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The influence of anthropometric characteristics on the performance of track-and-field athletes in running events

Iryna Yuzkovets*

PhD in Physical Culture and Sport, Associate Professor
Hryhorii Skovoroda University in Pereiaslav
08401, 30 Sukhomlynskoho Str., Pereiaslav, Ukraine
https://orcid.org/000-0001-9372-550X

Vladyslav Ruban

PhD in Physical Education and Sport, Associate Professor
Hryhorii Skovoroda University in Pereiaslav
08401, 30 Sukhomlynskoho Str., Pereiaslav, Ukraine
https://orcid.org/0000-0003-3771-5117

Abstract. The purpose of the study was to clarify how the anthropometric characteristics of track-and-field athletes are related to performance in sprint, middle-distance, and long-distance running. The study was conducted on 6-10 April 2025 at the Hryhorii Skovoroda University in Pereiaslav, with the participation of 90 male track-and-field athletes aged 18-24 years, divided into sprint, middle-distance, and long-distance groups. Anthropometric indicators, control running results, and statistical relationships between physical parameters and sports performance were assessed. The results showed distance-specific features of anthropometric profile, running speed, correlation patterns, and regression predictors. Sprinters had higher body mass, single-leg thigh circumference, and muscle mass percentage: 82.4 ± 6.8 kg, 62.8 ± 3.4 cm, and 47.8 ± 3.0%, which reflected the predominance of the muscle-strength component over short distances. Among long-distance runners, lower body mass, body mass index, and fat mass percentage – 70.8 ± 5.7 kg, 22.6 ± 1.3 kg/m², and 9.8 ± 1.8% – were associated with greater economy in prolonged running. Mean speed was 8.63 ± 0.41, 5.71 ± 0.32, and 4.62 ± 0.28 m/s in the sprint, middle-distance, and long-distance groups, respectively. The correlations linked sprint speed with muscle mass ($r = 0.62$), whereas in long-distance runners, speed had an inverse association with fat mass ($r = -0.56$). The regression models explained 51%, 46%, and 49% of speed variability, confirming the different role of anthropometric factors in each running specialisation. The results confirmed that the anthropometric determinants of performance differ by running specialisation: muscle-strength parameters predominate in sprinting, whereas lower fat mass and a more economical body-build profile are more important over long distances. In practical terms, these data may be used by coaches, athletics teachers, and sports selection specialists to refine distance specialisation and individualise the training process

Keywords: distance specialisation; sprint; body mass index; body build; long-distance runners; speed-strength realisation; endurance

Introduction

Track and field includes running events in which sports performance depends on a specific combination of morphological, functional, and biomechanical prerequisites. In sprint, middle-distance, and long-distance running, isolated physical parameters matter less than their interrelationship: height, body mass, lower-limb length, body mass index (BMI), and the proportions of muscle and fat components. Assessment of these characteristics helps to substantiate sports specialisation more precisely, predict performance, and select training-load parameters in line with the individual morphological profile of the athlete. Insufficient detail in anthropometric criteria for running events complicates the selection of optimal specialisation, as physical parameters that support success in sprinting are not always advantageous in middle-distance or long-distance running. This increases the likelihood of errors in sports selection, inaccurate prediction of competitive potential, and the choice of training loads that do not fully match the morphological and functional capacities of the track-and-field athlete.

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*Corresponding author (*ira_94@ukr.net*)

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Performance in track-and-field running events develops through the interaction of technical preparedness, functional reserves, motor qualities, and the morphological characteristics of the athlete; therefore, anthropometric parameters should be interpreted together with biomechanical, functional, and training-related factors of sports working capacity. I. Novikova *et al.* (2025) described the influence of athletics on the physical condition of a person, linking it with the development of endurance, coordination, speed abilities, and general functional readiness. This approach emphasised that running events depend not only on the amount of training work but also on the correspondence between physical development and the demands of a specific type of load. A. Kolot *et al.* (2025) substantiated the importance of technical preparation in the system of sports improvement for track-and-field athletes. Within this approach, anthropometric characteristics may be treated as factors affecting running-stride length, movement amplitude, the spatio-temporal organisation of running, and the effectiveness with which muscular effort is realised. In the study by I. Ivanyshyn *et al.* (2024), spirographic indicators of functional reserves in veteran track-and-field athletes specified the role of the respiratory system in maintaining working capacity during running load. The results confirmed that the morphological profile of an athlete should be assessed together with functional capacity, since running performance depends on the coherence of body build, technique, and physiological support for movement.

The anthropometric profile of an athlete reflects the morphological prerequisites for running work, because height, body mass, limb proportions, BMI, and the ratio of muscle to fat components determine the mechanical and energetic conditions of movement along a distance. O.S. Polianska *et al.* (2025) substantiated the value of anthropometric assessment for predicting sports performance by treating physical parameters as a basis for determining the potential of an athlete and their correspondence to the requirements of the chosen sport. The researchers noted that anthropometry is used not only to describe the external characteristics of an athlete but also to explain the relationship between body build, motor capacity, and the expected competitive result. N.V. Vdovenko *et al.* (2024) addressed the features of the fat component in qualified athletes of different specialisations and showed the variability of body composition according to the type of sports load. The work established that, for representatives of cyclic events, assessment of fat mass is linked with determining the ratio between active and inactive body mass, since excess fat may increase the energetic cost of motor work. A. Stachoń *et al.* (2023) showed that distance specialisation among runners is accompanied by differences in morphology and body composition. This supports the need for separate assessment of sprinters, middle-distance runners, and long-distance runners because the same anthropometric parameters may have different functional significance depending on the type of running work.

Distance specialisation in running imposes different requirements on body build, strength potential, movement economy, and the ability to maintain a given load intensity; accordingly, anthropometric characteristics need to be interpreted with reference to the structure of the specific distance. R. Pavlovic *et al.* (2022) analysed the anthropometric parameters of elite sprinters and determined the predictive significance of height and body mass for sports results. Their data confirmed that, in sprinting, morphological characteristics are meaningful for performance only in combination with running technique, strength capacity, and the ability to realise high speed over a short section. G.A. Christou *et al.* (2021) addressed the anthropometric, cardiorespiratory, and haematological determinants of marathon performance. The authors indicated that achievements in long-distance running depend not on an isolated body-build indicator, but rather on a combination of morphological parameters, cardiovascular capacity, oxygen-transport potential, and general endurance. L.A. Peyré-Tartaruga *et al.* (2024) treated biomechanical, physiological, and anthropometric predictors as interrelated factors in the performance of recreational runners. The researchers demonstrated that running effectiveness arises from the interaction of morphological profile, functional capacity, and biomechanical movement characteristics. Therefore, anthropometric assessment should be combined with analysis of technique and physiological readiness. P.T. Nikolaidis & B. Knechtle (2024) summarised the profile of marathon runners and predictors of long-distance performance. Their review confirmed that long-distance performance is associated with lower body mass, optimal BMI, a smaller fat component, high aerobic productivity, and running economy, which differentiates the morphofunctional demands of long distances from sprint specialisation.

