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Research Article

**AN ASSESSMENT OF DETERMINING THE VARIATION IN THE LEVEL OF
SODIUM IN CHILDREN DIAGNOSED WITH AWD (ACUTE WATERY DIARRHEA)
BEFORE AND AFTER ORS (ORAL REHYDRATION SALE) SOLUTION
MANAGEMENT**

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Abstract:

Background: The risk of death in a young age due to diarrhoea is minimized by oral rehydration salt (ORS) solution. This solution with decreased osmolarity may be very productive according to the suggestion of current studies. Therefore, hyponatremia with decreased osmolarity ORS is now considered.

Objective: The objective of this research was to find out the difference in the serum sodium level in children with acute watery diarrhoea (AWD) before and after the use of decreased osmolarity ORS solution.

Patients and Methods: This research was conducted at Mayo Hospital, Lahore from September 2017 to October 2018. Total children selected for this study were one hundred. The age of the children was between two to sixty months. A written agreement was signed by patients which were consistent with the clinical case definition of AWD (passage of 3 or more loose stools per day) with a period of fewer than 14 days. Non-probability purposive sampling was used for gathering a sample. Decreased osmolarity ORS solution was given to each child. Before and after the use of ORS, paired sample t-test was used. Those children were excluded who were with serious dehydration or having clinical affirmation of systemic infection. SPSS was used for data entry and assessment.

Results: Variation in serum sodium level after use of decreased osmolarity ORS solution was not valuable statistically P-value = 0.173. The serum sodium level before use was (133 ± 3.4) meq/L and after use was (133 ± 2.9) meq/L. For subgroups of age and gender, identical outcomes were observed.

Conclusion: In children with AWD, the incidence of hyponatremia was not significantly associated with decreased osmolarity ORS solution.

Keywords: Oral Rehydration Salt (ORS), Osmolarity, Sodium, Diarrhea and Solution.

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INTRODUCTION:

Morbidity and death rate in children are remarkably associated with diarrheal disorders [1]. It is suggested by UN children's International Emergency Fund (UNICEF) and World Health Organization (WHO) that for avoidance and management of dehydration from diarrheal disorders, single formulation (Na 90 mmol/L) and osmolarity 311 (mosmol/L) of ORS solution should be used [2]. Therefore, with the use of WHO-ORS, there has also been agitation of osmolarity driven increase in the stool output. Due to this, current attempts have especially focused on the solutions of decreased osmolarity (Na = 75mmol/L, and osmolarity 245 mosmol/L) to enhance the effectivity of ORS [3]. Solutions with a lower amount of sodium may be more productive according to the outcomes of the present studies [3 – 5]. This solution is also associated with the incidence of hyponatremia [2]. Unluckily, there are no local attempts to check the incidence of hyponatremia with use of decreased osmolarity ORS. The objective of the study was to find out the difference in the serum sodium level in children with acute watery diarrhoea (AWD) before and after the use of decreased osmolarity ORS solution.

PATIENTS AND METHODS:

This research was conducted at Mayo Hospital, Lahore from September 2017 to October 2018. Total

children selected for this study were one hundred. The age of the children was between two to sixty months. A written agreement was signed by patients which were consistent with the clinical case definition of AWD (passage of 3 or more loose stools per day) with a period of fewer than 14 days. Non-probability purposive sampling was used for gathering a sample. Decreased osmolarity ORS solution was given to each child. Before and after the use of ORS, paired sample t-test was used. Those children were excluded who were with serious dehydration or having clinical affirmation of systemic infection. Those patients were managed according to the individual merit, who were showing no improvement within six hours. SPSS was used for data entry and assessment.

RESULTS:

Variation in serum sodium level after use of decreased osmolarity ORS solution was not valuable statistically P-value = 0.173. The serum sodium level before use was (133 ± 3.4) meq/L and after use was (133 ± 2.9) meq/L. For subgroups of age and gender, identical outcomes were observed. The value of P before the use of ORS for age was 0.941 and value after the use of ORS was 0.211. On the other hand, 0.919 was the value of P before use for gender and 0.533 after use as reflected in the tabular data.

