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Original article

Sports performance indicators for the opening pitcher selection process

Indicadores de rendimiento deportivo para el proceso de selección del lanzador abridor

Indicadores de desempenho esportivo para o processo de seleção de batedores iniciais

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ABSTRACT

Sports talent is not defined by a single capacity, but by the interrelation and complementation, which implies comprehensive analysis and assessments. In baseball, in spite of having updated athlete preparation programs and established parameters for sports selection, the indicators that allow an objective selection to fulfill specialized functions are still deficient, which is an aspect of essential importance in contemporary competitive performance. However, in the process of forming the teams to participate in national championships, there are insufficiencies that limit the quality of their scope. Hence, the general objective of the research consisted in proposing sports performance indicators for the selection process of the opening pitcher, in the conformation of high performance baseball teams in La Isla de la Juventud. A sample composed of 11 baseball pitchers of the youth category of La Isla de la Juventud was selected, representing 52.38 % of the population; of them, eight are right-handed representing 72.72 % and three are left-handed representing 27.27 %, in addition to four coaches representing 19.04 % and 6 specialists representing 28.57 % of the population. The research methods used were observation, review of regulatory documents governing the process of sports selection in baseball, the survey of coaches and the criteria of specialists, which allowed to identify the lack of a tool to guide the work of the sports teacher in relation to the selection of the opening pitchers.

Keywords: pitcher; sports selection; sports talent.

RESUMEN

El talento deportivo no se define por una sola capacidad, sino por la interrelación y complementación, lo que implica análisis y valoraciones integrales. En el béisbol, a pesar de que cuenta con programas de preparación del deportista, actualizados y de parámetros establecidos para la selección deportiva, aún continúan siendo deficientes los indicadores que permiten una selección objetiva para cumplir funciones especializadas, lo que constituye un aspecto de esencial importancia en el desempeño competitivo contemporáneo. Sin embargo, en el proceso de conformación de los equipos a participar en campeonatos nacionales, se evidencian insuficiencias que limitan la calidad de su alcance. De ahí que el objetivo general de la investigación consistió en proponer indicadores de rendimiento deportivo para el proceso de selección del lanzador abridor, en la conformación de equipos de béisbol de alto rendimiento en la Isla de la Juventud. Se seleccionó una muestra compuesta por 11 lanzadores de béisbol de la categoría juvenil de la Isla de la Juventud que representa el 52,38 % de la población; de ellos, ocho son derechos que representan el 72.72 % y tres zurdos que representan el 27.27 %, además de cuatro entrenadores que representan el 19,04 % y 6 especialistas que representan 28,57 % de la población. Los métodos de investigación empleados fueron la observación, revisión de documentos normativos que rigen el proceso de selección deportiva en el béisbol, la encuesta a entrenadores y el criterio de especialistas, lo que permitió identificar la inexistencia de una herramienta que oriente la labor del profesor deportivo en lo referido a la selección de los lanzadores abridores.

Palabras clave: Lanzador; Selección deportiva; Talento deportivo.

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RESUMO

O talento esportivo não é definido por uma única capacidade, senão pela inter-relação e complementação, que envolve análise e avaliações abrangentes. No beisebol, apesar de ter atualizado programas de preparação dos atletas e estabelecido parâmetros para a seleção esportiva, os indicadores que permitem uma seleção objetiva para cumprir funções especializadas ainda são deficientes, o que é um aspecto de importância essencial no desempenho competitivo contemporâneo. Entretanto, no processo de conformação das equipes para participar de campeonatos nacionais, existem insuficiências que limitam a qualidade de seu escopo. Assim, o objetivo geral da pesquisa foi propor indicadores de desempenho esportivo para o processo de seleção do arremessador titular, na conformação de equipes de beisebol de alto rendimento na Ilha da Juventude. Foi selecionada uma amostra composta por 11 jogadores de beisebol da categoria jovem da Ilha da Juventude, representando 52,38 % da população; oito deles são destros, representando 72,72 % e três são canhotos, representando 27,27 %, além de quatro treinadores representando 19,04 % e 6 especialistas representando 28,57 % da população. Os métodos de pesquisa utilizados foram a observação, a revisão de documentos normativos que regem o processo de seleção esportiva no beisebol, o levantamento dos treinadores e os critérios dos especialistas, o que permitiu identificar a inexistência de uma ferramenta para orientar o trabalho do professor de esportes em relação à seleção dos arremessadores iniciantes.

