

Article

Impact of Kinanthropometric Differences According to Non-Professional Sports Activity Practiced

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Featured Application: This work could help people without regular physical activity to choose the best sport according to their morphotype. The different indexes could be used to plan sports training to potentiate different body regions. These results could be a factor to take into account when confirming that physical activity can be beneficial for health.



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Abstract: Kinanthropometry allows us to analyze variations in physical dimensions and body composition. This study's objective was to evaluate the kinanthropometric differences based on physical activity performance, depending on whether the lower body or the whole body is more or less potent and the differences with a sedentary population. We analyzed 131 individuals (74 men and 57 women), with an average age of 22.68 ± 2.98 years. We differentiated three populations: sedentary ($n = 63$), runners ($n = 20$), and basketball players ($n = 48$). Measurements and indices were obtained following the international protocol of the International Society for the Advancement of Kinanthropometry (ISAK). The results show differences between the populations regarding weight, height, wingspan, and certain perimeters, diameters, and morphotypes depending on the predominant training type and the sedentary population. These anthropometric measurements will allow the amateur athlete to compare between seasons or other moments of training, pay attention to their evolution, and assess the possibility of changes in training.

Keywords: Kinanthropometry; physical activity; anthropometric index; sedentarist; runners; basketball

1. Introduction

Nowadays, sedentary behavior is defined as low energy sitting (or reclining) during waking hours, while the inactive person is the one who does not do enough physical activity [1,2]. The United States Government recommends that we should perform muscle strengthening exercise at least two days per week. For healthy adults, at least 2 1/2 h per week of moderate intensity aerobic activity, or at least a minimum of 1 1/4 h per week of high intensity aerobic activity is suggested, or a combination of both [3].

In recent years, there has been an increase in research focused on sedentary lifestyles and also in federative sports, and also in recreational sports [4–8]. This is due to the fact that healthy lifestyle habits are being promoted more and more every day. We know that physical activity improves health, while physical inactivity is often associated with poor health [4,6,9].

The World Health Organization (WHO) considers anthropometry to be an inexpensive science that uses neither invasive nor painful techniques [10]. Its objective is to obtain a series of body measurements to evaluate the human body's composition and the different physical dimensions.

The study of kinanthropometry allows one to know exactly the physical state of an individual; for example, it would allow one to know the percentage of fat that forms the body weight, classified in percentage of fat mass, bone mass, and muscle mass. This can be important for people who are physically active and for people who are not. Authors such as Ekelund et al. (2016) suggest that physically inactive people are at greater risk of suffering poor health [11]. The Physical Activity Guidelines (2008) indicates that fatness can be reduced by regular physical activity of moderate to vigorous intensity 3 to 5 times a week, for 30 to 60 min, although other authors state that there is not enough evidence that links adiposity with sedentary behavior [3,4]. That is why we need more research using calibrated devices, because that way we could understand better the relation between sedentary behavior and health [6]. It is clear how important it is for these individuals to know their physical condition. In the case of active people who do regular professional sports or not, this can be really interesting because, on many occasions, athletes try to maintain their weight but reduce their fat percentage so that they can take nutritional measures or training guidelines. This is also applicable to muscle mass data, being able to guide different routines [12,13].

Although there are articles that analyze anthropometry and kinanthropometry in different sports disciplines [14,15], very few have compared the body composition and somatotype of persons with non-professional sports activity with persons without sport activity. Those who have done so have focused on studying the differences between sex or race or the different life stages (child, college, and adults) [5,15,16]. Until today, we have not found studies that fully analyze the anthropometry and kinanthropometry of the population of persons without sport activity, nor the anthropometric differences between the population of persons without sport activity and the persons with non-professional sports activity of different disciplines that improve the upper or lower body in a more significant way. In fact, there is not much research comparing these sports.

Our objective is to check the body composition and morphotype of persons without sport activity (sedentary) and persons with non-professional sports activity (basketball players and runners), in order to determine if there are differences between them. The anthropometric measurements refer to the lower and upper body since they could be indicators that allow us to promote the positive aspects of regular physical exercise in the health of people who do not do any kind of physical activity.

