

PODIUM

Journal of Science and Technology in Physical Culture

UNIVERSITY EDITORIAL

Volumen 17
Issue 2

2022

University of Pinar del Río "Hermanos Saíz Montes de Oca"

Director: Fernando Emilio Valladares Fuente

Email: fernando.valladares@upr.edu.cu

Translated from the original in spanish

Original article

Analysis of alternative physical tests for personnel with chronic diseases in the naval force

Análisis de las pruebas físicas alternativas para personal con enfermedades crónicas en la fuerza naval

Análise de testes físicos alternativos para o pessoal com doenças crônicas na força naval

Diego Vinicio Lincango Inga^{1*}  <https://orcid.org/0000-0003-4732-0629>

Enrique Chávez Cevallos¹  <https://orcid.org/0000-0002-2535-3705>

¹University of the Armed Forces ESPE. Quito. Republic of Ecuador

*Corresponding author: dvlincango@espe.edu.ec

Received: 03/30/2021.

Approved: 02/28/2022.

How to cite ítem: Lincango Inga, D., & Chávez Cevallos, E. (2022). Análisis de las pruebas físicas alternativas para personal con enfermedades crónicas en la fuerza naval/Analysis of alternative physical tests for personnel with chronic diseases in the naval force. PODIUM - Revista de Ciencia y Tecnología en la Cultura Física, 17(2), 478-489. <https://podium.upr.edu.cu/index.php/podium/article/view/1108>

ABSTRACT

The members of the Naval Force must have various characteristics that define their professional skills, including physical preparation, an essential requirement to remain fit. However, there are naval personnel who, due to their health condition, require adaptations in the physical performance assessment tests, for which proposals that need validation are issued. The objective of this research was to analyze through consultation by specialists some alternative physical tests that can be adapted to Naval Force

<http://podium.upr.edu.cu/index.php/podium/article/view/1108>



personnel with chronic non-communicable diseases. This Research is of descriptive-explanatory type, of correlational order. In it, the criteria of a sample made up of 13 specialists in sports medicine and officers of the Naval Force of the Republic of Ecuador are studied. During the study, three inclusion criteria are met, eight physical performance *tests are validated* and the recommendation of other tests is allowed. Two tests are presented as results, which were not relevant (*TLA* (2.23 points: not very relevant and *ÍB* 1.69 points: not relevant), while the rest obtained the following average scores, *IA* : 4.92 points (relevant-very relevant), *DS* : 4.85 points (relevant-very relevant), *TR* : 4.38 points (relevant), *TM* : 4.23 points (relevant), *TIV* : 3.23 points (moderately relevant) and *TFMPE* : 3.23 points (moderately relevant). Agreement between specialists is evident. (0.837). Six alternative physical tests for naval personnel with chronic noncommunicable diseases are validated as relevant, discarding the Barthel Index and the Stand Up and Go Test for not adjusting to the requirements of the naval force. It is recommended to consider the proposals issued by the specialists, carrying out empirical studies with the validated proposals; they adjust and create the necessary scales to prospectively evaluate the military personnel of interest.

Keywords: Alternative test; Chronic diseases; Naval force.

