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Original article

Evaluation of physical condition in populations aged 6 to 14 years from Mexico and Cuba

*Evaluación de la condición física en poblaciones de 6 a 14 años de México y
Cuba*

*Avaliação da aptidão física em populações de 6 a 14 anos de idade no México e
em Cuba*

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ABSTRACT

The present study constitutes a transcendent work in the area of knowledge of physical condition and represents the result of research carried out in the Republic of Cuba and in the United Mexican States in response to the request of both countries. It was designed statistically, to represent official and highly reliable data, with the objective of knowing the state of the physical condition of the two nations and thus evaluating the effect of the Physical Education programs that are applied. It was had the support of sports and physical culture organizations when forming the studies, carefully treated in the sample design, for this it was had a team of specialist statisticians who were in charge of processing the information. The data from this study was considered limited for publication and will be released once declassified. The same methodologies were used in its application, which is valuable information for the improvement of plans and programs in the field of the Bachelor's Degree in Physical Culture and information is provided that, in comparison, calls for reflection by specialists. of Physical Education, to continue the improvement of these specialties, in general.

Keywords: physical condition, percentiles, statistical significance.

RESUMEN

El presente estudio constituye un trabajo trascendente en el área del conocimiento de la condición física y representa el resultado de investigaciones realizadas en la República de Cuba y en los Estados Unidos Mexicanos como respuesta a la solicitud de ambos países. Fue diseñado estadísticamente, para representar datos oficiales y altamente confiables, con el objetivo de conocer el estado de la condición física de las dos naciones y valorar así, el efecto de los programas de Educación Física que se aplican. Se contó con el apoyo de las organizaciones deportivas y de cultura física al conformar los estudios, cuidadosamente tratados en el diseño de muestra, para ello se contó con un equipo de estadísticos especialistas que tuvieron a su cargo el procesamiento de la información. Los datos de este estudio se consideraron limitados para la publicación y una vez desclasificados se dan conocer. Se utilizaron iguales metodologías en su aplicación, lo que resulta una información



valiosa para el perfeccionamiento de los planes y programas que en el campo de la Licenciatura en Cultura Física y se brinda una información que, en su comparación, llama a la reflexión de los especialistas de Educación Física, para continuar el perfeccionamiento de estas especialidades, en general.

Palabras clave: condición física, percentiles, significación estadística.

RESUMO

O presente estudo constitui um trabalho transcendental na área do conhecimento da aptidão física e representa o resultado de uma pesquisa realizada na República de Cuba e nos Estados Unidos Mexicanos em resposta à solicitação de ambos os países. Foi projetado estatisticamente para representar dados oficiais e altamente confiáveis, com o objetivo de conhecer o estado da aptidão física em ambos os países e, assim, avaliar o efeito dos programas de Educação Física aplicados. As organizações esportivas e de cultura física foram apoiadas na elaboração dos estudos, cuidadosamente tratadas no desenho da amostra, com a ajuda de uma equipe de estatísticos especializados que foram responsáveis pelo processamento das informações. Os dados deste estudo foram considerados limitados para publicação e, uma vez desclassificados, são tornados públicos. Foram utilizadas as mesmas metodologias em sua aplicação, o que resulta em informações valiosas para o aprimoramento dos planos e programas no campo da cultura física e fornece informações que, em sua comparação, exigem a reflexão dos especialistas em educação física, a fim de continuar o aprimoramento dessas especialidades em geral.

Palavras-chave: condição física, percentis, significância estatística.

INTRODUCTION

The living being, specifically man, requires changes and transformations in the different spheres of economic, political, physical and social life. In that sense, Physical Education is a discipline that, within its abilities, requires the increasing preparation of people so that they are capable of facing the challenges that society imposes.



According to Cervantes *et al.* (2015), physical activity at an early age is taken advantage from the school environment, which favors the adoption of healthy lifestyles and guarantees the health of the future adult.

Chicuzaque and Jiménez (2017) point out that the objective of evaluating physical fitness is to inform people about their level of fitness related to health, age and gender and to provide data to develop physical exercise programs, obtain baseline data and provide follow-up based on program evaluation. In this way, it becomes possible to motivate individuals to improve or maintain their components, based on reasonable and established data. These authors point out that this evaluation also serves to know the physical qualities from an early age and thus be captured by a sport as future talents of the municipality, province or country.

