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Pre-Competition Physical Fitness Profiles and Competitive Outcomes of Indonesian Wrestlers at the 2024 National Games

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ABSTRACT

This study aimed to evaluate pre-competition physical fitness profiles and competitive outcomes among East Java wrestlers participating in the 2024 Indonesian National Games. A quantitative descriptive design was employed involving 18 athletes (12 men and 6 women) competing in Greco-Roman, men's freestyle, and women's freestyle wrestling. Physical fitness assessments were conducted on May 8, 2024, using a standardized testing battery administered by the East Java National Sports Committee. The assessments covered muscular strength, muscular endurance, explosive power, speed, flexibility, and aerobic capacity. Competitive outcomes were obtained from official tournament records. The findings indicated generally favorable muscular strength and power characteristics, although some athletes did not achieve the established aerobic fitness and flexibility targets. The team secured 14 medals, comprising five gold, four silver, and five bronze. These findings highlight the importance of comprehensive physical fitness monitoring for identifying individual conditioning priorities among national-level wrestlers. Although the descriptive design does not establish a direct relationship between physical fitness and competitive success, the results provide practical insights for optimizing athlete preparation and informing evidence-based training strategies.

Keywords: wrestling; physical fitness; athlete monitoring; competitive performance; national games.

INTRODUCTION

Wrestling is a high-intensity combat sport characterized by repeated explosive movements, sustained physical contact, and complex technical–tactical interactions that impose substantial physiological and neuromuscular demands on athletes. Competitive performance requires the integration of maximal strength, explosive power, anaerobic capacity, aerobic endurance, and movement coordination to execute offensive and defensive techniques effectively. The intermittent nature of wrestling involves alternating periods of intense muscular engagement and brief recovery, requiring athletes to maintain physical performance under considerable fatigue. Previous investigations have identified muscular strength, anaerobic power, and cardiorespiratory fitness as important characteristics of competitive wrestlers (Horswill, 1992; Callan et al., 2000; Yoon, 2002). More recent evidence has reinforced the importance of these attributes across wrestling styles and competitive levels (Chaabene et al., 2017; Mirzaei et al., 2021). Consequently, comprehensive physical preparation and systematic fitness assessment are essential components of competitive wrestling development.

Physical fitness assessment provides an empirical foundation for identifying individual strengths, monitoring physiological preparedness, and establishing training priorities. In wrestling, muscular strength and explosive power facilitate rapid force production during takedowns, lifts, and defensive actions, whereas muscular endurance supports sustained gripping and repeated technical exchanges. Aerobic capacity contributes to recovery between high-intensity efforts, while anaerobic performance supports the execution of demanding movements during competition. Demirkan et al. (2014) investigated physical fitness differences between freestyle and Greco-Roman wrestlers, highlighting the importance of considering wrestling style when interpreting physical characteristics. Similarly, Demirkan et al. (2015) identified differences

in physical and physiological profiles across competitive levels, supporting the relevance of multidimensional assessment. Research examining elite wrestlers has also demonstrated that strength-power performance and wrestling-specific fitness indicators may distinguish athletes with different competitive achievements (Özbay & Ulupınar, 2022; Marković et al., 2021). These findings emphasize the importance of selecting assessment instruments that reflect both general physical capacities and the specific demands of wrestling.

Previous studies have increasingly examined the relationships among physiological characteristics, wrestling-specific fitness, and competitive performance. Chaabene et al. (2017) synthesized evidence indicating that anaerobic capacity, muscular strength, and aerobic fitness are relevant to high-level wrestling performance. Cieśliński et al. (2021), using data from elite wrestlers, identified several performance-related indicators, including anaerobic power, strength endurance, response time, special endurance, and technical wrestling skills. Similarly, Škugor et al. (2023) examined anthropometric characteristics and generic and wrestling-specific fitness measures in relation to competitive success among young wrestlers. Research on physiological responses during wrestling matches has also demonstrated substantial cardiovascular and metabolic demands (Chino et al., 2015; Ghorbani et al., 2015). Furthermore, studies involving repeated combat exposure indicate that physical performance and recovery should be considered when evaluating competitive preparedness (Kons et al., 2020). Collectively, these findings support comprehensive physical monitoring while demonstrating that competitive outcomes depend on multiple interacting performance characteristics.

