OPEN ACCESS

Indonesian Journal of Sport, Health and Physical Education Sciences Vol 3 No 1 (2025) https://doi.org/10.58723/inasport.v3i1.206

Check for updates

Research Article

Effect of Electrolyte Fluid on Initial and Final Pulse Rate after 400x3 Sprints

Received : May 27, 2024	Revised : January 20, 2025	Accepted: January 23, 2025	Publish : January 24, 2025

Clara Rindianti Putri Pertiwi *, Ghana Firsta Yosika, Menard Ian Laoan

Abstract:
This research is an experimental descriptive research. The purpose of this study is to determine the effect of pocari electrolyte fluid with the difference between the initial pulse rate and the first set pulse. This study uses a sample of Sports Coaching Education students class of 2021. A total of 20 students are active. This research was conducted in the field of SSA Pontianak. Before taking the test, students warm up and measure their initial pulse for 60 seconds. Next, do a run, every 400m measure your pulse for 60 seconds and so on. The results showed that there was a significant change from the initial pulse rate to the set 1 pulse rate, which is known as the average initial pulse rate value of 15.60, and the average initial set value of 28.90. Even though they have drunk electrolyte fluids, so electrolyte drinks are only useful for replenishing the lost fluids but cannot anticipate the fluids that will be lost or lower the pulse rate during exercise.

Keywords: Pocari Electrolyte Liquid, Pulse, Running

1. INTRODUCTION

The intake of water and electrolytes through food and drink should be balanced with the amount excreted by the body. However, sometimes there is a homeostasis disorder where the amount taken and excreted is unbalanced (Kusuma, 2020; Mudzaki et al., 2020). In this condition, treatment must be given immediately to restore the balance of fluids and electrolytes in the body. This may include oral or intravenous administration of fluids and electrolytes, depending on the severity of the homeostasis disorder (Maulana et al., 2021). It is important to maintain a balance of fluids and electrolytes in the body so that the organs can function properly and prevent more serious complications. (Koeriyanto, 2023) However, if the body experiences a disorder in fluid and electrolyte balance, electrolytes can also be administered parenterally or through blood vessels, namely through an IV. This is done to ensure the body gets the necessary electrolytes quickly and effectively, especially in conditions that require immediate medical attention. It is important to ensure adequate and balanced electrolyte intake so that the body remains healthy and able to function optimally (Halim et al., 2017).

Electrolytes are one of the types of body fluids that are important in maintaining fluid balance in the human body. Therefore, the human body must meet or balance the electrolyte needs in its body, otherwise, the occurrence of electrolyte deficiency leads to dehydration, which can adversely affect the health of the body. However, excessive sweating can cause the body to lose electrolyte fluid (Shidiq Katijayanto, 2013) Therefore, it is important to ensure adequate electrolyte intake to keep the body hydrated and healthy (Nahdlotul Halimi et al., 2019). And with electrolyte drinks and additional drinks may contain ingredients that can affect the heart rate. To meet the needs of liquids and electrolytes, a suitable form of liquid is required. The ideal fluid is one that contains enough water and electrolytes needed by the body, and has the right balance between cations and anions (Juffrie, 2016). Some types of fluids that can be used to meet the needs of fluids and electrolytes in the body are isotonic, hypertonic, or hypotonic infusion fluids (Gusning Ranti et al., 2022). Every individual must need enough and balanced electrolytes in his or her body to keep the body from lack of fluids and dehydration that can interfere with one's activities.

Pulse rate is a measure to find out if arterial blood vessels expand and contract in one minute in response to heart rate (Saputri et al., 2021). (Maryanto, 2020) Influencing factors include age, fitness level, health conditions, etc. Knowing the pulse rate can help in monitoring heart health and detecting possible changes in a person's health condition (Said & Sahang, 2018). The pulse rate will continue to increase along with physical activity (Kusuma, 2020). Pulse rate is also used as an indicator of exercise intensity. Pulse rate can affect dehydration and have a significant effect on cardiovascular health (Krisnawati et al., 2011; Nugroho, 2022). When the body experiences a decrease in blood volume and electrolytes during strenuous activity, it has the potential to affect the pulse.