Retureta (2017) suggests that to achieve high sporting results, it is necessary to establish a selection system in which elements such as the detection, selection and monitoring of those who have great capacities and practical skills for a given sport must be present; these are normally subjected to a preparation process that allows them to move towards high performance without affecting their stages of biological development.

From the above, it follows that to achieve maximum performance, detection is essential, together with a correct and early selection of candidates, based on scientific advances in the various branches of science and innovative technology that verifies the validity of all the factors analyzed.

Therefore, there is agreement with Castillo *et al.* (2018) in that Physical Education must be interdisciplinary, that covers areas such as sports, health, free time and the environment, which means facing new challenges by accessing a renewed discipline.

López (2018) mention Vinaccia and Gustavo Ramón Suárez (2004) in his work since it dates back to a time when society used to identify with the benefits of practicing physical activity and exercises, from an early age. This is justified both in the physical aspect and in preventing future pathologies, focused on maintaining health, or in the field of optimization of the psychological, attitudinal part and acquisition of healthy habits.



The study presented corresponds to the comparison of representative samples from Cuba and Mexico, aged between 6 and 14 years of both sexes. Physical condition, physical preparation or motor performance is compared, a topic rarely addressed in international publications, especially because this requires sample designs that are statistically representative of the population reality of each country.

Basic physical capacities determine the physical condition of a person, they are susceptible to being improved through training and, thanks to the level of each individual, they can perform one or other physical activities with greater ease. Physical condition is the product of training the body, focused on its different physical capacities. Being fit is a concept that varies according to the needs and expectations of each person, but in all cases, it is necessary to enjoy good health, both physically and mentally, and to be able to use the various faculties of the body freely and without repercussions. negative ones such as pain or fatigue (Pérez and Garbey, 2015).

At birth, qualities are manifested that will determine whether, in the future, one will have a good, very good or excellent physical condition; however, the pre-established level is not reached if work is not done to develop it, since it depends on the work done to improve it (De León, 2019).

Guillamón (2019) points out that knowing physical condition is essential for health from an early age and in young subjects, he emphasizes that it constitutes an excellent predictor, perhaps the best, of life expectancy and, more importantly, of quality of life from childhood, which coincides with Gálvez *et al.* (2015) and Guillamón *et al.* (2018).

It is considered that maintaining a good state of physical condition and its evaluation has become a physiological need, which is why an instrument that meets the requirements of reliability, validity and feasibility is necessary; in addition, to motivate children and adolescents from an early age, know their health status, promote extracurricular physical activity, identify risk factors and design Physical Education programs, detect talents at an early age and strengthen from the base the potential of the different sports.



De la Cruz and Pino (2020) pointed out that physical condition, physical form or physical fitness (in English physical fitness) is a set of physical and evaluable attributes that people have and that are related to the capacity to perform physical activity. The World Health Organization defines physical fitness as the ability that adequately distinguishes the muscular work of people and implies the ability of individuals to successfully tackle a given physical task, within a physical, social and environmental environment. psychological.

To carry out the study presented, in the ages between 6 and 14 years of both sexes, different conditioning physical capacities were taken into account such as: strength, endurance and speed.

For Castillo *et al.* (2018), speed is not a pure capacity of the physical condition, but rather a mixed one between psychic, cognitive, coordinative and conditional that requires, to a large extent, psychic, neuronal and energetic aspects. They take into account other authors who conceptualize it as one of the qualities (not to say the only one) with the least possibility of improvement, it can be described as an intense dynamic effort, with an almost total anaerobic character, directly related to power and coordination.

The neuromuscular system is what conditions and determines speed capacity, conceptualized as the distance traveled in the unit of time (be it a person or object), although it can be also defined as the time spent traveling a certain distance. Aranda *et al.* (2018) define speed as the capacity to react and make movements in the face of a specific stimulus, in the shortest possible time, with the greatest efficiency, where fatigue has not made an appearance. So, speed is the capacity to move or make a movement in the shortest possible time.

Likewise, the physical capacity of strength, understood as a functional capacity of the human being, is what allows pressure to be exerted through muscular tension. The strength of the lower body is a reliable marker of the person's state of health and well-being (Álvarez and Claro, 2016). The Royal Spanish Academy (RAE) points out that strength is a term derived from the Latin *fortia* that is described as strength, robustness, power and the ability to remove or displace something or someone that has weight or that exerts endurance. Later,



in the same definition, it points out that strength is the capacity to endure a push or support a weight, Leiva (2019).