The character of the relationship between anthropometric characteristics and performance among track-and-field athletes of different running specialisations remains insufficiently clarified. The purpose of the study was to substantiate the role of anthropometric characteristics in forming the performance of track-and-field athletes in running events with different distance orientations. The following objectives were defined: to characterise the anthropometric and performance indicators of track-and-field athletes of different running specialisations; to establish statistical relationships between the physical parameters of athletes and performance in sprint, middle-distance, and long-distance running; and to determine the anthropometric characteristics with the greatest predictive significance for sports success in separate groups of running events.

Materials and Methods

Design and study setting

The work was conducted as a comparative correlational study with a single recording of anthropometric and performance indicators in track-and-field athletes. The study setting was the Faculty of Physical Education, Sport and Health of the Hryhorii Skovoroda University in Pereiaslav. The choice of this setting was justified by its direct relevance to athletics training, sports training, and assessment of athletes' performance in running events. It was also determined by the availability of training conditions, sports equipment, methodological support, and the possibility of recording anthropometric and running indicators. The study period lasted from 6 to 10 April 2025. It was selected because it preceded the spring-summer competitive period, when control results in running events reflect the current level of special preparedness among track-and-field athletes. The five-day period was sufficient to record the anthropometric parameters and running results of all participants.

Characteristics of the study sample

The sample included 90 male track-and-field athletes who were in years 1-4 of the Faculty of Physical Education, Sport and Health at the Hryhorii Skovoroda University in Pereiaslav. The participants were aged 18-24 years, and their mean age was 20.8 ± 1.7 years. A single-sex sample was chosen to reduce the influence of sex differences in body composition, strength capacity, and running results on the assessment of the relationship between anthropometric parameters and performance. The sample was divided into three equal groups, 30 participants each, by distance specialisation: sprinters (100 and 200 m), middle-distance runners (800 and 1,500 m), and long-distance runners (5,000 and 10,000 m), 30 participants. The sample was purposive. It was formed by distributing information about the study among students of the athletics department, members of sports groups, and representatives of the training sections of the faculty.

The inclusion criteria were: study in years 1-4 at the study setting; age 18-24 years; specialisation in track-and-field running events; membership of one of the distance-specialisation groups; sports experience of at least 2 years; regular participation in the training process; complete anthropometric indicators and a control result for the main distance; absence of medical restrictions on running loads; and voluntary consent to participate. The exclusion criteria were: mixed or undefined running specialisation; involvement in non-running track-and-field events; irregular training during the preceding three months; acute musculoskeletal injuries; abrupt body-mass change during the preceding three months; incomplete assessment procedure; or withdrawal from participation. No participants left the sample before the completion of the study, so group sizes remained equal, and the analysis was carried out using the full set of anthropometric and performance indicators.

Procedure for data collection and recording

Data were collected in two locations: anthropometric indicators were recorded in a medical room designated for standardised measurements, and control running results were recorded on an athletics track designated for control trials. The procedure was conducted by a department teacher and the coach of the training group, who supervised a uniform measurement procedure, correct recording of indicators, and allocation of athletes according to distance specialisation. Anthropometric measurements were conducted individually in the first half of the day, from 9:00 to 12:00, before the main training session and after a 2-3-hour period without food. Participants also avoided intensive physical load on the previous day, which reduced the influence of fatigue, body mass fluctuations, food intake, and hydration status on the assessment results.

Age, year of study, sports experience, main running distance, and specialisation group were recorded first. Height, body mass, lower-limb length, thigh circumference, fat mass percentage, and muscle mass percentage were then measured. Height was measured with a stadiometer in a standing position without shoes, accurate to 0.5 cm, and body mass was measured using Seca 876 electronic medical scales (Seca GmbH & Co. kg, Germany), in light sports clothing and without shoes, accurate to 0.1 kg. Lower-limb length was measured with an anthropometric tape from the anterior superior iliac spine to the floor in a standing position, and thigh circumference was measured at the level of the greatest circumference, accurate to 0.1 cm. Body-composition indicators were recorded by bioelectrical impedance analysis using a Tanita BC-545N body composition analyser (Tanita Corporation, Japan); before measurement, participants removed metal objects and maintained the body position specified in the device instructions. BMI was calculated using the following formula:

$$BMI = \frac{m}{h^2}, \quad (1)$$

where BMI – body mass index, kg/m^2; m – body mass of the athlete, kg; h – height of the athlete, m. The ratio of lower-limb length to height (LLL/H) was calculated using the following formula:

$$LLL/H = \frac{L_{LL}}{h} \times 100, \quad (2)$$

where LLL/H – ratio of lower-limb length to height, %; L_{LL} – lower-limb length, cm; h – height of the athlete, cm. The resulting indicator reflected the proportion of lower-limb length within total body length and was used to assess body-build proportionality in runners. The anthropometric assessment procedure was identical for the three distance-specialisation groups: sprint, middle-distance running, and long-distance running, which ensured comparability of indicators between groups. The anthropometric indicators obtained were used to characterise mass-height parameters, body-build proportionality, and body composition in track-and-field athletes of different distance specialisations.

The differences concerned the recording of sports performance: in the sprint group, the time for 100 or 200 m was recorded; in the middle-distance group – for 800 or 1,500 m, and in the long-distance group – for 5,000 or 10,000 m. Distances followed the standard markings of the athletics track, and time to cover the distance was recorded using a Casio HS-80TW-1EF electronic stopwatch (Casio Computer Co., Ltd., Japan), accurate to 0.01 s. Control runs were conducted after a standard warm-up under the supervision of the coach; one result for the main distance was recorded for each participant. Mean running speed was calculated to compare results across different distances using the following formula:

$$V = \frac{S}{t}, \quad (3)$$

where V – mean running speed, m/s; S – distance length, m; t – time taken to cover the distance, s. A standardised performance index was calculated for additional comparison of athletes from different distance specialisations using formula:

$$PI = \frac{T_{max} - T_i}{T_{max} - T_{min}}, \quad (4)$$

where PI – standardised performance index, arbitrary units; T_i – individual time of the athlete over the main distance, s; T_{max} – greatest time in the corresponding distance group, s; T_{min} – shortest time in the corresponding distance group, s. The index ranged from 0 to 1, with a higher value corresponding to a better result within the relevant distance group. After the measurement, the data were entered into a consolidated electronic spreadsheet using an individual participant code and without personal information. The control-run result, mean running speed, and standardised performance index were treated as sports-performance indicators, which allowed comparing the physical parameters of athletes with their results in sprint, middle-distance, and long-distance running.