RESUMEN

Los integrantes de la Fuerza Naval deben poseer diversas características que definen sus competencias profesionales, entre ellas la preparación física, requisito indispensable para permanecer apto. No obstante, existe personal naval que por su condición de salud requiere adecuaciones en las pruebas de valoración del rendimiento físico, para lo cual se dictan propuestas que necesitan validación. El objetivo de esta investigación consistió en analizar mediante consulta por especialistas algunas pruebas físicas alternativas que puedan adecuarse al personal de la Fuerza Naval con enfermedades crónicas no transmisibles. Esta Investigación es de tipo descriptiva-explicativa, de orden correlacional. En ella, se estudian los criterios de una muestra conformada por 13 especialistas en medicina deportiva y oficiales de la Fuerza Naval de la República del Ecuador. Durante el estudio, se cumplen tres criterios de inclusión, se validan ocho *test* del rendimiento físico y se permite la recomendación de otras pruebas. Como resultados se presentan dos pruebas, las cuales no resultaron relevantes (*TLA* (2.23 puntos: poco relevante y *ÍB* 1.69 puntos: nada relevante), mientras que el resto obtuvo los siguientes puntajes promedios, *IA*: 4.92 puntos (relevante-muy relevante), *DS*: 4.85 puntos (relevante-muy relevante), *TR*: 4.38 puntos (relevante), *TM*: 4.23 puntos (relevante), *TIV*: 3.23 puntos (medianamente relevante) y *TFMPE*: 3.23 puntos (medianamente relevante). Se evidencia concordancia entre especialistas (0.837). Se validan como relevantes seis pruebas físicas alternativas para el personal naval con enfermedades crónicas no transmisibles, descartándose el Índice de Barthel y el test de Levanta y Anda por no ajustarse a los requerimientos de la Fuerza Naval. Se recomienda considerar las propuestas emitidas por los especialistas, realizando estudios empíricos con las propuestas validadas; se ajustan y crean baremos necesarios para evaluar prospectivamente al personal militar de interés.

Palabras clave: Prueba alternativa; Enfermedades crónicas; Fuerza Naval.



RESUMO

Os membros da força naval devem possuir várias características que definem suas competências profissionais, incluindo a preparação física, que é um requisito indispensável para se manterem em forma. Entretanto, há pessoal naval que, devido ao seu estado de saúde, requer ajustes nos testes de avaliação de desempenho físico, para os quais são emitidas propostas que requerem validação. O objetivo desta pesquisa consistiu em analisar, por meio de consulta especializada, alguns testes físicos alternativos que poderiam ser adaptados ao pessoal da Força Naval com doenças crônicas não transmissíveis. Esta é uma pesquisa descritiva-explicativa e correlacional. Nele, são estudados os critérios de uma amostra de 13 especialistas em medicina esportiva e oficiais da força naval da República do Equador. Durante o estudo, três critérios de inclusão são cumpridos, oito testes de desempenho físico são validados e a recomendação de outros testes é permitida. Como resultados, são apresentados dois testes, que não foram relevantes (TLA (2,23 pontos: pouco relevante e ÍB 1,69 pontos: pouco relevante), enquanto o restante obteve as seguintes pontuações médias: IA: 4,92 pontos (relevante - muito relevante), DS: 4,85 pontos (relevante - muito relevante), TR: 4,38 pontos (relevante), TM: 4,23 pontos (relevante), TIV: 3,23 pontos (moderadamente relevante) e TFMPE: 3,23 pontos (moderadamente relevante). Há concordância entre os especialistas (0,837). Seis testes físicos alternativos são validados como relevantes para o pessoal naval com doenças crônicas não transmissíveis, descartando o Índice Barthel e o Teste de Elevação e Caminhada por não atenderem às exigências da força naval. Recomenda-se considerar as propostas emitidas pelos especialistas, realizando estudos empíricos com as propostas validadas; as escalas necessárias são ajustadas e criadas para avaliar prospectivamente o pessoal militar de interesse.

Palavras-chave: Teste alternativo; Doenças crônicas; Força Naval.

INTRODUCTION

The Republic of Ecuador is a sovereign country located in the northwestern region of South America, made up of twenty-four provinces. In Ecuador, the Armed Forces have three branches: the Army, the Navy and the Air Force (Campaña, 2020).

The Ecuadorian Navy, which is also called the Ecuadorian Naval Force, is a branch of the Armed Forces, responsible in times of war for preserving Ecuador's maritime sovereignty. In times of peace, this nation is responsible for controlling illicit activities, such as fuel smuggling, illegal migration, illegal fishing, drug trafficking, shipwrecks, among others (Armada, 2020) for which maritime awareness tends to be strengthened (Montalvo, 2018).

