

## ABSTRAK

**Latar belakang:** Pencak silat sebagai olahraga beladiri yang diakui UNESCO menuntut integrasi karakteristik antropometrik, kapasitas biomekanik, dan kesiapan psikologis. Namun, bukti ilmiah yang mengkaji ketiga domain tersebut secara bersamaan, khususnya mengenai perbedaan prestasi atlet masih terbatas dalam literatur Indonesia. **Tujuan:** Penelitian disertasi ini bertujuan mendeskripsikan karakteristik antropometrik, biomekanik, somatotipe, dan kepribadian atlet pencak silat laki-laki di Daerah Istimewa Yogyakarta, serta menganalisis perbedaan dan pola hubungan antar domain tersebut pada atlet juara dan bukan juara. **Metodologi:** Penelitian menggunakan desain observasional analitik dengan pendekatan komparatif pada 61 atlet laki-laki berumur 17-30 tahun peserta pemusatan latihan PORDA DIY XVII tahun 2025 (32 juara; 29 bukan juara). Variabel antropometrik mencakup tinggi tubuh, massa tubuh, IMT, indeks panjang lengan dan tungkai, tinggi duduk, dan massa otot segmental. Variabel biomekanik meliputi kekuatan genggam, lengan dorong, lengan tarik, ekstensi punggung, kekuatan ekstensi tungkai, plantar fleksi, daya ledak, kelenturan, keseimbangan, dan waktu reaksi. Komponen somatotipe dihitung menggunakan metode Heath–Carter (1990). Karakteristik kepribadian diukur menggunakan BFI-44. Analisis meliputi analisis univariat uji normalitas (Shapiro–Wilk), uji homogenitas varian (Levene’s test), uji perbedan rerata antar kelompok (*independent t-test*/Welch/Mann–Whitney), ukuran efek Cohen’s d dan r, korelasi Pearson/Spearman, analisis perbedaan korelasi (Fisher r-to-z), serta regresi logistik univariat dan multivariat serta analisis SAD untuk kategori somatotipe. **Hasil:** Karakteristik antropometrik pesilat laki-laki adalah tinggi tubuh supramedium, berat tubuh dan indeks massa tubuh normal, indeks panjang lengan dan tungkai pendek, indeks tinggi duduk makrosoma, massa otot lengan, tungkai dan *skeletal muscle mass* normal, seluruh variabel antropometrik tersebut tidak menunjukkan perbedaan bermakna antara atlet juara dan bukan juara ( $p > 0,05$ ). Komponen somatotipe (endomorfi, mesomorfi, ektomorfi) juga tidak berbeda bermakna antara kelompok juara (2,6 - 3,2 - 2,6) dengan kelompok bukan juara (2,7 - 3,4 - 2,6), kedua kelompok menunjukkan somatotipe ideal. Karakteristik biomekanik yang meliputi daya ledak, kelenturan, keseimbangan, waktu reaksi, kekuatan otot dalam kategori sedang. Seluruh variable biomekanik tidak menunjukkan perbedaan bermakna antara atlet juara dan bukan juara ( $p > 0,05$ ). Karakteristik kepribadian *big five*, dengan *openness* tinggi, dan *conscientiousness*, *extraversion*, *agreeableness* ketiganya sedang dan *neuroticism* rendah. Tiga dimensi kepribadian *openness* ( $p < 0,05$ ), *conscientiousness* ( $p < 0,05$ ), dan *extraversion* ( $p < 0,05$ ) menunjukkan perbedaan bermakna antara kelompok juara dan bukan juara. Hubungan antar domain menunjukkan komponen somatotipe mesomorfi berhubungan bermakna dengan % massa otot pada atlet juara (%massa otot skeletal  $r = +0,88$ ,  $p < 0,05$ ; %massa otot lengan  $r = +0,82$ ,  $p < 0,05$ ; % massa otot tungkai  $r = +0,76$ ,  $p < 0,05$ ) dan bukan juara ((%massa otot skeletal  $r = +0,75$   $p < 0,05$ ; %massa otot lengan  $r = +0,71$ ,  $p < 0,05$ ; % massa otot tungkai  $r = +0,61$ ,  $p < 0,05$ ), dan hanya pada atlet juara, kepribadian *openness* berhubungan bermakna dengan kekuatan ekstensi lutut ( $r = +0,51$   $p < 0,05$ ), plantar fleksi ( $r = 0,49$   $p < 0,05$ ) dan kepribadian *extraversion* berhubungan dengan waktu reaksi ( $r = -0,45$   $p < 0,05$ ).

Analisis Fisher r-to-z mengungkap pola hubungan psikologi-biomekanik yang bermakna pada atlet juara, yaitu pada *openness* dengan kekuatan tungkai ekstensi lutut ( $p < 0,05$ ), dan plantar fleksi ( $p < 0,05$ ), serta ektomorfi dengan kelenturan ( $p < 0,05$ ). Regresi logistik multivariat menunjukkan bahwa model multidimensi didapatkan prediktor berasal dari kepribadian. Kedua kepribadian *openness* ( $p < 0,05$ ; OR = 1,13; 95%CI 1,01-1,30) dan *conscientiousness* ( $p = 0,05$ ; OR = 1,16; 95%CI 1,01-1,35) menjadi prediktor bermakna peluang menjadi juara, sementara *extraversion* tidak bermakna ( $p > 0,05$ ; OR = 1,09 95%CI 0,91-1,32). Hasil uji moderasi menunjukkan bahwa variabel kepribadian *openness* menjadi moderator bagi variabel kekuatan otot plantar fleksi dan ekstensi lutut untuk menjadi juara. **Kesimpulan:** Peneliti menyimpulkan bahwa karakteristik antropometrik, biomekanik, dan somatotipe tidak berbeda antara atlet pencak silat laki-laki juara dan bukan juara. Kepribadian *openness*, *conscientiousness* dan *extraversion* berbeda bermakna antara atlet juara dan bukan juara, serta *openness* dan *conscientiousness* menjadi prediktor bermakna dalam model multidimensi. Atlet juara memiliki integrasi multidomain yang lebih adaptif dan pola hubungan berbeda bermakna dengan bukan juara. Terdapat peran moderasi kepribadian *openness* terhadap parameter biomekanik kekuatan otot ekstensi lutut dan plantar fleksi untuk menjadi juara.