Despite these contributions, the application of multidimensional physical fitness assessment within specific national competition settings requires further investigation. Existing research has primarily examined physiological differences between competitive levels, wrestling styles, or athletes with different performance classifications. However, these findings do not necessarily describe how athletes within a particular regional development program perform relative to institutional fitness standards before a major national competition. In Indonesia, the National Sports Games (*Pekan Olahraga Nasional*, PON) provide a relevant setting for evaluating athletes developed through provincial training programs. East Java wrestlers achieved seven gold, seven silver, and two bronze medals at the 2021 National Games, reflecting the region's established competitive presence. Nevertheless, an integrated description of pre-competition physical fitness characteristics and subsequent competitive outcomes at PON XXI 2024 remains valuable for identifying conditioning priorities. Research involving Colombian elite wrestlers has demonstrated the practical relevance of population-specific physical profiling for establishing training benchmarks (Ramírez-Vélez et al., 2014), while investigations of wrestling-specific assessment procedures highlight the importance of measurement validity when evaluating athlete preparedness (Marković et al., 2021).

Accordingly, the present study aimed to evaluate the pre-competition physical fitness profiles and describe the competitive outcomes of East Java wrestlers participating in the 2024 Indonesian National Games. The investigation involved 18 athletes competing in Greco-Roman, men's freestyle, and women's freestyle wrestling and examined muscular strength, muscular endurance, explosive power, speed, flexibility, and aerobic capacity using the provincial athlete monitoring program. Its principal contribution lies in presenting multidimensional physical fitness findings alongside documented competition outcomes within a specific national sporting context. Rather than establishing causal relationships between physical fitness and competitive success, this descriptive approach identifies reported conditioning strengths and limitations relative to institutional standards. The findings are expected to support individualized training priorities, improve athlete monitoring practices, and provide context-specific evidence for evaluating physical preparation among national-level wrestlers.

METHODS

Study Design

This study employed a quantitative descriptive design to evaluate the pre-competition physical fitness profiles and competitive outcomes of East Java wrestlers

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participating in the 2024 Indonesian National Games (*Pekan Olahraga Nasional*, PON XXI). The investigation involved the descriptive assessment of physical fitness characteristics before the competition and the documentation of subsequent competitive achievements. Physical fitness data were collected on May 8, 2024, at the East Java National Sports Committee (KONI) facility, while competitive outcomes were obtained from official records of PON XXI 2024, held in Aceh and North Sumatra. The study focused on describing athletes' physical preparedness relative to established fitness standards and documenting their competitive results without introducing experimental interventions or manipulating training conditions.

Participants

The study involved 18 wrestling athletes (12 men and 6 women) representing East Java at PON XXI 2024. Participants were members of the East Java Regional Training Center (*Pusat Latihan Daerah*, Puslatda) and competed in three wrestling disciplines: men's freestyle, women's freestyle, and Greco-Roman wrestling. All 18 athletes participating in the national competition were included in the descriptive evaluation. The study population therefore represented the East Java wrestling contingent participating in PON XXI 2024 rather than a randomly selected sample of Indonesian wrestlers. The athletes' physical fitness profiles were evaluated using assessment procedures implemented within the provincial sports development program.

Physical Fitness Assessment

Physical fitness was evaluated using a multidimensional testing battery implemented by the East Java National Sports Committee in collaboration with its sports science team. The assessment protocol was based on guidelines attributed to physical performance consultant Gregory Wilson and was designed to evaluate physical characteristics relevant to competitive wrestling. The reported assessments included muscular strength and endurance (sit-ups, Russian twists, single-leg squats, deadlifts, chin-ups, and clean and press), speed and explosive performance (20-m sprint, medicine ball throw, and square jump), flexibility (sit-and-reach, upper-body flexibility, and ankle flexibility), and aerobic capacity (multistage fitness test). The assessments were conducted under technical supervision on May 8, 2024. Physical fitness outcomes were interpreted in relation to the performance targets established by KONI East Java, including reported multistage fitness test targets of level 12 for male athletes and level 10 for female athletes. These assessments were intended to identify athletes' physical strengths and components requiring further conditioning before national-level competition.