However, it is no secret to anyone that the daily life of personnel stationed in the Naval Force is extremely demanding due to the requirements of the service (Haslop, 2018). All this is closely associated with the level of physical preparation that the members of this force must have, for which numerous preparation strategies are designed to enhance the capabilities of military personnel (Vantarakis, et al., 2017; Ilnytskyy, et al., 2018; Nindl, et al., 2018). This aspect allows to successfully meet the service requirements in an aquatic and hostile environment.



The assessment of the physical performance of military personnel is one of the most studied tasks in the literature, according to the consultation carried out in the different primary research sources. In this performance, various directly and indirectly related aspects are valued, such as motor technique (Guevara, Morales, 2017), nutrition, and level of physical activity (Malkawi, et al., 2018). Physical endurance and the analysis of the physical tests carried out on military personnel (both genders) are also included here (Clavijo, et al., 2016; Larrea, Morales, 2017; Rivadeneyra, et al., 2017).

The current regulation of evaluation and control of the level of physical condition in the Armed Forces of Ecuador has been going through some difficulties, associated with personnel suffering from chronic non-communicable diseases. Among these diseases are obesity, diabetes, high blood pressure and other conditions that can even be assessed in various published works, as is the case of Moreira, Frómeta (2021).

Precisely, the of physical endurance in the military, regardless of whether they are naval or not, is one of the most pressing problems for personnel with non-communicable disease problems such as those already mentioned. This situation is due to the fact that health problems can limit the results achieved and required by the scales of physical performance available in the naval forces, (OT, 2018) and in physical resistance assessment tests such as the Cooper test. Those that in the same way are usually validated to adapt them to the requirements of subjects with special characteristics or needs, as would be the case of Rojas (2018), who validates the test scales based on applying them at height.

All military personnel, who for various reasons suffer from non-communicable diseases, have difficulties with the assessment tests of sports performance, applied in the Ecuadorian Armed Forces. With this objective, some alternatives were proposed with complementary tests to which Naval Force personnel are subjected. In this sense, there are scientific-methodological inconsistencies, associated both with the conformation of the test that physically evaluates this naval personnel, as well as the standards of requirements in each of its indicators; this works like this, regardless of the genre studied.

It is important to bear in mind that even with the demands of the service (regulated in compliance tables by age) for personnel with these non-communicable diseases, a study has not been carried out to elucidate how the physical condition of the aforementioned personnel has been behaving. This study has not been carried out, specifically with a view to designing specialized scales or specific regulations in the future. These regulations should contain concrete actions to provide specialized medical follow-up and physical training to naval personnel who have said non-communicable diseases.

On the other hand, alternative tests such as the so-called Rockport test *have not* been validated nationally for their possible generalization and adaptation to the naval personnel under study. This method consists of determining the VO_2 Max in a walk of 1609 m. and swim a distance by age according to the table with a scale (physical instrument), created for this purpose. This assessment test is usually used in subjects with obesity problems (Jiménez, Gallardo, 2013) and has even been validated in university and elderly personnel, determining cardiovascular fitness; (Fenstermaker, et al., 1992; Dolgener, et al., 1994). From this perspective, like other physical performance assessment tests, this test could be useful in determining performance indicators for present and future decision-making by the highest-ranking officers of the Naval Force.



However, as an alternative to determine the maximum Vo^2 and other physical indicators in naval military personnel with chronic disease problems, there is no evidence of studies in the literature consulted, especially in the national literature. For which, the purpose of the research is established: to analyze through consultation by specialists some alternative physical tests that can be adapted to the personnel of the Naval Force with chronic non-communicable diseases.

In order to achieve an effective assessment of these tests, tests that come from authors specialized in this subject (Cid-Ruzafa, Damián-Moreno, 1997; Vicente, et al., 2007; Jiménez, 2007; Hernández, et al., 2008; Gutierrez-Claveria, et al., 2009; Jimenez, Gallardo, 2013) were used.

