

Analysis of the vo2max physical condition of tarung derajat athletes through yoyo test: Preparation for pre-PON XX

by Novi Yanti

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Analysis of the vo2max physical condition of tarung derajat athletes through yoyo test: Preparation for pre-PON XX

Novi Yanti^{1abcde*} , Uray Gustian^{1acde} , Ruslan Abdul Gani^{2acd} ,
Edi Setiawan^{3acd} 

Universitas Tanjungpura, Indonesia¹
Universitas Singaperbangsa Karawang, Indonesia²
Universitas Suryakencana, Indonesia³

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ABSTRACT

During the current Covid-19 pandemic crisis, it found that Vo2max possessed by Tarung Derajat athletes has decreased significantly during training, therefore the purpose of this study was to analyze the level of Vo2max physical condition of Tarung Derajat athletes. This study used a quantitative approach through the survey method. The sample in this study were all Tarung Derajat martial arts athletes who took part in the XX Pre-PON championship, with a total of 24 athletes. This study used total sampling technique and obtained 24 athletes as samples. The instrument applied in this study was Yoyo Test and data were analyzed by using Microsoft Excel 2010. The results showed that most of the female athletes had a poor physical condition, while the physical condition of some male athletes was in the good category, some were in the very good category. Thus, it was still need an improvement, especially studies in the preparation of training programs, in improving physical condition, particularly for female athletes. The contribution of the results of this research will be able to increase understanding and information for trainers in order to achieve maximum performance.

Keywords: Physical condition; vo2max; tarung derajat



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Corresponding Author: Novi Yanti, Department of Physical Education, Faculty of Teacher Training and Education, Universitas Tanjungpura, Pontianak, Indonesia
Email: noviyanti@fkip.untan.ac.id

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Authors' Contribution: a – Study Design; b – Data Collection; c – Statistical Analysis; d – Manuscript Preparation; e – Funds Collection

INTRODUCTION

Currently, every kind of sport in Indonesia is carrying out preparation in facing the Pre-PON XX, including the Tarung Derajat martial arts sport. This sport is characterized as self-defense with fast movements (Forenza, Alnedral, Masrun, & Sari, 2020, 2014), realistic, rational (Chairad, 2014), and it is included as a high-intensity sport. In preparing athletes who would take part in the XX Pre-PON event, a coach must pay attention to several factors, such as basic techniques (Yulianto, 2015), and the physical conditions possessed by each athlete. Even that, it was explained by several experts that in order to obtain high achievements, they must pay attention to several aspects, including technique, tactics, mental and

physical conditions, so that later they could greatly support the achievement of success (Rumini, 2015; Setiawan et al., 2020). According to previous studies that mentioned in order to achieve optimal performance in the Tarung Derajat martial sport, the factor that must be considered by each coach was to evaluate the level of physical condition of each athlete (Setiawan & Allsabab, 2018). A recent study has reported that by analyzing the level of physical condition among athletes, coaches can obtain a depth picture to prepare training programs that were intended for physical conditions (Jiang et al., 2018; Ramirez-Campillo et al., 2021), so that later they can maximize preparation in facing Pre-PON XX.

One of the physical conditions that is very dominant and supports the athlete's performance when practicing or competing is the physical condition of Vo2max which is basically the main capital for athletes. The quality of Vo2max is very decisive from the quality of athlete's body work, thus it is expected that the quality of Vo2max of an athlete should be better than ordinary people or non athlete (Debbian & Rismayanthi, 2016). Vo2max is the maximum ability of oxygen intake that can be used by the body. This means that if the lung has a more capacity to collect oxygen, the athlete will have a longer endurance or not easy to get fatigue (Nugraheni et al, 2017). Basically, the body needs oxygen for fuel, especially for muscles when carrying out activities, both heavy motion activities and light motion activities (Nirwandi, 2017). With a good Vo2max physical condition, athletes can optimally receive and carry out a good training program (Yanti, 2020). During the current Covid-19 pandemic crisis, the Vo2max aspect has decreased drastically (Christensen et al., 2021), due to several factors: infrequent exercise, social and physical distancing and isolation. Thus, this aspect was considered important in this study.

