



Physical condition and heart rate rest of yogyakarta rugby pon team players during the COVID-19 pandemic

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Abstract

Aim: To identify the correlation between different fitness indicators of rugby players in training conditions during quarantine related to Covid-19.

Material and methods. The study involved athletes from PON Rugby DIY (n = 28, including 15 male athletes and 13 female athletes). To assess the level of physical fitness, the following tests were used: to assess the level of strength, push ups for 1 minute (number) and squats for one minute (number) were used; the yo-yo test was used to assess the level of endurance; speed was assessed using a 40 meter running test (s); agility by performing an Illinois agility test; power (speed-strength abilities) was assessed by the value of the vertical jump (cm); and for the heart rate was determined by the athlete independently within 60 seconds after waking up. The data collection method in this study is test and questionnaire. Data analysis was performed using Pearson correlation analysis using SPSS V 25 software.

Results. It was shown that endurance has a strong correlation with power with r value (0.651) and significant p = 0.000. Speed also has a strong correlation with strength, as evidenced by the r (0.538) value with a significant p = 0.003. Strength has a strong correlation with power, as evidenced by the value of r (0.561) with a significant value of p = 0.002. Speed has a very strong correlation with agility, as evidenced by the value (0.935) with a significant p = 0.000.

Conclusions. It was found that endurance does not correlate with resting heart rate, and endurance does not correlate with strength, because the load of the training program was not optimally implemented by athletes in the Covid-19 quarantine.

Key words: physical condition; resting heart rate; rugby, Covid-19

Анотація

Антоніус Три Вібово. Фізичний стан та частота серцевих скорочень в стані спокою у гравців в регбі команди університету протягом карантину, пов'язаним з Covid-19

Мета: виявити кореляцію між різними показниками підготовленості регбістів в умовах тренувань при карантині, пов'язаному з Covid-19.

Матеріал і методи. У дослідженні взяли участь спортсмени з PON Rugby DIY (n = 28, з них 15 спортсменів-чоловіків і 13 спортсменок-жінок). Для оцінки рівня фізичної підготовленості застосовувалися такі тести: для оцінки рівня сили застосовувалися згинання-розгинання рук в упорі лежачи протягом 1 хвилини (кількість) і присідання протягом однієї хвилини (кількість); для оцінки рівня витривалості застосовувався тест йо-йо; швидкість оцінювали за допомогою бігового тесту на 40 метрів (с), спритність шляхом виконання тесту на спритність, розробленого в штаті Іллінойс; потужність (швидкісно-силові здібності) оцінювали величини вертикального стрибка (см); а для частота серцевих скорочень визначалася спортсменом самостійно протягом 60 секунд після пробудження. Метод збору даних в цьому дослідженні - тестовий і анкетне. Аналіз даних проводився з використанням кореляційного аналізу Пірсона з використанням допомогою програмного забезпечення SPSS V 25.

Результати. Показано, що витривалість має сильну кореляцію з потужністю зі значенням r (0,651) і достовірним значенням p = 0,000. Швидкість також має сильну кореляцію з силою, про що свідчить значення r (0,538) з достовірним значенням p = 0,003. Сила має сильну кореляцію з потужністю, про що свідчить значення r (0,561) з достовірним значенням p = 0,002. Швидкість має дуже сильну кореляцію зі спритністю, про що свідчить значення (0,935) з достовірним значенням p = 0,000.

Висновки. Виявлено, що витривалість не корелює з частотою серцевих скорочень в стані спокою, а витривалість не корелює з силою, тому що навантаження програми тренувань не була оптимально реалізована спортсменами, які перебувають на карантині Covid-19.

Ключові слова: фізичний стан; частота серцевих скорочень в спокої; регбі, Covid-19

Аннотация

Антониус Три Вибово. Физическое состояние и частота сердечных сокращений в состоянии покоя у игроков в регби команды университета в течение карантина, связанным с Covid-19

Цель: выявить корреляцию между различными показателями подготовленности регбистов в условиях тренировок при карантине, связанном с Covid-19.