MATERIALS AND METHODS

A descriptive-explanatory research of correlational order was developed, which studied a sample made up of 13 specialists in sports medicine and officers of the Naval Force of the Republic of Ecuador. This study was based on the selection in a non-probabilistic purposive sampling. Three inclusion criteria are fulfilled here (being officers of the naval force, having a third-level degree in general medicine or a related specialty, and consensual signature of non-disclosure of personal data).

The alternative physical tests analyzed by the specialists were:

1. Rockport test (RT): simple aerobic test, designed for people who cannot run due to poor cardiorespiratory fitness. This consisted on running a mile (a similar requirement in terms of distance for healthy active personnel who must perform assessment tests such as the Mile test or the *Cooper* test that determine their aerobic condition).
2. March Test (TeM in Spanish): cardiorespiratory functional test; It consists of walking 6 minutes, measuring the maximum distance that a subject can travel, useful for people with chronic respiratory diseases.
3. Stand Up and Go Test (TLA in Spanish): determined the level of balance of a subject; It consists of a patient sitting on a chair with arms, telling him to get up (start of the test with timing); walk 3m. and sits back in the starting chair (end of timing).
4. Barthel Index (ÍB): determined the subject's ability to perform ten basic activities of daily living; the degree of dependence of the subject is indicated
5. Round trip running test (*TIV in Spanish*): *determined the subject's agility*; applied in ten yards traveled.
6. Significant data of the sick officer (DS in Spanish): age, body weight, gender, illness and time dedicated to specialized physical activity were determined. The data was used among other aspects to determine the existence or not of obesity and sedentary lifestyle.
7. Anthropometric indicators (AI): fundamentally circumference of the abdominal waist and hip.



8. Maximum Strength by No extreme weight Test (TFMPE in Spanish): it was designed for patients with cardiovascular diseases or with cardiovascular risk factors; it was applied by selecting a weight for each subject and in each muscular plane that was required to be evaluated.

Others (O): other proposals recommended by the specialists, where the following was exemplified:

- According to recommendations, some tests of the Eurofit battery for adults were recorded, which are available in summary form in Table 2.
- The CPAFLA battery, which specifies hand grip strength, maximum number of arm flexions, and trunk flexion.
- HRFT-UKK battery, which specifies static lumbar extension for four minutes.

In the classification of the level of relevance or not that each performance assessment test described above has (only tests between 1 and 8 were evaluated). A five-level Likert scale was applied (1: not at all relevant; 2: slightly relevant; 3: moderately relevant; 4: relevant; 5: very relevant). It is considered to use an alternative test of a relevant type for Naval Force personnel with chronic diseases, provided that it exceeds the average of 3 points in the considerations provided by the 13 specialists.

To find out the concordance index between specialists, the Kendall's W test (0-1) is applied, considered as a coefficient that measures the agreements between evaluators.

RESULTS AND DISCUSSION

As evidenced in Table 1, of the eight tests analyzed by the specialists, only 6 qualified as relevant; the TLA tests (2.23 points: Little Relevant) and the IB test (1.69 points: Not Relevant) are excluded. The Stand Up and Go Test (TLA) is shown as a consideration for specialists. It is oriented to a greater degree for the elderly (Podsiadlo, Richardson, 1991) for which it is assumed that the vast majority of military personnel at that age are already retired from active military life. On the other hand, the Barthel Index (IB) is aimed at knowing the degree of dependency of a subject (Cid-Ruzafa, Damián-Moreno, 1997). For this, it is assumed that an official or crew member of the Naval Force must at least present sufficiency in all basic motor skills, such as the case of career technique, (Guevara, Morales, 2017). Regardless of the noncommunicable diseases that he has, otherwise, he should go to passive military service, as recommended by the aforementioned authors (Table 1).