2. Materials and Methods

2.1. Legal Documents

The sample was obtained voluntarily in our clinic and in various sports centers in Malaga and in the University Podiatry Clinic facilities of the University of Extremadura. The Bioethics Committee of the University of Extremadura's approval was previously obtained to carry out the work (reference 169/2019). The participants were informed of the procedure and had to sign the corresponding informed consent before taking the measurements.

2.2. Study Sample

One hundred and thirty-one people participated in this study 63 persons without sport activity (sedentary group) and 68 persons with non-professional sports activity (sport group)). All participants had a similar diet (Mediterranean diet without supplements). Of the participants, 74 were men (M) and 57 women (W), with an average age of 22.68 ± 2.98 years. The sample was divided into three groups based on their physical activity, obtaining three categories: persons without sport activity (S) ($n = 63$, 43 M–20 W), runners (R) ($n = 20$, 8 M–12 W), and basketball players (B) ($n = 48$, 23 M–25 W).

2.3. Inclusion and Exclusion Criteria

The inclusion criteria for the subjects to be classified as persons with non-professional sports activity (A) were that they exclusively practiced any of these sports; either running

(R) or basketball (B), at least three times a week, with a minimum of one hour per day as recommended by previous studies [17]. Runners who performed specific exercises to strengthen the upper limbs and basketball players who performed specific exercises to strengthen their lower limbs were excluded. According to previous studies' criteria, all those who did not practice any sport were classified as persons without sport activity (S) [1,2,17].

The main reason why we selected these two sports disciplines was that we were looking for two modalities that would perform different sports gestures that could enhance or further develop the whole body versus the lower body and vice versa. Consequently, we selected basketball as the sport with the greatest development of the whole body since the sporting gesture of throwing requires lots of work from the shoulders, arms, and trunk, and the leg muscles and buttocks from jumping and running [18–20]. As a sport with greater development of the lower body, we chose running because, obviously, the lower body muscles are more active [21,22].

2.4. Study Variables

The sociodemographic variables and sports habits studied were age, days, and number of hours of training practiced during the week, in addition to the years they had been doing the corresponding sport analyzed.

The sample was divided into three groups based on their physical activity, obtaining three categories: persons without sport activity (S), runners (R), and basketball players (B). After that, we grouped people with a regular sport activity in persons with non-professional sports activity (A).

Following the ISAK protocol [23,24], the following anthropometric measurements were performed on each of them: weight (kg); height (cm) in standing and sitting position; wingspan (cm); perimeter (cm) of the contracted arm, waist, hip, thigh, and calf; styloid diameter (cm) of the wrist and bicondylar joint of the femur; the fold (mm) brachial bicipital, brachial tricipital, male pectoral, subscapular, abdominal, suprailiac, thigh and calf. With these measures and through a series of mathematical formulas [25], the following were calculated: the Body Mass Index (BMI), the Weight Index (PI), the Cormic Index (CI), the Relative Index of Lower Limbs (IRMI), Body Density Index (IDC), fat percentage (F%), muscle percentage (M%), bone tissue percentage (B%), and residual percentage (R%). All these indices yield quantitative values that are useful for classifying them into different categories (Table 1).

It is true that there exists a great controversy about the use of BMI, since many authors discuss its validity [26–29], but it is also true that many other authors support its use for health purposes [26,30,31]. In our opinion, BMI continues to be one more anthropometric index within the variables that we have measured; in addition, it does not show significant relevant results. In fact, the mean BMI in all the groups studied is within normality (normal weight). We have only found slight significant differences between runners and basketball players.

2.5. Methodology

An ISAK Level I accredited person took the necessary measurements for the kinanthropometric assessment. As stated by the ISAK, three measurements were made for each variable and the average value of them was obtained. The measurements were carried out according to the protocols and measurement instruments recommended by the ISAK [23] and were as follows: electronic scale (model SECA704[®]), height rod (model SECA 213[®]), tape measure (model Premax 19394[®]), and digital caliper.

Table 1. Categorical division of the different indices based on the quantitative value obtained. BMI = Body Mass Index, PI = Weight Index, CI = Cormic Index, IRMI = Relative Lower Limb Index, IDC = Body Density Index. (M) = Men, (W) = Women.