Материал и методы. В исследовании приняли участие спортсмены из PON Rugby DIY (n=28, из них 15 спортсменов-мужчин и 13 спортсменок-женщин). Для оценки уровня физической подготовленности применялись следующие тесты: для оценки уровня силы применялись сгибания-разгибания рук в упоре лежа в течение 1 минуты (количество) и приседания в течение одной минуты (количество); для оценки уровня выносливости применялся тест йо-йо; скорость оценивали с помощью бегового теста на 40 метров (с), ловкость путем выполнения теста на ловкость, разработанного в штате Иллинойс; мощность (скоростно-силовые способности) оценивали величины вертикального прыжка (см); а для частота сердечных сокращений определялась спортсменом самостоятельно в течение 60 секунд после пробуждения. Метод сбора данных в этом исследовании - тестовый и анкетный. Анализ данных проводился с использованием корреляционного анализа Пирсона с использованием помощью программного обеспечения SPSS V 25.

Результаты. Показано, что выносливость имеет сильную корреляцию с мощностью со значением r (0,651) и достоверным значением p=0,000. Скорость также имеет сильную корреляцию с силой, о чем свидетельствует значение r (0,538) с достоверным значением p=0,003. Сила имеет сильную корреляцию с мощностью, о чем свидетельствует значение r (0,561) с достоверным значением p=0,002. Скорость имеет очень сильную корреляцию с ловкостью, о чем свидетельствует значение (0,935) с достоверным значением p=0,000.

Выводы. Вывявлено, что выносливость не коррелируют с частотой сердечных сокращений в состоянии покоя, а выносливость не коррелирует с силой, потому что нагрузка программы тренировок не была оптимально реализована спортсменами, находящимися на карантине Covid-19.

Ключевые слова: физическое состояние; частота сердечных сокращений в покое; регби, Covid-19



Introduction

Rugby sport is a relatively new sport in the ears of the Indonesian people, it is proven that it will only be officially included in the XX PON official event which is the biggest event which is a routine agenda for four years to be held in Papua in 2020, but because of this pandemic PON to XX has been postponed to 2021 [1]. In Europe, this sport is so popular in England since 1823, this sport was popularized by William Webbs Ellins from accidentally picking up the ball when he was playing football and then carrying it by hand while running on the football field [2]. In Northern Europe and Australia and in five continents Rugby is very popular and is played by both men and women so that in the next few years it is predicted that it will become increasingly popular in the world [3]. On the first occasion of organizing this PON, the PON RUGBY DIY team succeeded in becoming one of the participants who would compete in the XX PON and the success of the DIY Rugby team was not only one male team who would compete in PON but the Women's team also managed to qualify as a participant. This achievement is a proud thing for the DIY team because organizationally under Pengda PRUI DIY is still relatively young because it has only been running for two years but has managed to qualify as a PON participant.

The rugby that is competed in the XX PON is Rugby 7s (rugby Seven), which is a Rugby game that is played with 7 vs 7 players. Please note that there are several types of Rugby games including Tag Rugby (not touching), Touch rugby (by touching), wheelchair rugby, Beach Rugby, Rugby Seven 7s, Rugby 10s (10 vs 10), Rugby 12s (12vs 12). Becoming a Rugby player requires a very strong physical condition, because in the game Rugby is classified as a game. which is hard because it is a full body contact sport. Professional rugby players must be supported by having good physical components of strength, power, speed, agility, flexibility and endurance [4]. This physical ability will support athletes to improve performance and will avoid injury, every rugby player will certainly have different physical abilities between positions so that in a team they will provide mutual support [5].

Aerobic endurance is an important component because in the game 7 "S rugby uses a field size such as the size of a football field with only 7 vs 7 players making the area of the game wide so that good aerobic endurance is needed [6], especially focusing on $VO_{2\text{Max}}$ [7]. An athlete with a good $VO_2\text{Max}$ will allow the athlete to perform a wide range of motion and movement without experiencing fatigue and in recovery to return to fitness can be faster [8].

Many interpret $VO_{2\text{Max}}$ as the maximum amount of oxygen that the human body can use per minute in physical activity [9]. $VO_{2\text{max}}$ refers to the fitness of the cardiorespiration of each human being [10].

