PODIUM

PODIUM. Journal of Science and Technology in Physical Culture

Volume 16 Issue 1; 2021

University of Pinar del Río "Hermanos Saíz Montes de Oca". Scientific Publications Department.

E-MAIL: podium@upr.edu.cu. | Director: Fernando Emilio Valladares Fuente
Email: fernando.valladares@upr.edu.cu

ISSN: 1996–2452 RNPS: 2148
Revista PODIUM, *Januery-April 2021; 16(1):187-200*

Translated from the original in spanish

Original article

Procedures for evaluating the physical condition of the secondary education students in Angola

Procedimientos para evaluar la condición física a los alumnos de enseñanza secundaria en Angola

Procedimentos para avaliar a condição física dos alunos do ensino secundário em Angola

Walberto Quiala Barroso[1*] https://orcid.org/0000-0001-8013-564X

Rene Mesa Peña[2] https://orcid.org/0000-0002-3554-0280

Francisco Alberto Lussati[3] https://orcid.org/0000-0003-0731-1859

Yirka Cristina Chang Girón[1] https://orcid.org/0000-0002-6457-3735

[1]University of Las Tunas. Las Tunas, Cuba.
[2]University of Pinar del Río "Hermanos Saíz Montes de Oca", Faculty of Physical Culture "Nancy Uranga Romagoza". Pinar del Río, Cuba.
[3]Higher Institute of Physical Education and Sports. Angola.

*Corresponding author: walbertoqb@ult.edu.cu

Received:14/08/2020.
Approved:12/11/2020.

How to cite item: Quiala Barroso, W., Mesa Peña, R., Lussati, F., & Chang Girón, Y. (2021). Procedimientos para evaluar la condición física a los alumnos de enseñanza secundaria en Angola/Procedures for evaluate the physical condition to the students of secondary education in Angola. *PODIUM - Revista de Ciencia y Tecnología en la Cultura Física, 16*(1), 187-200. Recuperado de http://podium.upr.edu.cu/index.php/podium/article/view/981

ABSTRACT

The starting point of the research was the problematic situation, generated by the norms used to evaluate the physical condition in Angola, which do not adjust to the real conditions of this country, from which it is derived to design procedures for the evaluation of the physical condition of secondary school students in Angola. For this purpose, both the individual particularities of those evaluated and the environmental ones were taken into account, using different research methods and techniques that allowed the proposal to be theoretically and methodologically based. In particular, everything related to the determination of the evaluation patterns, using the procedure proposed by Zatsiorski, which allowed establishing the different classification groups. In addition, a spreadsheet program was created in Microsoft Excel that automatically evaluates the tests. This made it possible to speed up the grading process and achieve more reliable results of the students' actual level of physical condition. It was concluded with the demonstration of the feasibility of the proposed procedures to evaluate physical condition, since the standards, when they leave their original context, cease to be relevant, representative and modern. Likewise, it is recommended to address other aspects such as the enlargement of the sample and the individualization of the evaluation process.

Keywords: Evaluation; Physical condition; Norms; Procedures; Tests.

RESUMEN

La investigación tuvo como punto de partida la situación problemática, generada por las normas utilizadas para evaluar la condición física en Angola, que no se ajustan a las condiciones reales de este país, de las que se derivan diseñar procedimientos para la evaluación de la condición física a los alumnos de enseñanza secundaria en Angola. Para ello, se tuvieron en cuenta tanto las particularidades individuales de los evaluados como las medio-ambientales, utilizándose diferentes métodos y técnicas investigativas que permitieron fundamentar la propuesta, de forma teórica y metodológicamente. En especial, todo lo relacionado con la determinación de los patrones de evaluación, al utilizarse el procedimiento propuesto por Zatsiorski que permitió establecer los diferentes grupos de clasificación. Además, se creó un programa de hoja de cálculo en Microsoft Excel que evalúa automáticamente las pruebas. Esto posibilitó agilizar el proceso de calificación y lograr resultados más confiables del nivel real de la condición física de los alumnos. Se concluyó con la demostración de la factibilidad de los procedimientos propuestos para evaluar la condición física, pues las normas, al salir de su contexto de origen, dejan de ser relevantes, representativas y modernas. De igual modo, se recomienda el abordaje de otros aspectos como la ampliación de la muestra y la individualización del proceso evaluativo.

Palabras clave: Evaluación; Condición física; Normas; Procedimientos; Pruebas.