Table – I: Serum Na before giving ORS (Months)

| Serum Na before giving ORS (Months) | Number | Mean | ±SD | P-Value |
|-------------------------------------|--------|--------|-------|---------|
| ≤ 6 | 10 | 133 | 2.494 | 0.941 |
| 7 to 12 | 35 | 133.06 | 3.865 | |
| 13 to 24 | 32 | 133.19 | 3.316 | |
| 25 to 60 | 23 | 133.61 | 3.652 | |
| Total | 100 | 133.22 | 3.486 | |

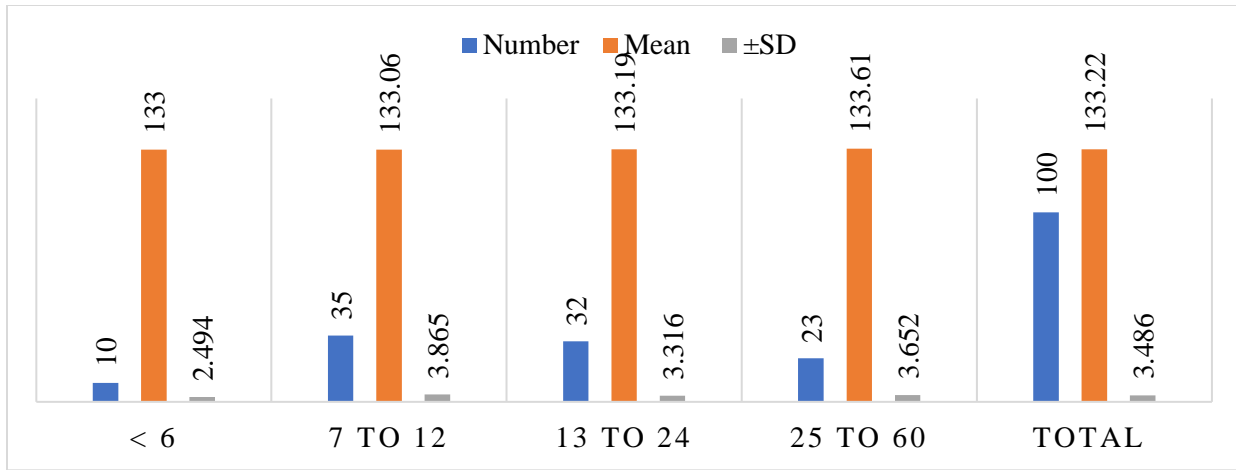


Table – II: Serum Na after giving ORS (Months)

| Serum Na after giving ORS (Months) | Number | Mean | ±SD | P-Value |
|------------------------------------|--------|--------|-------|---------|
| ≤ 6 | 10 | 132.3 | 2.751 | 0.211 |
| 7 to 12 | 35 | 133.74 | 2.442 | |
| 13 to 24 | 32 | 133.31 | 2.693 | |
| 25 to 60 | 23 | 134.48 | 3.666 | |
| Total | 100 | 133.63 | 2.894 | |

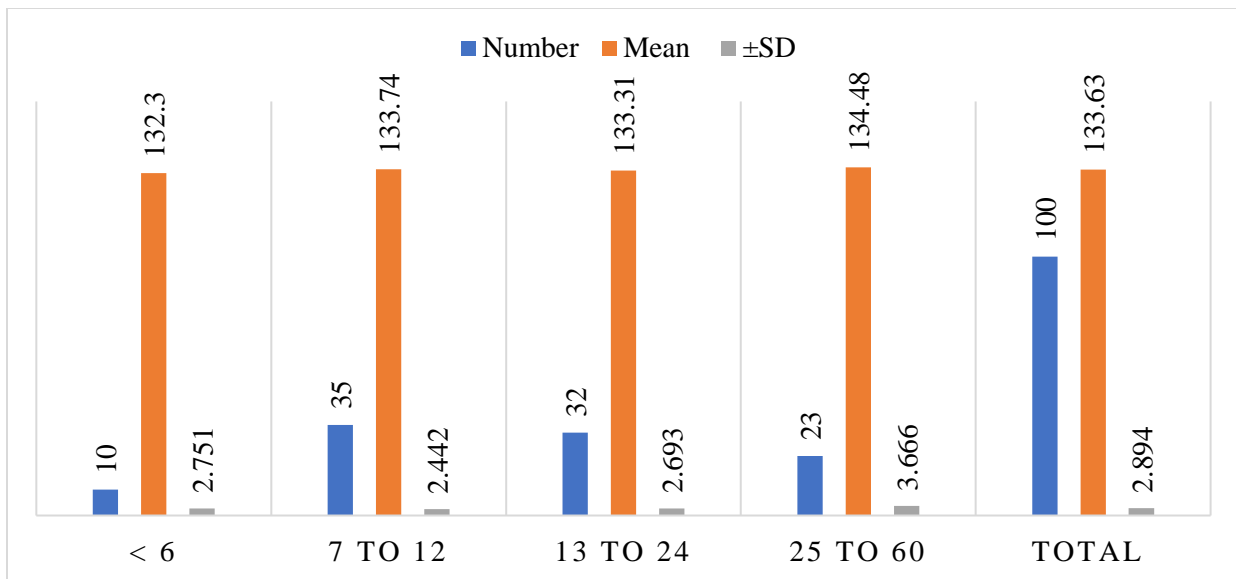
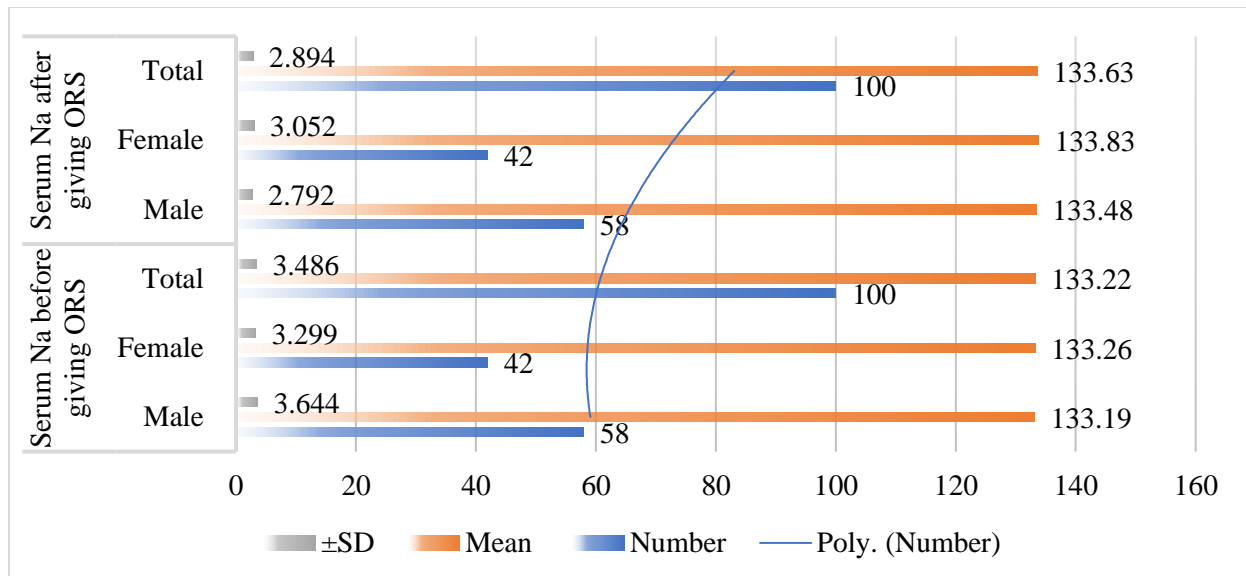