Endurance, in the field of Physical Education, is understood as the capacity to continue with a certain activity, beyond physical or mental fatigue. Aranda *et al.* (2018) to address physical endurance capacity took into account Zintl (1991) who pointed out that it is the capacity to psychologically and physiologically endure a load for a long time, ultimately producing insurmountable fatigue due to its intensity and duration.

The development of physical capacities allows the human body to create greater and better possibilities for quality of life, physical development and competitive performance. Therefore, the objective is to know the physical conditions of the students from an early age. These characteristics constitute the foundation for the selection of talents in various sports; in addition to likes, preference and the improvement of motor actions in the daily development of people in their natural habitat, considered as actions of a physiological nature that the organism executes to give functioning to the different organs and systems that make up the human body (Loor and Castillejo, 2019).

MATERIALS AND METHODS

The sample design included the measurement of 165,247 subjects, of which 79,393 made up the sample from Mexico and 24,171 from Cuba, both representative samples of the total population that both countries had at the time of the study. Below are the theoretical and empirical methods used in the research and the tables showing the sample by age and sex, in each country.

Theoretical methods

Historical-logical: facilitated the search for background information on main topics such as physical condition, physical capacities and Physical Education; it made it possible to identify, analyze and integrate, with a logical sequence, the tests as an evaluative resource for physical activities at an early age.



Modeling: it allowed establishing the structure for the improvement of the tests as a methodological tool to be used and its link with practice and the solution of the problem.

Analytical-synthetic: It was used in the analysis of the bibliography to emphasize the essential elements in the research process, by combining the different contents, from the general to the particular.

Inductive-deductive: It made it easier to specify the essential aspects, in relation to the tests that were used.

Empirical methods

Document review: to get information on the current state of the research object, the regulatory and governing documents of the processes of each country were considered and their indications were verified.

Interview: with the main sports managers of both countries, to find out their opinion about the evaluation process and obtain information regarding the treatment of standards in that age range.

Measurement: to collect data on each of the indicators that are related to physical capacities, such as: speed, strength in the upper extremities, abdominal muscles and explosive strength in the lower extremities and endurance.

Statistical-mathematical: the 90th percentile and the SPSS 21st of the data were used to describe the research process and thus verify the dimensions of the physical fitness levels from an early age, cognitively and physically, to guarantee and organize continuity in the different sports from the base.

RESULTS AND DISCUSSION

In the regulatory documents of Cuba, a treatment for the evaluation from 100% physical efficiency tests was appreciated, but for the Aztec country it was a novelty and its inclusion in the educational system, in the provinces evaluated, was of great impact.



For 100% of the Mexican and Cuban managers, this evaluation had a positive influence and would contribute to the selection of future talents in the coming years, to nurture high competence from the grassroots level. The simplicity of the methodology used for the evaluation of physical condition was highlighted, which was easy to apply and adaptable even to spaces with limited infrastructure, which is why it offered the possibility of being used even in places with few resources.

In Cuba, reference was made to the results obtained in the selection of talents through the use of the proposed methodology, where many of the athletes, glories of the sport, were identified from an early age; while in Mexico, managers projected expectations of achieving similar results in the future, in the sphere of high performance.

The design used to determine the samples to be investigated was carefully prepared by the National Census Office of the State Statistics Committee of Cuba, systematic sampling with equal possibilities was used to determine the subjects to be measured, so that they were representative for the determined population study (Pila, 2016 and 2018).

In this way, in both countries the study was carried out and the tests were applied with the methodology proposed in the research, from which the evaluation standards for each country in particular emerged and correspondence was observed in the comparison with the data obtained in both. The sample was made up of 146,643 Mexican subjects, of which 73,679 were male and 72,964 were female; on the Cuban side, a sample of 18,604 subjects, 9,718 male and 8,886 female. All between the ages of 6 to 14 years.

Below is the methodology of each test and the results obtained in each physical capacity evaluated.

Methodology of tests used to evaluate physical condition

Weight and height

Technique: to obtain body weight and height, the technique proposed by the International Kinanthropometry Working Group was used. McDougall (1992) referred to in the anthropometric standardization manual (Lohman, *et al.*, 1988).



Speed (30 and 50-meter race)

Objective: measure the speed of movement over short distances.

Organization: a line is drawn on the floor of 30 m and 50 m, as appropriate to the group to be evaluated. A start and finish line are marked (with some object, chalk, lime, flags, cones, etc.) They run 30 m, for both sexes up to 11 years old and 50 m, for both sexes from 12 years old and up. Two decimal stopwatches and a flag are used. This test must be carried out by couples of the same sex, so as to encourage competition and obtain the greatest effort and the time used for the distance must be taken.

