ORIGINAL ARTICLE

The sports longevity of the soccer player is related to his metabolic state

La longevidad deportiva del futbolista está relacionada con su estado metabólico

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ABSTRACT

Introduction: the presence of inadequate lifestyles, physical inactivity, and overeating, generate a cardiometabolic risk (CMR). CMR induces an increase in the likelihood of experiencing cardiovascular events or developing disease like diabetes mellitus. Soccer football is the most popular and practiced sport in Mexico and contributes significantly to the practice of exercise. Despite its importance, there is not enough information to evaluate the cardiometabolic risk of soccer players in our country and in the world, in terms of their blood variables related to glucose, lipids and proteins. **Objective:** therefore, the purpose of the present study was to relate cardiovascular and metabolic variables to longevity as an active player in professional soccer players. **Material and methods:** participated professional players of México belonged to the first (n = 10), second division (n = 10) and basic forces (n = 10). The age ranges were (14 to 44 years old). They were evaluated in their corporality, functional performance and metabolic variables of glucose, lipids, and proteins. ANOVA and regression and correlation tests were utilized for analysis. Alfa value was fixed at 95%. **Results:** anthropometric and functional characteristics were similar in three groups and proteins and lipids as well. There was a difference in glucose level and regression analysis shows an inverse relationship with age. **Conclusion:** an appropriate food intake, associated with healthy lifestyles, promotes health, decreases the CMR and prolongs sports life in soccer players.

RESUMEN

Introducción: la presencia de estilos de vida inadecuados, la inactividad física y la sobrealimentación generan un riesgo cardiometabólico (RCM). El RCM indujo un aumento en la probabilidad de experimentar eventos cardiovasculares o desarrollar enfermedades como la diabetes mellitus. El fútbol es el deporte más popular y practicado en México y contribuye significativamente a la práctica del ejercicio. A pesar de su importancia, no existe suficiente información para evaluar el riesgo cardiometabólico de los futbolistas de nuestro país y del mundo, en cuanto a sus variables sanguíneas relacionadas con glucosa, lípidos y proteínas. Objetivo: por lo tanto, el propósito del presente estudio fue relacionar variables cardiovasculares y metabólicas con la longevidad como jugador activo en futbolistas profesionales. Material y métodos: participaron jugadores profesionales de México pertenecientes a primera división (n = 10), segunda división (n = 10) y fuerzas básicas (n = 10). Los rangos de edad fueron (14 a 44 años). Estuvieron evaluados en su corporalidad, desempeño funcional y variables metabólicas de glucosa, lípidos y proteínas. Para el análisis se utilizaron pruebas ANOVA, así como de regresión y correlación. Valor Alfa se fijó en 95%. Resultados: las características antropométricas y funcionales fueron similares en los tres grupos, las proteínas y los lípidos también. Hubo una diferencia en el nivel de glucosa y el análisis de regresión muestra una relación inversa con la edad. Conclusión: una ingesta adecuada de alimentos, asociada a estilos de vida saludables, favorece la salud metabólica, disminuye el riesgo cardiometabólico y prolonga la vida deportiva en los futbolistas.

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INTRODUCTION

The presence of inadequate lifestyles, physical inactivity, and overeating, generate a cardiometabolic risk (CMR). The risk factors associated with CMR induces an increase in the likelihood of experiencing cardiovascular events or developing disease like diabetes mellitus. This concept involves the traditional risk factors included in risk calculators, such as hypertension, dyslipidemia, and smoking, as well as emerging risk factors, such as abdominal obesity, inflammatory profile, and genetic condition. These factors are best identified by primary care providers, as most patients will present at an early stage with no symptoms.[1]

In Mexico, health and demographic surveys[2] constitute one of the most important epidemiological investigations in the country, because they collect information on the population that is essential for the design and orientation of public policies and programs, while providing updated information on the affected population, if currently receiving treatment, for the evaluation and formulation of health programs aimed at reducing the prevalence of risk factors and diseases.

From 2022, and up to the present, surveys were conducted every 6 years, until 2018, when the decision was made to carry them out annually. Since it is the first report it was documented, an inadequate corporality, metabolic alterations in glucose, dyslipidemia, inadequate diet, and the elevated level of sedentary lifestyle of the Mexican population were highlighted, which makes its population susceptible to having a high cardiometabolic risk. These data are similar in most of the world, particularly in Latin American countries.[2-5] In Mexico, surveys indicate that in those under 40 years of age, 10% of the Mexican population have diabetes mellitus, between 20 to 25.8% have hypertriglyceridemia, 12% have hypercholesterolemia, between 20 to 40% have obesity, and physical inactivity It occurs in 80% of the population. All these factors affect the prevalence of CMR in human beings and exercisers.

