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Research Article

Pulse Rate of Jogging Two Kilometers of Constant Pace Running

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Abstract:
The study aims to obtain data on the average pulse rate before and after running 5 laps to determine the level of dehydration of a person. The pulse is a form of the heart's ability, which is located in a certain area. The pulse rate can be used as a reference to determine heart rate, rhythm, and heart strength. The method used is to calculate the normal pulse rate, then the sample runs 5 laps of the soccer field, after the test the sample returns to calculate the pulse rate by holding the artery area and counting it for 1 minute while standing and calm. From the research conducted on a sample of 16 active PKO students, there are women and men, from the average data obtained, the results of the pulse rate is higher after running 5 laps, namely 168 times per minute, compared to before running 5 laps, with an average of 102 times per minute.
Keywords: Exercise, Pulse, Running

1. INTRODUCTION

Pulse rate is the number of heart beats per minute with various influencing factors (Maulina et al., 2020). The pulse is an important component of the body to determine the cardiovascular system in a person's body, by touching the artery area on the hand (Wirkus et al., 2024). Through the pulse we can know the heart rate, heart rhythm and heart strength, checking the pulse can also find out whether the heart is working properly or not.

Exercise that aims to improve physical quality will cause an increase in body temperature (Heidelbach et al., 2024). When training a person experiences fatigue and a decrease in fluid in the body or called dehydration. a person if he loses fluid and is not balanced with adequate fluid consumption will experience dehydration (Stables et al., 2024). A person will experience a fast pulse because the blood becomes thick, so delivering oxygen to the whole body will require a lot of energy. The pulse rate before exercise will be lower than the pulse rate after exercise which is most likely 2 times higher than the normal pulse rate (Astari et al., 2024).

Every person's pulse is different. The pulse rate can be influenced by various factors, factors that affect the fluctuation of the pulse rate include physical activity, age, air temperature, emotions, body size, fitness level, consumption of certain drugs. The pulse rate of a normal person is generally around 60 beats per minute. This study specifically tested the pulse rate of people who ran at a constant speed for each individual for 5 laps (2km) of an athletic track.

2. MATERIAL AND METHOD

This research is an experimental study, this study aims to determine the pulse rate of a person when dehydrated. the sample used was 16 active sports coaching education students, consisting of men and women who were carried out at the Pontianak sultan syarif abdurahman stadium.

With the necessary tools; a stopwatch and a 2000m track. The procedure used is to calculate the initial normal pulse before doing the test for 1 minute. Furthermore, the sample ran 2000m with a track the size of a soccer field for 5 rounds, after doing the test the sample again counted the pulse again for 1 minute.

This data will be analyzed by descriptive and independent tests. Data is processed using the IBM SPPS statistical application version 22 to find (Mean, Median, ModeStd. Deviation, Minimum, Maximum). Creating graphs using excel, creating frequency distribution tables, normality tests using Kolmogorov-Smornov and parametric tests can be carried out with non-parametric statistical tests.

3. RESULT AND DISCUSSION

3.1 Result

The study used a sample of 16 PKO UNTAN students consisting of men and women who were carried out

at the syarif sultan abdurahman stadium in pontianak. The test is a 2000m run, which is 5 rounds of the soccer field by counting the pulse before and after doing the test.

Table 1. Descriptive Results of Pulse Rate Before and After 5 Rounds

	Before	After
Mean	102.75	168.75
Median	102.00	174.00
Mode	96	180
Std. Deviation	12.562	2006
Minimum	84	102
Maximum	126	186

Based on table 1 above the results of 16 sample data with pulse rate values before, mean 102.75, median 102.00, mode 96, std. deviation 12.562, minimum 84, maximum 126. and pulse rate after mean 168.75, median 174.00, mode 180. std. deviation 20.065, minimum 102, maximum 186.

