Motives in the practice of exercise and physical condition in adolescent martial athletes in the new normality

Motivos en la práctica de ejercicio y condición física en deportistas marciales adolescentes en nueva normalidad

Motivos na prática do exercício e condição física em adolescentes atletas marciais na nova normalidade

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ABSTRACT

The objective of this research is to determine the reasons in the practice of physical exercise, and its relationship with the physical condition -agility, flexibility, explosive strength- of adolescent martial art athletes in the new normal. The sample is made up of 56 taekwondo athletes and 18 karate athletes. The Reasons to Practice Physical Exercise Self-report (AMPEF, for its name in Spanish) was used, as well as the tests of Illinois, sit and reach and vertical jump quantified agility, flexibility of the hamstring muscles and explosive strength of the lower body. Statistical analysis–Pearson's correlation coefficient–was performed between motivations and physical condition. The main motivational factors of the adolescent athletes were prevention and positive health (M=8.9; SD=1.69), challenge (M=8.9; SD=1.8), and fun and well-being (M=8.6; SD=1,9). Physical tests showed excellent results in agility and flexibility but explosive strength was below average. There were positive correlations between the abilities of agility (0.86 in men and 0.80 in women), strength (0.90 in men and 0.84 in women), and their corresponding motivational factors, as well as a negative correlation between flexibility (-0.88 in men and -0.90 in women) and their respective motivation. It is concluded that the results of the AMPEF questionnaire and levels of agility, flexibility, and explosive strength are correlated either positively or negatively, with high values in Pearson's coefficient. This means that teenage martial athletes are aware of their physical abilities and show motivation to improve their skills.

Key words: Motivation, Physical exercise, Physical condition, Martial arts, Adolescents.

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RESUMEN

El objetivo de la presente investigación consiste en determinar los motivos en la práctica de ejercicio físico y relación con la condición física -agilidad, flexibilidad, fuerza explosiva- en deportistas marciales adolescentes en la nueva normalidad. La muestra está constituida por 56 deportistas de taekwondo y 18 de kárate. Se utilizó el Autoinforme de Motivos para la Práctica de Ejercicio Físico (AMPEF) y los test de: Illinois, sit and reach y salto vertical cuantificaron la agilidad, flexibilidad de musculatura isquiotibial y fuerza explosiva de tren inferior. Se cumplió análisis estadístico -coeficiente de correlación de Pearson- entre motivaciones y condición física. Los principales factores motivacionales de los adolescentes marciales fueron: Prevención y salud positiva (M=8,9; DE=1,69), desafío (M=8,9; DE=1,8), diversión y bienestar (M=8,6; DE=1,9). Los test físicos evidencian excelentes resultados en agilidad y flexibilidad, la fuerza explosiva está por debajo de la media. Existen correlaciones positivas entre las capacidades de agilidad (0.86 en hombres y 0.80 en mujeres), fuerza (0.90 en hombres y 0.84 en mujeres) y sus correspondientes factores motivacionales, y una correlación negativa entre la flexibilidad (-0.88 en hombres y -0.90 en mujeres) y su motivación respectiva. Se concluye que los resultados del cuestionario AMPEF y niveles de agilidad, flexibilidad y fuerza explosiva se correlacionan ya sea positiva o negativamente, con valores altos en el coeficiente de Pearson, significa que los adolescentes marciales están conscientes de sus capacidades físicas y mostraron motivación para mejorar sus habilidades.

Palabras Clave: Motivación, Ejercicio físico, Condición física, Deportes de combate, Adolescentes.

RESUMO

O objetivo desta pesquisa é determinar os motivos da prática de exercício físico e sua relação com a condição física - agilidade, flexibilidade, força explosiva - em atletas marciais adolescentes na nova normalidade. A amostra é composta por 56 atletas de taekwondo e 18 de caratê. Foi utilizado o Autorrelato dos Motivos para a Prática de Exercício Físico (AMPEF) e os testes de: Illinois, sentar e alcançar e salto vertical quantificaram agilidade, flexibilidade dos músculos isquiotibiais e força explosiva da parte inferior do corpo. A análise estatística -coeficiente de correlação de Pearson- entre motivações e condição física foi concluída. Os principais fatores motivacionais dos adolescentes marciais foram: Prevenção e saúde positiva (M=8,9; DE=1,69), desafio (M=8,9; DE=1,8), diversão e bem-estar (M=8,6, DP=1,9). Os testes físicos apresentam excelentes resultados em agilidade e flexibilidade, a força explosiva está abaixo da média. Existem correlações positivas entre habilidades de agilidade (0,86 em homens e 0,80 em mulheres), força (0,90 em homens e 0,84 em mulheres) e seus correspondentes fatores motivacionais, e uma correlação negativa entre flexibilidade (-0,88 em homens e -0,90 em mulheres); mulheres) e suas respectivas motivações. Conclui-se que os resultados do questionário AMPEF e os níveis de agilidade, flexibilidade e força explosiva estão correlacionados positiva ou negativamente, com altos valores no coeficiente de Pearson, significa que os adolescentes marciais estão cientes de suas habilidades físicas e demonstraram motivação para melhorar suas habilidades.