Previous researches related to Vo2max have been documented, for example analyzing the physical abilities of athletes (Reo, Dhedhy, & Rizky, 2019; Yanti, 2020; Putra & Ita, 2019; Forenza, Alnedral, Masrun, & Sari, 2020; Rusmanto, Ginanjar, & Ramadhan, 2020; Putri, 2020; Ariestika, Widiyanto & Nanda, 2020; Afshari, Rami, Angali, Shirali, & Azadi, 2021). Meanwhile, research conducted by Bahtra, Asmawi, Widiastuti, and Dlis (2020) analyzed the Vo2max of soccer athletes. Then Gönülateş (2018) analyzed the differences in the Vo2max values of athletes in the field and in the laboratory. Meanwhile, Kostic (2017) tried to analyze the difference in Vo2max capacity between athletes and non-athletes. However, according to our knowledge, no one has reported on the analysis of Vo2max levels in Tarung Derajat athletes during the COVID-19 pandemic crisis and this study offers different point of view from previous research, namely analyzing athletes' Vo2max levels using the Yoyo Test. Therefore, the purpose of this study was to analyze the Vo2max level of Tarung Derajat athletes through the Yoyo Test.

METHOD

This study used a quantitative approach with a survey method (Nopiyanto & Dimyati, 2018), to analyze the Vo2max level among Tarung Derajat athletes. The population in this study was 24 people, and the sampling technique was total sampling, so that the entire population, namely Tarung Derajat martial arts athletes who took part in the 2019 National Sports Week Prequalification (Pre-PON) championship with a total of 24 athletes including 11 female athletes and 13 male athletes were selected as samples in this study.

In collecting data, the researcher used a test method to measure the Vo2max ability of the West Kalimantan Tarung Derajat martial arts athlete using the Yoyo Test (Schmitz, Pfeifer, Kreitz, Borowski, Faldum & Brand, 2018; Pickering, Kiely, Suraci & Collins, 2018; Setiawan et al., 2021). The study was conducted on March 17, 2019 at the SSA KONI Athletic Field Stadium, West Kalimantan Province. The data obtained were normalized with the level of physical fitness based on the age level. Then, data was analyzed based on the prevailing norms. In this study using, data was analyzed by using Microsoft Excel 2010 in the form of percentage calculations (%) consisting of data recapitulation of the physical condition of male athletes and female athletes. Detail data is presented in the diagram.

RESULTS AND DISCUSSION

Based on the study results, the Tarung Derajat female athletes were in the poor category at 36.4%. Some were in the fair and good category, while the male athletes in Tarung Derajat were in the average and good categories at 30.8%, but some were in the very good category at 15.4%. The scoring were based on the

category is presented in Table 2. Furthermore, the results of the Vo2max physical condition test data are presented in Table 3. The recapitulation of percentage calculation results is presented in Table 4 and Table 5.

Table 2. Scoring based on Category

Category	Score
Very Poor	1
Poor	2
Fair	3
Average	4
Good	5
Excelent	6
Superior	7

Table 3. Data on Physical Condition Test Results (VO2Max)

No.	F/M	Age	Vo2max	Category
1.	P	17	9.3	5
2.	L	25	8.3	4
3.	P	17	8.4	4
4.	P	19	5.2	2
5.	L	17	10.1	5
6.	L	29	10.10	6
7.	L	30	7.10	4
8.	P	24	7.2	3
9.	P	28	6.4	3
10.	L	17	10.2	5
11.	L	19	9.4	4
12.	L	23	10.4	5
13.	L	24	12.2	6
14.	L	24	10.1	5
15.	L	14	4.5	1
16.	P	13	7.1	5
17.	P	14	5.8	3
18.	P	15	4.7	2
19.	P	23	5.2	2
20.	L	16	8.8	4
21.	L	29	7.2	3
22.	P	13	6.3	5
23.	P	18	5.7	2
24.	L	28	7.1	3