Soccer football is the most popular and practiced sport in Mexico and contributes significantly to the practice of exercise among the population. However, it is frequently practiced without proper guidance, which favors regular sports performance and a potential risk for the development of co-morbidities and consequently sudden death, in addition to fewer years as an active player in professional players.[6]

The Association of the European Union of Soccer,[7] in its Medical Competition Manual published in 2018, guides the teams to have laboratory studies that routinely consider: hematic cytometry, blood chemistry of four elements (glucose, urea, creatinine, uric acid), as elements that allow to attenuate the proinflammatory states that generate metabolic stress due to the effort in sports practice and potential damage to health, such as creatine phosphokinase (CPK), lactic dehydrogenase (DHL), lipids, serum electrolytes and general urine test, among others. The unhealthy lifestyles that affect the metabolism of sugars and fats, and the inadequate practice of exercise, contribute to the fact that the soccer player has a shorter number of sports life.[4,7,8]

Despite its importance, there is not enough information to evaluate the cardiometabolic risk of soccer players in our country and in the world, in terms of their blood variables related to glucose, lipids and proteins. Therefore, the purpose of the present study was to relate cardiovascular and metabolic variables to longevity as an active player in professional soccer players.

MATERIAL AND METHODS

An observational, retrospective, cross-sectional and descriptive study was conducted in 30 male players who actively participated in professional tournaments, from teams of the Pachuca group, from Mexico, with an average age of (± SD) 21.2 ± 2 years. The players belonged to the first (n = 10), second division (n = 10) and basic forces (n = 10). The age ranges were (14 to 44 years old). The participants were clinically evaluated through a clinical history, in which they were

questioned about their sports history, assessment of vital signs and physical examination. The players went to a certified laboratory, in post-absorptive conditions, fasting for at least 8 hours, to evaluate the levels of glucose, lipids, proteins that were extracted from the cephalic or basilic vein, after 10 minutes in a seated position. Hematic determinations were evaluated by enzymatic technique by spectrophotometry. automated and controls and results did not exceed internationally accepted inter- and intra-assay coefficients of variation (CV). Their feeding was recorded, and a 24-hour food intake count was made. The calories consumed were calculated, as well as the distribution of macronutrients with respect to the portions declared by the participants, to assess the quantity and quality of the food consumed and the type of food (refined or natural), which influence the hematic values. In that session, after his clinical assessment, maximum graduated physical exercise tests were conducted on a treadmill and his maximum oxygen consumption (VO$_2$max) was determined by indirect calorimetry. Statistically, a one-way ANOVA inferential test was applied to determine differences between the different age groups and Newman-Keuls post hoc analysis in all significant F's, as well as the Pearson regression and correlation model to find the association of the blood variables with the age of the participants as a measure of their sports longevity. The level of statistical significance was set at an alpha of 95%.

In all cases, the ethical considerations and principles established in the Declaration of Helsinki and the General Health Law, NOM-012-SSA3-2012, were observed in the formality and legality of research projects in humans.

RESULTS

The characteristics of the three groups are shown in *Table 1*.

As can be seen, no clinical data of alterations in morphological (weight, height), functional (VO$_2$ max) and metabolic (cholesterol, triglycerides, uric acid) variables were found, except for serum glucose.

The lowest glucose serum levels were found in the players of the 1st division and slightly higher ($p < 0.5$) in the 2nd division and basic forces, who are younger.

Figure 1 shows that there is a significant correlation ($p < 0.05$), in which the blood glucose level is lower in older 1st division players. The equation was: glucose (mg/dL) = 98.92 mg/dL, DS 14.26 ± 11.92*age (year) ($r = 0.49$; $p < 0.05$).

DISCUSSION

The results of the present study showed significantly lower values in glucose levels in the first division players in relation to those found in the other two groups *(Table 1)*. They clearly show that the metabolic state of the soccer player favors a greater permanence as an active player and his personal life is improved with a better quality of life. These results are consistent with other similar studies.[6-8] Also, the *Figure 1* shows the linear identity of the regression analysis in the relationship between glucose and age.