Strength in upper extremities (push-ups or planks)

Objective: evaluate the dynamic strength generated by repeated muscle contractions (upper extremity strength endurance).

Organization: the subject is instructed to lie on the floor or a firm mat, lying face down (prone), hands supported at the level of the armpits, elbows bent, fingers facing forward, head in a straight line with the trunk and view of the ground. Men have support on the balls of their feet and women have support on their knees. Care is taken to ensure that in each extension the arms do not separate from the trunk and the body remains straight.

Test procedure: at the signal, the student performs repetitions of arm extension and flexion, until the correct technical execution of the movement is altered and the number of arm flexion-extensions performed is counted.

Strength in abdomen (abdominals)

Objective: evaluate the strength generated by repeated muscle contractions (endurance to strength of the abdominal muscles).

Organization: the student is placed lying face up (supine) on a firm mat no more than 5 cm thick on the grass. or on the smooth floor. The legs bent at the knees forming a 90-degree angle, the feet can be separated at a distance of up to 30 cm. The subject keeps his arms



crossed in front, close to his chest, and his hands resting on his shoulders. An assistant holds the ankles firmly, so that they always keep the heels on the surface.

Test procedure: from the lying position go to the sitting position until the forearms touch the thighs without stopping, return to the initial position until the back and head touch the surface, stop immediately, sit again and repeat the action, the greatest number of executions is sought continuously and without pause, until the technical execution of the movement is altered.

Strength in lower extremities (long jump without push-off race)

Objective: evaluate explosive strength, the ability of muscles to perform maximum force.

Organization: a line is drawn in an area of at least 3 m long and 1 m wide on a flat, non-slippery surface and marked in centimeters. It is suggested to paint one or several saltimeters with enamel paint with the scale across the entire width, centimeter by centimeter, or failing that, a scale tape attached to the ground.

Test procedure: the subject is positioned in such a way that the tip of the feet is behind the take-off line, with the legs apart and the knees semi-flexed. When ready, he/she jumps forward seeking the maximum distance, to do so he/she performs a swing of the arms backwards and simultaneously, with the movement of these forwards and takes off with both legs. This test is for both sexes. Each student makes two attempts.

Endurance (600 and 1000-meter race)

Objective: evaluate physical capacity, with predominance of the aerobic energy component.

Organization: it is signed a flat surface, preferably on grass or earth, the distances are verified with a tape measure, it is suggested to use the athletics track or, failing that, a soccer field, baseball field or the patio of the school in which a quadrilateral of 200 meters is marked, if possible, or measured in a practical way to count the turns that the students must take. This test is carried out in groups of eight to 10 subjects, to encourage their execution at maximum effort. It is recommended that people wear tennis shoes and the starting position is considered the same as that described for speed.



Test procedure: subjects must be approximately up to 11 years old, they can be female and male, that is, mixed, they run 600 meters; from the age of 12, subjects of both sexes run 1000 meters. It is indicated to cover the distance, it can be alternated walking, marching or running, as long as the subject uses maximum effort (Table 1).

Table 1. - Results of the comparative measurements of capacity and speed in both sexes from Cuba and Mexico