RESUMO

A investigação teve como ponto de partida a situação problemática, gerada pelas normas utilizadas para avaliar a condição física em Angola, que não se ajustam às condições reais deste país, do qual deriva a concepção de procedimentos para a avaliação da condição física dos estudantes do ensino secundário em Angola. Para este fim, foram tidas em conta tanto as particularidades individuais dos estudantes avaliados como as ambientais, utilizando diferentes métodos e técnicas de investigação que permitiram

fundamentar a proposta, teórica e metodologicamente. Em particular, tudo relacionado com a determinação dos padrões de avaliação, utilizando o procedimento proposto por Zatsiorski que permitiu estabelecer os diferentes grupos de classificação. Além disso, foi criado um programa de folha de cálculo em Microsoft Excel que avalia automaticamente os testes. Isto permitiu acelerar o processo de classificação e alcançar resultados mais fiáveis do nível real da condição física dos estudantes. Concluiu-se com a demonstração da viabilidade dos procedimentos propostos para avaliar a condição física, uma vez que as normas, ao deixarem o seu contexto de origem, deixam de ser relevantes, representativas e modernas. Do mesmo modo, recomenda-se abordar outros fatores, como o alargamento da amostra e a individualização do processo de avaliação.

Palavras-chave: Avaliação; Aptidão física; Normas; Procedimentos; Testes.

INTRODUCTION

Physical Education contributes to achieve in the child a state of balance and harmony between his movements and his body, his body identity, as well as a directed self-image. For these reasons, it is essential to achieve an optimal physical condition as a way to face the challenges proposed by society. In this sense, it is a necessity to have an evaluation of the level of physical development at different times of the year and stages of a person's life.

For this reason, the evaluation of physical condition has been and is the subject of research by different authors worldwide. In the last five years, research developed by Secchi, García and Arcuri (2016), Benavides *et al.,* (2017), Rosa (2017), Martínez *et al.,* (2017), González and Ramírez (2017), Quiala, Chang and Pons (2019 and 2020), Farinola (2020) can be cited, which, as a common feature, seek to adjust the way of evaluating the environment and the evaluated personnel.

Derived from these investigations, developed from the last century, different tests to evaluate physical condition emerged, such as: American Association for Health, Physical Education, Recreation and Dance in 1958, the Canadian Association for Health, Physical Education and Recreation (CAHPER) in 1966, "La Test d' Evaluation de la Condition Physique del' Adulte in 1981, the EUROFIT test of Physical Condition in 1988 (as cited in Rosa, 2017), all, in essence, seek to evaluate as accurately as possible the level reached by the evaluated population.

Nevertheless, the applicability of a standard depends on its relevance, representativeness and modernity (Zatsiorski, 1989). In other words, a test and its evaluation scales cannot be extrapolated from one region to another. However, in Angola, it is evaluated by patterns that do not take into account the characteristics of its population, social, economic and environmental conditions. In the interviews with Physical Education teachers, in the exchange with students, during the review of Secondary Education programs and in the observations of the application of the physical condition tests, the following inadequacies were identified:

- Existence of a diversity of criteria on how to evaluate physical condition. *Consequently, teachers fail to comply with metrological requirements that affect the reliability and validity of the results achieved by students*.

- The standards established by age and sex do not take into account individual and socio-environmental particularities. *As a consequence, there are manifestations of rejection of these tests, muscular injuries and extreme fatigue.*

In the search for information on this problem, several authors with different points of view were consulted. In this sense, they are grouped in three aspects: the first and oldest one proposes to evaluate the load in its external dimension. In this group, those cited by Quiala, Changy Pons (2020) stand out, such as Grosser, Starischka and Zimmermann (1988), Pila (1989), Generelo and Tierz (1991) Ruiz, Rodríguez and Sasco (2007) Roland (2009). For them, the most important thing is to determine how flexible, fast, strong and resilient a person is.

In the second aspect, according to Quiala, Chang and Pons (2020), authors such as Bouchard, Shephard, Stephens, Sutton and McPherson (1990), Arce, Martínez and Elorza (1996), Tercedor (2001), Delgado and Tercedor (2002) and Latorre and Herrador (2003) assume the internal dimension of the load as a determinant. In their opinion, the most important thing is how the organism responds to achieve the external result obtained in each test.

Finally, in the third aspect are grouped what is expressed by Quiala, Changy Pons (2020) and authors such as Jeffers (2004), Quiala (2009) and Pacheco (2014), who consider the need to take into account both dimensions; this criterion is also shared by the authors of this research, since both complement each other.