BMI Index		
	<16.00	Severe thinness
	16.00–16.99	Moderate thinness
	17.00–18.49	Mild thinness
	18.50–24.99	Normal weight
	25.00–29.99	Pre-obesity
	30.00–34.99	Obesity class I
	35.00–39.99	Obesity class II
	≥40.00	Obesity class III
PI Index		
	<41.09	Low linearity
	42–44.5	Moderate linearity
	44.6–45.2	Normal linearity
	45.3–48.6	High linearity
	48.7–51.34	Very high linearity
CI Index		
<51 (M)	<52 (W)	Brachycormic
51.1–53 (M)	52.1–54 (W)	Metriocormic
>53.1 (M)	>54.1 (W)	Macroscopic
IRMI Index		
	<84.9	Brachyskeletal
	85–89.9	Metroskeletal
	>90	Macroskeletal
IDC Index		
≤5% (M)	≤8% (W)	Unhealthy (very low)
6–15% (M)	9–23% (W)	Healthy (lower end)
16–24% (M)	24–31% (W)	Healthy (top end)
>24% (M)	>31% (W)	Unhealthy (very high)

2.6. Statistical Analysis

Regarding the statistical analysis of the data, the SPSS version 20.0 program was used. The qualitative variables were analyzed using the chi-square test or Fisher's exact test if more than 5% of the expected square were less than 5. Meanwhile, for the quantitative variables, after checking for normality (using Shapiro–Wilk and Levene), the Student's t-test was used for independent samples or, otherwise, the Mann–Whitney U test. All of them had a significance level of 0.5%. The database is guarded by the Dedap research group and can be consulted if required.

3. Results

The results obtained in the investigation are reflected below (Table 2).

Table 2. Sociodemographic, lifestyle, and anthropometric results of the participants. S = persons without sport activity, A = persons with non-professional sports activity, R = runners, B = basketball players, A/S = persons with non-professional sports activity / persons without sport activity, S/R = persons without sport activity / runners, S/B = persons without sport activity / basketball players, B/R = basketball players / runners, * = statistically significant.

Sociodemographic and Lifestyle Results of the Participants								
Variables analyzed	Study groups					T independent samples/ Mann–Whitney U		
	S	A	R	B	S/A	S/R	S/B	R/B
Hours of training per week	0.00 (±0.00)	4.60 (±1.72)	2.40 (±1.85)	5.40 (±1.07)	<0.001 *	<0.001 *	<0.001 *	<0.001 *
Training days per week	0.00 (±0.00)	4.10 (±1.37)	3.95 (±1.61)	3.50 (±0.90)	<0.001 *	<0.001 *	<0.001 *	0.528
Years of training	0.00 (±0.00)	4.92 (±3.82)	1.46 (±2.54)	6.56 (±3.80)	<0.001 *	<0.001 *	<0.001 *	<0.001 *
Age	22.68 (±4.08)	25.24 (±6.47)	23.25 (±6.27)	20.58 (±3.43)	<0.001 *	0.745	0.001 *	0.008 *
Anthropometric Results of the Participants								
Variables analyzed	Study groups					T independent samples/ Mann–Whitney U		
	S	A	R	B	S/A	S/R	S/B	R/B
Weight	67.84 (±13.19)	74.53 (±10.63)	64.91 (±9.08)	77.46 (±9.88)	<0.001 *	0.552	<0.001 *	<0.001 *
Standing height	166.88 (±9.05)	177.32 (±7.95)	171.90 (±8.15)	178.62 (±6.80)	<0.001 *	0.045 *	<0.001 *	0.004 *
Sitting size	86.98 (±5.08)	89.34 (±6.33)	88.55 (±5.05)	90.48 (±6.45)	<0.001 *	0.266	0.007 *	0.274
Wingspan	167.42 (±12.19)	178.87 (±9.61)	172.57 (±10.03)	180.87 (±7.99)	<0.001 *	0.182	<0.001 *	0.070
Arm perimeter contracted	28.56 (±4.11)	30.89 (±3.89)	28.75 (±3.13)	31.67 (±4.08)	0.001 *	0.977	0.001 *	0.015 *
Waist circumference	78.74 (±12.87)	83.10 (±10.30)	73.20 (±8.90)	86.44 (±9.93)	<0.001 *	0.058	0.003 *	<0.001 *
Hip circumference	95.63 (±7.97)	93.54 (±6.57)	89.74 (±5.86)	95.61 (±6.22)	0.009 *	0.016 *	1.000	0.015 *
Thigh circumference	54.11 (±7.46)	52.89 (±4.41)	50.65 (±3.78)	53.14 (±4.34)	0.088	0.063	0.667	0.141
Calf circumference	35.77 (±3.80)	35.49 (±2.81)	35.17 (±3.14)	35.77 (±2.47)	0.594	0.649	0.936	0.761
Styloid diameter of the wrist	8.04 (±0.76)	7.96 (±0.76)	7.58 (±0.69)	8.18 (±0.79)	0.010 *	0.066	0.653	0.018 *
Bicondylar diameter of the femur	14.48 (±1.23)	14.43 (±1.34)	13.53 (±1.58)	14.27 (±1.11)	0.130	0.096	0.613	0.230
Brachial bicipital crease	9.56 (±3.24)	8.96 (±3.98)	9.00 (±4.07)	10.04 (±3.90)	0.634	0.678	0.781	0.388
Fold brachial triceps	16.34 (±5.15)	8.96 (±5.09)	12.70 (±4.03)	15.54 (±5.42)	0.023 *	0.020 *	1.000	0.119
Fold male pectoral	16.00 (±5.72)	13.76 (±5.46)	11.08 (±4.95)	12.07 (±6.00)	0.048 *	0.082	0.083	1.000
Subscapular fold	18.41 (±6.81)	16.59 (±6.14)	13.55 (±4.45)	19.72 (±6.31)	0.001 *	0.004 *	0.533	<0.001 *
Abdominal fold	21.19 (±7.33)	17.14 (±6.40)	14.25 (±4.85)	19.14 (±6.86)	0.001 *	<0.001 *	0.298	0.006 *
Suprailiac fold	19.73 (±7.35)	17.05 (±7.56)	13.35 (±4.22)	20.77 (±7.75)	0.001 *	<0.001 *	0.770	<0.001 *
Thigh crease	24.28 (±5.59)	18.05 (±6.35)	21.35 (±6.20)	18.68 (±6.16)	<0.001 *	0.089	<0.001 *	0.131
Calf crease	17.26 (±5.26)	13.66 (±4.63)	13.85 (±4.80)	13.91 (±4.50)	0.002 *	0.062	0.001 *	0.999