Methods of statistical analysis

Statistical analysis was conducted after checking data completeness and coding participants by distance-specialisation group. Quantitative data were summarised using descriptive statistics, including the mean level of the indicator, standard deviation, and the minimum and maximum recorded values. The distribution of variables was checked using the Shapiro-Wilk test. One-way analysis of variance (ANOVA) was used to compare anthropometric and performance indicators among the three groups when the data were normally distributed. When statistically significant inter-group differences were present, post-hoc pairwise comparisons with Bonferroni correction were performed. The relationship between anthropometric parameters and sports performance was determined using correlation analysis. Pearson's coefficient was used for normally distributed variables, and Spearman's coefficient – for variables with a non-normal distribution. Correlation strength was interpreted as follows: below 0.30 – weak; 0.30-0.49 – moderate; 0.50-0.69 – pronounced; and 0.70 or above – strong.

The predictive significance of anthropometric parameters for sports performance was assessed using multiple linear regression. Mean running speed was the dependent variable, while height, body mass, BMI, lower-limb length, thigh circumference, fat mass percentage, muscle mass percentage, and LLL/H – the independent variables. Separate regression models were constructed for the whole sample and for the sprint, middle-distance, and long-distance groups. Results were treated as statistically significant at $p < 0.05$. IBM SPSS Statistics 26.0 (USA) was used for statistical processing of the collected dataset, and the results were interpreted with reference to correlation coefficients, standardised β coefficients, and the explained variance R^2.

Ethical aspects and study limitations

The study was organised in accordance with the basic ethical principles of voluntary participation, informed consent, confidentiality, and risk minimisation, consistent with the provisions of The Declaration of Helsinki (2024). Participants were informed in advance about the purpose, measurement procedures, and use of data in a summarised form. Personal data were not entered into the final database, and each participant was assigned an individual code. The procedures did not involve medical intervention, the use of medicines, or experimental influence on the body of the athletes. One limitation of the study was its cross-sectional assessment, which did not allow changes in anthropometric characteristics and sports performance to be traced across a training cycle. The sample also included only male track-and-field athletes of student age, so the results should not be directly generalised to female athletes, juniors, or track-and-field athletes from other age and qualification groups.

Results

Anthropometric profile of track-and-field athletes of different distance specialisations

The anthropometric profile of male track-and-field athletes was assessed according to distance specialisation. Comparison of the three groups showed pronounced inter-group differences: sprinters had higher values for body mass, BMI, thigh circumference, and muscle mass; long-distance runners had lower mass-height and composition indicators; and middle-distance runners occupied an intermediate position for most parameters. This structure of results reflected different morphological correspondence between athletes and the demands of short, middle, and long distances. Descriptive statistics for anthropometric indicators are presented in Table 1. BMI was calculated using formula (1), and LLL/H was calculated using formula (2).

Table 1. Anthropometric indicators of track-and-field athletes of different distance specialisations, M ± SD

Indicator	Sprint, n = 30	Middle distances, n = 30	Long distances, n = 30
Height, cm	181.2 ± 5.6	179.4 ± 5.3	176.8 ± 5.1
Body mass, kg	82.4 ± 6.8	75.6 ± 6.1	70.8 ± 5.7
BMI, kg/m^2	25.1 ± 1.6	23.5 ± 1.4	22.6 ± 1.3
Lower-limb length, cm	94.1 ± 4.0	92.7 ± 3.8	91.1 ± 3.6
LLL/H, %	51.9 ± 1.5	51.7 ± 1.4	51.5 ± 1.4
Single-leg thigh circumference, cm	62.8 ± 3.4	59.6 ± 3.1	56.4 ± 2.9
Fat mass percentage, %	12.2 ± 2.3	11.0 ± 2.0	9.8 ± 1.8
Muscle mass percentage, %	47.8 ± 3.0	45.9 ± 2.8	44.2 ± 2.6

Source: compiled by the authors

According to Table 1, sprinters had the highest mean values for body mass, BMI, single-leg thigh circumference, and muscle mass percentage. Body mass in this group was 82.4 ± 6.8 kg, BMI was 25.1 ± 1.6 kg/m^2, single-leg thigh circumference was 62.8 ± 3.4 cm, and muscle mass percentage was 47.8 ± 3.0%. This anthropometric profile reflected the specificity of short distances, where performance depends on the ability of an athlete to develop high mechanical power quickly, execute the start acceleration effectively, and maintain maximal speed over a short section. Higher body mass in sprinters should not be interpreted here as an unfavourable characteristic, as it was combined with a larger muscle component and a greater thigh circumference. This points to more pronounced development of the lower-limb muscles, associated with push-off force, stride length, and the ability to generate explosive strength.

Middle-distance runners occupied an intermediate position between sprinters and long-distance runners for most indicators. Their body mass was 75.6 ± 6.1 kg, BMI – 23.5 ± 1.4 kg/m^2, single-leg thigh circumference – 59.6 ± 3.1 cm, and muscle mass percentage – 45.9 ± 2.8%. This profile reflected the mixed nature of the load in 800 and 1,500 m running, where the athlete has to combine sufficient muscular power with endurance and movement economy. Excessive increases in body mass or circumference indicators may raise the energetic cost of running, whereas insufficient development of the muscle component may restrict the ability to maintain high intensity over the distance. The mean values in this group therefore characterise a compromise morphological profile, combining prerequisites for speed work and sustained pace maintenance.

Long-distance runners had lower mean values for body mass, BMI, single-leg thigh circumference, fat mass percentage, and muscle mass percentage than the other groups. Body mass in this group was 70.8 ± 5.7 kg, BMI – 22.6 ± 1.3 kg/m^2, single-leg thigh circumference – 56.4 ± 2.9 cm, and fat mass percentage – 9.8 ± 1.8%. This profile does not imply insufficient physical development; rather, it reflects another morphological suitability for long-distance running. Over prolonged distances, lower body mass and a smaller fat component may reduce the energetic cost of movement, minimise mechanical load on the musculoskeletal system, and help maintain a stable pace. However, preservation of a sufficient muscle mass percentage in this group indicates that endurance specialisation does not require minimisation of the muscle component but its optimal level for prolonged cyclic work.