Palavras-chave: Batedor; Seleção esportiva; Talento esportivo.

INTRODUCTION

Sport in the world occupies a category of social movement of surprising dimensions. The competition factor is, undoubtedly, one of the essential elements that make this manifestation of human activity, of a social nature, acquire increasingly complex levels in which greater perfection and better marks in performance and sports results are sought.

Cuba does not escape from this reality, so it becomes necessary, more and more, to research and improve the processes related to sports with balls in their initiation and recruitment of athletes and, therefore, to the selection of potential talents to achieve a better projection for high competition and the achievement of significant results.

In baseball, each of the nine players occupies a certain position on the field and thus performs a certain function, one of them. The thrower or pitcher is in charge of opening the actions when they put the ball in play, starting with the first throw from the mound or pitching rubber, directing it to the catcher with the objective of putting out the batters by any means.

The act of throwing the ball requires effort, concentration, tenacity, mastery, skill and accuracy. For the development of this specialty, work is done in the search for young people with certain natural aptitudes, capable of assimilating large training loads and high rates of sports improvement, where an increasingly earlier selection is made and with a deeply scientific procedure (Abreu Quiñonez, Pérez Acosta, & Martínez Puig, 2015).

The talent selection process is one of the most pressing concerns in contemporary sport. Many can learn to sing, dance or paint, but very few achieve mastery of these disciplines. In sport, as in the arts, it is important to discover the most capable individuals, select them from the age, according to the characteristics of the sport, observe them, evaluate them and help them reach the highest level of mastery of their sport, with the application of ways and methods to ensure the future of the athlete.

The selection of talents in baseball is a topic of great interest; authors such as: (Ealo de la Herran, 1984), (Reynaldo Balbuena & Padilla Díaz, 2007), (Abreu Quiñones, 2016), where they contribute their criteria closely linked to science, without disregarding the natural or passive aspect of selection.

Recently, studies have been conducted that point to an improvement in the selection of baseball talent from the base, with a socio-constructive vision, taking into consideration indicators by organizational areas, perfecting the physical fitness profile of the sports reserve, the body proportionality profile and the statistical evaluation system applied to this sport among other topics (Reyes-Lausao, Batista- Santiesteban, & Noa- Cuadro, 2016; Padilla Alvarado, 2017; Pipper, Ferie-Palacios, & Mesa-Sánchez, 2018 and Cudeiro-González, Trejo-del Pino, & Zamora-Castro, 2019).

Criteria issued in research works consulted, related to the sports selection of pitchers, allowed the identification of insufficiencies in the performance of specialized functions, which are expressed in: instability in the behavior of sports performance with a tendency to decrease, the use throughout the competitive period of several pitchers, and the frequent use of pitchers in specialized functions for which they are not prepared.

Martínez Llantada, M. & Lorenzo García, R. (2002), cited by Menéndez, J.; Villanueva, M. & Companioni, Y. (2012), in a compendium referring to authors recognized worldwide for their studies on the subject of talents, from various positions and applied sciences, managed to incorporate new nuances that bring closer to understanding the term, clarifying that:

> "The literature reports the existence of hundreds of definitions of talent and its synonyms, but none has universal acceptance due to the fact that this is a multifaceted and multidetermined phenomenon".

It is recognized that the topic of talents has been dedicated to certain sections from the sciences, however, throughout history there have been biological, sociological and interactionist tendencies, which are the predominant ones today.

Nadori, L. (1993) defines talent as a faculty or groups of faculties with a certain specification, superior to the average, but which must still manifest itself with what is indicating us the way to follow or its conception on the capture of the same.

According to López, J. (1995) talent consists of a natural attitude acquired to do something. Talent depends on the individual capacity, the motivations of the subject and the social environment.

For Ruiz, L. M. & Sánchez, F. (1997) sports talent is a person who from an early age manifests special attitudes for a type of sports activity. Ilisástegui, M. (1999) referred to by Lorenzo García, R. (2010), defines that, "talent is the integration between above-average skills, high creativity and high commitment to the task", and proposes a dependence on the interaction between the biological and the social (dialectical-

materialistic), where the biological is a premise for the development of talent and the social is the determinant.

On this subject, Romero, E.; Bacallao, J.; Vinueza, E.; Chávez, E., & Vaca, M. (2015) point out that, "sports talent is that beginner who possesses innate and acquired skills that allow him/her to show potentialities to perform successfully in the future, in a given sport".