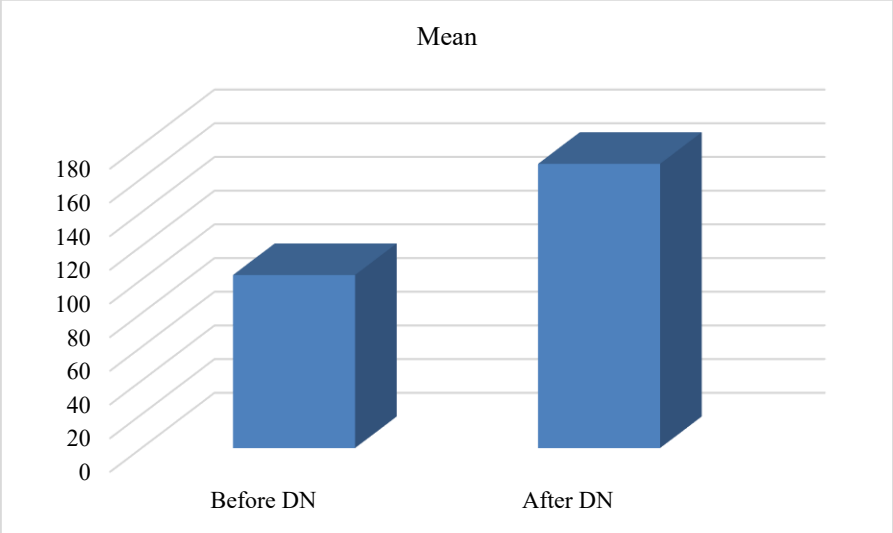

Figure 1. Pulse Rate Before and After Running 5 Rounds

Based on table 1 and graph 1 above of 16 pulse samples before and after running 5 laps, the mean value before 102.75 and after 168.75 is known.

Table 2. Results of Data Normality Calculation

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Before	.149	16	.200*	.950	16	.497
After	.243	16	.012	.671	16	.000

All data is considered significant if calculated above> 0.05. So the result of Sig from the normality calculation table is .012 said to be normal. The data from this study data after being declared abnormal. So then the data is analyzed using non-parametric statistics.

Table 3. Differential Test Results

Ranks				
		N	Mean Rank	Sum of Ranks
After - Before	Negative Ranks	0[a]	.00	.00
	Positive Ranks	16[b]	8.50	136.00
	Ties	0[c]		
	Total	16		

Table 4. Differential Test Results

Test Statistics[a]	
	After - Before
Z	-3.532[b]
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Table 3 above sig value (2 tailed) .000. So that the test data before and the test data after running 5 laps are different. Then the pulse rate before < pulse rate after (102 < 168).

So it is known that the results of the pulse before running 5 laps are 102 while the pulse after running 5 laps is 168. It can be seen that there is an increase in pulse rate after the test more than before the test. It is known through the lowest minimum score of the pulse before 84 minutes while the pulse after 102 minutes and with a different test sig value (2 tailed). So that the data on the results of the pulse rate before and the data on the results of the pulse rate after 5 rounds have a difference. The conclusion in this study is the pulse rate after > pulse rate before (168 > 102). This means that the pulse rate after running 5 laps has increased.

3.2 Discussion

The results showed that the pulse rate before running 5 laps was lower than the pulse rate after running 5 laps which was higher. Pulse rate can determine the health condition and physical condition of a person (Mather et al., 2024). When the pulse rate is higher, the body temperature will increase due to dehydration, the liquid that is released needs to be replaced by another liquid, one of which is an estonic drink (Wong et al., 2024). The content of isotonic drinks is electrolytes and carbohydrates (Sulastio et al., 2022). Isotonic drinks as a substitute for mineral fluids that function to restore lost body fluids so that the body avoids dehydration and muscle fatigue (Laborde et al., 2024). One of the good waters for dehydration is coconut water (Arimbi et al., 2023). Coconut water can be made into sports drinks because it is sugar balanced, rich in minerals and contains isotonic (Jalil et al., 2023). Every sporting activity the body will experience changes in dehydration status (Ghazzawi et al., 2023). In order to maintain dehydration status, a person is recommended to drink enough fluids (Sebastiá-Rico et al., 2024). Adequate rest and sleep can be shown by the pulse rate, the longer the number of hours of sleep, the more the pulse rate decreases.