Table 4. Data Recapitulation of Physical Condition (VO2Max) Based on Age and Gender

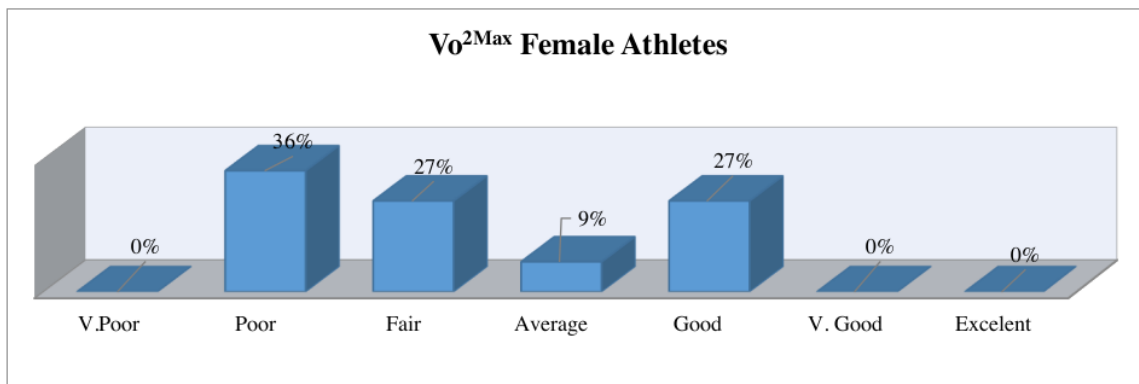
Female		
Classification	Total	Percentage
Very Poor	0	0%
Poor	4	36.4 %
Fair	3	27.3 %
Average	1	9%
Good	3	27.3 %
Very Good	0	0%
Excelent	0	0%
Total	11	100%

Table 5. Data Recapitulation of Physical Condition (VO2Max) Based on Age and Gender

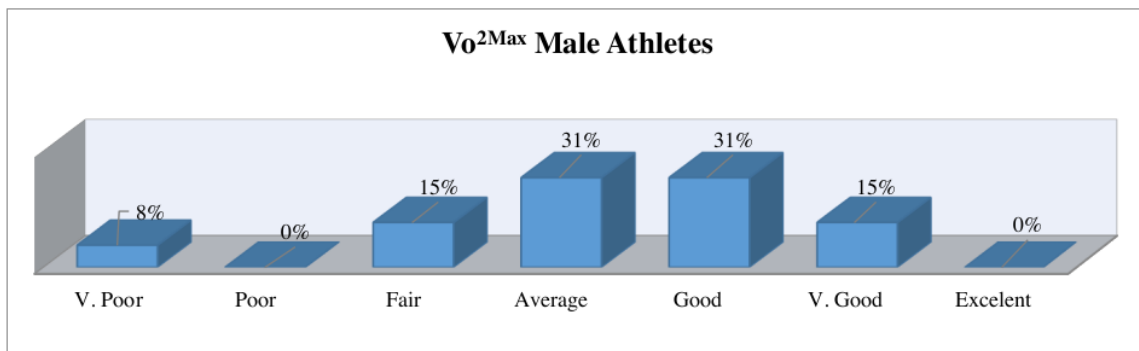
Male		
Classification	Total	Percentage
Very Poor	1	7.6 %
Poor	0	0%
Fair	2	15.4 %
Average	4	30.8 %
Good	4	30.8 %
Very Good	2	15.4 %
Excelent	0	0%
Total	13	100%

Based on data that presented in Tables 2, 3, and 4, it shows that the results of the Vo2max physical condition test for Tarung Drajat martial arts athletes in West Kalimantan in the female category, 0% was in excellent and very good category, 3 people (27.3%) were in the good category, 1 person (9%) was in the average category, 3 people (27.3%) in the fair category, 4 people (36.4%) in the poor category, and 0% in the very poor category.