**Kata kunci:** *Antropometri; biomekanik; somatotipe; kepribadian; performa atlet pencak silat.*

## ABSTRACT

**Background:** Pencak Silat, a martial art recognized by UNESCO, requires the integration of anthropometric characteristics, biomechanical capacities, and psychological readiness to achieve optimal performance. However, scientific evidence examining these three domains simultaneously—particularly in explaining differences in athletic achievement—remains limited within the Indonesian literature. **Objective:** This dissertation aimed to describe the anthropometric, biomechanical, somatotype, and personality characteristics of male Pencak Silat athletes in the Special Region of Yogyakarta, and to analyze differences and patterns of interrelationships among these domains between champion and non-champion athletes. **Methods:** This study employed an analytical observational design with a comparative approach involving 61 male athletes aged 17–30 years who participated in the 2025 PORDA DIY XVII centralized training camp (32 champions; 29 non-champions). Anthropometric variables included body height, body mass, body mass index (BMI), arm and leg length indices, sitting height, and segmental muscle mass. Biomechanical variables comprised handgrip strength, arm push and pull strength, back extension strength, knee extension strength, plantar flexion strength, explosive power, flexibility, balance, and reaction time. Somatotype components were calculated using the Heath–Carter method (1990). Personality traits were assessed using the BFI-44. Statistical analyses included univariate procedures, normality testing (Shapiro–Wilk), homogeneity of variance testing (Levene’s test), between-group comparisons (independent t-test, Welch’s test, or Mann–Whitney U test), effect size calculations (Cohen’s *d* and *r*), Pearson/Spearman correlation analyses, Fisher’s *r*-to-*z* tests for correlation differences, univariate and multivariate logistic regression, and Somatotype Attitudinal Distance (SAD) analysis for somatotype categorization. **Results:** The anthropometric profile of male Pencak Silat athletes was characterized by supramedium stature, normal body mass and BMI, short arm and leg length indices, macrosomic sitting height, and normal arm, leg, and skeletal muscle mass. None of the anthropometric variables differed significantly between champion and non-champion athletes ( $p > 0.05$ ). Somatotype components (endomorph, mesomorph, and ectomorph) also did not differ significantly between champions (2.6–3.2–2.6) and non-champions (2.7–3.4–2.6), with both groups demonstrating an ideal somatotype. Biomechanical characteristics—including explosive power, flexibility, balance, reaction time, and muscle strength—were generally in the moderate category, and no significant differences were observed between groups ( $p > 0.05$ ). Regarding personality, athletes demonstrated high openness, moderate conscientiousness, extraversion, and agreeableness, and low neuroticism. Three personality dimensions—openness ( $p < 0.05$ ), conscientiousness ( $p < 0.05$ ), and extraversion ( $p < 0.05$ )—differed significantly between champions and non-champions. Interdomain analyses showed that the mesomorphic component of somatotype was strongly and significantly correlated with muscle mass percentages in both champions (skeletal muscle mass  $r = +0.88$ ; arm muscle mass  $r = +0.82$ ; leg muscle mass  $r = +0.76$ ; all  $p < 0.05$ ) and non-champions (skeletal muscle mass  $r = +0.75$ ; arm muscle mass  $r = +0.71$ ; leg muscle mass  $r = +0.61$ ; all  $p < 0.05$ ).

*Notably, only among champion athletes did Openness show significant correlations with knee extension strength ( $r = +0.51$ ;  $p < 0.05$ ) and plantar flexion strength ( $r = +0.49$ ;  $p < 0.05$ ), while Extraversion was significantly associated with reaction time ( $r = -0.45$ ;  $p < 0.05$ ). Fisher's  $r$ -to- $z$  analyses revealed significantly stronger psych biomechanical relationship patterns in champion athletes, particularly for openness with knee extension strength ( $p < 0.05$ ), plantar flexion strength ( $p < 0.05$ ), and ectomorphy with flexibility ( $p < 0.05$ ). Multivariate logistic regression indicated that predictors retained in the multidimensional model originated exclusively from the personality domain. Both openness ( $p < 0.05$ ; OR = 1.13; 95% CI: 1.01–1.30) and conscientiousness ( $p = 0.05$ ; OR = 1.16; 95% CI: 1.01–1.35) significantly predicted the likelihood of becoming a champion, whereas extraversion was not significant in the final model ( $p > 0.05$ ; OR = 1.09; 95% CI: 0.91–1.32). Moderation analysis further demonstrated that openness moderated the relationships between plantar flexion strength and knee extension strength and championship status. **Conclusion:** This study concludes that anthropometric, biomechanical, and somatotype characteristics do not differ between champion and non-champion male pencak silat athletes. In contrast, openness, conscientiousness, and extraversion differ significantly between the two groups, with openness and conscientiousness emerging as significant predictors in the multidimensional model. Champion athletes exhibit more adaptive multidomain integration and significantly different relationship patterns compared with non-champions. Moreover, openness plays a moderating role in enhancing the contribution of knee extension and plantar flexion strength to competitive success.*

**Keywords:** Anthropometry; biomechanics; somatotype; personality; Pencak silat athletic performance.