Table 1. - Specialist evaluations

Do not	TR	TM	ALT	IB	IVT	DS	AI	TFMPE
one	4	4	3	two	3	5	5	4
two	3	4	two	two	3	5	4	4
3	4	4	two	two	3	5	5	4
4	5	4	two	one	4	5	5	3



5	5	5	two	one	3	5	5	3
6	4	4	two	one	4	4	5	3
7	5	5	two	two	5	5	5	3
8	5	4	3	one	3	5	5	4
9	5	4	3	two	3	5	5	5
10	4	4	two	two	3	5	5	3
eleven	5	4	3	3	3	5	5	3
12	4	5	two	two	3	5	5	two
13	4	4	one	one	two	4	5	one
□	4.38	4.23	2.23	1.69	3.23	4.85	4.92	3.23

On the other hand, of the tests approved as *relevant*, Anthropometric Indicators (AI) achieved the highest score (4.92 points). Criteria of the specialists in these tests applied to the military personnel of the Naval Force were taken into consideration. These have overweight or obesity problems, in addition to being a usual indicator in evaluations carried out every six months (Maldonado, Morales, 2017). The significant data of the sick officer (DS) was the other alternative test that reached the highest score achieved, a mean score of 4.85 points. These tests were equally demanding for healthy officers, (OT, 2018). This was because they do not require great demands on the part of the military personnel of the Naval Force with chronic diseases or not, which, like the *IA variable*, are useful throughout the active life of the personnel of officers and crew members of the Force Naval. These tests are also useful for determining a sedentary lifestyle, overweight and obesity. In this sense, and despite the fact that many of the tests mentioned above are not alternatives as they are part of the tests to assess the physical performance of the Ecuadorian naval force. Their inclusion in this research was considered considering that many of them are complementary to obtain other indicators of alternative interest. On the other hand, these can be measured through other recording instruments and methodologies, such as body weight or the time dedicated to physical activity.

Next, the alternative physical test with the highest score was the Rockport Test (4.38 points). This is a little-known *test* in the Naval Force that achieved a qualified score of *relevant*. Due to its ease of understanding and the need for the results it determines (aerobic capacity) in people with cardiorespiratory problems, according to Jiménez, Gallardo (2013) it was considered of great importance by the specialists consulted. This is an aspect to consider in order to propose it as an alternative test for the military personnel of the Naval Force of the Republic of Ecuador. On the other hand, the specialists considered the Walking *Test* as *Relevant* (4.23 points); this is a functional cardiorespiratory test with few requirements, but high effectiveness for military personnel of the Naval Force with chronic non-communicable diseases, as defined in Gutiérrez-Claveria, et al., (2009).



Finally, of the tests that achieved a relevant rating, the one with the lowest score was the *Test of Maximum Strength by Non-Extreme Weight* (3.23 points). When measuring the physical capacity of force, of importance for the Naval Force as established in consulted studies such as those established by *Deuster (1997)*. It is also relevant for the specialists surveyed, with the mitigating factor that can be adapted for each existing condition in each of the members of the Naval Force with chronic diseases of the Ecuadorian naval force. In effect, *the test is adapted* to the possibilities and sufferings of the members, for which it will be able to comply with the principle of individualization.

On the other hand, the round trip running test (*TIV*) when determining the agility of the subject, met few physical requirements. This was considered by the specialists as of medium relevance (□3.23 points). The same average score as the *TFMPE* test was obtained, for which its inclusion in the alternative tests for naval personnel with chronic non-communicable diseases (Table 2), (Table 3) and (Table 4) can be considered.

Table 2.- Descriptive data, ranges and test statistics

descriptive statistics					
	N	Half	dev . Deviation	Minimum	Maximum
TR	13	4.38	,650	3	5
TM	13	4.23	.439	4	5
ALT	13	2.23	,599	one	3
BI	13	1.69	,630	one	3
IVT	13	3.23	.725	two	5
DS	13	4.85	,376	4	5
AI	13	4.92	.277	4	5
TFMPE	13	3.23	1,013	one	5

Table 3.- Ranges

average range	
TR	5.81
TM	5.42
ALT	2.00
BI	1.42
IVT	3.65
DS	6.85
AI	7.04
TFMPE	3.81



Table 4. - Test statistics

N	13
W for Kendall ^a	,837
Chi squared	76,175
gl	7
asymptotic sig.	,000

a. Kendall's concordance coefficient

The means in the score, evidenced in table 1, can be corroborated in the descriptive statistics themselves and the ranges obtained in table 2. With them, a favorable asymptotic significance ($p=0.000$) and an indicator of 0.837 in the Test were reached. W for Kendall. The existence of a high concordance between the criteria issued by the specialists consulted was demonstrated, an aspect that allows the validation of the proposals of the alternative physical tests described above for naval personnel suffering from chronic non-communicable diseases for various reasons.