Based on the analyzed criteria and the detected insufficiencies, it is determined that the standards currently used in Angola to evaluate the physical condition in Secondary Education do not allow a reliable evaluation of the level reached by the students in the course, which is manifested in the results of the tests carried out. Therefore, when undertaking the research, the objective is to design methodological procedures to evaluate the physical condition of the students of the 1st cycle of Secondary Education in Kilamba, based on their individual particularities and those of their environment.

MATERIAL AND METHODS

For the development of this research, in the context of the Republic of Angola, it was decided to assume the definition of physical condition, given by Quiala, W., (Quiala, Chang & Pons, 2020) by considering it as a.

> "product of exercise, of physical preparation and which represents a satisfactory state of development of the capacities and motor skills of the individual, in correspondence with his age, sex, weight and height" (p.53).

This is because the most commonly used tests in this country evaluate conditional capacities and flexibility. On this basis, the methodological procedures proposed as a solution to the problem posed were designed.

Population and sample

The research population consisted of the students of the "11 de Julho" school, 1st cycle of Secondary Education in Kilamba, Belas municipality, Luanda province, Angola, with an enrollment of 1,860, distributed in 58 groups and two sessions. A stratified probability sample was selected that included five age groups from 13 to 17 years of age. These, in

turn, were subdivided by sex; the proportion of students in each stratum and subgroup is equivalent to the population.

To determine the sample size, the formula established for a known population was used. As a significance level for the investigation, a 95 %, standard deviation of 0.55 was assumed, determined by the values reached in the general level of the previous year. In addition, an error of 0.05 was estimated.

Based on these data, it was determined that the sample should be composed of 372 students, who were distributed by strata, as follows.

- 13 years: 49 (25 female (F) and 24 male (M).
- 14 years: 99 (51 F and 48 M).
- 15 years: 91 (47 F and 44 M).
- 16 years: 94 (49 F and 45 M).
- 17 years 39: (21 F and 18 M).

Finally, simple random sampling was used to select the members of each stratum. In addition to the students, information was obtained from 14 teachers who were also selected as a sample. Their average age is between 26 and 50 years old. With an average work experience of 13 years, the youngest have at least four years and the oldest 17 years. Of these, three have a degree in Physical Education and Sport and the rest are in different years of this degree.

The main methods and techniques used in the research were the following:

Analytical-synthetic, inductive-deductive, systemic-structural-functional, observation, interview, survey and users' criteria. These methods made it possible to provide a theoretical basis for the research, determine the inadequacies in the physical condition evaluation process, elaborate the proposed solution to the problem and verify its validity.

In this sense, the application of the tests used by the teachers was observed, as well as the way of evaluating them. In addition, they were interviewed and surveyed to find out how they used the results obtained to plan their classes.

The Iadov technique (López & González, 2001) made it possible to determine the level of individual and group satisfaction of the Physical Education teachers of the 1st cycle of Secondary Education of the Kilamba centrality, with respect to the way of elaborating the norms and on the spreadsheet program, designed for the process of grading the test.

The statistical-mathematical methods used were: the empirical distribution of frequencies and their corresponding percentage distributions. In addition, inferential statistics were used to evaluate whether the difference between the initial and final diagnosis was significant through the Wilcoxon signed ranks test.

This research allowed solving a practical problem throughout the 2019 school year, so it has a provisional character, where the aspects observed and measured in the field were quantified. In addition, emphasis was placed on the particularities of the community, therefore, it is a field study, longitudinal and quantitative.

The analysis carried out on the theoretical considerations, related to physical condition, made it possible to assume that there are several determining factors of the level reached by a person during the year. However, for the development of this research, in the 11 July school of the Kilamba centrality, only the following were taken into account: body composition (Body Mass Index (BMI)), the development of conditional physical capacities (speed (50m. run), strength (planks, sit-ups and horizontal jump) and endurance (1000m. run) and flexibility (ventral flexion from the sitting position), as well as the socio-environmental conditions. In this sense, the following procedures were designed:

- Determination of the requirements for the development of physical condition evaluation standards.
- Preparation of the evaluating personnel.
- Standardization of the test.
- Automation of the scoring process.
- Follow-up of the results of the physical condition test in Physical Education classes.