3.1. Sociodemographic Results and Sports Habits of the Participants

Results show significant differences regarding the years and hours of training between persons with non-professional sports activity and persons without sport activity, between the two sports studied, and between each sport and the persons without sport activity (p -values <0.001 in all contrasts). The same happens in the number of training days, except

among runners and basketball players (p -value 0.528). Regarding age, differences have been found between persons without sport activity and basketball players and between runners and basketball players (p -value <0.001, respectively), while no differences have been found between persons without sport activity and runners (p -value 0.552) (Table 2). The population that plays basketball is the one that has been doing sports for the longest time—for 6.56 years—while runners have been for 1.46 years. Those who play basketball are also among those who spend more hours playing during the week—5.40 h compared to 2.40 h for runners. Although, runners indeed expend 3.95 days per week for training, and basketball players 3.50 days. Regarding age, basketball players are the youngest, with an average age of 20.58 years versus 23.25 years for runners (Table 2).

3.2. Anthropometric Results of the Participants

Regarding weight (Table 2), height (both standing and sitting), and wingspan, the results show significant differences, compared between persons with non-professional sports activity and persons without sport activity and between basketball players and the persons without sport activity (p -values; sitting height 0.007 and in the rest of the contrasts; p -values < 0.001). On the other hand, between persons without sport activity and runners, differences were only observed concerning standing height (p -value 0.045) and between runners and basketball players, in the case of standing weight and height (p -values <0.001 and 0.004, respectively). It was observed that basketball players are the ones with the highest weight and that runners have the lowest (77.46 kg vs. 64.91 kg). At the same time, the highest mean values of height were found in basketball players and the lowest in the persons without sport activity, both in standing (178.62 cm vs. 166.88 cm) and sitting (90.48 cm vs. 86.98 cm), and the same happens with the wingspan (180.87 cm vs. 167.42 cm).