The physical condition test results (vo2max) for martial arts athletes Tarung Drajat, West Kalimantan, in the male category show that 0% in excellent category, 2 people 15.4% in the very good category, 4 people 30.8% in the good category, 4 people 30.8% in the average category, 2 people 15.4% in the fair category, 0% in the poor category, and 1 person 7.6% in the very poor category. Detailed data is presented in the form of a histogram depicted in Graph.1 and Graph.2.



Graph 1. Histogram Diagram of the VO²max Condition Among Female Athletes Involved in Pre-PON Tarung Drajat, West Kalimantan



Graph 2. Histogram Diagram of The VO²max Condition Among Male Athletes Involved in Pre-PON Tarung Drajat, West Kalimantan

Based on data described in Tables 2, 3, 4, along with Figures 1 and 2, it can be concluded that the female athletes in Tarung Drajat martial arts sport in the poor category or less than 36.4%. Some of these female athletes were in the fair and good category, while the male athletes in Tarung Drajat sport in the average and good categories at 30.8%, but some of them were in the very good category at 15.4%. Thus, in order to be able to compete in the Pre-PON and PON National championship events, it is very necessary to pay attention to improving physical condition (VO₂max), which can enhance performance when competing and obtain maximum achievement (Christensen et al., 2021).

This study aims to analyze the VO₂max level of Tarung Derajat athletes through the Yoyo Test. The results of this study indicate that female athletes in the martial arts sport were in the poor category or less than 36.4% while for male athletes were in the moderate and good categories. The results of this study are in line with and support previous research that had been carried out by Setiawan and Allsabah (2017) regarding the physical condition of the Kediri City fighting martial arts athletes. There was 67% of athletes included in the sufficient category, 33% of athletes were in the poor category, 11% of athletes were in the good category, and 11% of athletes were in the very good category. In the future, the related party need to pay attention to the regular monitoring of measurement agenda. Similar results were reported by Putra and Ita's research, (2019), which found that the physical condition of Papuan athletes, in facing PON XX Papua, especially for Tarung Derajat athletes in the VO₂max aspect. It was found that male athletes were in the poor condition category with a total of 12 athletes. (66.67%), for the most female athletes in very poor condition with a total of 7 people (58.33%), from the research data it was concluded that the physical condition of Papuan athletes was not good enough. Based on the calculation results it was found that the majority athletes were in the poor and very poor categories. This results show that there was a homework to improve physical quality of Papua athletes.

Based on this study results and supported by data from previous studies, it confirms that ability to supply oxygen to the body is the key in determining the application or function of these fuels in carrying out activities and determining success. In other words, if the athletes train harder, so they will inhale oxygen or breathe faster which could increase the supply of oxygen, and enabling aerobic energy formation. Giriwijoyo and Sidik (2013) explained that VO₂max is an illustration of a person's aerobic capacity in physical activity. The body's ability to absorb oxygen optimally can affect the performance of the body's muscles and resulting a very good impact, which can minimize the remaining substances that can cause fatigue. One way to measure VO₂max is based on the quantity of oxygen that can be absorbed in liters per minute or (l/min), or by using the calculation of the quantity of oxygen is absorbed in milliliters of body weight and calculated in kilograms per minute or (ml/kg/min) (Fuadi & Jatmiko, 2020). Thus, if the VO₂max possessed by an athlete is higher, it will result a better ability of endurance and stamina (Nugraheni et al. 2017). It is also reinforced by Ibikunle and Enumah (2016) in their research which focused on heart rate response, blood pressure response, and VO₂max prediction. Based on this study it can be stated that high VO₂max is a major indicator in aerobic fitness, heart health, and endurance performance.