LLL/H was similar in the three groups: 51.9 ± 1.5% in sprinters, 51.7 ± 1.4% in middle-distance runners, and 51.5 ± 1.4% in long-distance runners. This demonstrates that relative lower-limb length was not the leading marker of inter-group differentiation within this sample. Absolute lower-limb length was slightly greater in sprinters, but this difference corresponded to their higher mean height. Thus, distance-specific features of the anthropometric profile were expressed through body mass, BMI, single-leg thigh circumference, and the ratio of muscle and fat components, rather than through sharply pronounced differences in lower-limb proportionality.

The results show that the anthropometric profile of track-and-field athletes differs according to distance specialisation. Sprinters had higher mass-height indicators, greater single-leg thigh circumference, and a higher muscle mass percentage, reflecting the predominance of speed-strength demands over short distances. Middle-distance runners had intermediate values for most parameters beacuse this specialisation combines the need for muscular power with the ability to sustain an intensive load. Long-distance runners had lower body mass, lower BMI, and a smaller fat mass percentage, which corresponds to the demands of prolonged cyclic work and reduced energetic cost of running.

Sports performance of track-and-field athletes in control running trials

The control running trials recorded differences in performance among track-and-field athletes of different distance specialisations. The highest mean running speed was characteristic of sprinters, lower values were observed in middle-distance runners, and the lowest values were recorded in the long-distance group. This structure reflected the different character of competitive load: short distances require maximal speed realisation, middle distances combine speed and endurance, and long distances depend on the ability to maintain a stable pace over a long period. For correct comparison of the groups, Table 2 presents not only the time to cover the main distance, but also mean running speed, calculated using formula (3), and the standardised performance index, calculated using formula (4).

Table 2. Sports performance indicators of track-and-field athletes in control running trials, M ± SD

Indicator	Sprint, n = 30	Middle distances, n = 30	Long distances, n = 30	p
Main distance	100/200 m	800/1,500 m	5,000/10,000 m	-
Time to cover the distance, s	18.9 ± 7.2	267.4 ± 89.6	2,178.5 ± 612.7	-
Mean running speed, m/s	8.63 ± 0.41	5.71 ± 0.32	4.62 ± 0.28	<0.001
Standardised performance index, arbitrary units	0.71 ± 0.12	0.64 ± 0.11	0.58 ± 0.10	0.004

Note: the time to cover the distance is presented as a characteristic of the result within the relevant group; direct inter-group comparison of absolute time was not performed because the distances differed; inter-group comparison was performed for mean running speed and the standardised performance index
Source: compiled by the authors

The data in Table 2 show that the highest mean speed was recorded in sprinters and was 8.63 ± 0.41 m/s. This result reflects the specificity of short distances, where start acceleration, high movement frequency, push-off power, and the ability to maintain maximal or near-maximal speed for a short time are of primary importance. However, this indicator should not be interpreted as a higher general level of preparedness compared with the other groups, since sprint performance is formed under short-duration load with a predominance of the speed-strength component. The high mean speed in this group characterised a specific type of competitive realisation inherent in short distances rather than a universal advantage.

In middle-distance runners, mean speed was 5.71 ± 0.32 m/s, which was lower than in sprinters but higher than in long-distance runners. This indicator reflected the intermediate nature of 800 and 1,500 m running, where the result depended on a combination of speed capacity, strength endurance, pace stability, and resistance to fatigue. Unlike sprinting, high start speed or maximal speed alone is not sufficient in this group, as the athlete must maintain movement intensity over a longer period. Mean speed in middle-distance runners represented a balance between the power of motor actions and the ability to maintain the pace.

In the long-distance group, mean speed was 4.62 ± 0.28 m/s. The lower value of this indicator was expected since covering 5,000 and 10,000 m involves longer work, a predominance of aerobic energy supply, and the need to distribute effort rationally over the distance. For long-distance runners, performance is determined not by achieving maximal speed but by the ability to maintain a stable pace, preserve movement economy, and avoid a sharp decrease in working capacity at the end of the distance. In this context, lower mean speed does not indicate lower sports preparedness but reflects another mechanism of achieving results, associated with endurance and functional stability (Hayes & Gordon, 2021).

Mean running speed differed according to the distance specialisation of the athletes, as confirmed by the statistical significance level of $p < 0.001$. This shows that the speed component of performance depended substantially on distance specialisation and on the structure of the running load. Statistically significant differences were also recorded for the standardised performance index ($p = 0.004$). The highest mean value of this index was observed in sprinters, the intermediate value in middle-distance runners, and the lowest value in long-distance runners. This gradation may be associated with the fact that, over short distances, performance depends more directly on morphological and speed-strength parameters, whereas over long distances, pace, tactics, movement economy, aerobic productivity, and resistance to prolonged load are also important.

The results show that each group had its own sports-performance profile. Sprinters had the highest mean speed, which corresponds to the demands of short-duration speed-strength work. Middle-distance runners demonstrated intermediate values reflecting the combination of speed and endurance. Long-distance runners had lower mean speed, but this feature corresponds to the specificity of prolonged cyclic load, where maintaining pace and economising motor activity are decisive. Therefore, sports performance in control trials has pronounced distance-specific features and cannot be assessed only by the absolute time taken to cover the distance.

Correlations between anthropometric parameters and performance

Correlation analysis showed different structures of association between anthropometric parameters and mean running speed in groups with different distance specialisations. In sprinters, performance was most closely associated with indicators of the muscle component and lower-limb parameters, whereas in long-distance runners, stronger inverse relationships were recorded for body mass, BMI, and fat mass percentage. In the middle-distance group, the pattern of relationships was intermediate, with relevance for both muscle mass and indicators reflecting the energetic cost of running. Table 3 systematises the correlations between anthropometric parameters and mean running speed.

Table 3. SCorrelations between anthropometric indicators and mean running speed, r

Indicator	Sprint, n = 30	Middle distances, n = 30	Long distances, n = 30	Entire sample, n = 90
Height	0.38*	0.21	0.18	0.29*
Body mass	0.31	-0.36*	-0.48**	-0.22
BMI	0.27	-0.41*	-0.52**	-0.31*
Lower-limb length	0.46**	0.32*	0.24	0.35**
LLL/H	0.34*	0.28	0.19	0.27*
Single-leg thigh circumference	0.58**	0.39*	-0.33*	0.18
Fat mass percentage	-0.44**	-0.49**	-0.56**	-0.51**
Muscle mass percentage	0.62**	0.45**	0.29	0.48**

Note: *$p < 0.05$; **$p < 0.01$; positive r values reflect a direct relationship between the indicator and mean running speed, while negative – an inverse relationship

Source: compiled by the authors

In the sprint group, the closest relationships with mean running speed were recorded for muscle mass percentage ($r = 0.62$; $p < 0.01$), single-leg thigh circumference ($r = 0.58$; $p < 0.01$), and lower-limb length ($r = 0.46$; $p < 0.01$). This indicates that sprint performance was more closely linked with indicators characterising the muscle component and biomechanical prerequisites for high-speed running. Higher muscle mass percentage and greater single-leg thigh circumference may reflect better conditions for push-off force, start acceleration, and maintenance of high movement frequency. The positive relationship with lower-limb length also has a functional explanation – this parameter may affect the spatial structure of the running stride. Fat mass percentage had an inverse relationship with speed ($r = -0.44$; $p < 0.01$), which corresponds to lower speed realisation when inactive body mass increases.