Competitive Outcomes

Competitive outcomes were obtained from official wrestling competition records of PON XXI 2024. The evaluation focused on the East Java wrestling contingent's medal achievements, including the number of gold, silver, and bronze medals obtained during the competition. Medal distribution was used as the primary descriptive indicator of competitive achievement. The results were documented to provide an overview of the team's competitive outcomes following the pre-competition physical fitness assessment. Given the descriptive nature of the investigation, competition results were not interpreted as direct consequences of the measured physical fitness characteristics.

Statistical Analysis

The study was structured around descriptive analysis of physical fitness assessments and competitive outcomes. Physical fitness findings were evaluated against

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the performance targets established by KONI East Java to identify components meeting or falling below the expected standards. Competitive outcomes were summarized using medal frequencies and percentages. The analysis was intended to describe the physical characteristics and competitive achievements of the participating athletes rather than to test causal relationships between fitness indicators and competition success. No inferential statistical findings were reported in the available study documentation.

RESULTS AND DISCUSSION

Results

Physical Fitness Profiles of East Java Wrestlers

The pre-competition physical fitness assessment involved 18 East Java wrestlers, comprising 12 male and six female athletes competing in Greco-Roman, men's freestyle, and women's freestyle disciplines. The evaluation covered multiple physical fitness components, including muscular strength, muscular endurance, explosive power, speed, flexibility, and aerobic capacity. The assessment was conducted on May 8, 2024, as part of the athletes' preparation for the 2024 Indonesian National Games.

The descriptive findings indicated that the athletes generally demonstrated favorable muscular strength and power characteristics. Performance in the deadlift and clean and press assessments was reported to be consistent with the expected standards for competitive wrestlers, suggesting relatively favorable strength-related capabilities within the evaluated group. Similarly, the sit-up and Russian twist assessments indicated satisfactory performance in the evaluated trunk musculature. Nevertheless, the available results did not provide numerical scores or measures of variability for individual fitness components, limiting the extent to which differences between athletes and wrestling disciplines could be quantified.

Table 1. Overview of Pre-Competition Physical Fitness Assessment Results

Physical fitness component	Assessment	Reported findings
Muscular strength	Deadlift	Generally favorable performance relative to the reported standards
Muscular strength and power	Clean and press	Generally favorable performance relative to the reported standards
Trunk muscular endurance	Sit-up	Satisfactory performance
Trunk muscular endurance	Russian twist	Satisfactory performance
Lower-body strength/endurance	Single-leg squat	Numerical findings not reported
Upper-body strength/endurance	Chin-up	Numerical findings not reported
Sprint speed	20-m sprint	Numerical findings not reported
Upper-body explosive power	Medicine ball throw	Numerical findings not reported
Lower-body explosive performance	Square jump	Numerical findings not reported
Flexibility	Sit and reach	Numerical findings not reported
Upper-body flexibility	Upper-body flexibility test	Numerical findings not reported
Ankle mobility	Ankle flexibility test	Some athletes reportedly demonstrated limitations
Aerobic capacity	Multistage fitness test	Some athletes did not achieve the established targets

Achievement of Pre-Competition Physical Fitness Standards

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The evaluation of physical fitness against the standards established by the East Java National Sports Committee revealed differences across the assessed components. Although the athletes were generally reported to demonstrate satisfactory strength-related characteristics, some did not achieve the expected standards for aerobic capacity and flexibility. The multistage fitness test was used to assess aerobic fitness, with reported target levels of 12 for male athletes and 10 for female athletes. The original study also identified estimated maximal oxygen uptake targets of 54.1 and 47.1 $mL \cdot kg^{-1} \cdot min^{-1}$ for male and female athletes, respectively.