In baseball, the pitcher is in charge of opening the actions, putting the ball in play by throwing it from the mound or pitching rubber to the catcher, with the objective of putting out the batters by any means. The act of throwing the ball requires a great deal of effort, concentration, skill and dexterity.

The assignment of the specialized functions to be performed by the pitcher in high performance baseball, during his mound performance, must be through a scientifically based process organized by a multidisciplinary team, since each of them requires a specific preparation for the activity to be developed, which includes skills, qualities and a great mental aptitude, which must characterize the athlete to successfully face the different tactical situations.

Based on the above, the objective of this work is to propose sports performance indicators for the selection process of the opening pitcher in the conformation of high performance baseball teams.

MATERIALS AND METHODS

The research was developed at the Sport initiation school (Eide in Spanish) "Fladio Álvarez Galán", with a population of 21 subjects; a sample was selected composed of: 11 baseball pitchers of the youth category of the Isla de la Juventud, which represents 52.38 % of the entire population.

Of these, eight right-handed pitchers representing 72.72 % and three left-handed pitchers representing 27.27 %, where five of them served as starters, which recorded the necessary information that allowed the analysis of the sports selection of baseball pitchers of the aforementioned category. In addition to four coaches representing 19.04 % and six specialists representing 28.57 % of the total population.

The following methods were used to work on the conceptions about the sports selection of opening pitchers in the conformation of high performance baseball teams:

Scientific observation: it was used to identify the sports performance indicators (size, inning pitched, games won and lost, runs allowed, number of runs allowed, number of runs batted in, ratio between strikeouts and bases on balls, bases on balls awarded, pitching velocity and effectiveness) used in the sports selection process of baseball pitchers.

Document review: it was used with the objective of inquiring about the treatment given to the sports selection of baseball pitchers. The following were reviewed: the regulations provided by the National Baseball Commission, as well as what is expressed in the Baseball Athlete Preparation Programs and the Comprehensive Athlete Preparation Programs.

The exploration phase was developed in one year, from January 2019 to December 2019; during this time, the theoretical state of the reality under study was evaluated and the conceptual bases that supported the research process were identified, in addition to the following actions were carried out**:**

- The review and study of the bibliography, which made possible the systematization of the theoretical and methodological foundations that support the selection process of the pitcher in the conformation of high performance baseball teams.
- The review of the Baseball Athlete Preparation Programs (PPDB) in its different editions, as well as the Comprehensive Athlete Preparation Program (PIPD), which allowed knowing the conception adopted by the National Sports Commission and its provincial branches, in relation to the selection of talents.
- The diagnosis to determine the usual procedures applied in the process of integration of high performance baseball teams, in particular, in relation to the selection of pitchers.

Coaches' survey: made it possible to identify the indicators that contribute to sporting performance that have the greatest impact on the work of the starting pitcher.

Criteria of specialists: made it possible to know the level of acceptance of the indicators that contribute to sports performance for the selection of the starting pitcher.

RESULTS AND DISCUSSION

The results of the instruments applied in the research are shown below (Table 1).

Table 1. - Sport performance indicators

Indicators	Evaluation criterion
Height	Value measurement
Inning pitched	Value measurement
Games won and lost	Pro= jg / (jg + jp) * 1000
Runs allowed	Value measurement
Number of runs batted in (WHIP ratio)	WHIP = (bb + h) / inn
Ratio of strikeouts to bases on balls (k/bb)	Applying the formula so ÷ ip plus bb ÷ ip will give the base rate per ip. By applying ip ÷ 9 = x and then bb ÷ x and so ÷ x the will give for each game of 9 inning
Bases on balls awarded	Value measurement
Pitching velocity	Measurements in games and training
Effectiveness (pcl)	Apply formula x = ip÷ 9

Upon analyzing the statistics that include the aforementioned indicators, the following was determined:

1. In the performance of the pitchers, the efficiency of games won is low, which is manifested in that, out of 47 interventions to open games, they only achieve victory in 12 opportunities, which means that they manage to fulfill their role in less than 50 % of the cases.

2. In the performance of 63 innings of performance, they allow 110 hits and 70 runs, which can be translated into the fact that they do not manage to prevent the opposing team from scoring.

3. The number of batters that manage to bunt, from the inning in which they start their work, is 4.66, which shows a high percentage of bunts.

4. Analyzing the data obtained on these pitchers, it can be seen that the number of bases on balls awarded exceeds the number of strikeouts.