In middle-distance runners, the correlation structure was more balanced. The most pronounced relationships were recorded between mean speed and fat mass percentage ($r = -0.49$; $p < 0.01$), muscle mass percentage ($r = 0.45$; $p < 0.01$), BMI ($r = -0.41$; $p < 0.05$), single-leg thigh circumference ($r = 0.39$; $p < 0.05$), and body mass ($r = -0.36$; $p < 0.05$). This distribution of correlations shows that performance in 800 and 1,500 m running was associated with the relationship between body mass, muscle mass, and fat component, in addition to the development of the muscle component. The positive relationship of muscle mass and thigh circumference with speed reflected the importance of strength endurance and the ability to maintain an intensive pace. By contrast, the inverse relationships with body mass, BMI, and fat mass showed that excessive mass-height parameters may increase the energetic cost of movement and reduce running effectiveness over middle distances.

In long-distance runners, the strongest inverse correlations with speed were recorded for fat mass percentage ($r = -0.56$; $p < 0.01$), BMI ($r = -0.52$; $p < 0.01$), and body mass ($r = -0.48$; $p < 0.01$). This highlights that performance among long-distance runners was primarily linked with a lighter mass-height profile and a lower proportion of inactive body mass. In prolonged running, excess mass increases mechanical load on the musculoskeletal system, raises the energetic cost of movement, and may reduce movement economy. Single-leg thigh circumference had a moderate inverse relationship with speed ($r = -0.33$; $p < 0.05$), which differentiated this group from sprinters and middle-distance runners. This suggests that, for long distances, an excessively pronounced circumference-related muscle component of the lower limbs is not always associated with better performance since additional mass may increase energy expenditure during prolonged cyclic work.

For the whole sample, the most stable relationships with mean running speed were recorded for fat mass percentage ($r = -0.51$; $p < 0.01$), muscle mass percentage ($r = 0.48$; $p < 0.01$), lower-limb length ($r = 0.35$; $p < 0.01$), and BMI ($r = -0.31$; $p < 0.05$). The general pattern was that a higher muscle component and greater lower-limb length were linked with better speed realisation, whereas a larger fat mass percentage and higher BMI had inverse relationships with performance. However, the general correlations did not fully reflect the specificity of separate distances because the same anthropometric indicator had different functional significance in sprint, middle-distance, and long-distance running. For example, single-leg thigh circumference correlated directly with speed in sprinters but inversely in long-distance runners, confirming that the role of anthropometric factors depends on the type of competitive load.

Thus, correlation analysis determined that the relationship between anthropometric parameters and sports performance had pronounced distance-specific features. In sprinting, performance was most strongly associated with muscle mass, single-leg thigh circumference, and lower-limb length. In middle-distance running, the leading feature was a balanced relationship between the muscle component, body mass, and a low fat mass percentage. In long-distance running, better results were linked with lower body mass, lower BMI, and a smaller fat component. Anthropometric characteristics did not have a universal influence on performance. Their role changed according to the distance specialisation of the track-and-field athletes.

Anthropometric predictors of performance in running events

Regression analysis established that the anthropometric characteristics associated with mean running speed differed according to distance specialisation. In sprinters, performance was explained mainly by indicators of the muscle component and lower-limb parameters; in middle-distance runners – by a combination of muscle and fat mass with BMI; and in long-distance runners – by lower fat mass percentage, BMI, and lower-limb proportionality. Summary results of the multiple linear regression models are presented in Table 4.

Table 4. Regression models of anthropometric predictors of mean running speed

Group	Predictor	β	p	Model R^2
Sprint, n = 30	Muscle mass percentage, %	0.42	0.004	0.51
	Single-leg thigh circumference, cm	0.34	0.012	
	Lower-limb length, cm	0.27	0.041	
Middle distances, n = 30	Fat mass percentage, %	-0.39	0.007	0.46
	Muscle mass percentage, %	0.31	0.021	
	BMI, kg/m^2	-0.26	0.048	
Long distances, n = 30	Fat mass percentage, %	-0.44	0.003	0.49
	BMI, kg/m^2	-0.33	0.014	
	Body mass, kg	-0.28	0.039	

Note: β – standardised regression coefficient; R2 – proportion of explained variance in mean running speed; the table presents statistically significant predictors
Source: compiled by the authors

In the sprint group, the model explained 51% of the variability in mean running speed. Muscle mass percentage made the largest positive contribution ($\beta = 0.42$; $p = 0.004$), indicating a relationship between the development of the active muscle component and the capacity for speed-strength realisation. Single-leg thigh circumference also retained an independent statistical relationship with performance ($\beta = 0.34$; $p = 0.012$), reflecting the role of lower-limb muscular development in forming push-off force, start acceleration, and maintenance of high movement frequency. Lower-limb length had a weaker but statistically significant contribution ($\beta = 0.27$; $p = 0.041$), which may be associated with biomechanical prerequisites for running-stride length.

In the middle-distance group, the regression model explained 46% of the variability in mean speed. The most pronounced inverse relationship was recorded for fat mass percentage ($\beta = -0.39$; $p = 0.007$), exhibiting lower performance with a higher proportion of inactive body mass. Muscle mass percentage had a positive relationship with mean speed ($\beta = 0.31$; $p = 0.021$), although its contribution was lower than in the sprint group. BMI had an inverse relationship with performance ($\beta = -0.26$; $p = 0.048$), stressing the importance of mass-height balance in 800 and 1,500 m running. Thus, for middle distances, performance was determined not by a single anthropometric parameter but by the relationship between the muscle component, body mass, and fat mass.