The findings indicated that aerobic fitness remained below the established targets for some athletes. Limitations were also reported in flexibility, particularly ankle mobility. However, the number of athletes who failed to achieve each standard and the magnitude of the differences between observed and target values were not specified in the available dataset. Consequently, the results identify potential areas requiring further physical conditioning but do not establish the prevalence or severity of these limitations within the evaluated group.

Table 2. Reported Aerobic Fitness Standards and Identified Conditioning Limitations

Assessment component	Male target	Female target	Reported outcome
Multistage fitness test	Level 12	Level 10	Some athletes did not meet the target
Estimated VO_2max	54.1 $mL \cdot kg^{-1} \cdot min^{-1}$	47.1 $mL \cdot kg^{-1} \cdot min^{-1}$	Individual results not reported
Ankle mobility	Not specified	Not specified	Limitations reported in some athletes
General flexibility	Not specified	Not specified	Some athletes did not meet expected standards

Competitive Outcomes at the 2024 Indonesian National Games

The East Java wrestling contingent achieved 14 medals at the 2024 Indonesian National Games, consisting of five gold, four silver, and five bronze medals. Gold and bronze medals each accounted for 35.71% of the total medal count, whereas silver medals represented 28.57%. These results reflected the team's competitive achievements across the wrestling events contested during the national competition.

The original study reported that 77.78% of the participating athletes reached podium positions. However, individual-level competition results were not provided to independently verify this proportion. Therefore, the present descriptive summary focuses on the documented medal distribution rather than assuming that the total number of medals corresponds directly to the number of individual medal-winning athletes.

Table 3. Medal Distribution of East Java Wrestlers at the 2024 Indonesian National Games

Medal category	Number of medals	Percentage (%)
Gold	5	35.71
Silver	4	28.57
Bronze	5	35.71
Total	**14**	**100.00**

Compared with the previous National Games in Papua in 2021, the East Java wrestling team recorded a reduction in total medal achievements. The number of gold medals decreased from seven to five, silver medals from seven to four, and bronze medals from two to five. Overall, the total medal count declined from 16 in 2021 to 14 in 2024, representing a reduction of two medals. Despite this decrease, the team maintained a substantial competitive presence at the national level.

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Table 4. Comparison of East Java Wrestling Medal Achievements at the 2021 and 2024 Indonesian National Games

Medal category	PON XX 2021	PON XXI 2024	Difference
Gold	7	5	−2
Silver	7	4	−3
Bronze	2	5	+3
Total	**16**	**14**	**−2**

The comparison is based on medal totals reported in the original manuscript. Differences were calculated as the 2024 medal count minus the 2021 medal count. These figures represent descriptive competition outcomes and should not be interpreted as evidence of changes in athletes' physiological performance.

Discussion

The present study evaluated the pre-competition physical fitness profiles and competitive outcomes of East Java wrestlers participating in the 2024 Indonesian National Games. The findings indicated generally favorable muscular strength and explosive power characteristics, while some athletes demonstrated limitations in aerobic capacity and flexibility relative to institutional assessment standards. These observations highlight the multidimensional nature of physical preparedness in wrestling, where different physiological attributes contribute to the execution and maintenance of demanding technical actions. Previous investigations have demonstrated that competitive wrestlers require a combination of maximal strength, anaerobic power, muscular endurance, and cardiorespiratory fitness to accommodate the intermittent high-intensity demands of competition (Callan et al., 2000; Yoon, 2002; Chaabene et al., 2017). Similarly, Mirzaei et al. (2021) demonstrated the importance of considering the temporal and energetic characteristics of wrestling competition when interpreting athletes' physical requirements. Nevertheless, the favorable strength-related characteristics observed in the present study should be interpreted descriptively because individual assessment scores and measures of variability were unavailable. Therefore, these findings provide an overview of reported physical preparedness rather than evidence of a specific physiological profile directly associated with medal achievement.