Age	CUBA						MEXICO						-							
	Female			Male			Female			Male			F	M	F	M	F	M		
	N	X	S	N	X	S	N	X	S	N	X	S	T	T	SI	SI	A	A		
															G.	G.	Fav	Fav	or	or
6	72	7.	1.8	79	7.	1.2	77	8.	1.8	84	7.	1.5	-	-	**	**	CU	CU		
	4	6	47	1	1	38	27	1	00	72	7	00	7.	12.			B	B		
													0	8						
7	90	7.	2.2	85	7.	1.8	83	7.	1.7	83	7.	1.4	-	-	**	no	CU			
	2	3	13	4	0	38	54	6	00	75	1	00	3.	1.5			B			
													9							
8	10	7.	2.6	10	6.	1.7	85	7.	1.5	84	6.	1.7	-	-	*	**	CU	CU		
	31	0	97	71	6	86	15	2	00	66	8	00	2.	3.5			B	B		
													3							
9	95	6.	2.3	11	6.	2.1	88	6.	1.2	86	6.	1.6	-	3.0	no	**	-	CU		
	9	8	57	48	7	86	07	9	00	27	5	00	1.					B		
													3							
10	91	6.	3.3	11	6.	2.1	87	6.	1.5	86	6.	1.6	0.	0.0	No	N	-	--		
	2	7	22	35	3	16	10	7	00	71	3	00	0		o					
11	10	6.	1.7	10	6.	1.6	85	6.	1.6	83	6.	1.6	-	3.7	No	**	-	CU		
	65	6	66	30	4	65	81	7	00	92	2	00	1.					B		
													8							
12	11	9.	1.9	12	8.	1.7	78	9.	2.1	80	8.	1.7	-	-	**	**	CU	CU		
	53	1	66	46	5	22	75	6	00	18	9	00	8.	7.6			B	B		
													0							
13	10	9.	2.2	12	8.	1.2	74	9.	2.1	75	8.	1.7	-	10.	**	**	CU	CU		
	20	3	01	62	4	39	39	8	00	35	8	00	6.	0			B	B		
													8							
14	88	9.	1.8	11	8.	1.9	69	9.	2.1	71	8.	1.7	-	1.7	no	no	-	-		
	4	7	40	81	5	13	56	8	00	27	4	00	1.							
													5							

It can be seen in the comparative table on the speed capacity for both sexes, that in the female sex, in five of the nine comparisons made the results favor Cuba with high statistical significance when applying the T test; this significance corresponds to the ages of 6, 7, 8, 12 and 13 years, in the rest of the ages no differences with statistical significance are seen, while for the male sex, the results are higher than those observed in the female sex. and they favor



Cuba in six of the nine comparisons, with high statistical significance, in the remaining three comparisons no significance is observed, from a statistical point of view (Table 2)

Table 2. - Results of the comparative measurements of strength endurance capacity in the upper extremities, both sexes

Age	CUBA						MÉXICO						-					
	Femenino			Masculino			Femenino			Masculino			F	M	F	M	F	M
	N	X	S	N	X	S	N	X	S	N	X	S	T	T	SI G.	SI G.	A Fav or	A Fav or
6	72	1	15.0	79	9	5.56	77	6	7,50	84	5	6,5	8.8	19.	**	**	CU	CU
	4	1	51	1		1	27		0	72		00		1			B	B
7	90	1	8.82	85	1	5.95	83	7	7,80	83	6	7.2	9.8	18.	**	**	CU	CU
	2	0	4	4	0	7	54		0	75		00		3			B	B
8	10	1	7.23	10	1	6.01	85	9	10.2	84	7	8.1	8.0	19.	**	**	CU	CU
	31	1	7	71	1	6	15		00	66		00		6			B	B
9	95	1	7.69	11	1	7.31	88	9	11.2	86	8	8.2	10.	17.	**	**	CU	CU
	9	2	1	48	2	4	07		00	27		00		9			B	B
10	91	1	9.91	11	1	6.19	87	1	11,0	86	8	8,5	11.	19.	**	**	CU	CU
	2	4	2	35	2	9	10	0	00	71		00		5			B	B
11	10	1	11.6	10	1	7.66	85	1	11,0	83	8	7,5	13.	23.	**	**	CU	CU
	65	6	18	30	4	1	81	1	00	92		00		3			B	B
12	11	1	10.8	12	1	8.68	78	1	11,6	80	9	8,5	11.	22.	**	**	CU	CU
	53	6	38	46	5	5	75	2	00	18		00		6			B	B
13	10	1	9.66	12	2	45.6	74	1	11,7	75	1	8,8	18.	9.3	**	**	CU	CU
	20	7	2	62	2	76	39	1	00	31	0	00		1			B	B
14	88	1	11.5	11	1	20.0	69	1	11.2	71	1	9.2	7.3	13.	**	**	CU	CU
	4	5	58	81	9	43	56	2	00	27	1	00		5			B	B

In the comparison on one of the qualities of strength, that referring to endurance to strength in the upper extremities, a high significance is seen in the female sex and all the results favor Cuba, with outstanding marks, the age of 13 years where a difference of six repetitions is observed.

In the results of the comparison of the strength endurance capacity in the upper extremities for the male and female sex, it can be seen that all the results significantly favor the Cuban sample, with differences that generally tend to increase with age, begin with a difference of four repetitions from 6 to 12 years and increase until the greatest difference is observed at the age of 13 years, with 12 more repetitions in favor of the subjects sampled in Cuba (Table 3).