1 CONCLUSION

Based on the results of this research and discussion as described above, it can be concluded that the physical condition (VO₂max) of the athletes involved Pre-PON XX martial arts sport of Tarung Derajat West Kalimantan for Male was categorized in the good condition. Meanwhile, female athletes were categorized as inadequate condition. The research contributes to existing knowledge and provides material for evaluation and study in the preparation of training programs, especially to improve the physical condition of female athletes to be even better in the future according to the expected target. In addition, it can facilitate the coach in conducting a more in-depth assessment to improve the points of supporting sports achievement and development in further research. The principal limitation of this analysis was the small number of research sample. It is expected that in the future, the researcher could use more Tarung Derajat athletes from several regions in Indonesia or conduct survey research with a cross-sectional design.

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CONFLICT INTEREST

All authors declare that there is no conflict of interest whatsoever in this research.

REFERENCES

- Afshari, D., Rami, M., Angali, K. A., Shirali, G., & Azadi, N. (2021). A Model for Estimating the Physical Work Capacity Based on Anthropometric Components and Body Composition: A Pilot Study Based on Measuring the Maximum Oxygen Consumption on Direct Method. *Journal of Occupational Hygiene Engineering*, 8(2), 1-7. <https://doi.org/10.52547/johe.8.2.1>
- Ariestika, E., Widiyanto, W., & Nanda, F. A. (2020). Physical activities and vo2 max: Indonesian national team, is there a difference before and after covid-19?. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 6(3), 763-778. https://doi.org/10.29407/js_unpgri.v6i3.14972
- Bahtra, R., Asmawi, M., Widiastuti., Dlis, F. (2020). Improved VO2Max: The Effectiveness of Basic Soccer Training at a Young Age. *International Journal of Human MoveMent and Sports Sciences*, 8(3), 97-102. <https://doi.org/10.13189/saj.2020.080304>
- Candra, O. (2020). Tingkat Kemampuan Vo2Max Pada Atlet Bola Basket Puteri POMNAS Riau. *Journal Sport Area*, 5(2), 106–115. [https://doi.org/10.25299/sportarea.vol\(\).3761](https://doi.org/10.25299/sportarea.vol().3761)
- Christensen, R. A., Arneja, J., St. Cyr, K., Sturrock, S. L., & Brooks, J. D. (2021) The association of estimated cardiorespiratory fitness with COVID-19 incidence and mortality: A cohort study. *PLoS One*, 16(5), e0250508. <https://doi.org/10.1371/journal.pone.0250508>
- Chairad, M. (2014). Sejarah dan Perkembangan Beladiri Tarung Derajat. *Jurnal Ilmu Keolahragaan*, 13(2), 38–44.
- Debbian, A., & Rismayanthi, C. (2016). Profil Tingkat Volume Oksigen Maskimal (Vo2 Max) dan Kadar Hemoglobin (Hb) Pada Atlet Yongmoodo Akademi Militer Magelang. *Jurnal Olahraga Prestasi*, 12(2), 19-30. <https://doi.org/10.21831/jorpres.v12i2.11874>
- Forenza, D., Alnedral, A., Masrun, M., & Sari, D. P. (2020). Profil Tingkat Kondisi Fisik Atlet Beladiri Tarung Derajat Kota Sungai Penuh. *Jurnal Patriot*, 2(4), 1104–1117.
- Fuadi, A. R. N., & Jatmiko, T. (2020). Pengaruh High Intensity Interval Training (HIIT) dan Fartlek Terhadap VO2max Tim Futsal SMK Negeri 1 Surabaya. *Jurnal Prestasi Olahraga*, 3(4), 1-6.
- Giriwijoyo, S., & Sidik, D. Z. (2013). *Ilmu Faal Olahraga (Fisiologi Olahraga): Fungsi Tubuh Manusia Pada Olahraga Untuk Kesehatan dan Prestasi*. PT Remaja Rosdakarya.
- Gönülateş, S. (2018). Analysis of Difference between the VO2max Values in Field and Laboratory Tests. *Universal Journal of Educational Research*, 6(9), 1938-1941. <https://doi.org/10.13189/ujer.2018.060912>
- Hambali, H., Syamsulrizal, S., & Ifwandi, I. (2015). Komponen Mendasar Kondisi Fisik Atlet Tarung Derajat Kota Banda Aceh. *Jurnal Ilmiah Mahasiswa Pendidikan Jasmani, Kesehatan dan Rekreasi*, 1(2), 30-40.
- Hariyanti, M. A., Rahayu, N. I., & Pitriani, P. (2020). Hubungan kadar hemoglobin dan vo2max pada atlet softball putra. *JTIKOR (Jurnal Terapan Ilmu Keolahragaan)*, 5, 16-21. <https://doi.org/10.17509/jtikor.v5i1.24191>

