and 5th year cadets in both groups is reliable ($p < 0.001$). The level of attention, memory and thinking of cadets of both groups at the 5th year is estimated as high. The absence of a significant difference between the investigated indicators of attention, memory and thinking of cadets-lifters and cadets who were engaged in the current system of physical training, can be explained by the fact that the formation of these psychological qualities is more influenced by educational activities, intellectual work and other factors, and physical training and sports provide the right conditions for their formation and contribute to this process. The analysis shows that both: the current system of physical training as well as kettlebell lifting exercises has a positive effect on the improvement of professionally important psychological indices for cadets. At the same time, the high physical activity of cadets in the course of

kettlebell lifting exercises and which are considerably larger in comparison with the current system of physical training did not prevent the development of professionally important psychological qualities of cadets-lifters – the future officers of army. The results of testing the cadets for proof-reading of Burdon-Anfimov allow to continually improving the mental performance of cadets as a result of kettlebell lifting exercises.

Analysis of the dynamics of indicators of situational anxiety showed the same tendency in both groups: before the 4th year, the rates are improved ($p < 0.001$) – the best value of situational anxiety was recorded on the 4th year (in group A – 34.2 points, in group B – 29.6 points). On the 5th year in both groups, the indicators are not significantly deteriorating relative to the 4th year ($p > 0.05$). It was determined that at the 3rd year in both groups the level of anxiety is estimated as optimal, at the 4th year in group A – as optimal, in group B – as low, and in the 5th course in both groups – as optimal. The insignificant deterioration of anxiety in the cadets of the two groups under study at the 5th year is due to the growing fear of cadets due to the approach of state examinations and graduation. At the same time, an in-depth analysis, which showed a significant difference between the anxiety indices of A and B group cadets in the senior year, shows the positive impact of kettlebell lifting exercises on the level of anxiety of cadets-lifters. The intense competitive and training activity of cadets in kettlebell sport contributes to the formation of a high level of such psychological (volitional) qualities as: self-confidence, decision-making, persistence in achieving the goal, willpower, courage, dedication and others that have a positive effect on the effectiveness of the training and future military-professional (combat) activity of cadets – future officers of the Ukrainian Armed Forces.

The study of the emotional state of the cadets shows that in group A, the best indicators were found at the 4th year (6.08 points), and on the 5th year their insignificant deterioration was observed ($p > 0.05$). In group B (cadets-lifters) the best value was recorded on the 5th year (7.07 points). We consider the following reasons of the deterioration of the emotional state: graduation year, state examinations and future professional activities. All this causes cadets to have some anxiety, uncertainty, fatigue, etc. At the 5th year, the indicators are the highest, which indicates the positive impact of kettlebell lifting exercises on the formation of a positive emotional background for success in the training and future military-professional activities.

Conclusions

Positive influence of kettlebell lifting exercises on improvement of professionally important psychological qualities, emotional state and mental performance of cadets is established, which will give them high performance of educational activity, and in the future – effective fulfillment of tasks of military-professional (combat) activity. The foregoing suggests the necessity of purposeful use of means of kettlebell lifting sports in the process of physical education of cadets – future officers, commanders, managers of occupations in the Ukrainian Armed Forces.

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