Regarding the perimeters (Table 2), differences were found in the contracted arm, the waist, and the hip when we compared persons with non-professional sports activity and persons without sport activity. Furthermore, it happens when we compare basketball players and runners (p -values 0.015, <0.001, and 0.015, respectively). However, we have only observed differences in the contracted arm perimeter and the waist perimeter when comparing persons without sport activity and basketball players (p -values 0.001 and 0.003, respectively). Differences were also observed in the hip circumference when we compared the persons without sport activity with the runners (p -value 0.016). Persons with non-professional sports activity and basketball players have the greatest contracted arm circumference and persons without sport activity the least (31.67 cm versus 28.56 cm). The waist circumference is also greater in persons with non-professional sports activity, specifically in basketball players, but in this case, it is lower in runners (86.44 cm vs. 73.20 cm). The persons without sport activity are those with the greatest hip circumference and the runners are those with the smallest circumference (95.63 cm versus 89.74 cm).

Regarding the diameters (Table 2), we have only found statistically significant differences in the wrist's styloid diameter when we compared between persons with non-professional sports activity and persons without sport activity and between runners and basketball players (p -value 0.018). It was observed that basketball players have a bigger styloid diameter of the wrist and runners have it smaller (8.18 cm versus 7.58 cm).

Finally, concerning the comparison of the folds (Table 2), significant differences were observed when we compared between persons with non-professional sports activity and persons without sport activity and also in the study groups with the following folds: brachial, pectoral, subscapular, abdominal, suprailiac, thigh, calf (p -values 0.023, 0.048, 0.001, 0.001, 0.001, <0.001, 0.002, respectively). Significant differences have also been found in the following folds: brachial, scapular, abdominal, and suprailiac triceps, when comparing between persons without sport activity and runners (p -values 0.020, 0.004, <0.001, <0.001, respectively), and when we compared between runners and basketball players in the scapular, abdominal, and suprailiac creases (p -values <0.001, 0.006, <0.001, respectively). In the comparison between persons without sport activity and basketball

players, we only found differences in the fold of the thigh and calf (p -values <0.001 and 0.001 , respectively). It is striking that all the folds show higher data for persons without sport activity when compared with persons with non-professional sports activity. We have observed that the mean values of the brachial, pectoral, abdominal, and calf triceps fold have higher values in persons without sport activity and lower in runners. Meanwhile, the subscapular and suprailiac fold shows higher values in basketball players and they are lower in runners. Moreover, the thigh crease is higher in persons without sport activity and lower in basketball players.

3.3. Kinanthropometric Results of the Participants

From the anthropometric results, indices and percentages were obtained (Table 1) to establish the possible existence or not of differences between the various existing morphotypes (Table 3).

Table 3. Kinanthropometric and body composition results of the participants. S = persons without sport activity, A = persons with non-professional sports activity, R = runners, B = basketball players, S/A = contrast persons without sport activity/persons with non-professional sports activity, S/R = contrast persons without sport activity/runners, S/B = contrast persons without sport activity/basketball players, R/B = contrast runners/basketball players, BMI = Body Mass Index, IP = Weight Index, CI = Cormic Index, IRMI = Relative Lower Limb Index, IDC = Body Density Index. F% = fat percentage, M% = muscle percentage, B% = bone tissue percentage, R% = residual percentage, * = statistically significant.