It is important to maintain a balanced intake of water and electrolytes in the body. Homeostasis disorders can disrupt this balance, and therapy is needed to restore it. Electrolytes are important in maintaining the body's fluid balance, and their deficiency can lead to dehydration. Electrolyte drinks and electrolyte-containing liquids can affect heart rate. The pulse rate is used to monitor heart health, and factors such as age, fitness level, and health conditions affect it. Ensuring adequate and balanced electrolyte intake and monitoring the pulse rate are important for maintaining a healthy body. Therefore, the purpose of this study is to determine the effect of pocari electrolyte fluid with the difference between the initial pulse rate and the first set pulse.

2. MATERIAL AND METHOD

This research is an experimental descriptive research. The purpose of this study is to determine the effect of pocari electrolyte fluid with the difference between the initial pulse rate and the first set pulse. This study uses a sample of Sports Coaching Education students class of 2021. A total of 20 students are active. This research was conducted in the field of SSA Pontianak. Before doing the 400x3 sprint run test, students were given 240ml of electrolyte drink, then measured their pulse for 60 seconds, followed by doing a 400x3 sprint with recovery in each set for 5 minutes. When you're done, continue measuring your pulse for 60 seconds. The data was processed using SPSS statistics to find the mean, median, mode, std.deviation, minimum, and maximum. Create graphs using excel, create frequency distribution tables, normality tests using Kolmogorov-somomov. Parametric tests can be performed with the T-test.

3. RESULT AND DISCUSSION

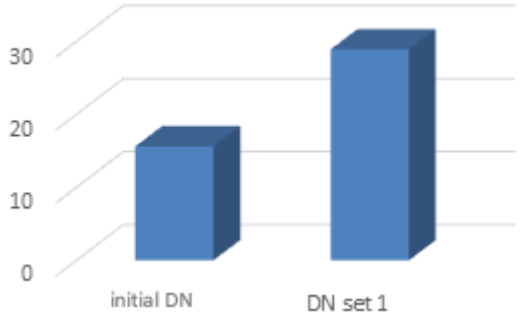
1.1 Result

This research was conducted on May 17, 2023 at SSA Pontianak field. With 20 samples of Sports Coaching Education students.

Table 1. Descriptive results of measuring the effect of pocari electrolyte liquid with the difference between the initial pulse rate and the first set pulse rate.

.	**Initial pulse**	**Pulse set 1**
Mean	15.60	28.90
Median	15.00	29.50
Mode	15	31
Std. Deviation	.843	2.079
Minimum	15	25
Maximum	17	31

Based on table 1 above with the results of 20 sample data with initial pulse value mean 15.60, median 15.00, mode 15, std. Deviation 843, minimum 15, maximum 17. initial set value mean 28.90, median 29.50, mode 31, std. Deviation 2.079, minimum 25, maximum 31.



Graph 1. Mean of initial pulse rate and set 1

Based on table 1 and graph 1 above from 20 samples, it is known that the mean initial pulse rate is 15.60 and set 1 pulse rate is 28.90.

Table 2. Results of data normality calculations

N		10
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1.64991582
Most Extreme Differences	Absolute	.172
	Positive	.128
	Negative	-.172
Test Statistic		.172
Asymp. Sig. (2-tailed)		.200[c,d]

All data is considered significant if calculated above 0.05. We can conclude that the data is normal. If the data is normal, parametric tests can be carried out. Parametric tests can be carried out with a paired T test. This analysis is assisted by SPSS.

Table 3. t-test using independent test

		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	Upper
Initial pulse results and set 1	Equal variances assumed	8.545	.009	-18.747	18	.000	-13.300	.709	-14.791	-11.809
	Equal variances not assumed			-18.747	11.883	.000	-13.300	.709	-14.847	-11.753

Table 3 above the sig value (2 tailed) with the sample obtained = 000. So that the initial and set 1 pulse data results are different. Then the pulse rate of set 1 is higher than the initial pulse rate. So it is known the experimental results of the effect of giving electrolyte drinks on the pulse rate at the beginning and end of the sprint run. It can be seen that there is a difference from the initial pulse rate and after running 400 meters experiencing a significant difference. with a different test sig value (2 tailed) with the sample obtained = 000. The conclusion in this study is that there is a significant difference from the initial pulse rate to the first set pulse rate after running 400 meters.