Table – III: Gender Distribution

| Gender | | Number | Mean | ±SD | P-Value |
|----------------------------|--------|--------|--------|-------|---------|
| Serum Na before giving ORS | Male | 58 | 133.19 | 3.644 | 0.919 |
| | Female | 42 | 133.26 | 3.299 | |
| | Total | 100 | 133.22 | 3.486 | |
| Serum Na after giving ORS | Male | 58 | 133.48 | 2.792 | 0.553 |
| | Female | 42 | 133.83 | 3.052 | |
| | Total | 100 | 133.63 | 2.894 | |

**DISCUSSION:**

Morbidity and death rate in children are remarkably associated with diarrheal disorders [1]. Dehydration is the worst complexity related to AWD. All around the globe, there observed a decrease in the mortality from diarrheal disorder due to the use of WHO-ORS and as a result establishment of decreased osmolarity ORS [6]. Variation in serum sodium level after the use of decreased osmolarity ORS [6]. Variation in serum sodium level after use of decreased osmolarity ORS solution was not valuable statistically (P-Value 0.173). The serum sodium level before use was (133 ± 3.4) meq/L and after use was (133 ± 2.9) meq/L. For subgroups of age and gender, identical outcomes were observed. The value of P before the use of ORS for age was 0.941 and value after the use of ORS was 0.211. On the other hand, 0.919 was the value of P before use for gender and 0.533 after use. Our outcomes are comparable with the outcomes of a study conducted by Allam *et al* [2]. This study indicated that in children

with AWD managed with decreased osmolarity ORS, the incidence of symptomatic hyponatremia is very low (2%). Dutta *et al* [7] also reported similar results. Another study was conducted by Hahn *et al*. [3]. In this study symptomatic hyponatremia in three RCTs was reported. But between both the treatment groups, dissimilarity was not significant. Murphy *et al*. [8] also conducted a similar study. He found seven trials and noticed that with decreased osmolarity ORS, biochemical hyponatremia (serum sodium < 130 mmol/L) was more common (RRI 67, CI 1.09 to 2.57; 465 participants, 4 trials). However, this was not valuable (RR 1.58, CT 0.62 to 4.04, 465 participants, 4 trials), for extreme biochemical hyponatremia (serum sodium < 125 mmol/L). Symptomatic hyponatremia or death is not observed by any trials. In the current study, children with extreme dehydration were not included. This makes the study restricted to a certain level.

CONCLUSION:

The results concluded that in children with AWD, the incidence of hyponatremia was not significantly associated with decreased osmolarity ORS solution.

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