Kinanthropometric Results of the Participants								
Variables	Study groups				S/A	Chi-squared test		R/B
	S	A	R	B		S/R	S/B	
BMI Index	24.23 (± 3.46)	23.63 (± 2.44)	21.89 (± 2.36)	24.21 (± 2.31)				
Severe thinness	0.00%	0.00%	0.00%	0.00%				
Moderate thinness	1.59%	1.47%	5.00%	0.00%				
Mild thinness	3.17%	1.47%	5.00%	0.00%				
Normal weight	47.62%	64.71%	75.00%	60.42%	0.177	0.126	0.241	0.048 *
Pre-obesity	42.86%	32.35%	15.00%	39.58%				
Obesity class I	4.76%	0.00%	0.00%	0.00%				
Obesity class II	0.00%	0.00%	0.00%	0.00%				
Obesity class III	0.00%	0.00%	0.00%	0.00%				
PI Index	41.15 (± 1.99)	42.27 (± 1.52)	42.94 (± 1.66)	42.02 (± 1.38)				
Low linearity	57.14%	23.53%	15.00%	27.08%				
Moderate linearity	34.92%	67.65%	70.00%	66.67%	0.001 *	0.009 *	0.010 *	0.403
Normal linearity	4.76%	4.41%	5.00%	4.17%				
High linearity	3.17%	4.41%	10.00%	2.08%				
Very high linearity	0.00%	0.00%	0.00%	0.00%				
CI Index	52.38 (± 2.84)	50.38 (± 2.84)	51.54 (± 2.93)	50.63 (± 2.70)				
Brachycormic	26.98%	52.94%	60.00%	50.00%	<0.001 *	0.071	<0.001 *	0.010 *
Metriocormic	47.62%	41.18%	25.00%	47.92%				
Macrocormic	25.40%	5.88%	15.00%	2.08%				
IRMI Index	91.51 (± 11.10)	99.15 (± 12.08)	94.19 (± 12.20)	98.22 (± 11.70)				
Brachyskeletal	20.63%	2.90%	5.00%	2.08%	0.001 *	0.081	0.003 *	0.793
Metroskeletal	31.75%	22.06%	20.00%	22.92%				
Macroskeletal	47.62%	75.00%	75.00%	75.00%				
IDC Index	16.81 (± 7.75)	19.29 (± 7.28)	8.03 (± 0.60)	11.26 (± 8.08)				
Unhealthy (very low)	0.00%	0.00%	0.00%	0.00%				
Healthy (lower end)	25.40%	35.30%	50.00%	29.17%	0.017 *	0.031 *	0.084	0.227
Healthy (top end)	44.44%	54.40%	45.00%	58.33%				
Unhealthy (very high)	30.16%	10.30%	5.00%	12.50%				
Results of Body Composition of the Participants								
Variables	Study groups				Student's t-test/Mann-Whitney U			
	S	A	R	B	S/A	S/R	S/B	R/B
F%	17.33 (± 3.66)	15.75 (± 3.38)	13.98 (± 2.28)	17.20 (± 3.46)	0.596	0.001 *	0.105	<0.001 *
M%	32.57 (± 2.84)	33.85 (± 2.74)	34.49 (± 2.74)	33.34 (± 2.64)	<0.001 *	0.590	<0.001 *	0.026 *
B%	28.14 (± 3.25)	27.33 (± 2.79)	27.99 (± 2.47)	26.80 (± 2.94)	0.065	0.449	0.002 *	0.004 *
R%	21.96 (± 1.52)	23.07 (± 1.52)	23.55 (± 1.29)	22.67 (± 1.60)	0.003 *	0.986	<0.001 *	0.004 *

BMI of our population was classified in the three groups as “normal weight”, being higher in the case of persons without sport activity (24.23 ± 3.46) than in that of persons with non-professional sports activity (23.63 ± 2.44). Values of 21.89 ± 2.36 were obtained in the runners and 24.21 ± 2.31 in basketball players. No statistically significant differences were obtained when we compared persons with non-professional sports activity with persons without sport activity, or with runners, and runners with persons with non-professional sports activity as a whole (p -values 0.177, 0.126, and 0.241, respectively). However, differences were found when we compared the group of runners and basketball players (p -value 0.048), observing higher percentages of individuals with the lowest BMI in runners (Table 3).

Regarding the PI of our population, the group of persons without sport activity belongs to the category “low linearity” (41.15 ± 1.99), and the persons with non-professional sports activity to “moderate linearity” (42.27 ± 1.52), both in the runners (42.94 ± 1.66) and in basketball players (42.02 ± 1.38). In this case, statistically significant differences have been obtained comparing between persons with non-professional sports activity and persons without sport activity (p -value 0.001), between persons without sport activity and runners (p -value 0.009), and between persons without sport activity and basketball players (p -value 0.010). This did not happen when we compared runners and basketball players (p -value 0.403) (Table 3).

Regarding the CI, differences were obtained between persons with non-professional sports activity and persons without sport activity (p -value <0.001), and also between runners and basketball players (p -value 0.010) and between persons without sport activity and basketball players. The CI of the persons without sport activity and runners were metriocormic (52.38 ± 2.84 and 51.54 ± 2.93 , respectively). That of the persons with non-professional sports activity, in general, was brachycormic (50.38 ± 2.84) and that of the basketball players was brachycormic (50.63 ± 2.70) (Table 3).