1.2 Discussion

The results above show that there is a significant change from the initial pulse to the pulse set 1, even though it has drunk electrolyte fluid. Electrolyte drinks are ion replacement drinks in the body that also help as additional energy when dehydrated. It is important to maintain the balance of fluids and electrolytes in the body so that the organs can function properly and prevent more serious complications. If the body experiences a disturbance in the balance of fluids and electrolytes, electrolytes can also be given parenterally or through blood vessels, namely through infusion (Lestari & Hidayati, 2022).

The human body must fulfill or balance the electrolyte needs in their body (Santika & Subekti, 2020). According to (Rohmansyah, 2017) (Hidayat et al., 2022) if not then the occurrence of electrolyte deficiency can cause dehydration. Dehydration can cause fatigue, weakness, muscle cramps, and even death if not treated immediately (Kuntjoro, 2020). Therefore, it is important to immediately address the problem by consuming adequate fluids and electrolytes to replace those lost (Pane, 2015), as well as maintaining hygiene and sanitation to prevent infections that cause diarrhea (Atmaja & Tomoliyus, 2015). Therefore, it is important to ensure adequate electrolyte intake to keep the body hydrated and healthy (Zharfani et al., 2022).

To meet the needs of fluids and electrolytes, an appropriate form of fluid is needed (Fauzi & Sari, 2020). According to (Dewi & Setiyono, 2022) The ideal liquid is one that contains enough water and electrolytes needed by the body, and has the right balance between cations and anions. The liquid must also be free from contaminants or other harmful substances that can affect the health of the body (Nahdlotul Halimi et al., 2019). Several types of fluids that can be used to meet fluid and electrolyte needs in the body are isotonic, hypertonic, or hypotonic infusion fluids (Bulqini et al., 2022). Isotonic infusion fluid is a fluid that has the same electrolyte concentration as the electrolyte concentration in human blood.

4. CONCLUSION

From the results of the above discussion, it shows that there is a significant change from the initial pulse rate to the pulse rate of set 1, even though it has drunk electrolyte fluids, so electrolyte drinks are only useful to fulfill lost fluids but cannot anticipate fluids that will be lost or lower the pulse rate during exercise.

5. ACKNOWLEDGEMENT

We would like to express our deepest gratitude to all participants who have contributed to this research. The support and cooperation of the participants greatly assisted in the smooth running and success of this research. We would also like to thank those who have provided the support and facilities needed during the research. Hopefully the results of this research can provide real benefits for the development of science and health.

AUTHOR INFORMATION

Corresponding Authors

Clara Rindianti Putri Pertiwi, Tanjungpura University, Indonesian
https://orcid.org/0009-0006-6167-0421
Email: F1251211022@student.untan.ac.id

Ghana Firsta Yosika, Tanjungpura University, Indonesian
https://orcid.org/0000-0002-9993-7586
Email: ghana.firsta@fkip.untan.ac.id

Menard Ian Laoan, Mariano Marcos State University Philippines
https://orcid.org/0009-0009-3704-4916
Email: milaoan@mmsu.edu.ph

REFFERENCE

Atmaja, N. M. K., & Tomoliyus, T. (2015). Pengaruh Metode Latihan Drill Dan Waktu Reaksi Terhadap Ketepatan Drive Dalam Permainan Tenis Meja. *Jurnal Keolahragaan*, *3*(1), 56–65. https://doi.org/10.21831/jk.v3i1.4969

Bulqini, A., Hartono, S., & Wahyuni, E. S. (2022). Nutrisi untuk Peak Performance bagi Atlet Profesional Sebelum, Selama dan Setelah Kompetisi. *Jurnal Pendidikan Kesehatan Rekreasi*, *8*(2). https://doi.org/10.20473/amnt.v8i1.2024.40-48