The requirements for elaborating the *physical condition evaluation standards* were as follows:

- Elaboration of a standardization for the test, as strict as possible.
- The norms elaborated on the basis of the results achieved by the students in the initial diagnosis.
- The use of the arithmetic mean and standard deviation in the elaboration of the norms, as established by Zatsiorski (1989), but, with five classificatory groups. That is, from "Excellent" to "Poor".
- In speed, if the standard deviation is less than or equal to 0.02 seconds, then use this value (0.02 seconds) as the standard deviation.
- In endurance, if the standard deviation is less than or equal to 2 seconds, then use this value (2 sec.) as the standard deviation.
- In flexibility and horizontal jump, if the quality deviation is less than or equal to 2 cm, then use this value (2 cm) as the quality deviation.
- In planks (push-ups) and sit-ups, if the standard deviation is less than or equal to 2 repetitions, then use this value (2 repetitions) as the standard deviation.
- For the flexibility, quickness and horizontal jump tests, use two attempts and choose the best one.

The preparation of the evaluation personnel was aimed at increasing the level of theoretical and methodological knowledge related to test theory. In addition, the necessary skills were developed to increase the reliability of the results. To this end, several theoretical and practical classes were held in April and May.

In the standardization of the test, all the necessary elements were included for the control of variables that could alter the reliability of the results, such as:

- Name of the test.
- Objective of the test.
- Organization of the test.
- Development of the test.
- Sketch of the test.

Other organizational elements were:

- Day of the week it is applied.
- Time at which it is applied.
- Time measuring instrument (basic error).
- Weight measuring instrument (Basic error).
- Length measuring instrument (Basic error).
- Time of rest.
- Nature of the rest and how to do it.

Data on personnel evaluated

- Name.
- Age.
- Sex.
- Clothing.
- Footwear.

Data of the evaluating staff

- Principal evaluator.
- Timekeeper.

Annotated:

Auxiliary staff data

A spreadsheet program was designed to automate the grading process. It groups all students with equal age and gender. In each sheet, the following data were collected: name, weight, height, body mass index (BMI), flexibility, speed, arm strength, abdominal strength, vertical jump, horizontal jump, endurance and general level (Figure 1).

ISSN: 1996–2452 RNPS: 2148
Revista PODIUM, Januery-April 2021; 16(1):187-200

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AC	AD	AE	AF
1																															
2	Ni	Nome y sobrenome	Idai	Pes	Esta	IMI	Av	Fleibilidade			Velocidade			Força de braç			Abdominais			Salto vertica			Salto horizont			Resistencia				Avaliação Ge	
3	1	Adalberto João	14	44,1	1,65	16,2	NP	15	B	14	7,2	B	16	45	E	20	15	B	13	20	B	15	122	B	19	10	90	M	11	15,3	B
4	2	Ariel Adriana	14	39,94	1,6	15,6	BP	11	R	10	3,29	E	20	10	M	8	17	B	15	19	B	14	123	B	19	7	50	B	16	14,4	B
5	3	Rogerio Soares	14	54,81	1,78	17,3	NP	11	R	10	7,19	B	16	16	B	12	11	R	9	15	R	11	106	B	16	6	40	MB	18	13,4	B
6	4	António Domingos	14	48,68	1,58	19,5	NP	18	B	16	6,97	B	17	22	B	17	17	B	15	16	R	12	100	R	15	7	39	B	16	15,4	B
7	5	Delcio Dezoito	14	49,41	1,72	16,7	NP	15	B	14	6,49	B	18	21	B	16	43	E	20	17	B	13	120	B	18	10	23	M	12	15,8	B

13 Anos F | 13 Anos M | 14 Anos F | 14 Ano M | 15 Anos F | 15 Anos M | 16 Anos F | 16 Anos M | 17 Anos F | 17 Anos M ...

Fig. 1. - Spreadsheet program, elaborated to grade physical condition tests

The quantitative evaluation was carried out on the basis of 20 points, which correspond to the qualitative evaluations. In this sense, the spreadsheet program was designed to elaborate a norm for each test and, from the integration of all of them, to determine the general level. With it, both initial and final evaluative moments were evaluated. For the development of this process, the results of the first diagnosis were taken as starting data.

Each test had a score that was the result of the following mathematical operation (Equation 1).

$$R*20/(X-S) \quad (1)$$

For the time-related tests (speed and endurance) (Equation 2).

$$R*20/(X+S) \text{ para las restantes} \quad (2)$$

Where:
"R" is the record achieved in the test.
"20 "is the base value of the evaluations in Angola.
"X" is the mean of the records achieved by the age group in that test.
"S" is the standard deviation of the records achieved by the group, with the same age and sex in that test.