The biggest and most direct change in pulse rhythm occurs when after carrying out physical sports activities (Lu et al., 2024). Besides that, when someone is overweight and wants to lose weight instantly, it can be dangerous because the level of dehydration is excessive, making the pulse rate faster (Hou et al., 2025). because the pulse rate is an important indication in health, it is useful for evaluating and knowing the health of the body. pulse rate measurement is related to heart blood flow, the faster the oxygen demand increases (Suwanto et al., 2021). The greater the intensity of exercise, the more the exercise pulse rate increases, on the other hand, if the intensity is low, the pulse rate will decrease.

Dehydration is something that is always present in sports, when someone is dehydrated, their pulse rate increases. every time you exercise the body releases fluids but awareness of dehydration is still lacking, especially in sports people (Samodra, 2020). According to (Wati, 2021), the fluid that comes out is what makes the fluid in the body decrease, so this can cause dehydration and increase the pulse rate (Husnul & Nida, 2021). The most important thing is how the body always remains hydrated (Pałka et al., 2024). Adequacy in providing fluids to the body during exercise is very important in maintaining a person's dehydration status which will maintain the balance of water and electrolytes in the body (Haetami et al., 2022). When the body temperature is higher during exercise and the cardiovascular pressure is high, it causes higher dehydration as a form of resistance to the increase in temperature and the pulse rate increases. The speed of reaction, response and better performance can be influenced by the adequacy of fluids in the body (Rebelo-Marques et al., 2024), fluid intake plays an important role in regulating body temperature, lubricating joints and maintaining the normal structure and function of the body to support good performance (Arista & Wahyudin, 2021).

Based on the results of research and discussion, it turns out that running up to 2000 meters is enough, in fact it is recommended that at least 2000 meters be used to reach the exercise pulse. Changes in pulse rate are an indication of changes in exercise intensity. Hydration status is an important discussion as a response to changes that occur in relation to fluid

balance, sports activities and maintaining body hydration.

4. CONCLUSION

From the pulse rate can know the level of health of a person, when someone is tired or being exhausted then the pulse rate is increasing, as well as in sports activities the pulse rate will increase compared to the normal pulse rate. The greater the intensity of exercise, the greater the increase in pulse rate. a factor that affects a person's pulse rate is his level of dehydration, someone who is dehydrated due to lack of fluid will experience an increase in pulse rate. Returning to a normal pulse rate is by getting enough rest and keeping the body away from dehydration. The results of this experiment show that there is a change in achievement until the pulse exercise by running 2000 meters with an average pulse achievement of 168 beats per minute. The implication of this study is that at least the warm-up is done up to 2000 meters to reach the training pulse.

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REFFERENCE

Arimbi, A., Usman, A., Nurliani, N., Rusli, R., & Sarifin, S. (2023). *Green Coconut Water on Pulse Rate Recovery After Physical Activity* (pp. 76–83). https://doi.org/10.2991/978-94-6463-354-2_12

Arista, L., & Wahyudin, A. A. (2021). Faktor-Faktor yang Berhubungan dengan Status Hidrasi Mahasiswa Program Profesi Ners Fakultas Ilmu Keperawatan Universitas Indonesia. *Jurnal Ilmu Keperawatan Medikal Bedah*, *4*(2), 36–47. https://doi.org/10.32584/jikmb.v4i2.669