Palavras chave: Motivação, Exercício físico, Condição física, Artes marciais, Adolescentes.

INTRODUCTION

The practice of physical exercise is essential for people of any social class, ethnicity, gender and age who want to improve their health and physical condition. It is evident that regular physical exercise ensures benefits for the physical, social and mental health of all people, and constitutes a powerful tool for general well-being (Lubans et al., 2016).

The “new normal” caused by the global Covid-19 pandemic has led to a considerable reduction in exercise practice due to confinement. One of the age groups affected are adolescents. Adolescence is a critical period in the formation of the human personality. The adolescent population presents a risk profile in terms of motivations for practicing physical

exercise, 60 and 80% of adolescents recognize being sedentary (Díaz et al., 2017; World Health Organization [WHO], 2020; Oviedo et al., 2013)

Regular exercise is one of the main tools available to the population to develop and maintain their physical condition. As a consequence, motivation, understood as the process that stimulates and guides behavior towards the objective or goal of an activity that it instigates and maintains (Menéndez, 2013), has a fundamental impact on the initiation and consolidation of physical exercise habits.

Data on childhood obesity and adolescent abandonment of sports have progressively increased and have become an alarming issue of social concern (Portela-Pino et al., 2020). A study in Italy reveals that maintaining a regular exercise routine is a key strategy for physical and mental health during a period of forced rest such as the current coronavirus emergency (Maugeri et al., 2020). They suggest that the level of physical fitness of Spanish adolescents is lower than that of adolescents in other developed countries.

In Ecuador, it was shown that adolescents' physical activity levels correlate with the intention to be physically active, obtaining higher values before the pandemic, moving from high-intensity activities to lower-impact ones, both before and during the pandemic (Díaz et al., 2020).

Galan & Ries (2019) conclude that the practice of physical exercise by adolescents is based on the feelings and experiences they perceive in the process of sports practice, having as main factors revitalization and enjoyment, strength and resistance, challenge and competition, with men obtaining higher scores than women in all factors.

Fuentes & Lagos (2019) consider that physical-sports practice is an important element to maintain a healthy lifestyle, especially in adolescence, given that there are constant physical, psychological and social changes.

Research focused on assessing the physical condition of adolescents shows a clear tendency towards a decrease in different physical capacities (Bohannon et al., 2017; Burner et al., 2019; Tomkinson et al., 2018; Tremblay et al., 2010). This decrease may be related to the low or non-existent practice of physical exercise, caused by disinterest or lack of motivation towards this practice (Palmi et al., 2018).

According to Gasca & Aibar (2020), more self-determined motivation levels are linked to higher levels of free-time exercise practice during the COVID-19 lockdown situation. Therefore, it is worth noting the relationship between motivation and physical condition in post-pandemic martial arts practice programs. Various strategies are based on martial arts and combat sports -MA & CS- activities that have shown highly beneficial health results in diverse populations with different age groups, comorbidities, and even as part of management protocols for some pathologies (Origua et al., 2018).

In martial arts practice, Zhen (2019) found that the three main motivations for adolescent athletes were: "value development", "improving health" and "having fun". The "skill levels" had no significant differences, but the "gender", "ages" and "countries" did. Important characteristics of health-related behaviors of these young people were found and discussed, which have meanings for improving sports training and management.

'External' martial arts and combat sports are characterized by fast, vigorous and dynamic movements aimed at generating and transmitting the maximum possible force to the attack surface. According to Pons et al., (2014), research on the effects that 'external' martial arts can have on health is currently increasing; there are studies on balance, muscle strength, bone

mineral density, cognition, among others, in different groups of the population.