Muscular strength and explosive power represent essential physical attributes in wrestling because offensive and defensive techniques frequently require rapid force production, sustained muscular engagement, and effective control of an opponent's body position. The favorable performances reported in the deadlift and clean and press assessments suggest that strength-related capabilities were relatively well developed among the evaluated athletes. Similarly, satisfactory sit-up and Russian twist performances indicate favorable results in the assessed trunk musculature, although these tests do not independently establish functional core stability during wrestling techniques. Demirkan et al. (2015) identified differences in physical and physiological characteristics between elite and amateur wrestlers, supporting the relevance of strength-related assessments in competitive preparation. Özbay and Ulupınar (2022) further demonstrated that strength-power testing under fatigued conditions may help distinguish wrestlers with different competitive achievements. More recently, Cieśliński et al. (2021) identified strength endurance and anaerobic power among the factors associated with wrestling success. These findings support the continued development of muscular strength and power within individualized conditioning programs. However, the absence of numerical

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strength measurements in the present study prevents quantitative comparisons across wrestling disciplines, weight categories, and competitive outcomes.

Aerobic capacity emerged as an important conditioning consideration because some athletes reportedly failed to achieve the multistage fitness test targets established by KONI East Java. Although wrestling involves substantial anaerobic energy demands, aerobic fitness contributes to recovery between repeated high-intensity efforts and may support the maintenance of physical performance throughout successive competitive exchanges. Yoon (2002) identified aerobic and anaerobic characteristics as relevant components of the physiological profiles of elite wrestlers, while Chaabene et al. (2017) emphasized the importance of cardiorespiratory fitness for sustaining effort and facilitating recovery. Chino et al. (2015) documented substantial exercise intensity during freestyle wrestling matches, highlighting the physiological demands imposed by competitive exchanges. Similarly, Ghorbani et al. (2015) examined blood lactate responses and recovery strategies in wrestlers, demonstrating the relevance of metabolic recovery following intense exercise. These findings support continued aerobic conditioning and systematic endurance monitoring. Nevertheless, the present study cannot establish the magnitude of individual aerobic limitations because numerical test results were unavailable. Furthermore, the reported multistage fitness test targets require clarification regarding their assessment procedures and estimated oxygen uptake conversions.

Flexibility and joint mobility were additional components identified as potential limitations among some participating athletes, particularly in assessments involving the ankle joint. Wrestling requires substantial changes in body position, dynamic weight transfer, and coordinated movement across multiple joints. Adequate mobility may facilitate the execution of technical movements under demanding positional conditions, although the functional requirements vary according to wrestling style, technique, and individual characteristics. Demirkan et al. (2014) demonstrated differences in selected physical fitness characteristics between freestyle and Greco-Roman wrestlers, supporting the importance of considering discipline-specific requirements during athlete evaluation. Chaabene et al. (2017) also indicated that flexibility should be interpreted as one component of a broader physical fitness profile rather than an isolated determinant of wrestling success. Accordingly, the reported mobility limitations suggest that joint-specific assessment should remain part of comprehensive physical preparation. However, the present findings do not establish whether reduced ankle mobility affected technical execution, movement efficiency, or injury occurrence. Therefore, flexibility results should be interpreted as indicators of potential conditioning priorities rather than direct evidence of reduced competitive effectiveness.

The East Java wrestling contingent secured 14 medals at the 2024 Indonesian National Games, comprising five gold, four silver, and five bronze medals. Compared with the 2021 competition, the team obtained two fewer medals overall, with reductions in gold and silver medals and an increase in bronze medals. Although these outcomes document the team's competitive achievements, they should not be interpreted as direct consequences of the measured physical fitness characteristics. Competitive wrestling performance is multifactorial and depends on technical proficiency, tactical decision-making, psychological readiness, opponent characteristics, and physical preparedness. Cieśliński et al. (2021) demonstrated that wrestling success is associated with a combination of physiological and technical performance indicators rather than a single physical attribute. Similarly, Škugor et al. (2023) examined the contribution of

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anthropometric characteristics and generic and wrestling-specific fitness measures to competitive success among young wrestlers. These findings emphasize the importance of integrating physical assessment with broader performance evaluation. Consequently, the medal distribution observed in the present study should be interpreted as a descriptive competitive outcome rather than evidence that favorable strength-related characteristics directly produced competitive success.