Table 3. - Results of the comparative measurements of the strength endurance capacity of the abdominal muscles in both sexes

Age	CUBA						MEXICO						-					
	Femenino			Masculino			Femenino			Masculino			F	M	F	M	F	M
	n	x	s	n	x	s	n	x	s	n	x	s	t	t	Si g.	Si g.	A Fav or	A Fav or
6	72	1	19.5	79	1	6.71	77	6	8,00	84	7	8.40	9.5	11.	**	**	CU	CU
	4	3	93	1	0	2	27	0	72	0	7	0	7			B	B	
7	90	1	8.93	85	1	7.19	83	8	8.60	83	9	8,90	9.6	7.6	**	**	CU	CU
	2	1	0	4	1	0	54	0	75	0	0	0				B	B	
8	10	1	9.61	10	1	10.0	85	9	9.30	84	1	11.2	12.	9.1	**	**	CU	CU
	31	3	6	71	4	84	15	0	66	1	00	7				B	B	
9	95	1	8.39	11	1	10.9	88	1	9,50	86	1	11.4	13.	11.	**	**	CU	CU
	9	4	3	48	7	65	07	0	0	27	3	00	8	6			B	B
10	91	1	9.47	11	1	10.8	87	1	10.3	86	1	12.4	15.	11.	**	**	CU	CU
	2	6	6	35	9	82	10	1	00	71	5	00	0	4			B	B
11	10	1	9.24	10	2	13.4	85	1	9,60	83	1	12,0	23.	13.	**	**	CU	CU
	65	8	1	30	2	02	81	1	0	92	6	00	2	7			B	B
12	11	1	9.25	12	2	12.3	78	1	10,6	80	1	12,9	16.	13.	**	**	CU	CU
	53	7	0	46	3	35	75	2	00	18	8	00	8	2			B	B
13	10	1	8.05	12	3	48.9	74	1	10.2	75	2	16,0	18.	9.4	**	**	CU	CU
	20	8	1	62	4	48	39	3	00	31	1	00	0			B	B	
14	88	1	19.2	11	3	45.7	69	1	10,8	71	2	14,6	6.0	8.9	**	**	CU	CU
	4	7	99	81	5	56	56	3	00	27	3	00				B	B	

The table shows the results that compare the endurance to strength of the abdominal muscles. A higher result of this capacity can be seen in the female sex with a high statistical significance in the nine comparisons made, it remains almost stable the margin of difference in all comparisons between four and seven repetitions.

Like the female sex, the results seen for the endurance of the abdominal muscles in the male sex markedly favor, with high statistical significance, the Cuban sample; greater differences are observed from the age of 11 and are wider in ages 13 and 14 years (Table 4).





Table 4. - Results of comparative measurements of explosive strength capacity in the lower extremities in both sexes

Age	CUBA						MEXICO						-								
	Female			Male			Female			Male			F	M	F	M	F	M			
	n	x	s	n	x	s	n	x	s	n	x	s	t	t	Si g.	Si g.	A Fa vor	A Fa vor			
6	72	97.4	18.404	79	109.1	17.32	511	27	0	200	72	94.9	20.400	84	94.1	21.7	**	**	CU	CU	
7	90	109.2	22.46	85	118.4	17.76	677	54	4	300	75	94.5.3	19	10	19	21.4	**	**	CU	CU	
8	10	114.31	17.67	10	128.71	21.01	048	85	15	20	84	11	20	11	20	19	18.6	**	**	CU	CU
9	95	119.9	22.89	11	135.48	19.47	111	88	07	1.0	20	86	12	20	11	21	21.7	**	**	CU	CU
10	91	131.2	20.19	11	142.35	20.29	822	87	10	8.2	20	86	12	21	18	18	21.1	**	**	CU	CU
11	10	136.65	19.21	10	148.30	19.92	600	85	81	3.1	20	83	13	20	18	18	20.8	**	**	CU	CU
12	11	138.53	21.59	12	158.46	25.10	976	78	75	0.1	21	80	14	22	12	15	15.7	**	**	CU	CU
13	10	142.20	21.87	12	165.62	24.91	056	74	39	2.2	20	75	15	24	15	13	13.0	**	**	CU	CU
14	88	141.4	20.27	11	179.81	24.15	968	69	56	3.7	23	71	16	27	10	14	10.2	**	**	CU	CU

In the comparison between both nations, regarding the explosive strength capacity in the lower extremities, it is seen how all the comparisons significantly favor Cuba, with differences between 8 and 15 centimeters. Something similar to what happened in the female sex happens in the male sex, where it is seen how all the results favor the Cuban sample, with high significance in the statistical comparison; in some cases, differences of up to 14 centimeters or greater are observed, as is the case at six years (Table 5).