In the long-distance group, the model explained 49% of the variability in mean running speed. The leading predictor was fat mass percentage (β = -0.44; p = 0.003), which pointed to its inverse relationship with performance during prolonged cyclic load. BMI also had a statistically significant inverse relationship (β = -0.33; p = 0.014), while body mass retained an independent contribution to the model (β = -0.28; p = 0.039). This model structure demonstrated that, over long distances, a more successful profile was associated with lower mass-height indicators and a smaller fat component. Unlike in sprinting, single-leg thigh circumference and muscle mass percentage were not among the significant predictors, reflecting a different morphological basis for long-distance performance.

The regression analysis showed that anthropometric predictors of performance differed according to distance specialisation. In sprinting, mean speed was determined mainly by the muscle component, single-leg thigh circumference, and lower-limb length. In middle-distance running, muscle mass percentage, fat mass percentage, and BMI were all relevant, reflecting the mixed speed-endurance character of the load. In long-distance running, performance was associated primarily with lower fat mass percentage, BMI, and body mass. In general, the regression models confirmed that anthropometric characteristics have different predictive roles in sprint, middle-distance, and long-distance running.

Practical recommendations for distance orientation in track-and-field athletes

The results provide grounds for practical recommendations on the use of anthropometric assessment in sports selection, refinement of distance specialisation, and individualisation of the training process. This does not mean setting rigid standards for body mass, BMI, thigh circumference, or the proportions of muscle and fat mass. Rather, these characteristics should be used as auxiliary reference points. The anthropometric profile should be interpreted together with control running results, running technique, functional readiness, training experience, and the athlete's response to load. This approach is important because the identified relationships pointed to not a universal advantage of a single body-build indicator but its different value according to distance specialisation. The results established that sprinters, middle-distance runners, and long-distance runners had different leading anthropometric predictors of performance, so coaching decisions should be differentiated rather than applied uniformly to all runners.

For athletes who show a pronounced muscle-strength profile and high speed capacity, orientation towards sprint events is appropriate. In this group, practical significance belongs not to total body mass in itself but to its functional structure, namely the predominance of active muscle component over inactive mass. If an athlete has sufficient development of lower-limb muscles, a higher muscle mass percentage, pronounced thigh circumference, and the ability to realise start acceleration quickly, this may point to favourable prerequisites for short distances. In the training process for such athletes, emphasis should be placed on the development of explosive strength, maximal push-off power, reactive muscle capacity, running-stride frequency, and start technique. The coach should also ensure that the body-mass increase does not occur through the fat component or through excessive muscle volume that does not improve speed realisation. In practical terms, this means regular monitoring of body composition, assessment of control-section dynamics, and comparison of strength indicators with actual running speed. If an increase in muscle mass is not accompanied by improvement in acceleration, stride frequency, or mean speed, strength training should be adjusted towards greater specialisation and speed orientation.

For middle-distance runners, recommendations should focus on maintaining a functional balance between muscular power, endurance, and movement economy. This specialisation requires neither the maximal muscle-strength profile typical of sprinting nor an excessively light body-build profile characteristic of long-distance runners. An athlete oriented towards 800 and 1,500 m should combine the ability to run at high intensity with the capacity to maintain pace as fatigue increases. In sports selection and subsequent preparation, it is necessary to assess the relationship between body mass, muscle component, fat mass, and BMI, instead of a single anthropometric indicator. If an athlete has an intermediate anthropometric profile, demonstrates sufficient speed over shorter sections, and can maintain a stable pace over longer control distances, they may be treated as a potential middle-distance runner. The training process for this group should combine speed-strength work, interval loads, tempo running, strength-endurance exercises, and recovery control. Excessive body-mass increase may complicate pace maintenance, whereas insufficient development of the muscle component may reduce the capacity for finishing acceleration and high-intensity work. Therefore, preparation should be adjusted not towards changing one indicator but towards preserving the optimal relationship between strength and endurance prerequisites for performance.

For long-distance runners, practical recommendations should be based on monitoring the mass-height profile, fat mass percentage, and the athlete's ability to maintain economical movement during prolonged load. The results showed that lower body mass, lower BMI, and a smaller fat component are more important for long-distance runners, but these indicators must not be interpreted as grounds for mechanical weight reduction. In training practice, long-term body-mass reduction without regard to functional state may impair recovery, reduce strength endurance, and increase the risk of overfatigue. The coach should assess body mass and body composition together with pace stability, tolerance of training volume, dynamics of results, and signs of recovery. If an athlete has a lighter body-build profile, lower fat mass percentage, stable running technique, and the ability to maintain an even pace for a long time, this may support orientation towards 5,000 and 10,000 m distances. Training for such track-and-field athletes should emphasise aerobic endurance, running economy, pace stability, and the ability to preserve effective technique under fatigue. Control of anthropometric indicators should serve a preventive function: it should identify excessive growth of inactive mass or, conversely, undesirable reduction of the muscle component in time.

In sports selection practice, the results may be used as an instrument for preliminary distance orientation. If the morphological profile of an athlete corresponds to sprint prerequisites but control results do not show sufficient speed realisation, it is preferable not to change specialisation immediately, but first to analyse start technique, push-off force, stride frequency, and the quality of speed-strength preparation. If an athlete has an intermediate profile and unstable results between shorter and longer distances, testing under different pace regimes is appropriate to clarify whether the athlete performs better through speed, endurance, or their combination. If a track-and-field athlete has long-distance anthropometric prerequisites but does not show pace stability, functional readiness, aerobic training volume, and recovery capacity should be checked. The practical value of the data lies in the possibility of using the anthropometric profile as an additional basis for individualising preparation. Anthropometric indicators do not replace coaching observation, control starts, or functional testing, but they help explain more precisely why one athlete performs better in sprinting, another – in middle-distance running, and a third – in prolonged running. The most effective approach is comprehensive: body build, body composition, speed indicators, endurance, and technique should be viewed as interrelated components of sports performance.

Discussion

Comparison of the groups showed that the morphological characteristics of track-and-field athletes differed in their expression among sprinters, middle-distance runners, and long-distance runners. Sprinters had higher mass-height indicators, greater single-leg thigh circumference, and a higher muscle mass percentage, whereas long-distance runners had lower values for body mass, BMI, and fat component. Middle-distance runners occupied an intermediate position for most parameters. Correlation and regression analyses showed that the relationship between anthropometric characteristics and mean running speed was distance-specific: the muscle component and lower-limb parameters were more important for sprinting, whereas lower body mass and a smaller fat mass percentage were more important for long distances.