Dewi, N., & Setiyono, E. (2022). Pengaruh Dukungan Keluarga Terhadap Kepatuhan Dalam Pembatasan Asupan Cairan Pada Pasien Chronic Kidney Disease (CKD) Yang Menjalani Terapi Hemodialisa di Radjak Hospital Cileungsi. *Jurnal Ilmiah*

Kesehatan, *14*(2). https://doi.org/10.37012/jik.v14i2.1330

Fauzi, Y., & Sari, F. M. (2020). Analisis Determinan Kejadian Diare Pada Balita Di Wilayah Kerja Puskesmas Nusa Indah Kota Bengkulu. *Journal of Nursing and Public Health*, *8*(2). https://doi.org/10.37676/jnph.v8i2.1206

Gusning Ranti, E., Syarif, H., Nurhidayah, I., Program Studi Profesi Ners, M., Keperawatan Universitas Syiah Kuala, F., Keilmuan Keperawatan Gawat Darurat, B., & Keperawatan, F. (2022). Respiratory Failure et causa Diabetic Ketoacidosis Management in ICU: A Case Study. *JIM F Keperawatan*, *1*. https://doi.org/10.4239/wjd.v6.i8.1009

Halim, F., Warouw, S. M., Rampengan, N. H., & Salendu, P. (2017). Hubungan Jumlah Koloni Escherichia Coli dengan Derajat Dehidrasi pada Diare Akut. *Sari Pediatri*, *19*(2). https://doi.org/10.14238/sp19.2.2017.81-5

Hidayat, R. A., Permadi, A. A., & Hermawan, I. (2022). Pengaruh Latihan Reaksi terhadap Performance Goalkeeper. *Jurnal Porkes*, *5*(1), 178–188. https://doi.org/10.29408/porkes.v5i1

Juffrie, M. (2016). Penelitian Kendali Acak Terbuka Terhadap Efektifitas dan Keamanan Cairan Elektrolit Rumatan pada Neonatus dan Anak (KAEN 4B® vs N/4D5). *Sari Pediatri*, *6*(2). https://doi.org/10.14238/sp6.2.2004.91-6

Koeriyanto. (2023). Program Cegah Dehidrasi Terhadap Penurunan Kejadian Dehidrasi Pada Prajurit Kri Pulau Raas 722 Satran Koarmada II. *JIK: Jurnal Ilmu Keperawatan*, *1*(1). https://doi.org/10.58524/app.sci.def..v2i3.341

Krisnawati, D., Pradigdo, S. F., & Kartini, A. (2011). Efek Cairan Rehidrasi terhadap Denyut Nadi, Tekanan Darah dan Lama Periode Pemulihan. *Media Ilmu Keolahragaan Indonesia*, *1*(2). https://doi.org/10.15294/miki.v1i2.2028

Kuntjoro, B. F. T. (2020). Rasisme Dalam Olahraga. *Jurnal Penjakora*, *7*(1). https://doi.org/10.23887/penjakora.v7i1.19503

Kusuma, M. N. H. (2020). Efek minuman berbasis alkali terhadap kadar laktat darah dan denyut nadi istirahat setelah aktivitas fisik intensitas tinggi pada pemain sepak bola. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, *6*(2). https://doi.org/10.29407/js_unpgri.v6i2.14196

Lestari, D. P., & Hidayati, E. (2022). Slimber Ice Efektif Menurunkan Rasa Haus pada Pasien Gagal Ginjal Kronik yang Menjalani Hemodialilisa di Khorfakkan Hospital Uni Emirate Arab. *Ners Muda*, *3*(3). https://doi.org/10.26714/nm.v3i3.6923

Maryanto, E. P. (2020). Dampak Dehidrasi Saat Masa Kehamilan. *Jurnal Ilmiah Kesehatan Sandi Husada*, *12*(2). https://doi.org/10.35816/jiskh.v12i2.438

Maulana, R., Caesardi, M. R., & Setiawan, E. (2021). Klasifikasi Tingkat Dehidrasi Berdasarkan Kondisi Urine, Denyut Jantung dan Laju Pernapasan. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *8*(2). https://doi.org/10.25126/jtiik.2021824379