The caloric intake in the youngest group was 2,808 ± 300 kcal, those in the intermediate group was 2,736 ± 400 kcal and the oldest was 3,042 ± 280 kcal, which were not statistically significant. Therefore, in terms of nutritional content, the different value of glycaemia is not explained. However, the data on the type of food eaten varied significantly. The foods of the younger

Table 1: Clinical characteristics of the three groups.				
Variables	First division	Second division	Basic forces	p
Age [years]	30 ± 4.0	24 ± 3.0	18 ± 4.0	*
Weight [kg]	78 ± 3.0	76 ± 2.0	72 ± 4.0	NS
Height [cm]	178 ± 3.0	177 ± 3.0	174 ± 4.0	NS
Fat corporality [%]	17 ± 4.0	16 ± 5.0	14 ± 4.0	NS
Cholesterol [mg/dL]	198 ± 10.0	197 ± 12.0	192 ± 7.0	NS
Triglycerides [mg/dL]	110 ± 20.0	114 ± 22.0	116 ± 24.0	NS
Glucose [mg/dL]	88 ± 2.0	96 ± 2.0	94 ± 3.0	*
Uric acid [mg/dL]	6.0 ± 0.8	5.8 ± 1.0	5.4 ± 1.2	NS
VO$_2$ max (mL/kg/min)	58 ± 4.0	56 ± 3.0	54 ± 2.0	NS

NS = not specified. * $p < 0.05$.
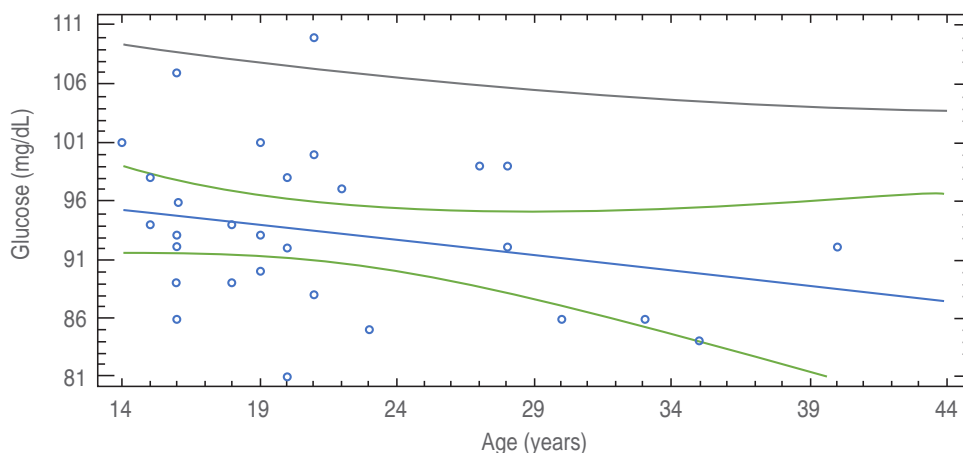
Figure 1:

Linear regression equation in glucose levels and age of the participants. Sport longevity indicator.

participants had a higher content of refined products, they ate at different times and did not pay attention to their diet due to lack of nutritional orientation, as shown in other studies such as Sihyung et al and Sacheck et al.[8,9] In turn, the players who had a greater sports longevity, were more careful, even had participants over 40 years old, who even participated in the representative teams of Mexico. Therefore, players in the initial stages of their lives do not have adequate eating habits and this partially explains the higher levels of blood glucose levels, a situation that is prevalent among the Mexican population.[2,3]

On the other hand, blood levels that are indicators of metabolism are related to the level of energy used by exercising. In the soccer player, great physical efforts of an aerobic and anaerobic nature are appreciated. It requires fundamentally aerobic energy content, in addition to explosive movements of short duration.[8-11]

We found significant cardiometabolic and fitness improvements following group sport participation, primarily recreational soccer. These findings suggest that group sport interventions are promising strategies for reducing cardiometabolic risk in adults and consequently in a better condition to play at older ages.[11] Castagna et al, and Mohr et al,[12,13] have demonstrated that the lifestyle conditions, corporality, and metabolic conditions of players increase the expectative to continue in professional play.

Drawer and fuller,[11] applied five hundred questionnaires to retired English professional players and their opinion was for more help and advice on medical, financial, career, and educational matters, including lifestyle habits for a better quality in their life and longer soccer activity. They indicated the need to have more information about their nutrition and cardiometabolic risk from the beginning of their professional life as soccer players, to have a better quality of life in retirement and a longer duration as active professional players.

CONCLUSION

The results of this study show the importance of the control in metabolic variables, particularly in glucose, to maintain a healthy state, a lower cardiometabolic risk in older people associated with better habits and lifestyles in relation with younger people. This demonstrates the importance of primary prevention through health promotion, particularly in the food intake and adequate practice of physical training, which give a longer possibility to last longer as a soccer player.

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Conflict of interest: it is declared without conflict.

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