Astari, H., Vebrianto, D. H., Agustin, R. D., Rusdita, J. N. D., Khaidir, D., Oktaviano, R. N. R., Ramadhan, R. I. I., & Arzety, K. S. (2024). Pengaruh Latihan Tabata dan Jogging Terhadap Perubahan Denyut Nadi Basal, Istirahat dan Kadar Glukosa dalam Darah. *Jurnal Yoga Dan Kesehatan*, *7*(1), 117–129. https://doi.org/10.25078/jyk.v7i1.3281

Ghazzawi, H. A., Hussain, M. A., Raziq, K. M., Alsendi, K. K., Alaamer, R. O., Jaradat, M., Alobaidi, S., Al Aqili, R., Trabelsi, K., & Jahrami, H. (2023). Exploring the Relationship between Micronutrients and Athletic Performance: A Comprehensive Scientific Systematic Review of the Literature in Sports Medicine. *Sports*, *11*(6), 109. https://doi.org/10.3390/sports11060109

Haetami, M., Gandasari, M. F., Sastaman, P., & Suwanto, W. (2022). Status Dehidrasi Setelah Latihan Man To Man Pada Cabang Olahraga Futsal. *Jurnal Pendidikan Olahraga*, *11*(2), 317–329. https://doi.org/10.31571/jpo.v11i2.4905

Heidelbach, M. J., Cysarz, D., & Edelhäuser, F. (2024). Typical everyday movements cause specific patterns in heart rate. *Frontiers in Physiology*, *15*. https://doi.org/10.3389/fphys.2024.1379739

Hou, Y., Li, Z., & Li, H. (2025). Sensor based interactive digital entertainment and gamified training to alleviate basketball player fatigue. *Entertainment Computing*, *52*, 100838. https://doi.org/10.1016/j.entcom.2024.100838

Husnul, D., & Nida, K. (2021). Hubungan Denyut Nadi Dengan Daya Tahan Kardiovaskular Ditinjau Dari Indeks Massa Tubuh. *Jurnal Sport Science*, *11*(1), 1. https://doi.org/10.17977/um057v11i1p1-6

Jalil, R., Ahmad, A., Hidayat, R., Kahar, I., Riswanto, A. H., & Nur, S. (2023). *Endurance of Pencak Silat Athletes: Palm Sugar and Coconut Water Treatment* (pp. 144–152). https://doi.org/10.2991/978-94-6463-354-2_21

Laborde, S., Wanders, J., Mosley, E., & Javelle, F. (2024). Influence of physical post-exercise recovery techniques on vagally-mediated heart rate variability: A systematic review and meta-analysis. *Clinical Physiology and Functional Imaging*, *44*(1), 14–35. https://doi.org/10.1111/cpf.12855

Lu, X., Goulding, R. P., Mündel, T., Schlader, Z. J., Cotter, J. D., Koga, S., Fujii, N., Wang, I.-L., Liu, Z., Li, H.-Y., Wang, H., Zheng, H., Kondo, N., Gu, C.-Y., Lei, T.-H., & Wang, F. (2024). Interactive effects of exercise intensity and recovery posture on postexercise hypotension.

American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, *326*(6), R567–R577. https://doi.org/10.1152/ajpregu.00036.2024

Mather, J. D., Hayes, L. D., Mair, J. L., & Sculthorpe, N. F. (2024). Validity of resting heart rate derived from contact-based smartphone photoplethysmography compared with electrocardiography: a scoping review and checklist for optimal acquisition and reporting. *Frontiers in Digital Health*, *6*. https://doi.org/10.3389/fdgth.2024.1326511

Maulina, N., Sayuti, M., & Said, B. H. (2020). Hubungan Konsumsi Kopi Dengan Frekuensi Denyut Nadi Pada Mahasiswa Program Studi Pendidikan Dokter Universitas Malikussaleh Tahun 2019. *AVERROUS: Jurnal Kedokteran Dan Kesehatan Malikussaleh*, *6*(1), 17. https://doi.org/10.29103/averrous.v6i1.2624