The evaluation of the general level was based on the arithmetic mean of the values achieved in each of the tests. In order to establish the correspondence between the quantitative and qualitative scales, the following relationships were used:

- · Excellent (E) = 20.
- · Very good (MB) <20 >=17.
- · Good (B) <17 >=14.
- · Fair (R) < 14 >=10.
- · Poor (M) < 10.

To follow up the results of the physical condition test in the Physical Education classes, a summary table was used, created by the spreadsheet program (Figure 2). This made it possible to determine which capacity was most affected, as well as the students with the greatest deficiencies. In this way, the teachers were able to distribute the content

objectively. In other words, they assigned a greater number of classes to the most needed skills. In addition, it made it possible to direct attention to individual differences.

		Flexibilidade			Velocidade			Força de braços			Abdominais			Salto vertical			Salto horizontal			Resistencia			Avaliação Geral	
45																								
46	Excelente	E	1	5,3	E	2	11	E	1	5,26	E	1	5,3	E	1	5,3	E	2	10,5	E	2	10,5	0	0
47	Muito Bem	MB	2	11	MB	1	5,3	MB	2	10,5	MB	1	5,3	MB	3	16	MB	0	0	MB	5	26,3	1	5,263
48	Bem	B	11	58	B	11	58	B	10	52,6	B	13	68	B	9	47	B	11	57,9	B	7	36,8	16	84,21
49	Regular	R	4	21	R	4	21	R	6	31,6	R	4	21	R	6	32	R	5	26,3	R	1	5,26	2	10,53
50	Mal	M	1	5,3	M	1	5,3	M	0	0	M	0	0	M	0	0	M	1	5,26	M	4	21,1	0	0

Fig. 2. - Spreadsheet program's summary table of tests

RESULTS AND DISCUSSION

In order to test the validity of the proposal for the evaluation of the physical condition of the students of the "11 de Julho" school of Kilamba, in the first cycle of Secondary Education, a set of tests was applied. It was carried out in two stages: the first from June 3 to 7 and the second from October 7 to 11. The results obtained in the initial diagnosis for each age group were the following (Table 1).

Table 1. - Initial physical condition levels of the students in the sample

	Initial General					
	Total	E	MB	B	R	M
13 años	49	0	6	10	19	14
14 años	99	0	14	24	41	20
15 años	91	0	12	23	36	20
16 años	94	0	14	22	39	19
17 años	39	0	6	8	14	11

With the application of the initial diagnosis, it was found that, in general, there is a low level of physical condition in the students taken as a sample, as can be seen in the totals by evaluation category (Excellent "E", Very Good "MB", Good "B", Regular "R", Bad "M"), (Table 1). In this sense, more than 60 % of the enrollment, in all age groups, is evaluated as R and M. Of these, the most affected are the 13 year-olds, with 67.3 % and the 17 year-olds, with 64.1 %.

When analyzing how the initial diagnosis behaved by sex (female "F" and male "M"), it was also necessary to group them by evaluative categories and age groups (Figure 3). In the graph, it can be seen that males present a higher percentage of those evaluated as R and M. In this sense, most of them are above 65 %, with the exception of the 16 year-old age group, with 62.2 %. The same does not occur in the female group, which is closer to 60 %, except for the 13-year-old female students, with 68 %.