The IRMI of our sample was classified as macroskeletal, since both persons without sport activity (91.51 ± 11.10), persons with non-professional sports activity (99.15 ± 12.08), and runners (94.19 ± 12.20) and basketball players (98.22 ± 11.70) fell into this category (Table 1). As happened with the CI, statistically significant differences were obtained when comparing persons with non-professional sports activity and persons without sport activity and also with basketball players (p -value 0.001 and 0.003, respectively). However, there were no statistically significant differences between runners and basketball players (p -value 0.793) (Table 3).

The IDC shows that the majority of the population falls within the lower extreme; both persons without sport activity (16.81 ± 7.75), as well as persons with non-professional sports activity (19.29 ± 7.28), and runners (8.03 ± 0.60) and basketball players (11.26 ± 8.08). Statistically significant differences were obtained when we compared between persons with non-professional sports activity and persons without sport activity (p -value 0.017) and between persons without sport activity and runners (p -value 0.031), while no differences were obtained between runners and basketball players (p -value 0.227) or between persons without sport activity and basketball players (p -value 0.084) (Table 3).

3.4. Body Composition Results of the Participants

The results show significant differences in the parameters of the body composition studied. When comparing between persons with non-professional sports activity and persons without sport activity, we observed differences in M% and R% (p -values <0.001 and 0.003, respectively). If we compare runners and basketball players, differences are observed in all parameters of body composition, that is, in F%, M%, B%, and R% (p -values <0.001 , 0.026, 0.004, and 0.004, respectively), while in the case of persons without sport activity and runners, these differences lie exclusively in F% (p -value 0.001), and in the case of persons without sport activity and basketball players in M%, B%, and R% (p -values <0.001 , 0.002, and <0.001 , respectively).

It was observed that the F% was less than 20% in all groups, with the results being relatively similar among the population of people without sport activity (17.33 ± 3.66), persons with non-professional sports activity (15.75 ± 3.38), and basketball players (17.20 ± 3.46), but very different in the case of runners (13.98 ± 2.28). Otherwise, when we analyzed the M%, it was observed that the group of persons without sport activity had the lowest value (32.57 ± 2.84) and runners the highest (34.49 ± 2.74). Simultaneously, in B%, the basketball players had the lowest value (26.80 ± 2.94) and the persons without sport activity the highest (28.14 ± 3.25). Finally, regarding the R%, the persons without sport activity had the lowest mean values (21.96 ± 1.52) and the runners the highest (23.55 ± 1.29) (Table 3).

4. Discussion

This study's objective was to compare the kinanthropometry parameters between a group of persons without sport activity and another who usually does exercise, either basketball or running. We consider that basketball's sporting gesture enhances the whole body, while the sporting gesture of running leads to enhancement of the lower body. We are trying to establish the indices that really make differences. Therefore, we could facilitate the training work of these persons with non-professional sports activity by improving different factors. In the case of people without physical activity (S), we could promote the positive aspects of exercise to improve health [32,33]. These factors could also serve to select young athletes by sports analysts for each modality. In addition, the persons with non-professional sports activity could also choose the sport that most enhances these differentiating indices and parameters.

During the anamnesis before data collection, we observed that basketball players were the population group that had been practicing this sport for the longest time; also, they are the ones that dedicated more hours per week to it. This is probably because this physical activity is more promoted than running in schools, as it is a team sport that also requires great motor coordination, which improves the development of the child and promotes essential values such as companionship. We also observed that the basketball players had a lower average age than the rest of the groups. On the other hand, the runners were the ones with the highest average age and also, they are the ones who dedicated more days per week for training. As with other authors, such as Boyer [34] and DeVita [35], we have observed that this physical activity is really popular in the older age range. This is probably related to the fact that running does not require much time and can be done alone and at any time of the day, so many people do it as an escape valve from the daily routine and to maintain a good physical and mental state [36,37].

Our research has produced interesting data regarding anthropometric values and indices, especially regarding the PI, CI, IRMI, IDC, and M% of the sports population compared to the persons without sport activity. The PI, IDC, and M% of the persons with non-professional sports activity presented more suitable values than that of persons without sport activity, as happened in the investigations of Hermann [38], Mayr [39], Casazza [40], and Rancourt [7]. This can be a plus point when it comes to showing that the practice of physical exercise considerably favors our health. In fact, we think that we did not find statistically significant values in terms of F% among the group of persons without sport activity and sportspeople because all participants had a similar diet (Mediterranean diet without supplements). There is research that shows that the diets of some athletes are very questionable [41,42], and in our level of study there is not enough evidence that links adiposity with persons without sport activity behavior [4]. In addition, as the literature shows, basketball players tend to have more F% than players from other sports disciplines [8]. We consider that if our sports population had been exclusively high-level professionals, or had performed another sport apart from basketball, probably we would have found statistically significant data in terms of F%.