What is meant by physical fitness? It consists of a set of attributes (functional status) that individuals possess or obtain, and that are related to the ability to develop physical activity. The term physical fitness is derived from the English phrase physical fitness, and designates the vitality of the person and their actual aptitude for the actions they undertake. It can be defined as a set of attributes that are related to health (Rosa, 2019). Physical condition is a biological indicator of the general state of health. The relationship between physical activity and physical condition in young subjects shows contradictory results.

In relation to physical fitness for health in adolescents (Del Sol, 2012), it is highlighted that the components in the first place are aerobic capacity or cardiovascular resistance, muscular strength-resistance, flexibility and body composition, their measurements are carried out through the application of physical and functional tests.

The assessment of physical fitness aims to provide information about the physical condition of the subject and the effects of the practice of physical activity carried out. This will allow informed decisions to be made about physical education programs focused on teaching movement skills, fostering perceived motor competence to promote motivation, especially among students with lower levels of self-perception. This helps to become competent, confident and motivated actors (Estevan et al., 2021).

From the field of sports performance, it can be defined as the sum of all the physical and motor qualities necessary to obtain greater sports performance.

Taking into account the conceptualization of these two terms, we can then say that it is not enough to say whether the physical condition is "good", "regular" or "bad", but to determine and quantitatively measure the conditional capacities to then obtain optimal sports performance as mentioned above, at any level of training that is carried out.

The aim of this study was to determine the motivational factors of adolescent martial artists through the Self-Report of Motives for Physical Exercise (AMPEF) and associate them with the level of physical abilities of explosive strength, flexibility and agility established in the Illinois sit and reach and vertical jump tests respectively. The level of physical fitness can be objectively assessed through laboratory tests and field tests. Field tests are a good alternative to laboratory tests.

METHODS

The research is quantitative, descriptive, cross-sectional, non-experimental and field. The subjects of the study - adolescent athletes from the province of Imbabura - were selected based on inclusion and exclusion criteria; the sample is 56 taekwondo athletes and 18 karate athletes.

The Self-Report of Motives for Physical Exercise (AMPEF) questionnaire was applied to the participants, a reduced version with 25 items divided into 11 motivational factors. The AMPEF questionnaire (Capdevila et al., 2004) is the adaptation into Spanish of the Exercise Motivations Inventory (EMI-2) developed by Markland & Ingledew (1997), it consists of 5 items divided into 11 motivational factors. A Likert scale is used to answer each item of the questionnaire, ranging from 0 ("not true for me") to 10 ("totally true for me"). The interpretation of the results can be obtained through an analysis of means and standard deviations for each item and for each

factor, thus obtaining the main motivations for the practice of physical exercise.

Within the framework of physical condition, the Illinois sit and reach and vertical jump tests were applied, which allowed quantifying agility, hamstring flexibility and explosive strength of the lower body respectively.

The Illinois test allows quantifying the agility of an individual by the time it takes to complete the established circuit (Cardona & Buitrago, 2018), agility being the ability to quickly change direction without losing speed, balance, or control (Dietrich et al., 2017). It is a simple test to perform and only requires eight markers or cones. Once positioned as indicated in the protocol, the test begins in a prone position with the hands at shoulder level, having to get up as quickly as possible and follow the path of the system (it can be in either direction).

To assess the flexibility of the hamstring muscles of the study subjects, the sit and reach test is used due to the simplicity and speed of its application process, since it consists of measuring the distance between the tip of the fingers of the hand and the ground or the tangent to the sole of the feet when performing maximum trunk flexion with extended knees (Ayala et al., 2012).

The vertical jump test allows the assessment of the explosive strength of the lower body, it is also known as the Sargent Jump Test, in honor of the doctor who devised it in 1921, it has undergone numerous adaptations and studies; the most accepted-standardized protocol is that of Lewis (1977) (Cardozo & Moreno, 2018). This test is easy to apply and does not require complex equipment. Table 1 describes the scores of the tests described above.

Table 1

Fitness test scores.