For rugby athletes, $VO_{2\text{Max}}$ gives a very vital role in supporting athletes' performance in the field, if athletes have low $VO_{2\text{max}}$ it will affect their physical condition, decrease their stamina and strength and of course reduce concentration [11], especially in Rugby concentration. provides a very important impact so that you don't experience a collision in the game because the game of Rugby can knock your opponent down and is often called a tackle technique. Athletes having a good $VO_2\text{Max}$ will be an indicator that the athlete has good physical fitness so that it can help the athlete to always be in a good physical condition [12] This 7 "s Rugby athlete must have good endurance abilities and it is expected that players have low-fat anthropometry because players will always run with a large enough area so that if high fat will affect the agility of the players [13]. Measurement of $VO_{2\text{Max}}$ usually uses several tests including 12 and 15 minute runs or MTF [14].

General physical fitness parameters that are emphasized in a rugby league match include muscle strength, muscle endurance, speed, acceleration, agility, aerobic endurance and flexibility [15]. A professional Rugby player must have good muscle strength and endurance because in a game of rugby players will always do pushing, pulling, and lifting tasks during the match and this power is always used to perform the above techniques [16]. In measuring this strength, it can be done by using measuring 1 RM bench press or 1RM Squat test, optimally, while to determine muscle endurance can use a push-up test or sit-up for 60 seconds. Rugby players, especially in Rugby 7 "s, speed and agility are important elements, because players must always make movements that require players to move quickly to attack or defend and to avoid opponent attacks, and usually for this speed test is done using the 15 sprint test. meters or 40 meters, the Rugby player's agility can be measured using the Illinois test, or the L-run test [17].

Athletes who exercise with measurable intensity and load will certainly change the player's physiology, especially in the cardiorespiratory and cardiovascular systems, with regular training will make changes in the heart and lungs will enlarge compared to the condition of normal people. Of course, the physiological changes of the heart and lungs will result in the heart muscle becoming stronger and more flexible, and will have better ability to supply blood throughout the body [18]. Regular exercise will be able to reduce resting heart rate and increase stroke volume, so that heart performance will be more optimal, to calculate this



resting heart rate is done when waking up before doing any activity in a relaxed state [19]. From the above thinking shows that if athletes who have been prepared for the PON championship which will be held in 2021, in good condition, they will certainly have a low heart rate.

From the data above, what about the physical capacity of the DIY Rugby TEAM to prepare PON 2021? With specific VO_2 Max endurance, Speed, Agility, Power, and strength, it will also know how the athlete's Heart rate Rest. Based on the description above, this study aims to: [1]. Knowing the physical condition of DIY Rugby athletes who are being prepared for PON 2021 [2]. Knowing the relationship between the variables of strength, VO_2 Max, Speed, Agility and Heart rate rest.

Materials and Methods

This research method is a descriptive quantitative research. The sample in this research is the PON RUGBY DIY athletes who are prepared to take part in the XX PON in Papua in 2021, totaling 28 athletes consisting of 15 male athletes and 13 female athletes. The data taken in this study are components of physical conditions such as strength

by doing push-up and sit-up tests for 60 seconds [20], Endurance using the Yoyo test which is very suitable for the sport of Rugby [21], speed by doing a 40 meter test [21]. Agility by doing a test with the Illinois Agility Run Test [22], Power uses the Vertical Jump test [21], while to calculate the resting heart rate the athlete calculates the himself and previously given understanding to count for 60 seconds after waking up. The data collection method used a survey, data analysis used Pearson Correlation analysis [22] with SPSS V 25.

Results

From the tests carried out on Sunday, August 9, 2020, the results of the 5 physical component tests above were obtained the average results are below (Table 1).

The data above for endurance is obtained on average for male athletes for the yo-yo test that is included in speed lev 16 with shuttle 3, it shows a (Average) criteria, while the results of female athletes are speed Lev 13 with shuttle 2 with (below average).