The results confirmed that the anthropometric profile of track-and-field athletes differed according to distance specialisation: among sprinters, body mass was 82.4 ± 6.8 kg, single-leg thigh circumference – 62.8 ± 3.4 cm, and muscle mass percentage – 47.8 ± 3.0%; in middle-distance runners, the corresponding values were 75.6 ± 6.1 kg, 59.6 ± 3.1 cm, and 45.9 ± 2.8%; and in long-distance runners – 70.8 ± 5.7 kg, 56.4 ± 2.9 cm, and 44.2 ± 2.6%. This gradation of indicators reflected a more pronounced muscle-strength component in sprinters, an intermediate anthropometric profile in middle-distance runners, and a lighter body-build profile in long-distance runners. This pattern is consistent with the data of C. Sanchez Munoz *et al.* (2020), who addressed anthropometric characteristics, body composition, and somatotype in young elite runners. The researchers showed that the morphological profile of runners is associated with specialisation, which coincides with the inter-group differences recorded in the present study. Similar results were obtained by C.A. Herrera-Amante *et al.* (2025), who analysed anthropometric characteristics and athletic performance in track-and-field athletes at different competition levels. Unlike the broader disciplinary approach in that work, the presented study specified the morphological factors of performance for sprint, middle-distance, and long-distance running. Partial correspondence with the results of M. Thuany *et al.* (2023a) is observed in the relationship between mass-height parameters and running performance. However, that paper treated BMI together with training volume as a mediator of performance, whereas the present study focused primarily on anthropometric differences between distance groups.

Mean running speed was 8.63 ± 0.41 m/s in sprinters, 5.71 ± 0.32 m/s in middle-distance runners, and 4.62 ± 0.28 m/s in long-distance runners; inter-group differences were statistically significant ($p < 0.001$). The standardised performance index also differed among the groups and was 0.71 ± 0.12 in sprinting, 0.64 ± 0.11 in middle-distance running, and 0.58 ± 0.10 in long-distance running. The difference between the speed profiles of sprinters and middle-distance runners corresponds to the results of O. Wiriawan & M. Kesa (2020), who compared the physical capacities of representatives of these specialisations. Their study underscored that sprint performance is associated with short-term speed realisation, whereas middle-distance events require a combination of speed, endurance, and the ability to maintain load intensity. The event-specific character of the results was also confirmed by M. George (2025), who analysed kinanthropometric predictors of performance in different athletics events. In contrast to the disciplinary approach of that researcher, the present study specified morphological performance factors for sprint, middle-distance, and long-distance running. The explanation of lower mean speed among long-distance runners is in agreement with the provisions of P.R. Hayes & D.A. Gordon (2021), who described the physiological determinants of middle and long distances. In this context, the speed of long-distance runners cannot be interpreted as a lower level of preparedness, because prolonged load is based on a different relationship between aerobic productivity, pace stability, and movement economy. Results concerning middle-distance runners were supplemented by the data of N.P. Radhakrishnan *et al.* (2025), who analysed the influence of training load, physiological features, and recovery on performance. This broadened the interpretation of the data obtained, as the mean speed in 800 and 1,500 m running is formed not only by anthropometric profile but also by functional readiness and the ability to maintain the required pace.

Correlation analysis showed that, in sprinting, mean speed was most closely associated with muscle mass percentage ($r = 0.62$), single-leg thigh circumference ($r = 0.58$), and lower-limb length ($r = 0.46$). In long-distance runners, the strongest inverse relationships were recorded for fat mass percentage ($r = -0.56$), BMI ($r = -0.52$), and body mass ($r = -0.48$). The relationship between body composition and 100 m performance described by A. Azim *et al.* (2025) aligns with the results of the present study for sprinters. In the sprint group, mean speed correlated most closely with muscle mass percentage and single-leg thigh circumference, confirming the role of the active muscle component in speed-strength realisation over a short distance. Y. Aikawa *et al.* (2020) addressed the relationship of height, body mass, muscle mass, fat mass, and fat percentage with sports results in male track-and-field athletes. Their data coincide with the present results regarding the different directions of association between muscle and fat components and performance across running specialisations. The findings of J. Rosado *et al.* (2020) on body composition in long-distance runners correspond to the indicators obtained for long-distance runners in this study, where fat mass percentage and BMI had inverse correlations with mean speed. This comparison confirmed that, in prolonged running, performance is associated not only with endurance but also with a body-build profile that reduces the energetic cost of movement. D. Tomita *et al.* (2020) confirmed the relationship identified in the sprint group between lower-limb parameters and running speed. Direct comparison is limited, however, because those researchers analysed the length of separate bone segments of the lower limb, whereas the present study used the total anthropometric indicator of lower-limb length. J.F. Rickta *et al.* (2025) addressed the correlation between fat mass percentage and aerobic capacity in athletes and linked body composition with functional capacity. These data provide a broader explanation of the results obtained in the long-distance group, particularly the inverse relationship between fat mass percentage and mean running speed.

Regression analysis showed that, in sprinting, the model explained 51% of the variability in mean speed, and the significant predictors were muscle mass percentage ($\beta = 0.42$), single-leg thigh circumference ($\beta = 0.34$), and lower-limb length ($\beta = 0.27$). In middle-distance running, the model explained 46% of variability, in long-distance running – 49%. In both groups, fat mass percentage played a significant role with negative β coefficients. The analysis of runners' body composition by A. Dammicco & G. Reina (2025) supports the use of fat and muscle mass as variables in regression models of performance. In the present study, this is important for interpreting the models in which fat mass percentage had a negative β coefficient in the middle- and long-distance groups, while muscle mass percentage had a positive β coefficient in sprint and middle-distance running. M. Thuany *et al.* (2023b) interpreted the performance of runners over distances from 5 km to the marathon as the result of interaction among morphological, training-related, and social factors. This approach emphasised the multicomponent nature of sports achievement in endurance running. It corresponds to the long-distance regression model, in which fat mass percentage, BMI, and LLL/H explained variability in mean speed, although the current study focused specifically on anthropometric parameters. M.I. Black *et al.* (2020) addressed anthropometric factors in running economy, linking morphological characteristics with movement efficiency during running. Their conclusions deepen the explanation of the long-distance model, where lower fat mass percentage and lower BMI were associated with higher mean speed, since a reduction in inactive mass may lower the energetic cost of prolonged movement. H. Ueno *et al.* (2021) considered the role of body-segment mass in the performance of trained endurance runners. This partly corresponds to the regression model for long-distance runners, confirming the importance not only of total body mass but also of the distribution of mass across separate segments, which may affect running mechanics and energy expenditure. O. Kettunen *et al.* (2025) treated body composition as one factor that may explain differences in performance among elite endurance-profile athletes. This agrees with the long-distance model obtained during the study, in which fat mass percentage had the most pronounced inverse relationship with mean speed. Body composition functioned not as an auxiliary characteristic but as a statistically significant component of performance in endurance running.