Physical Tests	Illinois Test		Sit and reach test		Vertical jump test	
Classification	Male (seconds)	Female (seconds)	Male (cm)	Female (cm)	Male (cm)	Female (cm)
Excelent	< 15.2	< 17.0	>27.0	> 30.0	< 65	< 60
Above average	15.2 - 16.1	17.0 - 17.9	6.0 – 27.0	11.0 – 30.0	56 - 65	51 - 60
Average	16.2 - 18.1	18.0 - 21.7	0 – 5.0	1.0 – 10.0	50 - 55	41 - 50
Below average	18.2 - 19.3	21.8 - 23.0	-1.0 – -20.0	0 – -15.0	49 - 40	35 - 40
Low	> 19.3	> 23.0	< -20cm	<-15cm	<40	<35

To measure the degree of relationship between motivations for exercise practice and physical condition of adolescent martial athletes, a statistical analysis was applied using Pearson's

correlation coefficient, based on the results presented in the different physical tests and the motivations related to agility, flexibility and strength. The analysis was carried out by gender due to the scores that the test presents between genders.

RESULTS

The average age of the established sample is 13.8 years (SD = 2.46), where 51% is between 11 and 13 years old, with only 15% over 17 years old, which shows that martial arts attract increasingly younger people, which is beneficial for sport and society, these adolescents receive the culture and teachings of taekwondo and karate from a very young age. Regarding gender, there is not much difference between men (54%) and women (46%), leaving behind the stigma that martial arts are only practiced by men, considering them the stronger gender. 92% of the study subjects are studying, which is to be expected due to the age range in which they are found. The predominant ethnicity is mestizo with 84%, making it clear that these sports do not have much diversity among their practitioners. The most practiced martial art by the study subjects is taekwondo with 76%, a sport that has had a lot of expansion in the country and that has been an Olympic sport since 2000, which has made it promoted by different sports organizations. On the other hand, karate (24%) only remained as an Olympic sport in Tokyo 2021, which may influence its lower practice and dissemination by government institutions; this sport has proliferated only in private clubs. Regarding the sporting age, the extremes of the variable stand out, on the one hand, the novices (27%) who have been practicing martial arts for less than a year and the advanced (31%) who have more than 4 years of experience in TKD or Karate, leaving the remaining 42% in those who practice it between 1 and 4 years. Table 2 shows the main factors associated with the practice of physical exercise and motivations in adolescent martial athletes from the province of Imbabura. Regarding the main motivations we have the following: having a healthy body (M = 9; SD = 1.6), the development of personal skills (M = 8.9; SD = 1.7), the satisfaction of practicing exercise (M = 8.6; SD = 1.9), increasing strength and endurance (M = 7.8; SD = 1.7), the enjoyment of sports competition (M = 7.8; SD = 2.7) and to be more agile and flexible (M = 7.1; SD = 1.8). This demonstrates the commitment of athletes to the practice of exercise and how the motives influence their personal, social and sports life, after a long season of partial inactivity due to the global pandemic caused by Covid-19.

Table 2

Mean and standard deviation of the main factors for the practice of physical exercise.

Factors	Mean	SD
Prevention and positive health	8,9	1,69
Challenge	8,9	1,8
Fun and well-being	8,6	1,9
Competition	7,9	2,6
Muscle strength and endurance	7,8	1,7
Agility and flexibility	7,1	1,8
Total	**8,2**	**1,9**

Table 3 shows that males perform better on the agility and strength tests, while females perform better on average on flexibility. Based on the Illinois standard test scores (see Table 1), both genders are within the average time range. In the case of the sit and reach test, the entire sample performs excellently compared to what is shown in Table 1. However, the results of the Sargent test are below average, which means that adolescent martial artists need to improve their lower body explosive strength capabilities.

Table 3

Averages of the Illinois, Sit and Reach, and Sargent tests.

Sexo	Illinois Test (s)	Sit and Reach Test (cm)	Vertical Jump Test (cm)
Female	18,30	32,80	20,10
Male	17,40	27,30	25,00

Once the results of both the motivations for exercise and physical condition are known, it is necessary to perform a correlational analysis between these two independent variables, for which the Pearson correlation coefficient is used. The individual results of each test are used to relate them to the item corresponding to agility, flexibility and strength of the AMPEF, presenting the following results:

Male		
Motivation	Physical capacity	Pearson's correlation coefficient
To be more agile	Agility	0,86
To have more flexibility	Flexibility	-0,88
To have more strength	Explosive force	0,90
Female		
Motivation	Physical capacity	Pearson's correlation coefficient
To be more agile	Agility	0,80
To have more flexibility	Flexibility	-0,90
To have more strength	Explosive force	0,84

