

# Analysis of Oral rehydration Salt Citrate Drink on Selected Physiological Variables of Endurance Athlete

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## ABSTRACT

**Introduction:** Endurance is the ability to do something for long period of time without fatigue. Proper body electrolyte balance is most important during any endurance activities. **Aim of the study:** The purpose of this study was to analyze Oral Rehydration Salt Citrate (ORS) drink on physiological variables of endurance athlete. **Methodology:** Ten females aged between 18 and 25 years athletes from LNIPE, Gwalior were selected for this study. Physiological variables were body weight, total body water (TBW), total body potassium (TBK), plasma fluid, and mineral and performance was taken as another variable. **Data Analysis:** It was found that intake of ORS before and during the endurance activity was better than the plain water or nothing. **Result:** It also found that TBW, minerals, plasma fluid, and TBK reduction were less after intake of ORS and result of less electrolyte reduction leads to better performance.

**Keywords:** Mineral, Oral rehydration salt, Plasma fluid, Total body potassium, Total body water

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## INTRODUCTION

Endurance activities are also called aerobic activities which are help to keep heart lungs and circulatory system healthy. Cross country is a team sport, in which success is measured by collective willingness to hurt for one another, to push for one another and to become part of sometimes larger.<sup>[1]</sup> Proper body hydration or electrolyte is most important during any endurance activities to avoid risk of muscle cramp and muscle fatigue. Athlete hydration level is most important factor to maintain proper physiological function during long distance training. There are various types of minerals loss with the sweat (mainly sodium and potassium) from our body. Proper hydration can be maintained through adequate water and electrolyte intake before, during and after the competition. Oral Rehydration Salts (ORS) is consists of sodium chloride, potassium chloride, sodium citrate, and dextrose which help to maintain the water inside and outside the cell.<sup>[2]</sup> According to the current American college of Sports medicine recommendation, marathon runner should consume approximately 0.4–0.8 L of water/hour.<sup>[3]</sup>

Various studies showed that we can detect the decreased performance after the loss of fluid equal to 2% of body mass. There are various risk factor of dehydration of >2% of body weight such as nausea, vomiting, diarrhea, and other gastrointestinal problem during exercise. Dehydration reduced the rate of fluid absorption from the intestine, making it more difficult to reverse the fluid deficit. If an athlete's loses more than 1.4 kg of body weight during exercise, performance capacity decreases, and more than 4 kg of body weight leads to heat illness, heat exhaustion, heat stroke, and even death also. To prevent from dehydration, athlete should train themselves to consume more amounts of water and fluids.<sup>[4]</sup>

## METHODS

In this study, ten female ( $n = 10$ ) athletes aged between 18 and 25 years were participated from LNIPE, Gwalior. All subjects were from Cross Country and Hockey. Selected physiological variables were body weight, total body potassium (TBK), total

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body water (TBW), plasma fluid, and minerals and another variable was performance (timing). Purposive sampling technique was used for the selection of the sample for the study.

These variables were measured through the following equipments.

S. No.	Variables	Test/equipment
1	Body weight	Weighing machine
2	Total body water	Bioelectrical impedance
3	Total plasma fluid	BOI
4	Total body K	BOI
5	Minerals	BOI
6	Performance	Stopwatch

All the subjects had been measured their all physiological variables before the test. All the subjects were drink plain water 30 min before running. Subjects were asked to warm-up for 5 km run on treadmill. Then record the timing of the athletes and measured all physiological variables through bioelectrical impedance just after the completion of the race. All physiological variables were measured in lying position on the table through bioelectrical impedance. In post-test, subjects were asked to drink ORS during the race and then measured variables just after the race.

### Amount of ORS Mixture

One packet of ORS (21 g) with 1 L of plain water. Content of ORS was sodium chloride-2.6 g, potassium chloride-1.5 g, sodium citrate-2.9g, and citrate-13.5 g.

### Statistical Technique

To evaluate the analysis of ORS intake on selected Physiological variables, "paired t test" was used with the help of data analysis software SPSS version 20 at 0.05 level of significance.

### RESULTS

Table 1 show the mean and standard deviation (SD) of physiological variables and performance of subjects.