However, for the consideration of some specialists, other alternative physical tests could be included as recommendations for the naval personnel under study. These tests include: tests with manual grip, arm and trunk flexion, among others, described in works such as the one in *Vicente, et al., (2007) and Jiménez, (2007)*. Finally, they could be considered in the future in a more comprehensive study than the one provided in this research report.

CONCLUSIONS

Conclusively, it can be added that six alternative physical tests for naval personnel with chronic non-communicable diseases are validated as relevant. The Barthel Index and the Stand Up and Go Test were discarded because they did not adjust, according to the specialists, to the requirements of the naval force. It is recommended to consider the proposals issued by the specialists and carry out empirical studies with the validated proposals, in which the necessary scales must be adjusted and created to be able to prospectively evaluate the military personnel of interest.

ACKNOWLEDGMENT

To Afidesa Research Group (Physical Activity, Sports and Health) of the University of the Armed Forces ESPE for the advice and implementation of the intervention proposal.



REFERENCES

- Dolgener, F. A., Hensley, L. D., Marsh, J. J., & Fjelstul, J. K. (1994). Validation of the Rockport Fitness Walking Test in college males and females. *Research quarterly for exercise and sport*, 65(2), 152-158. doi:10.1080/02701367.1994.10607610
- Fenstermaker, K. L., Plowman, S. A., & Looney, M. A. (1992). Validation of the Rockport Fitness Walking Test in females 65 years and older. *Research quarterly for exercise and sport*, 63(3), 322-327. doi:10.1080/02701367.1992.10608749
- Guevara, P. V., & Morales, S. (2017). La técnica de carrera y el desarrollo motriz en aspirantes a soldados. *Revista Cubana de Investigaciones Biomédicas*, 36(3), 1-14. <http://www.revibiomedica.sld.cu/index.php/ibi/article/view/12>
- Gutierrez-Claveria, M., Beroíza, T., Cartagena, C., Caviedes, I., Céspedes, J., Gutiérrez-Navas, M., & Schönffeldt, P. (2009). Prueba de caminata de seis minutos. *Revista chilena de enfermedades respiratorias*, 25(1), 15-24. <http://revchilenfermrespir.cl/pdf/S0717-73482009000100003.pdf>
- Haslop, D. (2018). *Early naval air power: British and German approaches*. New York: Routledge.
- Hernández, R., Román, I., López, M., Ghassah, M., & Agramonte, S. (2008). Prueba para determinar la fuerza máxima en pacientes con enfermedades crónicas no transmisibles. *Lecturas: Educación Física y Deportes*, 13(119), 1-6. <https://www.efdeportes.com/efd119/fuerza-maxima-en-pacientes-con-enfermedades-cronicas.htm>
- Ilnytskyy, I., Okopnyy, A., Palatnyy, A., Pityn, M., Kyselytsia, O., & Zoriy, Y. (2018). Use of boxing to improve the physical education content in lyceums within intensive military and physical training. *Journal of Physical Education and Sport*, 18(1), 262-269. doi:10.7752/jpes.2018.01035
- Jiménez Gutiérrez, A. (2007). La valoración de la aptitud física y su relación con la salud. *Journal of human sport and exercise*, 2(2), 53-71. <https://www.redalyc.org/pdf/3010/301023504004.pdf>
- Jiménez, H. J., & Gallardo, A. (2013). Determinación del máximo consumo de VO₂ mediante el test de Rockport en mujeres adultas obesas. *Lecturas: Educación Física y Deportes*, 18(183), 1-6. 13 de enero de 2021. <https://www.efdeportes.com/efd183/el-test-de-rockport-en-mujeres-adultas-obesas.htm#:~:text=La%20prueba%20aer%C3%B3bica%20de%20caminar,mill a%20lo%20m%C3%A1s%20r%C3%A1pido%20posible> .
- Larrea, B., & Morales, S. (2017). El rendimiento aeróbico del personal militar femenino en menos de 500 y más de 2 000 m snm. *Revista Cubana de Investigaciones Biomédicas*, 36(3), 1-10. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-03002017000300009
- Maldonado Vaca, I. F., & Morales, S. (2017). Perfil antropométrico y composición corporal en aspirantes de la Escuela de Formación de Soldados del Ejército. *Revista Cubana de Investigaciones Biomédicas*, 36(2), 208-218.



