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The Influence of Isotonic Liquid and Non-Isotonic Liquid in Speeding Up Recovery Process Treadmill on 21-24 Years Old at FK UNPRI

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Abstract

Isotonic liquid and non-isotonic liquid generally is used for rehydration process in a state of dehydration, as in the case of diarrhea, throws up, sufferers of chronic diseases, excessive sweating like an athlete. presence of isotonic fluid and non isotonic liquid as first line to resolve dehydration especially mild dehydration. To know the influence of isotonic liquid and non isotonic liquid in speeding up recovery process, then study experimental was conducted with randomized controlled trial. Data sample was taken from inclusion, exclusion is not smoking, and criteria for drop out. Activities treadmill carried out by the sample was done by pre-test post-test method which is conducted for 4 days of monitoring from one sample. The results of the analysis prove that isotonic fluid has a significant effect on the time of blood pressure and HR recovery ($p=0.000 < 0.05$). which mean, giving non-isotonic fluids succeeded in speed up recovery time for blood pressure and HR. The results of the analysis prove that recovery time blood pressure due to the influence of isotonic fluid faster than recovery time of blood pressure due to the influence of non-isotonic fluids. This means isotonic fluid gived more significant influence compared to non-isotonic liquids against recovery time of blood pressure ($p\ 0.019 < 0.05$). following of analysis results prove that HR recovery time due to the influence of isotonic fluid much faster than HR recovery time due to the effect of non-isotonic fluids. This means isotonic fluid gives more significant influence than non isotonic fluid to HR recovery time ($p = 0.013 < 0.05$). Thus, can be concluded that effect of isotonic fluid much more significant than the effect of non isotonic fluids against the recovery time of blood pressure ($p\ 0.019 < 0.05$) and the effect of isotonic fluid much more significant than the effect of non isotonic fluids to HR recovery time ($p = 0.013 < 0.05$).

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Keyword: Isotonic Liquid; Non-Isotonic Liquid; Mild Dehydration; Speed Recovery; Blood Pressure and Heart Rate.

1. Introduction

Cells are mostly consisted of water, around 60% to 80%. Blood plasma 91% are water. Water is a simple molecule consisting of two hydrogen atoms covalently bound to one oxygen atom. Because oxygen atoms pull electrons stronger than hydrogen atoms, water molecules are polar with positive partials to hydrogen and partial negatives to oxygen. The feature of a water molecule (uneven distribution of electrons) determines why ion-binding molecules dissociate in water. Negatively charged ions are attracted to positively charged hydrogen atoms, and positively charged ions are attracted to negatively charged oxygen atoms [1]. In every day fluid intake, only 100 ml of water is excreted with 99% of intestinal absorption efficiency. Theoretically intestinal water absorption capacity is very high, as much as 3000 ml per day, a level that exceeds the excretory ability of the kidneys. People with abnormality the absorption capacity reduce by 1-2%, resulting in life-threatening dehydration and depletion of electrolyte [2]. Normally, electrolyte balance and body fluids are regulated automatically through the mechanism of homeostasis. When the state of body fluid decreases, signals were sent to central nervous system to compensate [3]. The health of the human body not only depends on the type of food consumed, but also from the activity or physical exercise performed. Physiological parameters (oxygen consumption, heart rate, body temperature, chemical compounds) changed due too physical activities [4].

2. Material and Method

This study was conducted for one month from March 2019 until April 2019. All experimental procedures were performed in accordance with the Medical Research Ethics Committee Faculty of Medicine University of Prima Indonesia. Research of the sample were carried in the room of Medical Check-Up at Royal Prima Hospital Medan. This research was performed on 10 medical students as samples at Faculty of Medicine University of Prima Indonesia with ages 21-24 years old and normal Body Mass Index (BMI). Samples were grouped randomly into 2 groups, first group were given isotonic liquid for 4 days on each person, while second group were given non-isotonic liquid. The trial was done by using treadmill, where samples were measured before starting. Measurement consists of heart rate, blood pressure and resting ECG. Treadmill process started with walk, jog, light run and actual run in 20 minutes of time range while monitoring every parameter. Once the time ends samples were told to rest and assess the recovery time until indicator reach individual resting parameters. The next step is giving isotonic or non-isotonic according to the separated group, with pretest measurements beforehand. Samples were told to do the second run and monitored for the heart rate and blood pressure measurements. All data results were tested for normality test using Shapiro-Wilk. If the data were normally distributed ($p > 0,05$), then followed by variance analysis Independent T-test to determine the influence of isotonic liquid and non-isotonic liquid in speeding up recovery process of treadmill. If the variance analysis showed the significant difference result ($p < 0,05$), then using Mann-Whitney test to point the differences in observation of each group. These tests were performed by SPSS (Statistical Package for the Social Sciences) 22.00 program for Windows.