The findings also highlight the importance of selecting valid and sport-specific assessment procedures when monitoring wrestling athletes. Although conventional tests such as deadlifts, chin-ups, sprinting, and multistage fitness assessments provide useful information about general physical capacities, their ability to represent the integrated demands of wrestling techniques may be limited. Marković et al. (2021) investigated the validity of a wrestling-specific fitness test and demonstrated its potential utility for assessing sport-specific physical preparedness. Similarly, research on competitive wrestling has emphasized the importance of evaluating physiological responses and performance under conditions that reflect the demands of repeated combat (Kons et al., 2020). These findings suggest that future monitoring programs should consider combining general physical fitness tests with wrestling-specific assessments, including repeated technical actions, strength endurance, and recovery-related indicators. However, the selection of additional tests should be guided by established validity, reliability, feasibility, and relevance to the athletes' competitive characteristics. Such an approach may improve the practical interpretation of physical fitness profiles and strengthen evidence-informed training decisions.

The principal contribution of this study lies in documenting multiple physical fitness components alongside subsequent competitive outcomes within a provincial wrestling development program. The findings identify aerobic fitness and joint mobility as potential areas requiring further evaluation while indicating generally favorable strength-related characteristics. However, several limitations should be acknowledged. First, the descriptive observational design prevents causal inferences regarding relationships between physical fitness and competitive success. Second, the relatively small sample was restricted to 18 athletes from a single provincial contingent, limiting generalizability. Third, the absence of individual fitness scores, measures of variability, and discipline-specific results prevented detailed quantitative comparisons. Fourth, potential differences in age, weight category, training history, and competitive experience were not examined. Finally, technical, tactical, psychological, and opponent-related factors were not included in the analysis. Future investigations should employ longitudinal monitoring, standardized testing protocols, and individual-level competition data to examine associations between physiological characteristics and competitive performance. Integrating general and wrestling-specific fitness assessments may provide a more comprehensive understanding of athlete preparedness and support the development of individualized conditioning strategies.

CONCLUSION

This study provides a descriptive evaluation of pre-competition physical fitness profiles and competitive outcomes among East Java wrestlers participating in the 2024 Indonesian National Games. The findings revealed generally favorable muscular strength and power characteristics, although some athletes did not achieve the established aerobic fitness and flexibility standards. The wrestling contingent secured 14 medals, comprising five gold, four silver, and five bronze, reflecting its competitive achievements at the national level. These findings highlight the practical relevance of multidimensional

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physical fitness assessments for identifying individual conditioning priorities and supporting systematic athlete monitoring. In particular, aerobic capacity and joint mobility warrant further evaluation within individualized training programs. However, the descriptive design and limited availability of individual-level data prevent conclusions regarding direct associations between physical fitness characteristics and competitive success. Future research should incorporate longitudinal monitoring and comprehensive performance indicators to clarify the contribution of specific physiological attributes to competitive wrestling outcomes.

REFERENCES

Baechle, T. R., & Earle, R. W. (Eds.). (2008). *Essentials of strength training and conditioning* (3rd ed.). Human Kinetics.

Balyi, I., Way, R., & Higgs, C. (2013). *Long-term athlete development*. Human Kinetics.

Bompa, T. O., & Haff, G. G. (2009). *Periodization: Theory and methodology of training* (5th ed.). Human Kinetics.

Callan, S. D., Brunner, D. M., DeVolve, K. L., Mulligan, S. E., Hesson, J., Wilber, R. L., & Kearney, J. T. (2000). Physiological profiles of elite freestyle wrestlers. *Journal of Strength and Conditioning Research, 14*(2), 162–169. https://doi.org/10.1519/00124278-200005000-00008

Chaabene, H., Negra, Y., Bouguezzi, R., Mkaouer, B., Franchini, E., Julio, U., & Hachana, Y. (2017). Physical and physiological attributes of wrestlers: An update. *Journal of Strength and Conditioning Research, 31*(5), 1411–1442. https://doi.org/10.1519/JSC.0000000000001738

Chino, K., Saito, Y., Matsumoto, S., Ikeda, T., & Yanagawa, Y. (2015). Investigation of exercise intensity during a freestyle wrestling match. *The Journal of Sports Medicine and Physical Fitness, 55*(4), 290–296.