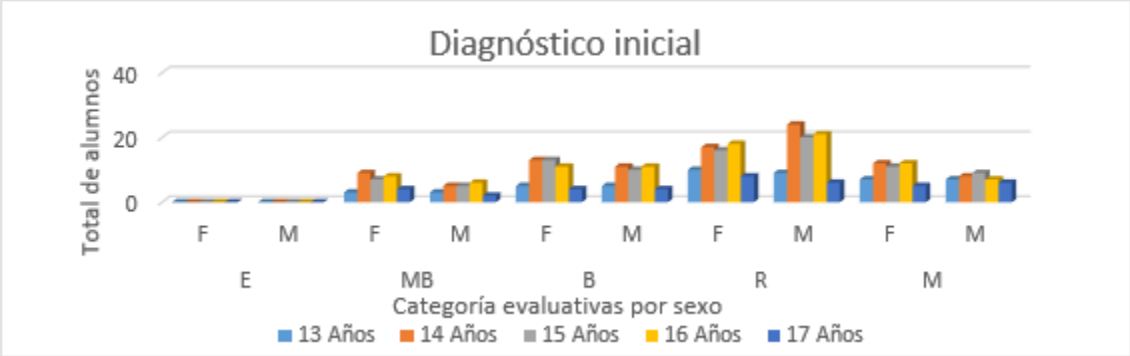

Fig. 3. - Results of initial diagnosis by sex, evaluative category and age

Regarding BMI behavior, it was found that there are several students with "underweight", 31 in the female sex and 45 in the male sex. In this sense, most of the enrollment is evaluated as "normal weight", however, the average values are close to the lower limit. On the other hand, although there are manifestations of "overweight", the values are close to the upper limit of what is considered normal by the WHO (CDC Centers for Disease Control and Prevention, 2020).

On the other hand, the use of the spreadsheet program in the process of scoring the test also provided the main weaknesses of the different age groups and individual inadequacies. In this way, the work was focused on solving them, both during and outside of Physical Education classes. These elements allow improving the effectiveness of the teacher's activity and favor the students' interest in overcoming their initial results.

In order to evaluate the progress achieved, the test was applied again from September 23 to October 5. Compliance with all the requirements established in the standardization was taken into account to avoid the effects caused by additional errors. By simple inspection, favorable results were observed (Table 2). In this sense, the students evaluated for R and M, in all age groups, are below 15 %, with the 17 year olds standing out with 8.8 %.

Table 2. - Final physical condition levels of the students in the sample

	General Final					
	Total	E	MB	B	R	M
13 años	49	13	18	11	6	1
14 años	99	23	38	25	9	4
15 años	91	18	39	26	7	1
16 años	94	19	41	24	9	1
17 años	39	12	14	8	4	1

Similarly, the behavior of the results was analyzed by sex, evaluation category and age (Figure 4). It is observed, in relation to those evaluated in R and M, a distribution with greater percentage dispersion in the female sex (8.2 % to 20 %), with respect to the male sex (8.3 % to 13.3 %). Nevertheless, there is a favorable change in the evaluation, with respect to the initial test. This is influenced by the work carried out in the Physical Education classes, by focusing attention on the detected insufficiencies and by adjusting the demands to the particularities of the students and their environment.

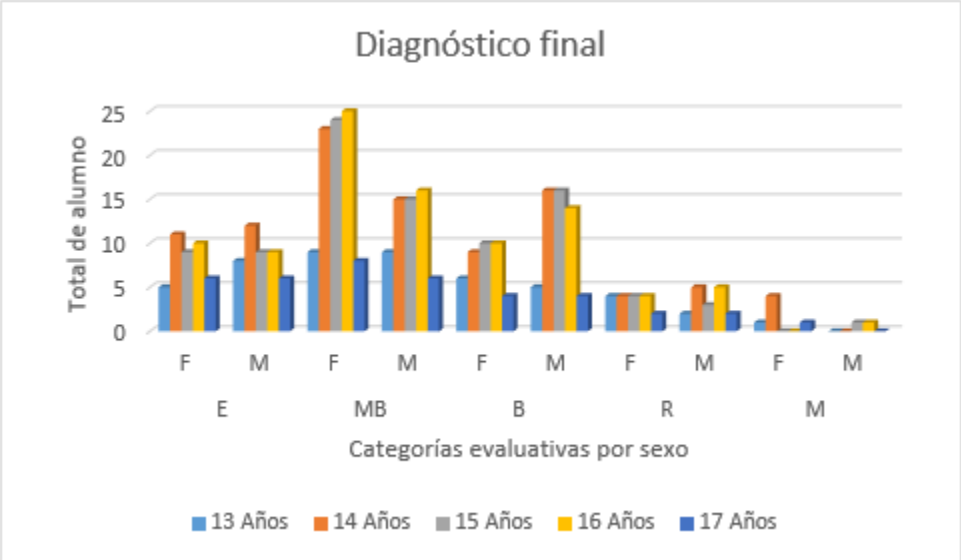

Fig. 4. - Results of the final diagnosis by sex, evaluation category and age

In order to verify whether the changes observed in the level of physical condition of the students during the final diagnosis were significant, the Wilcoxon test was used, at the 0.05 level. The results show a significance of ,000 which shows that they are significantly higher than the initial ones. Therefore, the adjustment of the norms to the material and environmental conditions of the school, together with the individual particularities, provides a higher level of reliability to the test results.