3. Result and Discussion

Table 5.2: Recovery Time Mean Value of Isotonic Liquid

Parameter	Mean	Deviation Standard	p-value
Pretest Blood Pressure Recovery Time	7.5400	2.14191	0.000
Postest Blood Pressure Recovery Time	6.4970	2.13635	
Pretest Heart Rate Recovery Time	12.8925	5.40875	0.000
Postest Heart Rate Recovery Time	12.4800	5.35474	

Analysis result shows that isotonic liquid contributes significant changes to recovery time of blood pressure and heart rate ($p=0.000 < 0.05$). Thus, isotonic liquid speeds up the recovery time.

Table 5.3: Recovery Time Mean Value of Non-Isotonic Liquid

Parameter	Mean	Deviation Standard	p-value
Pretest Blood Pressure Recovery Time	10.4925	4.81080	0.000
Postest Blood Pressure Recovery Time	9.3895	4.80142	
Pretest Heart Rate Recovery Time	17.2750	5.12662	0.000
Postest Heart Rate Recovery Time	16.9435	5.04363	

Analysis result shows that isotonic liquid contributes significant changes to recovery time of blood pressure and heart rate ($p=0.000 < 0.05$). Thus, isotonic liquid speeds up the recovery time.

Table 5.4

Administration		Mean	p-value	Z
Blood Pressure Recovery Time	Isotonic	16.18	0.019	-2.344
	Non-Isotonic	24.83		
Heart Rate Recovery Time	Isotonic	15.93	0.013	-2.477
	Non-Isotonic	25.08		
	Total			

Analysis result proofs that recovery time of blood pressure due to isotonic liquid administration is shorter than non-isotonic. This shows that isotonic liquid gives more significant influence rather than non-isotonic in blood pressure recovery time ($p=0.019 < 0.05$).

For the recovery time of heart rate also gives similar outcome to blood pressure. Means isotonic liquid administration gives more significant influencein heart rate recovery time than non-isotonic ones ($p =0.013 <$

0.05). Former study in 2015 by Rony Sendjaya in Effect of Isotonic Liquid Administration to the Balance of Fluid and Electrolyte, Stress and Recovery of Sportsman: Study of Medium and Long Distance Running Male Athlete in DKI Jakarta shows similar result where isotonic significantly have better effect of maintaining fluid balance where the average of difference in hemoglobin and hematocryte before and after exercise in isotonic group (-0,21 ± 0,69 g/dL and -0.68 ± 2,11%) and (0.26 ± 0,49 g/dL and 1,11 ± 1.34 %) in group given water only. Fatigue time significantly different between isotonic given group and water given group (79,45 ± 12.52 minutes and 58.72 ± 10.43 minutes), blood glucose level was maintained better in group given isotonic than water, either in physical activity and recovery. The study conluded that administration of isotonic liquid during sports and recovery phase can maintain fluid balance and increases indurance, and maintaining blood glucose level in activity and recovery better than water [5]. The study of the Effect of Isotonic to Recovery Time in Taekwondo Dojang Athlete in Universitas Negeri Padang shows different result, where recovery time monitored by heart rate gives no significant discrepancy by administration of isotonic given prior [6].

4. Conclusion

Based on the result of the study of effect of blood pressure and heart rate recovery time due to isotonic and non-isotonic given aftar treadmill, results are:

1. Isotonic liquid contributes significant changes to recovery time of blood pressure and heart rate ($p=0.000 < 0.05$). Thus, isotonic liquid speeds up the recovery time.
2. Non-isotonic liquid contributes significant changes to recovery time of blood pressure and heart rate ($p=0.000 < 0.05$). Thus, isotonic liquid speeds up the recovery time.
3. Changes in isotonic is more significant than non-isotonic in recovery time of blood pressure ($p\ 0.019 < 0.05$) and heart rate ($p = 0.013 < 0.05$).

5. Suggestion

Isotonic fluid uptake is best recommended to fasten recovery time in exercise. Similar future studies may alter various amount of time, samples and variables to obtain more precise outcome.

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