It reveals the descriptive statistics of all selected physiological variables as reduced body weight, TBW, TBK, plasma fluid, and minerals and performance of all subjects. It showed the mean and SD of all selected variables for this study.

The mean difference of reduced body weight, plasma fluid, TBW, minerals, and performance found significant difference between the pre- and post-data of all subjects as its p value is.00 which is <0.05. The mean difference of TBK found significant difference between pre- and post-data of all subjects as its p value is 0.001 which is <0.05.

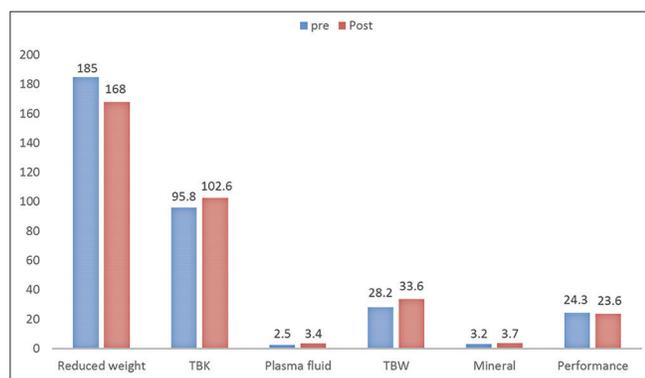
Table 2 shows the mean of pre- and post-reduced body weight, TBW, TBK, plasma fluid, and minerals and performance

**Table 1:** All variables with mean±SD

Variables	Pre-test	Post-test
Body weight (kg)	185±7.07	168±6.32
Body K (mmol/l)	95.77±4.7	102.5±3.11
Plasma fluid (liter)	2.5±0.29	3.4±0.13
Body water (liter)	28.13±7.07	33.58±6.32
Minerals (gm)	3.21±0.19	3.69±0.24
Performance	24.23±1.9	23.53±2.04

**Table 2:** Paired t-test of all variables with DF=9

Variables	t - value	Sig.
Reduced body weight pre and post	10.47	0.00
TBK pre and post	4.96	0.001
Plasma fluid pre and post	-10.83	0.00
TBW pre and post	-7.7	0.00
Minerals pre and post	-12.43	0.00
Performance pre and post	7.25	0.00



**Figure 1:** Graphical representation of pre- and post-mean of all subjects

were 185 and 168, 95.77 and 102.57, 2.5 and 3.4, 28.13 and 33.58, 3.21 and 3.69, and 24.23 and 23.53, Figure 1 shows graphical representation of pre and post data score.

### DISCUSSION

From the findings, it was clearly indicate that there was significant effect of ORS intake on selected physiological variables. TBW and potassium were increased after the intake of ORS, this may due to it contains potassium chloride and it helps to replacement of the lost fluid during the endurance run. Even small changes in the body's water content can impair the performance, because water lost through the sweating during the endurance exercise. Potassium is essential for conversion of blood into glucose. Potassium deficiency produced fatigue and weakness to the muscle.<sup>[5]</sup>

Minerals are lot with the sweat, so endurance exercise can deplete these minerals. Sports drink and fluid supplement fulfill the requirement of an athlete during the exercise. ORS is also a sports drink which helps to replace the lost minerals and fluid lost during the endurance exercise.<sup>[6]</sup>

Anna Maria Volanaki and Simpson was investigated on effect of caffeine and sodium chloride on fluid balance after induced exercise and find similar type of result.

Plasma fluid increased after the intake of ORS before and after the endurance training. Fluid loss decreases plasma volume and ORS helps to maintain it. Daniel Chibkova *et al.* reported the similar result that fluid and electrolyte were help to maintain plasma volume during marathon.

Reduced body weight after ORS intake before and during the endurance exercise was decreased 2% of body weight, but when it increased more than 2%, both heart rate and temperature are elevated during the exercise.<sup>[7]</sup> Apostu Mihaela also find the similar result and concluded that 500 ml of fluid drink help to reduce 400 g less body weight lost after the exercise.

### CONCLUSION

Based on this study results, it was concluded that ORS intake before and after the exercise was better than plain water. TBW, plasma fluid, reduced body weight, and TBK reduction were less after intake of ORS and it also concluded that ORS intake could be help to enhance the performance of an athlete.

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