- Hidayatulloh, D. T., Asmawi, M., Sujiono, B., & Jakarta, U. N. (2018). Model Latihan Berbasis Permainan Meningkatkan Daya Tahan Cardiorespiratory Atlet Pencak silat Usia SMP. *Journal Sport Area*, 3(2), 131–139. [https://doi.org/10.25299/sportarea.2018.vol3\(2\).1947](https://doi.org/10.25299/sportarea.2018.vol3(2).1947)
- 2 Huang, C., Wang, J., Deng, S., She, Q., & Wu, L. (2016). The Effects Of Aerobic Endurance Exercise On Pulse Wave Velocity And Intima Media Thickness In Adults: A Systematic Review And Meta-Analysis. *Scandinavian Journal of Medicine & Science in Sports*, 26(5), 478–487. <https://doi.org/https://doi.org/10.1111/sms.12495>
- Ibikunle, P. O., & Enumah, U. G. (2016). Maximum Oxygen Uptake and Cardiovascular Response of Professional Male Football and Basketball Players to Chester Step Test. *IOSR Journal of Sports and Physical Education (IOSR-JSPE)*, 3(4), 1–5.
- Jiang, B., Sun, H., Rai, W., Li, H., Wang, Y., Xiong., H & Wang., Niang. (2018). Data Analysis of Soccer Athletes' Physical Fitness Test Based on Multi-View Clustering. In *Journal of Physics: Conference Series* (Vol. 1060, No. 1, p. 012024). IOP Publishing
- 2 Kang, S.-J., Kim, E., & Ko, K.-J. (2016). Effects of aerobic exercise on the resting heart rate, physical fitness, and arterial stiffness of female patients with metabolic syndrome. *Journal of Physical Therapy Science*, 28(6), 1764–1768.
- Karyono, T. (2016). Pengaruh Metode Latihan dan Power Otot Tungkai Terhadap Kelincahan Bulutangkis. *Jorpres (Jurnal Olahraga Prestasi)*, 12(1), 49-62. <https://doi.org/10.21831/jorpres.v12i1.9496>
- Kostic, V. (2017). Differences in aerobic capacity and spirometric parameters between athletes and nonathletes: PS099. *Porto Biomedical Journal*, 2(5), 184. <https://doi.org/10.1016/j.pbj.2017.07.022>
- Mansur, L. K., Irianto, J. P., & Mansur, M. (2018). Pengaruh latihan squat menggunakan free weight dan gym machine terhadap kekuatan, power, dan hypertrophy otot. *Jurnal Keolahragaan*, 6(2), 150–161. <https://doi.org/10.21831/jk.v6i2.16516>
- Milanović, Z., Pantelić, S., Sporiš, G., Mohr, M., & Krstrup, P. (2015). Health-Related Physical Fitness in Healthy Untrained Male: Effects on VO₂max, Jump Performance and Flexibility of Soccer and Moderate-Intensity Continuous Running. *PloS One*, 10(8), e0135319. <https://doi.org/10.1371/journal.pone.0135319>
- 3 Nirwandi. (2017). Tinjauan Tingkat VO₂Max Pemain Sepakbola Sekolah Sepakbola Bima Junior Kota Bukit Tinggi. *Jurnal PENJAKORA*, 4(2), 18–27. <http://dx.doi.org/10.23887/penjakora.v4i2.13362>
- Nopiyanto, Y. E., & Dimiyati, D. (2018). Karakteristik psikologis atlet sea games indonesia ditinjau dari jenis cabang olahraga dan jenis kelamin. *Jurnal Keolahragaan*, 6(1), 69–76. <https://doi.org/10.21831/jk.v6i1.15010>
- Noviatmoko, F. (2016). Analisis komponen kondisi fisik dominan dalam cabang olahraga tarung derajat. *Jurnal Kesehatan Olahraga*, 4(4), 441 - 449.
- 3 Nugraheni, H., Marijo, M., & Indraswari, D. (2017). Perbedaan nilai vo₂max antara atlet cabang olahraga permainan dan bela diri. *Jurnal Kedokteran Diponegoro*, 6(2), 622–631. <https://doi.org/10.14710/dmj.v6i2.18580>
- Nugroho, A. (2012). Standarisasi Status Kondisi Fisik Atlet Cabor Perorangan Koni Daerah Istimewa Yogyakarta. *Jorpres (Jurnal Olahraga Prestasi)*, 8(2), 49–63. <https://doi.org/10.21831/jorpres.v8i2.10293>
- 1 Patah, I. A., Jumareng, H., Setiawan, E., Aryani, M., & Gani, R. A. (2021). The importance of physical fitness for pencak silat athletes: Home-based weight training tabata and circuit can it work? *Journal Sport Area*, 6(1), 86–97. [https://doi.org/10.25299/sportarea.2021.vol6\(1\).6172](https://doi.org/10.25299/sportarea.2021.vol6(1).6172)