Table 5. - Results of the comparative measurements of endurance capacity in both sexes

Age	CUBA						MEXICO						-		-		-		-	
	Femenino			Masculino			Femenino			Masculino			F	M	F	M	F	M	F	M
	n	x	s	n	x	s	n	x	s	n	x	s	t	t	Si	Si	Fav	Fav	or	or
6	72	3.	0.5	79	3.	0.5	77	4.	0.7	84	4.	0.6	-	-	**	**	CU	CU	B	B
	4	35	00	1	25	40	27	19	60	72	05	70	41	39						
													.0	.0						
7	90	3.	0.5	85	3.	0.5	83	4.	0.7	83	3.	0.6	-	-	**	**	CU	CU	B	B
	2	30	10	4	25	10	54	03	60	75	50	30	38	13						
													.6	.3						
8	10	3.	0.4	10	3.	0.3	85	3.	0.5	84	3.	0.5	-	-	**	**	CU	CU	B	B
	31	25	90	71	14	90	15	51	90	66	36	80	15	16						
													.7	.3						
9	95	3.	0.7	11	3.	0.3	88	3.	0.5	86	3.	0.5	-	-	**	**	CU	CU	B	B
	9	33	10	48	02	90	07	44	80	27	27	60	4.	19						
													6	.2						
10	91	3.	0.5	11	3.	0.5	87	3.	0.5	86	3.	0.5	-	-	**	**	CU	CU	B	B
	2	21	10	35	09	60	10	38	50	71	21	80	9.	6.						
													5	8						
11	10	3.	0.5	10	3.	0.4	85	3.	0.7	83	3.	0.7	-	-	**	**	CU	CU	B	B
	65	19	30	30	02	80	81	45	60	92	23	70	14	12						
													.3	.2						

In the endurance capacity that includes aerobic work, the differences all favor the Cuban sample with high significance from a statistical point of view, differences that become relatively smaller with increasing age. In this test for both sexes, the comparison was not shown at the ages of 12, 13 and 14 years, because the same methodological requirements were not applied in this comparison.

When analyzing the male and female sex, it is observed that all comparisons favor the Cuban sample with high significance; although there are somewhat smaller differences in the female sex.

Given these results, the question arises: Why does the sample evaluated in Cuba present favorable differences of significance? It is known that environmental, nutritional, cultural factors and all those that, in one way or another, act on man as a biopsychosocial being, directly determine his development. In the analysis carried out, they did not want to assess each and every one of the factors that intervened in the results, since many variables that are considered unrelated may have intervened (Pila, 2016).



It can be referred to a variable, specifically for each country, if it is controlled; in this sense, it is considered that from a pedagogical point of view, the plans and programs that both countries have contemplated in the Physical Education of the Education System influence the student's evolution. According to Pila (2015), these have a unique impact on general training, these are the contents, the work time and the frequencies that students receive in Physical Education in schools.

In the case of the sample evaluated in Mexico, only 30 percent of the country's students receive services directed by a Physical Education teacher, there are 70% who do not receive the health and development benefits that this subject provides, organized and pedagogically directed. In Cuba, 100% of students receive Physical Education in schools, as a pedagogical process directed and organized by the education system; this, without a doubt, effectively influences the development of their abilities and skills, their formation as a social being and is reflected in results such as those demonstrated.

The percentile technique constitutes the statistical standards to evaluate the results. Escalante (2018) uses it to establish the norms of the Cuban older adult who systematically practices sports. These results have made it possible to group and evaluate the subjects to select possible talents, based on the population studies carried out.

In this sense, when a student is identified as talented in some capacity, it indicates that he or she is located in the results that were determined in the range of the 90th percentile or better marks; starting from the fact that the norm is required at the 90th percentile and is met by only 10% of the students subjected to the test. In the same way, when talking about talent in height, it is that student whose result falls within the 97th percentile, a mark that only 3% of the measured population meets, that is, students who have a very tall height in accordance with Cuban growth and development research.



CONCLUSIONS

The evaluation of physical condition in populations aged 6 to 14 years from Mexico and Cuba revealed that the sample evaluated in Cuba presents favorable statistical differences of significance.