Pałka, T., Rydzik, Ł., Koteja, P. M., Piotrowska, A., Bagińska, M., Ambroży, T., Angelova-Igova, B., Javdaneh, N., Wiecha, S., Filip-Stachnik, A., & Tota, Ł. (2024). Effect of Various Hydration Strategies on Work Intensity and Selected Physiological Indices in Young Male Athletes during Prolonged Physical Exercise at High Ambient Temperatures. *Journal of Clinical Medicine*, *13*(4), 982. https://doi.org/10.3390/jcm13040982

Rebelo-Marques, A., Coelho-Ribeiro, B., De Sousa Lages, A., Andrade, R., Afonso, J., Pereira, R., Batista, A. S., Teixeira, V. H., & Jácome, C. (2024). Trends and Missing Links in (De)Hydration Research: A Narrative Review. *Nutrients*, *16*(11), 1709. https://doi.org/10.3390/nu16111709

Samodra, Y. T. J. (2020). Pengaruh dehidrasi (kehilangan) cairan 2.8% terhadap prestasi lari 400 meter. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, *6*(2), 526–540. https://doi.org/10.29407/js_unpgri.v6i2.14484

Sebastiá-Rico, J., Soriano, J. M., Sanchis-Chordà, J., García-Fernández, Á. F., López-Mateu, P., de la Cruz Marcos, S., & Martínez-Sanz, J. M. (2024). Analysis of Fluid Balance and Urine Values in Elite Soccer Players: Impact of Different Environments, Playing Positions, Sexes, and Competitive Levels. *Nutrients*, *16*(6), 903. https://doi.org/10.3390/nu16060903

Stables, R. G., Hannon, M. P., Costello, N. B., McHaffie, S. J., Sodhi, J. S., Close, G. L., & Morton, J. P. (2024). Acute fuelling and recovery practices of academy soccer players: implications for growth, maturation, and physical performance. *Science and Medicine in Football*, *8*(1), 37–51. https://doi.org/10.1080/24733938.2022.2146178

Sulastio, A., Afniza, R., & Vai, A. (2022). Hubungan Status Hidrasi Dengan Vo2 Max Pada Atlet Karate Tako Forki Bengkalis. *Musamus Journal of Physical Education and Sport (MJPES)*, *4*(02), 246–253. https://doi.org/10.35724/mjpes.v4i02.4299

Suwanto, Y. A., Lusiana, L., & Purnama, Y. (2021). Perbedaan Denyut Nadi dan Saturasi Oksigen Sebelum dan Sesudah Senam Bhineka Tunggal Ika (SBTI) di Era Pandemi Covid-19. *Journal of Sport Coaching and Physical Education*, *6*(1), 59–62. https://doi.org/10.15294/jscpe.v6i1.46034

Wati, I. D. P. (2021). Perbedaan Pengaruh Dehidrasi 2.2 % Dan 2.8% Terhadap Prestasi Lari 400 Meter. *Jurnal Pendidikan Jasmani Dan Olahraga*, *6*(2). https://doi.org/10.17509/jpjo.v6i2.31040

Wirkus, J. M., Goss, F., David, M., Hartmann, E. K., Fukui, K., Schmidtmann, I., Wittenmeier, E., Pestel, G. J., & Griemert, E.-V. (2024). Changes of pulse wave transit time after haemodynamic manoeuvres in healthy adults: a prospective randomised observational trial (PWTT volunteer study). *BJA Open*, *11*, 100291. https://doi.org/10.1016/j.bjao.2024.100291

Wong, Z. Q., Yap, S. L., Wong, T. H., Tsai, M., Tan, S. T., Tan, S. S., & Tan, C. X. (2024). Effects of fortified electrolyte drink on cognitive, mood, and nutritional parameters: a randomised, single-blind, placebo-controlled study. *International Journal of Food Science & Technology*. https://doi.org/10.1111/ijfs.17578