- Pickering, C., Kiely J., Suraci B., Collins D. (2018) The magnitude of Yo-Yo test improvements following aerobic training intervention are associated with total genotype score. *PLoS One*, 13(11), e0207597. <https://doi.org/10.1371/journal.pone.0207597>
- 4 Pramata, A. (2016). Analisis Kemampuan Vo2max Pada Atlet Karate Ranting Permata Sidoarjo. *Jurnal Kesehatan Olahraga*, 4(4), 1–7.
- Purba, P. H. (2016). Profil Kondisi Fisik dan Motivasi Berprestasi Atlet Karate Sumut Persiapan Pra-PON Tahun 2015. *Journal Generasi Kampus*, 9(1), 72–87.
- Putra, M. F. P., & Ita, S. (2019). Gambaran Kapasitas Fisik Atlet Papua: Kajian Menuju PON XX Papua. *Jurnal Keolahragaan*, 7(2), 135–145. <https://doi.org/10.21831/jk.v7i2.26967>
- Putri, A., & (2020). Profil Kondisi Fisik Atlet Tarung Derajat (KODRAT) Satlat 01 Lubuk Sikaping Kab. Pasaman. *Jurnal JPDO*, 3(6), 24–31.
- Rahmad, H. A. (2016). Pengaruh Penerapan Daya Tahan Kardiovaskuler (Vo2max) Dalam Permainan Sepakbola Ps Bina Utama. *Curricula: Journal of Teaching and Learning*, 1(2), 23-32.
- Ramadhoni, H. (2018). Evaluasi Kondisi Fisik Atlet Tarung Derajat Kota Padang. *Jurnal JPDO*, 1(1), 40–45.
- Ranadive, S. M., Yan, H., Lane, A. D., Kappus, R. M., Cook, M. D., Sun, P., ... Wilund, K. R. (2016). Aerobic Exercise Training and Arterial Changes In African-Americans Versus Caucasians. *Journal Medicine and Science In Sports and Exercise*, 48(1), 90. <https://doi.org/10.1249/MSS.0000000000000742>
- Ramirez-Campillo, R., Andrade, D. C., García-Pinillos, F., Negra, Y., Boullosa, D., & Moran, J. (2021). Effects of jump training on physical fitness and athletic performance in endurance runners: A meta-analysis. *Journal of sports sciences*, 39(18), 1–21. <https://doi.org/10.1080/02640414.2021.1916261>
- Reo, P., Dhedhy, Y., & Rizky, M. Y. (2019). Analisis Kondisi Fisik Atlet Puslatkot Kota Kediri dalam Rangka Menuju “Kediri Emas” di Porprov 2019. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 5(2), 342–353. https://doi.org/10.29407/js_unpgri.v5i2.13758
- Rumini, R. (2015). Manajemen Pembinaan Cabang Olahraga Atletik di Pusat Pendidikan dan Latihan Pelajar (PPLP) Provinsi Jawa Tengah. *Journal of Physical Education Health and Sport*, 2(1), 20–27. <https://doi.org/10.15294/INAPES.V1I2.43101>
- Rusmanto, R., Ginanjar, A., & Ramadhan, R. (2020). Profil Kondisi Fisik Atlet PPLPD Cabang Olahraga Beladiri Tarung Derajat Kabupaten Indramayu. *Jurnal Kependidikan Jasmani dan Olahraga*, 1(1), 18–27.
- Sagiv, M. S. (2012). *Exercise Cardiopulmonary Function In Cardiac Patients*. Springer. <https://doi.org/10.1007/978-1-4471-2888-5>
- Saputra, M. A., & Asmi, A. (2019). Tinjauan Kondisi Fisik Atlet Gulat Kabupaten Solok. *Jurnal JPDO*, 2(3), 6–8.
- Schmitz, B., Pfeifer C., Kreitz K., Borowski M., Faldum A & Brand S-M. (2018) The Yo-Yo Intermittent Tests: A Systematic Review and Structured Compendium of Test Results. *Frontiers in physiology*, 9, 870. <https://doi.org/10.3389/fphys.2018.00870>
- Setiawan, I., & Alisabah, M. A. H. (2017). Profil Kondisi Fisik Atlet Tarung Derajat Pusat Pelatihan Kota Kediri dalam Menghadapi Kejuaraan Provinsi Jawa Timur Tahun 2017. *BRAVO'S (Jurnal Prodi Pendidikan Jasmani & Kesehatan)*, 5(4), 189-194.