It was considered that from the pedagogical point of view, the plans and programs that both countries have contemplated in the Physical Education of the Education System influence the evolution of the evaluation of the student's physical condition: the contents, the work time and the frequencies.

In the case of the sample evaluated in Mexico, the majority of students did not receive the health and development benefits that Physical Education provides; meanwhile, in Cuba, this subject is received in schools, as a pedagogical process directed and organized by the education system, which effectively influenced the development of abilities and skills, training as a social being and reflected in the demonstrated results.

REFERENCES

- Álvarez, C. V., & Claros, J. A. V. (2016). Efecto de un programa de entrenamiento físico sobre condición física saludable en hipertensos. *Revista Brasileira de Geriatria e Gerontología*, 19, 277-288. <https://doi.org/10.1590/1809-98232016019.140168>
- Aranda, E. E. C., Morales, P. G. C., & Osorio, R. R. (2018). *Manual de pruebas para la evaluación de la forma física*. Universidad autónoma de Yucatán, UADY. <https://www.deportes.uady.mx/recursos/manualpruebasfisicas.pdf>
- Candeaux, L. E., Álvarez, M. M., Hernández, H. J. P., & Valdés, A. G. (2019). El adulto mayor practicante sistemático: Pruebas para evaluar su condición física. *PODIUM - Revista de Ciencia y Tecnología en la Cultura Física*, 14(3), Article 3. <https://podium.upr.edu.cu/index.php/podium/article/view/827>



- Cervantes de la Torre, K., Amador Rodero, E., & Arrázola David, M. (2017). Nivel de actividad física en niños de edades de 6 a 12 años en algunos colegios de Barranquilla-Colombia, en el año 2014-2015. *Biociencias*, 12(1), 17-23. <https://dialnet.unirioja.es/servlet/articulo?codigo=6228794>
- De la Cruz Sánchez, E., & Pino, J. O. (2020). *Condición física y salud*. Universidad de Murcia. Digitum. <https://digitum.um.es/digitum/bitstream/10201/6621/1/CONDICI%c3%93N%20F%c3%8dSICA%20Y%20SALUD.pdf>
- De León, F. L. (2010). *Tema 4o Eso: La condición física y cualidades físicas básicas. Métodos de entrenamiento y efectos sobre la salud*. xunta. [http://www.edu.xunta.gal/centros/iescastroalobrevilagarca/system/files/Condici% i%B3n%20f%C3%ADsica%204%20eso_1.pdf](http://www.edu.xunta.gal/centros/iescastroalobrevilagarca/system/files/Condici%i%B3n%20f%C3%ADsica%204%20eso_1.pdf)
- Guillamón, A. R., Cantó, E. G., & Soto, J. J. P. (2018). Condición física y bienestar emocional en escolares de 7 a 12 años. *Acta Colombiana de Psicología*, 21(2), 282-300. <https://www.redalyc.org/journal/798/79856553013/html/>
- Huerta Ojeda, Á., Hernández, N., Galdames-Maliqueo, S., & Cancino, J. (2018). *EJERCICIO Y CONDICIÓN FÍSICA. 2da Edición*. Universidad de Playa Ancha. https://www.researchgate.net/publication/332116711_EJERCICIO_Y_CONDICIION_FISICA_2da_Edicion
- López de los Mozos-Huertas, J. (2018). Condición física y rendimiento académico. *Journal of Sport and Health Research*, 10(3), 349-360. http://www.journalshr.com/papers/Vol%2010_N%203/JSHR%20V10_3_3.pdf
- Pila, H. J. (2015). *Talentos deportivos: Detección, orientación y desarrollo*. Universidad Miguel de Cervantes. <http://estudios.umc.cl/wp-content/uploads/2017/06/MANUAL-SERIE-4.pdf>
- Pila, H. J. (2016). *Primer Estudio Nacional sobre la Condición Física de la Población Cubana*. Editorial Deportes.



Roche, A. F., & Martorell (eds), R. (1988). *Anthropometric Standardization Reference Manual*. Human Kinetics Books.
https://books.google.com.cu/books/about/Anthropometric_Standardization_Reference.html?id=jjGAAAAAMAAJ&redir_esc=y

Rosa-Guillamón, A. (2019). Análisis de la relación entre salud, ejercicio físico y condición física en escolares y adolescentes. *Revista Ciencias de la Actividad Física*, 20(1), 1-15.
<https://www.redalyc.org/journal/5256/525661507008/html/>

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