The discussion confirmed that the results generally correspond to other studies in which anthropometric profile, body composition, and mass-height parameters are treated as factors associated with running performance. The strongest correspondence was observed in the confirmation of the muscle-strength profile of sprinters, the intermediate character of indicators in middle-distance runners, and the lighter body-build profile of long-distance runners. Nonetheless, a comparison with previous research showed that the importance of individual anthropometric characteristics changes according to distance specialisation and the structure of competitive load.

Conclusions

The results of the study displayed that the anthropometric profile of track-and-field athletes depends strongly on distance specialisation. Sprinters had the most pronounced mass-height and muscle indicators: body mass was 82.4 ± 6.8 kg, BMI – 25.1 ± 1.6 kg/m^2, single-leg thigh circumference – 62.8 ± 3.4 cm, mass percentage – 47.8 ± 3.0%. In middle-distance runners, these indicators had intermediate values: body mass was 75.6 ± 6.1 kg, BMI – 23.5 ± 1.4 kg/m^2, single-leg thigh circumference – 59.6 ± 3.1 cm, muscle mass percentage – 45.9 ± 2.8%. Long-distance runners had a lighter body-build profile, lower body mass of 70.8 ± 5.7 kg, lower BMI of 22.6 ± 1.3 kg/m^2, and a smaller fat mass percentage of 9.8 ± 1.8%, which was due to the requirements of prolonged cyclic load. Sports performance also differed among the groups. The highest mean speed was recorded in sprinters, at 8.63 ± 0.41 m/s; it was lower in middle-distance runners, at 5.71 ± 0.32 m/s, and lowest in long-distance runners, at 4.62 ± 0.28 m/s. Inter-group differences were statistically significant ($p < 0.001$). The standardised performance index was 0.71 ± 0.12 in sprinters, 0.64 ± 0.11 in middle-distance runners, and 0.58 ± 0.10 in long-distance runners ($p = 0.004$), confirming the relevance of assessing performance with reference to distance specificity rather than only absolute time to cover the distance.

Correlation analysis established that, in sprinters, mean speed was most closely associated with muscle mass percentage ($r = 0.62$), single-leg thigh circumference ($r = 0.58$), and lower-limb length ($r = 0.46$). In middle-distance runners, performance was associated with muscle mass percentage ($r = 0.45$), fat mass percentage ($r = -0.49$), and BMI ($r = -0.41$), reflecting the mixed character of this specialisation. In long-distance runners, the closest inverse relationships were recorded for fat mass percentage ($r = -0.56$), BMI ($r = -0.52$), and body mass ($r = -0.48$), emphasising the importance of a lighter mass-height profile for endurance work. The regression models confirmed the specialised role of anthropometric characteristics in performance. In sprinting, 51% of the variability in mean speed was explained by muscle mass percentage, single-leg thigh circumference, and lower-limb length. In middle-distance running, the model explained 46% of performance variability through fat mass percentage, muscle mass percentage, and BMI. In the long-distance group, 49% of the variability in mean speed was explained by fat mass percentage, BMI, and body mass. Thus, anthropometric characteristics do not have a universal influence on performance: muscle-strength parameters are leading in sprinting, the balance between muscle and fat components is important for middle distances, and lower fat mass percentage and a more economical body-build profile are more important for long distances. Further research should use a longitudinal design with repeated measurements at different stages of the training cycle, which would allow the dynamics of anthropometric characteristics and sports performance to be traced during preparation. The generalisability of the results should be improved by expanding the sample by sex, age, and level of sports qualification, including female athletes, juniors, adult track-and-field athletes, and representatives of different qualification groups.

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Conflict of Interest

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Вплив антропометричних даних на результативність легкоатлетів у бігових дисциплінах

Ірина Юзковець

Доктор філософії у галузі фізичної культури і спорту, доцент
Університет Григорія Сковороди в Переяславі
08401, вул. Сухомлинського, 30, м. Переяслав, Україна
https://orcid.org/000-0001-9372-550X

Владислав Рубан

Кандидат наук з фізичного виховання і спорту, доцент
Університет Григорія Сковороди в Переяславі
08401, вул. Сухомлинського, 30, м. Переяслав, Україна
https://orcid.org/0000-0003-3771-5117

Анотація. Мета дослідження полягала у з'ясуванні особливостей зв'язку антропометричних характеристик легкоатлетів із результативністю у спринті, бігу на середні й довгі дистанції. Дослідження проводилося 6-10 квітня 2025 року на базі Університету Григорія Сковороди в Переяславі, за участю 90 легкоатлетів чоловічої статі віком 18-24 роки, розподілених на групи спринту, бігу на середні та довгі дистанції, з оцінюванням антропометричних показників, контрольних бігових результатів і статистичних зв'язків між фізичними параметрами та спортивною результативністю. Отримані результати засвідчили, що антропометричний профіль, швидкість бігу, кореляційні зв'язки та регресійні предиктори мали дистанційну специфіку. Спринтери характеризувалися вищою масою тіла, окружністю стегна однієї ноги та часткою м'язової маси – 82,4 ± 6,8 кг, 62,8 ± 3,4 см і 47,8 ± 3,0 %, що відображало перевагу м'язово-силового компонента на коротких дистанціях. У стаєрів нижчі маса тіла, індекс маси тіла і жирова маса – 70,8 ± 5,7 кг, 22,6 ± 1,3 кг/м^2 і 9,8 ± 1,8 % – були пов'язані з економізацією тривалого бігу. Середня швидкість становила 8,63 ± 0,41, 5,71 ± 0,32 і 4,62 ± 0,28 м/с відповідно у групах спринту, середніх і довгих дистанцій. Кореляції показали зв'язок швидкості у спринті з м'язовою масою ($r = 0,62$), а у стаєрів – обернений зв'язок із жировою масою ($r = -0,56$). Регресійні моделі пояснили 51 %, 46 % і 49 % варіативності швидкості, підтверджуючи різну роль антропометричних чинників у кожній біговій спеціалізації. Результати підтвердили, що антропометричні чинники результативності відрізняються за біговою спеціалізацією: у спринті переважають м'язово-силові параметри, у довгих дистанціях – нижча жирова маса та економічніший тілобудовний профіль. Практично ці дані можуть використовувати тренери, викладачі легкої атлетики та фахівці зі спортивного відбору для уточнення дистанційної спеціалізації й індивідуалізації тренувального процесу

Ключові слова: дистанційна спеціалізація; спринт; індекс маси тіла; тілобудова; стаєри; швидкісно-силова реалізація; витривалість