http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-03002017000200016

- Malkawi, A. M., Meertens, R. M., Kremers, S. P., & Sleddens, E. F. (2018). Dietary, physical activity, and weight management intervention among active-duty military personnel: a systematic review. *Military Medical Research*, 5(1), 1-12. <https://link.springer.com/article/10.1186/s40779-018-0190-5>
- Montalvo, Cevallos F. M. (2018). Diseño de una guía metodológica para mejorar la gestión en la vinculación con la sociedad del Instituto Tecnológico Superior Eugenio Espejo de la ciudad de Riobamba.
- Moreira, E. P., & Frómata, E. R. (2021). Insuficiente ejercicio, su incidencia en el rendimiento en las pruebas físicas de la policía nacional. *Lecturas: Educación Física y Deportes*, 25(274), 134-144. doi:10.46642/efd.v25i274.2817
- Nindl, B. C., Billing, D. C., Drain, J. R., Beckner, M. E., Greeves, J., Groeller, H., & Friedl, K. E. (2018). Perspective on resilience for military readiness and preparedness: report of an international military physiology roundtable. *Journal of science and medicine in sport*, 21(11), 1116-1124. doi:10.1016/j.jsams.2018.05.005
- OT. (2018). Reglamento para la Evaluación de la Condición Física del Personal Profesional de las Fuerzas Armadas. Quito: FEDEME.
- Podsiadlo, D., & Richardson, S. (1991). The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *Journal of the American Geriatrics Society*, 39(2), 142-148. doi:10.1111/j.1532-5415.1991.tb01616.x
- Rivadeneira Carranza, P. E., Morales, S., & Parra Cárdenas, H. A., H. A. (2017). Estudio del vO_2 máx en soldados entrenados en menos de 500 y más de 2 000 m snm. *Revista Cubana de Investigaciones Biomédicas*, 36(2), 12-28. <http://www.revibiomedica.sld.cu/index.php/ibi/article/view/4>
- Rojas, I. A. (2018). Validación de los baremos preestablecidos del test de Cooper en población que aplica la prueba en altura. *Lúdica Pedagógica*, 1(27), 15-24. doi:10.17227/ludica.num27-9439
- Vantarakis, A., Chatzinikolaou, A., Avloniti, A., Vezos, N., Douroudos, I. I., Draganidis, D., & Fatouros, I. G. (2017). A 2-month linear periodized resistance exercise training improved musculo skeletal fitness and specific conditioning of navy cadets. *The Journal of Strength & Conditioning Research*, 31(5), 1362-1370. doi:10.1519/JSC.0000000000001599
- Vicente, J. M., Montesinos, J. L., & Rodríguez, H. M. (2007). Baterías de tests más utilizadas para la valoración de los niveles de condición física en sujetos mayores. *Revista Española de Educación Física y Deportes*, (380-381), 107. (6-7), 107-29. <http://www.reefd.es/index.php/reefd/article/viewFile/468/454#page=107>



Conflict of interests:

Los autores declaran no tener conflictos de intereses.

Authors' contribution:

The authors have participated in the writing of the work and analysis of the documents.



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International license
Copyright (c) 2022 Diego Vinicio Lincango Inga, Enrique Chávez Cevallos