Cieśliński, I., Gierczuk, D., & Sadowski, J. (2021). Identification of success factors in elite wrestlers—An exploratory study. *PLOS ONE, 16*(3), Article e0247565. https://doi.org/10.1371/journal.pone.0247565

Coapstick, G.-J. A., Barry, A. M., Levesque, C. L., & Shoemaker, M. E. (2024). Nutrient intake, performance, and body composition of preseason wrestlers. *International Journal of Exercise Science, 17*(2), 517–530. https://doi.org/10.70252/DJES3022

Demirkan, E., Koz, M., Kutlu, M., & Favre, M. (2015). Comparison of physical and physiological profiles in elite and amateur young wrestlers. *Journal of Strength and Conditioning Research, 29*(7), 1876–1883. https://doi.org/10.1519/JSC.0000000000000833

Demirkan, E., Kutlu, M., Koz, M., Ozal, M., & Favre, M. (2014). Physical fitness differences between freestyle and Greco-Roman junior wrestlers. *Journal of Human Kinetics, 41*, 245–251. https://doi.org/10.2478/hukin-2014-0052

Ghorbani, S., Mohebbi, H., Safarimosavi, S., & Ghasemikaram, M. (2015). The effect of different recovery methods on blood lactate removal in wrestlers. *The Journal of Sports Medicine and Physical Fitness, 55*(4), 273–279.

Horswill, C. A. (1992). Applied physiology of amateur wrestling. *Sports Medicine, 14*(2), 114–143. https://doi.org/10.2165/00007256-199214020-00004

Kons, R. L., Orssatto, L. B. R., & Detanico, D. (2020). Acute performance responses during repeated matches in combat sports: A systematic review. *Journal of Science and Medicine in Sport, 23*(5), 512–518. https://doi.org/10.1016/j.jsams.2019.12.004

Kutlu, M., Demirkan, E., & Özbek, M. E. (2015). Assessments of world and national level wrestling teams at a pre world championship competition: Hydration, body

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composition and body mass alterations. *The Journal of Sports Medicine and Physical Fitness, 55*(4), 305–312.

Marković, M., Kukić, F., Dopsaj, M., Kasum, G., Toskić, L., & Zarić, I. (2021). Validity of a novel specific wrestling fitness test. *Journal of Strength and Conditioning Research, 35*(12S), S51–S57.

Mirzaei, B., Faryabi, I., & Alizaei Yousefabadi, H. (2021). Time-motion analysis of the 2017 Wrestling World Championships. *Pedagogy of Physical Culture and Sports, 25*(1), 24–30. https://doi.org/10.15561/26649837.2021.0104

Özbay, S., & Ulupınar, S. (2022). Strength-power tests are more effective when performed after exhaustive exercise in discrimination between top-elite and elite wrestlers. *Journal of Strength and Conditioning Research, 36*(2), 448–454. https://doi.org/10.1519/JSC.0000000000003456

Ramírez-Vélez, R., Argothyd, R., Meneses-Echavez, J. F., Sánchez-Puccini, M. B., López-Albán, C. A., & Cohen, D. D. (2014). Anthropometric characteristics and physical performance of Colombian elite male wrestlers. *Asian Journal of Sports Medicine, 5*(4), Article e23810. https://doi.org/10.5812/asjsm.23810

Škugor, K., Gilić, B., Karninčić, H., Jokai, M., Babszky, G., Ranisavljev, M., Štajer, V., Roklicer, R., & Drid, P. (2023). What determines the competitive success of young Croatian wrestlers: Anthropometric indices, generic or specific fitness performance? *Journal of Functional Morphology and Kinesiology, 8*(3), Article 90. https://doi.org/10.3390/jfmk8030090

Yoon, J. (2002). Physiological profiles of elite senior wrestlers. *Sports Medicine, 32*(4), 225–233. https://doi.org/10.2165/00007256-200232040-00002

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