As for the general performance of these pitchers, it could be seen how:

- Not only did they play the role of openers, but they were also assigned other relief duties and, in two cases, they performed the duties of closers.
- In 97.0 innings of performance, overall, they struck out 62 times and gave up 57 bases on balls, at a rate of 0.91 bases per strikeout; this result also reflects an average of 0.64 strikeouts and 0.59 bases on balls per inning of performance.
- Their average performance was sixty-two thirds of an inning (70 and 2/3).
- The effectiveness of these pitchers during the entire championship was 4.52 clean runs per nine innings of performance.

Documents review: According to Reynaldo Balbuena, F. (2007), a group of authors (1984) of the Cuban Sports Directorate prepared the *High Performance Sports Subsystem*, which came into force in 1985 and regulated the selection based on physical and technical aspects.

Physical aspect with a total value of 100 points distributed as follows:

- Somatotype 5 points.
- General and special physical preparation 95 points.

In the somatotype, a value of five points was assigned, but without defining, what aspects should be taken into account to confer that value.

Considering a problem of definition of terms and orientation, physical fitness was not evaluated, but rather the state of general and special physical preparation based on six indicators, i.e., it was very difficult for a child who had not received physical training to achieve such a high score (95), even if he had superior natural aptitudes for the practice of Baseball.

In the technical condition, six indicators were measured for the defensive, also based on the state of technical preparation, with a value of 100 points.

In the offense: 50 points for five batting indicators and another 50 for the touch of the ball, distributed in four elements to be validated in the execution of this technique.

It can be stated that the 22 indicators to be evaluated in the *High Performance Sports Subsystem*, with a value of 300 points, was wide, but at the same time, insufficient in the selection system, where the measurements were limited to the states of physical preparation, technical gesture and did not include the search for natural aptitudes for sports initiation in Baseball athletes.

The Subsystem was replaced by the Athlete Preparation Program (Collective of Authors, 1988), which lasted 12 years and whose results were finally used to create a ranking. For this selection, the evaluation is based on the control of seven indicators, which are specified in the application of oriented tests for more than a decade. A detailed analysis showed that the program revealed several deficiencies, although it already included arm strength, which could be an element to be taken into account for pitchers.

In the year 2000, in the improvement of the Athlete Preparation Program (PPD in Spanish), prepared by the National Baseball Commission and approved by the National Directorate of High Performance, which became the guiding document for the work from the lower categories (7-8) to the youth category (17-18), the height requirement was added as the most important and innovative aspect for the selection process, described as follows:

- 1st year 13 -14 5 athletes with 1.60 m. or more must be in the enrollment.
- 2nd year 13 -14 5 athletes with 1.63 m. or more must be in the enrollment.
- 1st year 15 -16 5 athletes with 1.70 m. or more must be in the enrollment.
- 2nd year 15 -16 5 athletes with 1.73 m. or more must be in the enrollment.

In this program, the somatotype is included in the search for the ideal model. In this sense, it is necessary to point out that, in the 70's of the last century, the then "Manuel Fajardo" Superior School of Physical Education carried out an anthropometric study of Cuban baseball pitchers and obtained that the most effective ones differed from the rest in:

1. Height above the average height of players and other pitchers.
2. Long upper and lower extremities (arms and legs).
3. Large hands and long fingers.
4. Small trunk.

In 2009, a new Athlete Preparation Program appeared. Within the framework of its indications, it begins to outline the specialization from the youth category (17-18 years), aiming to achieve this purpose in the provincial baseball academies, in a mediated way for the formation of provincial teams. It is important to point out that, within the specific objectives for the area of pitchers oriented in the document, no indicators are established for the specialization of these players and much less to profile them according to the function or role to be played in competitive events, activity that is developed empirically and using indicators obtained by the knowledge acquired over the years and the experience in these tasks by the coaches who attend these areas.

From the 2013-2014 academic year, the current Comprehensive Athlete Preparation Program (PIPD), developed under the leadership of Reynaldo, F. (2013), is put into effect. Among its objectives, the following is included: Each level of teaching, consolidation and sports improvement must comply with the logical order established in the contents of the program, in order to achieve the basic objective of developing massiveness and that, from this, the future talents that high performance baseball requires arise.

In the indicated program, some elements and indicators are provided for the selection of pitchers, from the U-15 to U-21 categories, which are the academies' enrollments.