On the other hand, the Iadov technique was applied to the teachers to find out their level of satisfaction with this way of evaluating the physical condition of their students. The results of the individual satisfaction index (Figure 5) indicate that 95.4 % are clearly satisfied or more satisfied than dissatisfied with the proposal for the evaluation of physical condition in the 1st cycle of Secondary Education in Kilamba, Angola.

ISSN: 1996–2452 RNPS: 2148
Revista PODIUM, Januery-April 2021; 16(1):187-200

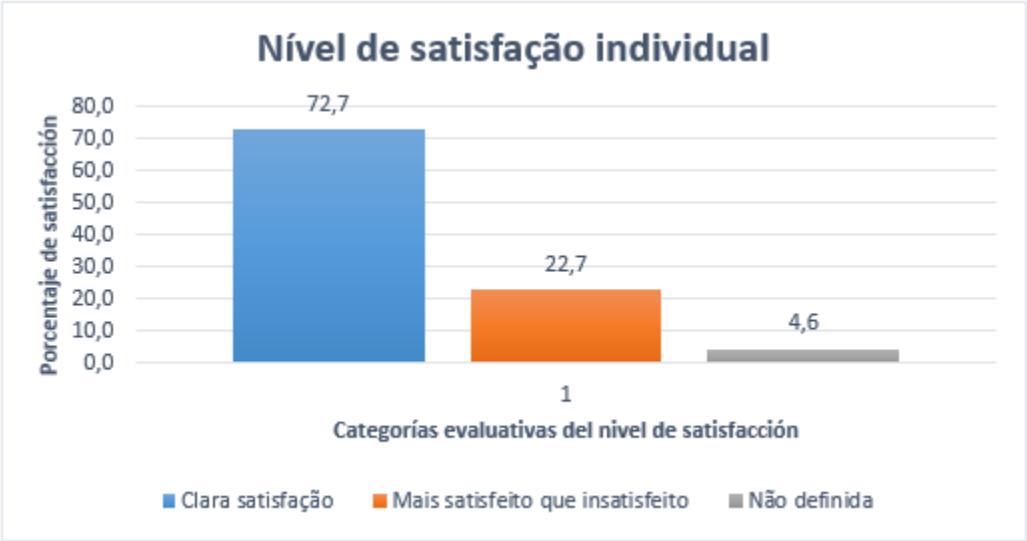

Fig. 5. - Behavior of teachers' individual satisfaction level with respect to the form proposed in the research to evaluate physical condition in Secondary Education in Kilamba, Angola

The calculation of the group satisfaction index (Figure 6) shows that the Physical Education teachers are satisfied with the proposal. When analyzing the answers to the question: What are the aspects that need to be improved? They refer to administrative and organizational problems. Among these are the location of Physical Education shifts in the school schedule and material limitations.

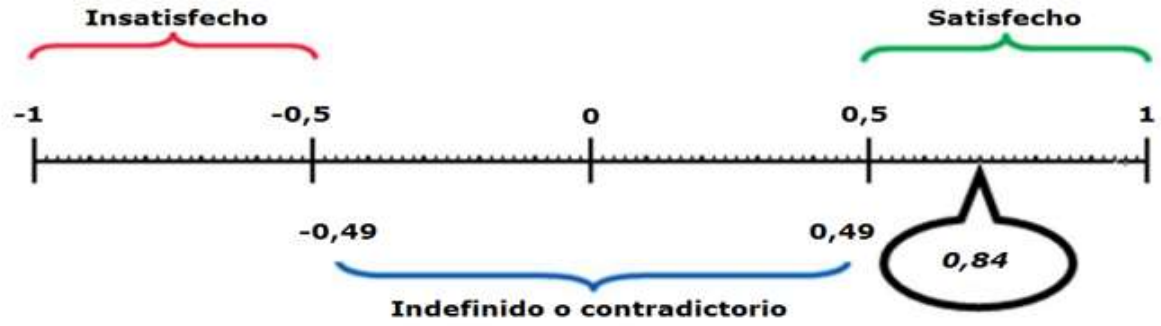

Fig. 6. - Behavior of teachers' group satisfaction level with respect to the proposal to evaluate the students' physical condition in Secondary Education in Kilamba, Angola

On the other hand, to the question: What would you do to improve the way of evaluating the physical condition of the students in your school? The responses with the highest level of coincidence are expressed around the need to take into account the weight/height ratio in the evaluation; in this way, it would be much fairer. These criteria are based on the results shown when calculating the BMI, since 20.4 % of the sample is evaluated as "underweight". This is an element to be taken into account for the improvement of this proposal.