Table 1

Correlation Data between Physical Components

	Indicators	Endurance	Strength	Speed	Agility	Power	HeartRateRest
Endurance	PearsonCorrelation	1	0,651**	-0,110	0,037	0,538**	-0,267
	Sig.(2-tailed)		0,000	0,577	0,853	0,003	0,169
	N	28	28	28	28	28	28
Strength	PearsonCorrelation	0,651**	1	-0,266	-0,050	0,561**	-0,444*
	Sig.(2-tailed)	0,000		0,172	0,802	0,002	0,018
	N	28	28	28	28	28	28
Speed	PearsonCorrelation	-0,110	-0,266	1	0,935**	0,032	0,242
	Sig.(2-tailed)	0,577	0,172		0,000	0,871	0,215
	N	28	28	28	28	28	28
Agility	PearsonCorrelation	0,037	-0,050	0,935**	1	0,258	0,237
	Sig.(2-tailed)	0,853	0,802	0,000		0,185	0,225
	N	28	28	28	28	28	28
Power	PearsonCorrelation	0,538**	0,561**	0,032	0,258	1	-0,127
	Sig.(2-tailed)	0,003	0,002	0,871	0,185		0,521
	N	28	28	28	28	28	28
Heart RateRest	PearsonCorrelation	-0,267	-0,444*	0,242	0,237	-0,127	1
	Sig.(2-tailed)	0,169	0,018	0,215	0,225	0,521	
	N	28	28	28	28	28	28

Notes: **.Correlation is significant at the 0.01 level (2-tailed); *.Correlation is significant at the 0.05 level (2-tailed). Source: SPSS V25

From these results, it shows that rugby athletes are still lacking and need to do more extra training to catch up with endurance, but because the impact of Covid is an obstacle for the team because

athletes are not well controlled even though they always provide training reports but still not optimal when compared to training. Together because it can be controlled. For endurance, a professional rugby athlete is included in the good category for men,



speed lev 17 and shuttle 3, while for women it is speed lev 16 and shuttle 6. The strength of the average results obtained by male athletes is 43 with criteria (excellent), while for the women's team 16 criteria (average). In this component of strength, the results above show that the strength is still not optimal, the strength must show very good, both the men's and women's teams, this is influenced by the training load obtained by each athlete is not the same because they still experience the limitations of each athlete's equipment. Because athletes in the Covid-19 pandemic condition, athletes do strength training at home, of course, the load of the equipment depends on the availability at each athlete's house.

The speed of the male athletes group averaged 5 seconds and entered the criteria (below average), while the women's team had an average of 6 seconds and entered the criteria (poor). Agility for the men's team got an average of 15 and entered the criteria (good), while the women's team got an average of 17 and entered the criteria (good). The power for the men's team averaged 54 cm and was in the criteria (good), while the women's team had an average of 40 in the criteria (enough). Meanwhile, the heart rate for the men's team was 58 beats·minute⁻¹ and the women's team averaged 69 beats·minute⁻¹.

Based on the correlation data above, it shows that endurance has a strong correlation with strength with an r value of (0.651) and a significant value of 0.000 ($\alpha < 1\%$). Then endurance also has a strong correlation with power as evidenced by the r value of (0.538) with a significance value of 0.003 ($\alpha < 1\%$). In addition, from the data above, there is also a correlation between strength with a strong correlation with power as evidenced by the r value of (0.561) with a significant value of 0.002 ($\alpha < 5\%$). Speed has a strong correlation with agility as evidenced by the value (0.935) with a significance value of 0.000 ($\alpha < 1\%$).

Discussion

As previously relevant research on physical condition profile of roller skates athletes in the Special Region of Yogyakarta [23]. This study aims to determine the physical profile of roller skates athletes in the Special Region of Yogyakarta. The physical profile measured includes endurance, abdominal muscle strength, arm muscle strength, agility, explosive power, flexibility, speed and balance. This research is quantitative descriptive. This study use survey method with data collection techniques in the form of tests and measurements. The population in this research is all athletes of the Pre-National Sport Week of Yogyakarta Special Region which is twelve athletes join progressively in