Most of the persons with non-professional sports activity in our sample had a PI cataloged as "moderate linearity" versus "low linearity" of the group of persons without sport activity. As Acero reflected in his studies [25], the PI reflects the relative mobility

degree that a person would have based on their weight and height. Therefore, based on our results, we could affirm that people who do sports regularly tend to be more agile than those who do not; among other things, it is probably because they are more used to moving than persons without sport activity.

Furthermore, the CI and the IRMI of our sample indicated that persons with non-professional sports activity tend to be brachycormic and macroskeletal compared to persons without sport activity, who tend to be metriocormic and macroskeletal, as has occurred in research by other colleagues [25]. We also found significant differences between the morphotypes of basketball players compared to the persons without sport activity. The basketball players analyzed tend to be brachycormic and metroskeletal, which means, a short upper trunk and lower extremities of average size in relation to their total height. Therefore, we could consider that these physical characteristics can be advantageous when practicing this sport, even more so considering that statistically significant results were also obtained that suggest that their wingspan and height in standing are higher than the average of the population. These results also coincide with those of other authors such as Popovic [43], Espinoza Navarro [44], and Sánchez Muñoz [45].

Having a height and wingspan higher than the average but still having a brachycormic and metroskeletal morphotype could be anthropometric characteristics that favored individuals who played basketball. Sports establishments increasingly undertake the premature search for sports talent, and the morphotype of the players has to be one of the characteristics to take into account [46].

Obviously, fitness is not everything; attitude and innate ability are a fundamental part of any sport, but it is true that, especially in the field of recruiting young basketball players, historically, there has been a tendency to select athletes based on their overall height. This idea was defended for a long time by authors such as Nadori, with whom we disagree, as does Abella [47,48]. We believe that it would be more beneficial to observe the entire set of anthropometric values of an individual to maximize their performance. That way, we could help persons with non-professional sports activity to choose which sport will be better for them according to their morphotype and we could promote the positive aspects of exercise to improve health [32,33].

5. Conclusions

In view of our results, we consider that the practice of sport, in general, helps to have more suitable rates and percentages, although we must not ignore that each individual's lifestyle has a notable influence on both. These results are consistent with those offered by other studies that have used the same ISAK methodology, so we could discuss whether the morphotype influences if an individual is more or less athletic, but there is no doubt that the regular practice of physical exercise improves our health.

We have found statistically significant differences in most of the anthropometric and kinanthropometric measurements obtained depending on whether the subjects are persons without sport activity or persons with non-professional sports activity. Moreover, observed in the latter category is how there are also differences according to the type of sport practiced, which further enhances the lower body or the whole body. Within our population, persons without sport activity tend to be metriocormic and macroskeletal, as is the case with runners, while basketball players tend to be brachycormic and metroskeletal. These indices could be helpful when it comes to cataloging athletes and training them and attracting sports talent.

We consider that this work could contribute to promoting sport with anthropometric indicator control. They could be used as a guide for training, since these amateur athletes do not usually follow a guided training. Thus, we could promote a healthy life against a sedentary lifestyle, and it can also encourage sedentary people to start a sport and monitor their possible improvement. In addition, this work could help people to choose a sport based on their anthropometric indices.

6. Strengths and Limitations of Study

The purpose of this research was to show possible anthropometric differences between physically inactive people and people who perform physical exercise continuously. The indices that mark these differences are healthier according to previous studies, so they constitute a useful tool for individual monitoring of continued physical practice for any individual who wants to do sports.

On the other hand, as far as the limitations of the study are concerned, we would have wanted to expand the sample. This was complicated by the difficulty of finding people who only perform a sporting activity that enhances their lower or upper body. Another thing was the impossibility of having more sophisticated apparatus (DEXA photon oscillometry) to improve our analysis regarding the fat mass that has not obtained significant results in this work.

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