The indicators for the selection of the immediate perspective player for the Sports Initiation Schools (Eide), according to the Integral Program for the Preparation of the Athlete (PIPD) are as follows:

- Motor capacity.
- Coordinative capacities of the technical gesture.
- Biometric condition.
- Psychological condition.

In addition to motivation and interest in the practice of this sport and in joining the Eide, there is the power of concentration, tactical intelligence, courage and spirit of cooperation in the solution of situations.

As can be seen, after an evaluation of all the athlete preparation programs, none of them provides the necessary tools to guide the sports coach and orient him as to the main characteristics that a pitcher should show in order to assign him the functions to be performed during the competitive event and, among them, that of the starter. Although in all cases, there are sections dedicated to pitchers in particular, the indicators that should be taken into account to assign them the specific functions to be performed by each of the members of the pitching corps or staff, according to the tactical action to be faced during their performance, do not appear in the governing documents of this sport and it is minimal as far as the specialized bibliography is concerned.

The survey of youth baseball coaches showed that: the indicators that contribute to the dimensions of sports performance, proposed by Romero, R. (2009), are also manifested in the work of the starting pitcher, which are as follows:

1. Regarding the *constitution* dimension, 100 % of the coaches indicated within the anthropometric requirements the height and weight, as well as the somatotype.
2. In relation to the *physical fitness* dimension, 100 % of the coaches identified the speed of his throws as a very incident indicator in the work of this player and 81 % considered flexibility.
3. When evaluating the *sport-specific technical-coordination* dimension, 100 % agreed that the orientation of movement as an indicator that measures control is of vital importance in these pitchers and 85 % identified balance.
4. Regarding the results in the *personality* plus tactical thinking dimension, 91 % agreed that temperament was an indicator to be taken into account in terms of

psychological characteristics and 95 % considered tactical capacities as another important indicator.

5. When analyzing the *sports results* dimension, it was found that 92 % of the respondents indicated the effectiveness or average of clean runs (ERA or PCL) as an indicator to follow and the number of runs batted in (WHIP), as statistical indicators of great weight when evaluating the sports results of these pitchers.

6. Finally, in relation to the dimension of *potential to make their competitive level* sustainable, 90 % of the trainers marked the acceptance of a role as indispensable for this objective.

From the results obtained by the instruments used, it was revealed that, in order to guarantee a better performance of the player, it is necessary to evaluate other sport performance indicators for the selection process of the starting pitcher, such as:

- Somatotype.
- The speed of his throws.
- Flexibility.
- Movement orientation.
- Balance.
- Temperament.
- Tactical capacities.
- Acceptance of a role.
- Average number of errors.
- Runs batted in average.
- Average of clean runs.
- Average balk (pitcher's illegal act) and wild pitch (pitcher's uncontrolled pitch).

Specialist criterion:

Subsequently, the proposal was accepted by the six selected specialists, suggesting the following aspects.

1. The 83.3 % of the specialists (5) consider that, in the sports results of this type of pitcher, the ratio between strikeouts given and bases given should be taken into account.

2. The 66.6 % (4) pointed out health as an indispensable requirement for the sustainable maintenance of their competitive level.

In addition, in an isolated manner and without reaching an important degree of significance, some criteria were recorded on essential aspects of this pitcher's work, such as:

- He must be a good pitcher in the low zone.
- He must be convinced that he starts the game.
- He must be a good pitcher, both against righties and lefties.
- He must know how to impose himself.
- He must have a pitch that dominates to perfection for complicated moments.

Therefore, it is summarized that, from the theoretical and practical background identified in the information search process, related to the object of study, as well as the experiences of the authors, it can be stated that, in the conditions of Cuba, up to the present, the selection of opening pitchers is made from the personal considerations of the coaches, without the application of methodological indications of any kind.

And it is possible to establish, from the general theory, the indicators for the selection of the starting pitcher in the conformation of high performance baseball teams, identifying the theoretical bases that serve as support and order, which allows declaring that the general objective of the research was achieved.

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Authors' contribution:
Humberto Andrés Durañona Nápoles: Conception of the idea, literature search and review, review and final version of the article, authorship coordinator.

Yidier Pons Gámez: Compilation of information resulting from the instruments applied, statistic analysis, drafting of the original (first version), review of the application of the applied bibliographic standard.

Yoanni Gil López: Instrument making, instrument application, database preparation, translation of terms or information obtained.

Douglas Crispin Castellanos: Preparation of tables, graphs and images, general advice on the topic addressed, article correction.