training. Test and measurement indicators namely speed test (sprint 30 m), strength (sit-up test and push-up test), power (standing long jump test), flexibility (sit and reach test), agility (shuttle run test), balance (stork stand), and endurance (multistage fitness test). The selection of research subjects using purposive sampling, then obtained entire population as subjects. The data analysis technique uses descriptive. The results of the physical condition profile research with tests and measurements showed the following results: [1] The speed of roller skates was categorized as "very poor" with a percentage of 75% [2] the abdominal strength of roller skates was categorized as "good" with a percentage of 66% [3] the arm muscle strength of roller skates is categorized as "sufficient" with a percentage of 58.3% [4] the power or explosive power of roller skates is categorized as "sufficient" with a percentage of 66.6% [5] the flexibility or flexibility of the roller skates is categorized "Very good" with a percentage of 41.6% [6] the agility of roller skaters are categorized as "good" with the largest percentage of 50% [7] the balance is categorized as "very good" with a percentage of 100% [8] endurance of roller skaters are categorized as "good" with a percentage of 50%. So this study can be concluded that the profile of physical roller skates athletes in the category is sufficient.

From the statistical test data above, there are also results that show endurance is not correlated with heart rate rest, this result is an evaluation and a note for athletes because in theory that with good endurance, the resting pulse rate will show low [24]. For an athlete who is trained, the resting pulse will be less than 60 beats·minute⁻¹ and will be less when compared to normal people. These results will be an evaluation for the team going forward. In addition, strength does not show a correlation with power.

The results that are not in accordance with this theory become a future evaluation for the trainer in making the program and this is because the training process is still not optimal. Caused by many factors including:

1. An exercise program that has been well programmed but the implementation is not optimal because the supervisor is different from direct training.
2. The intensity of the training that has been programmed is good but the training load for strength training is less because the athlete trains at home alone so that the load is limited for strength training.
3. Lack of discipline of athletes in maintaining fitness during the Covid-19 pandemic and some athletes have not yet



recovered 100% after injury, which affects the results of training and tests.

Conclusion

1. The results of this study indicate that the components of physical fitness are as follows: (a). Endurance component: the average endurance for male athletes for the yo-yo test is included in speed lev 16 with shuttle 30, it shows the criteria (average), while the results of female athletes are speed Lev 13 with shuttle 2 with (below average). (b). The strength component of the average result obtained by male athletes is 43 with criteria (excellent), while for the women's team 16 with criteria (average) (c). Speed component: the male athlete group had an average of 5 seconds and entered the criteria (below average), while the women's team had an average of 6 seconds and entered the criteria (poor). (d) The Agility component for the men's team got an average of 15 and entered the criteria (good), while the women's team had an average of 17 and entered the criteria (good). (d) The power component for the men's team averages 54 cm and is in the criteria (good), while the women's team has an average of 40 criteria (average). (e) Meanwhile, the heart rate for the men's team was

58 beats·minute⁻¹ and the women's team averaged 69 beats·minute⁻¹.

2. For the correlation, it shows that endurance has a strong correlation with strength, with an r value of (0.651) and a significant value of 0.000 ($\alpha < 1\%$). Then endurance also has a strong correlation with power as evidenced by the r value of (0.538) with a significance value of 0.003 ($\alpha < 1\%$). In addition, from the data above, there is also a correlation between strength with a strong correlation with power as evidenced by the r value of (0.561) with a significant value of 0.002 ($\alpha < 5\%$). Speed has a strong correlation with agility as evidenced by the value (0.935) with a significance value of 0.000 ($\alpha < 1\%$). The endurance component does not correlate with heart rate rest, and the strength component does not correlate with power. This is because the training process is still not optimal and is constrained by the Covid-19 pandemic, there is still time for a year to improve the physical condition of athletes before joining XX PON in 2021 in Papua.

Conflict of interest

Authors state that there is no conflict of interest.