In order to analyse the results, it is pertinent to observe those presented in Table 4, and relate them to the results in Table 3. The agility average for both men and women is in an acceptable but improvable zone, therefore, there is a positive correlation between the motivation "to be more agile" and the measurements of the Illinois test; in turn, the averages of the Sargent test are low and the correlation between the motivation "to have more strength" and the vertical jump test is positive. This shows that martial artists are aware of their deficiencies in agility and explosive strength and are motivated to improve these physical capacities. On the other hand, the averages in the sit and reach test were excellent and this translates into a negative correlation between the motivation "to have more flexibility" and the measurements of the flexibility test, because the athletes do not feel the motivation to improve a physical capacity that already presents excellent results.

Table 4

Correlational analysis.

DISCUSSION

Rodríguez et al. (2017) evaluated the agility of 20 adolescents who were part of the men's soccer team of the Department of Córdoba-Colombia

using the Illinois test, obtaining an average of 16.9 seconds, which is 0.5 seconds better than the average obtained in the present research, which is probably due to the average age. On the other hand, Singh et al. (2017) demonstrated that a training program focused on improving the agility of adolescent taekwondo athletes presents excellent results, having an average of 17.8s in the pretest and 15.27s in the Illinois posttest, which is why it is necessary to constantly train this physical capacity to present improvements. A Colombian study (Peraza et al., 2018) aimed to evaluate the level of flexibility in 334 child and adolescent athletes between 8 and 17 years old. Regarding taekwondo, an average of 17.4 cm was obtained in men and 22.5 cm in women, which places them above the average according to the standards of the sit and reach test. Women stand out with a better average than men, which is similar to the present study, with the difference that the averages presented in table 8 are higher.

Regarding explosive strength, Pal et al. (2020) evaluated 120 young karate athletes in order to find the training plan that presents the best results. In the pretest, an average of 60.55 cm was obtained and the best results were obtained by implementing a plyometric training program with an average of 71.34 cm. In the present investigation, by presenting low values in the section (explosive strength), the plyometric training method remains as a precedent for further studies. Guillen et al. (2021) presented similar values for adolescent taekwondo athletes with an average of 30.53 cm in the Sargent test.

In a binational study between the United States and China (Zhen, 2019), in which the main motivations for the practice of physical exercise were evaluated in 163 youth martial arts athletes between 12 and 18 years of age, the three highest average scores were: "Enjoying the competition" (M = 4.53; SD = 0.7), "Having a healthy body" (M = 4.23; SD = 0.96), "Having fun" (M = 4.21; SD = 0.94). On the other hand, in the study by Portela-Pino et al. (2020) in which 852 adolescents with an average age of 15 years were evaluated, the results obtained show a predominance of competition, social recognition and challenge as motivational factors for the practice of exercise. Both studies highlight competition among the motivational factors, which coincides with the present research, showing that martial adolescents generally do it to stay healthy and because of the need for competition.

Regarding the motivations for performing physical activity during and after the pandemic, Angosto et al. (2020) highlight that the main reasons shown by adolescents were psychological reasons related to improved or managed general or emotional well-being. These results are similar to those presented in Table 4, where the main motivational factor of martial athletes in Imbabura is prevention and positive health.

During the research process, it was not possible to obtain a larger number of martial arts athletes to generalize about motivations and physical condition in adolescents. Additional studies will be necessary.

CONCLUSION

The results obtained after applying the AMPEF questionnaire indicate that adolescents practicing taekwondo and karate have motivations for practicing physical exercise related to physical and emotional health, challenge, competition and improvement of physical abilities. Demonstrating that the partial

inactivity of recent years due to the pandemic and confinement did not diminish the sporting spirit that martial arts instill.

The assessment of the physical condition tests in the study subjects indicates positive results in agility and flexibility, the measurements are above average and excellent respectively. On the other hand, the explosive strength of the lower body presents negative or below average results, making it necessary to improve this physical capacity through training plans focused on adolescents.

The correlations between the results of the physical tests and the motivations associated with agility, flexibility and strength are high. The results are positive for agility (0.86 in men and 0.80 in women) and strength (0.90 in men and 0.84 in women) and negative for flexibility (-0.88 in men and -0.90 in women). This means that adolescents are aware of their physical strengths and weaknesses, showing the motivation necessary to improve their weaknesses and consequently their skills in the martial arts they practice.

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