- Setiawan, E., Patah, I., Baptista, C., Winarno, M., Sabino, B., & Amalia, E. (2020). Self-efficacy dan Mental toughness: Apakah faktor psikologis berkorelasi dengan performa atlet?. *Jurnal Keolahragaan*, 8(2), 158-165. <https://doi.org/10.21831/jk.v8i2.33551>
- Setiawan, E., Patah, I. A., Jumareng, H., Budiarto, Kastrena, E. (2021). *Tes, Pengukuran dan Evaluasi Pendidikan Jasmani dan Olahraga*. CV Alfabeta. Bandung.
- Soraya, N. (2017). Perbandingan Senam Aerobik Mix Impact Dengan Senam SKJ 2012 dan Motivasi Berprestasi Terhadap Daya Tahan Cardiorespiratory. *Journal Sport Area*, 2(2), 63–75. [https://doi.org/10.25299/sportarea.2017.vol2\(2\).878](https://doi.org/10.25299/sportarea.2017.vol2(2).878)
- Swadesi, I. K. I. (2016). Standardisasi Kondisi Fisik Atlet Porprov Bali. *Seminar Nasional Riset Inovatif (SENARI)*, 4, 152–159.
- Sylta, Ø., Tønnessen, E., Hammarström, D., Danielsen, J., Skovereng, K., Ravn, T., ... Seiler, S. (2016). The Effect Of Different High-Intensity Periodization Models On Endurance Adaptations. *Journal of the American College of Sports Medicine*, 2165–2174. <https://doi.org/10.1249/MSS.0000000000001007>
- Yanti, N. (2020). The VO2max Athletes Of Matrial Art West Kalimantan Preparation Pre-PON XX. *Seminar Nasional Keindonesiaan (FPIPSKR)*, 2(1), 220–232.
- Yulianto, F. (2015). Pembinaan Prestasi Cabang Olahraga Tarung Derajat di Satlat Gor Satria Kabupaten Banyumas Tahun 2013. *ACTIVE: Journal of Physical Education, Sport, Health and Recreation*, 4(2), 1607-1612. <https://doi.org/10.15294/active.v4i2.4636>

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