Reference

1. Djanti Virantika. *PON 2020 Papua Diundur hingga Tahun Depan, Menpora: Belum Ada Tanggal Baru* : Okezone Sports. <https://sports.okezone.com/>. 2020.
2. Kang Odon. *Sejarah Perkembangan dan Cara Bermain Olahraga Rugby - Berita Bola*. <https://www.beritabola.win/>. 2016.
3. International Rugby Board. *Laws of the game: rugby union. Dublin, Ireland: International Rugby Board; 2010.*
4. Vaz L0, Morais T0, Rocha H0, James N. Fitness profiles of elite Portuguese rugby union players. *J Hum Kinet*. 2014; 8(2):108–22
5. Quarrie KL0, Raftery M0, Blackie J0, Cook CJ0, Fuller CW0, Gabbett TJ0, et al. Managing player load in professional rugby union: A review of current knowledge and practices. *British Journal of Sports Medicine*. 2017.
6. Delaney JA0, Scott TJ0, Ballard DA0, Duthie GM0, Hickmans JA0, Lockie RG0, et al. Contributing factors to change-of-direction ability in professional rugby league players. *J Strength Cond Res*. 2015; 8(2):108–22
7. Kobal R0, Nakamura FY0, Moraes JE0, Coelho M0, Kitamura K0, Cal Abad CC0, et al. Physical performance of brazilian rugby players from different age categories and competitive levels. *J Strength Cond Res*. 2016; 8(2):108–22
8. Elloumi M0, Makni E0, Moalla W0, Bouaziz T0, Tabka Z0, Lac G0, et al. Monitoring training load and fatigue in rugby sevens players. *Asian J Sports Med*. 2012; 8(2):108–22
9. Smart D0, Hopkins WG0, Quarrie KL0, Gill N. The relationship between physical fitness and game behaviours in rugby union players. *Eur J Sport Sci*. 2014;
10. Dhara SCKA. Study of VO₂ max in Relation with Body Mass Index (BMI) of Physical Education Students. *J Phys Educ*. 2015;3:(2330–9011).
11. Isnaeni P. Artikel Penelitian Hubungan Perilaku Merokok Dengan VO₂max. *Pada Pemain Futsal*. 2014;3(1):1–6.
12. Hariyanta IWD0, Parwata IGLA0, Wahyuni NPDS. Pengaruh circuit training terhadap kekuatan otot tungkai dan VO₂max. *e-Journal IKOR Universitas Pendidikan Ganesha. e-Journal IKOR Univ Pendidik Ganesha*. 2014;I.
13. Higham DG0, Pyne DB0, Anson JM0, Eddy A. Ps. Inphysiological, anthropometric, and performance characteristics of rugby sevens player. *J Sports Physiol Perform*. 2013;8(1):19–27.
14. Austin D0, Gabbett T0, Jenkins D. The physical demands of Super 14 rugby union. *J Sci Med Sport*. 2011;8(2):108–22
15. Meir R0, Arthur a0, Forrest M. Time and motion analysis of professional rugby league: a case study. *Strength Cond Coach*. 1993;3(October):24–9.
16. Marques MC0, Van Den Tillaar R0, Gabbett TJ0, Reis VM0, González-Badillo JJ. Physical fitness



- qualities of professional volleyball players: Determination of positional differences. *J Strength Cond Res.* 2009;23(4):1106–11.
17. Posthumus MO, Durandt J. *Physical Conditioning for Rugby.* 2005;27(21):1–37.
18. Lismadiana. Peranan olahraga terhadap kapasitas kardiorespiras. *Jorpres (Jurnal Olahraga Prestasi).* 2012;8(2):108–22.
19. Rafi MO, Nurhayati TO, Sari DM. Heart Rate Profile of Professional and Amateur Football Athletes in Bandung. *J Med Heal.* 2018;2(2):798–805.
20. David C. Nieman. *Fitness and Sports Medicine An Introduction.* USA: Bull Publishing Company, 1990.
21. Davis.B. et al. *Physical Education and the study of sport.* 4th ed. London: Harcourt Publishers.; 2000. p. 129.
22. Sahid Raharjo. *Cara Melakukan Analisis Korelasi Bivariate Pearson dengan SPSS - SPSS Indonesia.* <https://www.spssindonesia.com/>. 2014.
23. Saputra BA0, Indra EN. Profil kondisi fisik atlet sepatu roda daerah istimewa yogyakarta. *Medikora.* 2019; 8(2):108–22
24. Nafis Ali Khasan0, Tri Rustiadi MA. Korelasi Denyut Nadi Istirahat Dan Kapasitas Vital Paru Terhadap Kapasitas Aerobik. *Act - J Phys Educ Sport Heal Recreat.* 2012;1(4).

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