CONCLUSSIONS

The results obtained with the application of the methodological procedures designed to evaluate the physical condition of Secondary Education first cycle students of the centrality of Kilamba, Angola, based on their particularities and those of the environment, allowed confirming their effectiveness and feasibility. In addition, they confirmed that the standards, when they leave their original context (the universe from which they were obtained), cease to be relevant, representative and modern. These metrological aspects should always be taken into account if a reliable evaluation of the level of physical condition of a given population is to be obtained.

REFERENCES

Benavides, C., García, J., Fernández, J., Rodríguez, D., & John, A. (2017). Condición física, nivel de actividad física y capacidad funcional en el adulto mayor: instrumentos para su cuantificación. *U.D.C.A Actualidad & Divulgación científica, 20*(2), 255-265. https://doi.org/10.31910/rudca.v20.n2.2017.385

CDC Centers for Disease Control and Prevetion (2020). Healthy Weight, Nutrition, and Physical Activity. Obtenido de About Child & Teem BMI. https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html

Farinola, M. G. (enero-marzo de 2020). Propuesta de evaluación de la condición física para población general: Batería Dickens. *Educación Física y Ciencia, 22*(1), e114. https://www.efyc.fahce.unlp.edu.ar/article/download/EFyCe114/12236?inline=1

González Rico, R., & Ramírez Lechuga, J. (2017). Revisión de las pruebas de evaluación de la condición física en Educación Secundaria. *Ágora para la educación física y el deporte, 19*(2-3), 355-378. https://dialnet.unirioja.es/servlet/articulo?codigo=6261767

López, A., & González, V. (2002). *Técnica de Iadov*. Efdeportes, Revista Digital - Buenos Aires, 8(47). Recuperado de https://www.efdeportes.com/efd47/iadov.htm

Quiala Barroso, W., Chang Girón, Y. C., & Pons Núñez, A. M. (2019). Alternativa metodológica para la evaluación de la condición física en las escuelas primarias rurales. *Olimpia, 16*(56), 183-195. https://revistas.udg.co.cu/index.php/olimpia/article/view/915

Quiala Barroso, W., Chang Girón, Y. C., & Pons Núnez, A. M. (2020). Ventajas de una alternativa metodológica para la evaluación de la condición física en la educación primaria. *Mundo FESC, 10*(S1), 49-59. https://www.fesc.edu.co/Revistas/OJS/index.php/mundofesc/article/view/395

Rosa Guillamón, A. (2017). Análisis bibliográfico de las baterías de evaluación de la condición física. *Revista Peruana de ciencia de la actividad física y del deporte, 4*(4), 533-543. https://www.researchgate.net/profile/Andres_Guillamon/publication/323759194_Analisis_bibliografico_de_las_baterias_de_evaluacion_de_la_condicion_fisica_Bibliographic_analysis_of_the_physical_fitness_assessment_batteries/links/5aa960d7aca272d39cd5201c/Anal

Secchi, J. D., García, G. C., & Arcuri, C. R. (2016). Evaluación de la condición física relacionada con la saluden el ámbito escolar_ un enfoque práctico para interpretar e informar los resultados. *Enfoques, XXVIII*(2), 67-87. https://www.redalyc.org/pdf/259/25955334004.pdf

Zatsiorski, V. M. (1989). *Metrología Deportiva.* Moscú, Rusia: Ed. Planeta.

Conflict of interests:
The authors declare not to have any interest conflicts.

Authors' contribution:
Walberto Quiala Barroso: Conception of the idea, literature search and review, instrument making, statistic analysis, preparation of tables, graphs and images, database preparation, General advice on the topic addressed, redacción del original (primera versión), revisión y versión final del artículo, article correction, authorship coordinator, translation of terms or information obtained, review of the application of the applied bibliographic standard.

Rene Mesa Peña: literature search and review, compilation of information resulting from the instruments applied, database preparation, general advice on the topic addressed, drafting of the original (first version), review and final version of the article, article correction, translation of terms or information obtained, review of the application of the applied bibliographic standard.

Francisco Alberto Lussati: literature search and review, instrument making, instrument application, compilation of information resulting from the instruments applied.

Yirka Cristina Chang Girón: literature search and review, statistic analysis, preparation of tables, graphs and images, database preparation.