Dear Editor,

Measurement of urine sodium is a vital matter which can show integrity of tubular function for reabsorption and low urine sodium indicate intact tubular function for sodium conservation, while high urine sodium may signify salt wasting causes and classification of hyponatremia, the reference range for urine sodium is 40–220 mEq/L/24 h.[1] In this study, we try to find urine sodium changes in children who are receiving standard values of sodium (3 mEq/dL of maintenance fluid) as compared to healthy children who intake usual Iranian diet [Table 1]. Age of ill and starved children was between 24 and 156 months 66 ± 4 months, daily sodium intake was varied from 2.8 ± 0.7 g (minimum 2 g, maximum 4 g) or 48 ± 12 mEq. There is not any correlation between urine sodium and received total sodium in grams per 24 h (r = −0.06, P = 0.7) or total sodium (mEq) per 24 h (r = −0.06, P = 0.7) there is not any correlation between urine sodium/creatinine (UNa/Cr) and total sodium intake in gram (r = −0.3, P = 0.1) and millie quivalent (r = −0.26, P = 0.1).

Urine sodium excretion in starved, ill children was lower than normal healthy nonstarved group (73 ± 43 vs 164 ± 68 mEq/L). Ill children had normal renal function, in isonatremic condition their urine sodium was significantly lower (83 ± 46 mEq/L) than normal group; while their urine UNa/Cr was higher than normal group (3.8 ± 5.5 vs 1.9 ± 1.5, P = 0.00), partly due to their lower creatinine excretion (38 ± 30 vs 128 ± 100 mg/dl). Changes of UNa/Cr in ill children is so wide, overlapped to what seen in healthy nonstarved children and opposite to what observed in spot urine sodium [Figure 1].

Sodium ion plays important role in blood pressure regulation, but sodium intake rarely used in clinical practice because of 24 h urine collection is cumbersome, while spot urine test can be desirable, although sodium excretion in random can be varied in different time of collection but in mid afternoon and early morning are more correlative with 24 h urine sodium excretion,[2] but in renal diseases estimation of 24 h sodium excretion by spot urine test cannot be reliable.[3]

Eighty-three percent of daily dietary intake can be excreted in urine, it was shown that 24 h sodium can be comparable with overnight collection, but not with spot urine test.[4] Although in other studies the benefits of spot urine test has been investigated, spot UNa/Cr was attributed to hypertension, this ratio (UNa/Cr randomly) is also correlated to 24 h sodium excretion and can be correlated positively to gastric cancer risk stages.[5] Our study tries to show that urine spot sodium is not correlated with sodium intake, in fasting ill group it varied between 58 and 88 mEq/L, while in normal nonfasting children it was high between 142

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**Table 1: Comparison of urine parameters of ill fasting and nonfasting healthy children**

| Parameter                  | Case        | Control     | P  |
|----------------------------|-------------|-------------|----|
| Age (month)                | 66 ± 4 (24-156) | 82 ± 37     | 0.09*|
| UNa/Cr                     | 3.8 ± 5.5   | 1.9 ± 1.5   | 0.00*|
| Total sodium (gram)        | 2.8 ± 0.7   | 128 ± 100   | 0.00*|
| Total Sodium (mEq)         | 48 ± 12     | 1,019 ± 9   | 0.06|
| USG                        | 1,019 ± 9   | 1016 ± 5    | 0.06|

U: Urine, Na: Sodium, Cr: Creatinine, USG: Ultrasonography

Figure 1: Urine sodium is low (lower part), while UNa/Cr is high and overlapped with control group (upper part)
and 168 mEq/L, while UNa/Cr in ill children is higher than control group with a wide range of changes and overlap with control group P values compare to spot urine sodium.

**CONCLUSION**

This study is different than other studies which find relation of 24 h urine Na with spot urine Na and UNa/Cr. We show that different total value of Na intake will not effect on urine sport Na and UNa/Cr because all they received fixed dose of sodium or maintenance daily dose or 3 mEq/dL of received fluid.

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**REFERENCES**

1. Allan B. Wolfson Chapter 95 Renal Failure. 7th ed. Marx: Rosen's Emergency Medicine. Mosby Elsevier publication. Philadelphia 2010.
2. Mann SJ, Gerber LM. Estimation of 24-hour sodium excretion from spot urine samples. J Clin Hypertens (Greenwich) 2010;12:174-80.
3. Nerbass FB, Pecoits-Filho R, McIntyre NJ, McIntyre CW, Taal MW. Development of a formula for estimation of sodium in take from spot urine in people with chronic kidney disease. Nephron Clin Pract 2014;128:61-6.
4. Micheli ET, Rosa AA. Estimation of sodium intake by urinary excretion and dietary records in children and adolescents from Porto Alegre, Brazil: A comparision of two methods. Nutr Res 2003;23:1477-87.
5. Correa P, Montes G, Cuello C, Hansel W, Liuzza G, Zarama G, et al. Urinary sodium-to-creatinine ratio as an indicator of gastric cancer risk. Natl Cancer Inst Monogr 1985;69:121-3.