Mudzaki, I., Alfita, R., & Ulum, M. (2020). Rancang Bangun Smart Urinoir Untuk Mendeteksi Status Dehidrasi Berbasis Image Processing Dengan Metode Jaringan Syaraf Tiruan Perceptron. *JEECOM: Journal of Electrical Engineering and Computer*, *2*(1). https://doi.org/10.33650/jeecom.v2i1.1093

Nahdlotul Halimi, M. A., Fauzan, M. N., Habibi, R., & Riza, N. (2019). DRIMM: Drink Mixing Machine Untuk Membantu Pedagang Minuman Menentukan Takaran Air Yang Konsisten. *Jurnal Ilmiah*

Teknologi Infomasi Terapan, *5*(2), 21–31. https://doi.org/10.33197/jitter.vol5.iss2.2019.257

Nugroho, M. S. (2022). Pengaruh Pemberian Minuman Isotonik dan Jus Jambu Biji terhadap Pemulihan Denyut Nadi dan Tingkat Hidrasi pada Tim Futsal Permata FC Ponorogo. *Jurnal Prestasi Olahraga*, *5*(3). https://doi.org/10.26714/jg.5.2.2016.%25p

Pane, B. S. (2015). Peranan Olahraga Dalam Meningkatkan Kesehatan. *Jurnal Pengabdian Kepada Masyarakat*, *21*(79), 1–4. https://jurnal.unimed.ac.id/2012/index.php/jpkm/article/view/4646

Risky Ratna Dila, & Yuanita Panma. (2020). Asuhan Keperawatan Pada Klien Dengan Gangguan Gagal Ginjal Kronik RSUD Kota Bekasi. *Buletin Kesehatan: Publikasi Ilmiah Bidang Kesehatan*, *3*(1). https://doi.org/10.36971/keperawatan.v3i1.60

Rohmansyah, N. A. (2017). Kecemasan Dalam Olahraga. *Jurnal Ilmiah PENJAS*, *3*(1). https://www.researchgate.net/publication/332605698

Said, R.-, & Sahang, S. W. (2018). Penerapan Asuhan Keperawatan Pada Pasien Tn. H Dengan Ggk Dalam Pemenuhan Kebutuhan Cairan Dan Elektrolit. *Media Keperawatan: Politeknik Kesehatan Makassar*, *9*(1). https://doi.org/10.32382/jmk.v9i1.68

Santika, I. G. P. N. A., & Subekti, M. (2020). Hubungan Tinggi Badan dan Berat Badan Terhadap Kelincahan Tubuh Atlet Kabaddi. *Jurnal Pendidikan Kesehatan Dan Rekreasi*, *6*(1). https://media.neliti.com/media/publications/296943-hubungan-tinggi-badan-dan-berat-badan-te-ec24e15a.pdf

Saputri, I. N., Kasim, F., Nurianti, I., & Arif P Siahaan, D. (2021). Pengaruh Pemberian Minuman Karbohidrat Elektrolit Terhadap Produktivitas Kerja Pada Pekerja Pembuatan Batu Bata. *Jurnal Kesmas Dan Gizi (JKG)*, *3*(2), 182–187. https://doi.org/10.35451/jkg.v3i2.583

Shidiq Katijayanto, M. (2013). Perbedaan Tekanan Darah Dan Denyut Nadi Pekerja Sebelum Pemberian Air Kelapa Dan Sesudah Pemberian Air Kelapa Pada Pekerja Pandai Besi. *Jurnal Kesehatan Masyarakat 2013, Vol 2, No 1 (2013): Jurnal Kesehatan Masyarakat 2013*. http://ejournals1.undip.ac.id/index.php/jkm

Zharfani, H. A., Wimbarti, S., & Kusrohmaniah, S. (2022). Akurasi Dan Waktu Reaksi Pada Atlet pedoman Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). *Jurnal Muara Ilmu Sosial, Humaniora, Dan Seni*, *6*(1), 12–20. https://doi.org/10.1001/jama.2017.19163