

Effect of forced migration on electrolyte profile of refugees

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Abstract

Forced migration, whether internally or outside the national borders do come with problems and challenges. These challenges are common irrespective of migratory status (Refugee or Internally displaced persons). Some of the challenges are those of electrolytes imbalance and literature contains limited materials in this important group of people. Therefore, this paper assessed some electrolytes (sodium and potassium) level among refugees at Oru refugee camp, Nigeria. Subjects were adult (18-55yrs) males and females, 100 in two groups: local residents and refugees that just moved into camp within last 6months. Venous blood was collected from each volunteer, centrifuged and stored at -20°C until analysis at the chemical pathology departmental laboratory of Ambrose Alli University, Ekpoma. Mean values of Sodium and Potassium in refugees and residents are respectively; 136 ± 2.4 , 3.9 ± 0.3 mmol/L, Vs 137 ± 2.6 , 3.7 ± 0.2 mmol/L. There is no significant difference in electrolyte levels of both groups. This may be because the refugee population is settled. The electrolyte levels should be checked routinely in migrating populations and as soon as they are settled in a camp.

Keywords: Electrolytes, Sodium, Potassium, IDPs, Refugee.

1. Introduction:

Forced migration is a phenomenon as old as man. Throughout the history of man, 400years of Sojourn of Israelites in Egypt, more than 400 years of pillage and desecration of Africans and African societies by Europeans and their African collaborators during the trans- Atlantic slave trade and intertribal warfare all over Africa (Gogalkrishna 2005).

This tale of woe is not limited to Africa but rather ubiquitous. Britannia, today's Britain (United Kingdom) was pummeled and plundered for almost 800years by varying world powers (Empires) before she finally set herself free from the Roman Empire.

The first and second world wars of 1914-1918, 1939-1945 respectively brought untold hardship to the entire human kind with millions of deaths directly and several millions indirectly. Many more millions were displaced within (internally displaced person, IDPs) and or without national borders (refugees) primarily all over Europe with extensions or ripples in the colonies of European nations.

Thus in 1949, the United Nations, the agency that replaced the league of nations officially recognized refugee status and put in place measures aimed at ameliorating the problem faced by these groups of individuals. Much later, another group, the internally displaced peoples (IDP'S) was recognized (Korn 1998, OAU 1969).

Much have been said and done about these two groups concerning social, economic, health, etc, but little really exist in the area of the biochemical derangement associated with their forced migration/displacement. Worst hit are the electrolytes- sodium, potassium, chloride, bicarbonate, calcium and phosphates, these ions and myriad of others are usually bathed and transported perpetually in water (Mayne 1998).

Closely associated with this is the urinary output. Since no more water is coming in, the body will conserve whatever it has as much as possible and this would raise the osmolality of the urine considerably sometimes approaching 1400 mOsm (normal 290). This has its sequel in retention of toxic products of metabolism – nitrogenous wastes mainly and this is damaging to different organ system and their accumulation can manifest severally in terms of the organ affected. This may include irrational talks and generalized body itching amongst others. This work is therefore aimed at studying the effects of forced migration/displacements on the electrolytes of such individual refugees or IDPs.

2. Materials and Method

2.1: Study population: Following the massive influx of refugees into Nigeria in middle 1990s the federal government of Nigeria established a permanent camp for refugees at Oru, via Ijebu-Ode a town in Eastern part of Ogun State, in south Western Nigeria. The location was a former teachers' training college with boarding facilities, playground, library, health centre, hand pump wells and pit latrines. Two study groups were used, the Oru community and the refugee camp.

2.2: Sampling: The nominal list of the population revealed a total of 4,200; three thousand are adults above

18years of age. Out of these, only three hundred moved in within the last six months of 2005. The list consists of all nationalities one after the other showing lists of families as well as that of unaccompanied young children. Housing is on household basis and singles as well as unaccompanied are housed in dormitories depending on the sex. Only those refugees that came in within the last six months were studied because those that have stayed longer might have adjusted to the environment. Simple random sampling method was used, employing use of ballot papers for the study population (300) out of which 100 were sampled (ie 200 'no' and 100'yes'), the ballot box was taken to their residences as identified from above. Controls were drawn from the host community of Oru made up of a population of about fifty thousand (50,000) people by multistage sampling and of same size as the subjects. From the five wards in the town, one was chosen for study by random sampling (1 'Yes', 4 'No') and within the ward odd numbered houses on each street were approached for sampling. Each ward had differing number of streets but the sampled one had In each house, a male and a female were studied by simply finding out the total number of eligible adults and writing out 'NO' for all but one 'YES'. This was continued until the total numbers of samples (100) were obtained.

2.3: Ethical consideration: Ethical clearance was obtained from appropriate authorities; written and oral consent were obtained from subjects. Subjects were adults (18-55years) males and females, 100 in each group that cut across all the groups of refugees – Liberians, Sierra Leoneans, Sudanese, Congolese and Nigeriens in the camp. These were initially contacted through their representatives and the camp commandant.

2.4: Data collection, sample collection and analysis: Questionnaire on demography and refugee status was administered by the investigator (interviewer administered). Venous blood (10mls) was collected in fasting state and emptied into the heparinised and fluoride oxalate bottle (5ml each). Centrifugation was done within an hour at 3000rpm for 5minutes and plasma thus collected was stored at – 20°C until all the samples were collected. Analysis was done at the Ambrose Alli University Chemical Pathology department Laboratory, Ekpoma. Statistical analysis was by Microsoft Excel software package.

2.5: Limitation of study: The study would be best suited for displaced persons and refugees in flight or refugees just arriving at the camp. The subjects here are camp based and had to be limited to periods not more than six months stay in the camp.

3. Results:

Table 1: Distribution of Sodium in local Oru resident population.

Level of sodium	Frequency	Cum. frequency	Percentage
130-134	11	11	11
135-139	63	74	64
140-145	23	97	24
145-149	1	98	1

Table 1 shows that 64% of the local residents have sodium of 135-139 and 88% of them had Sodium levels between 135-145 mmol/L.

Table 2: Distribution of Potassium among the local Oru resident population.

Level of K ⁺	Frequency	Cum. Frequency	Percentage
3.0-3.4	2	2	2
3.5-3.9	81	83	83
4.0-4.4	15	98	15
4.5-4.9	0	0	0

Table 2 shows that 83% of the local Oru resident population had K⁺ level of 3.5-3.9mmol/L while 98% of the had the level between 3.5-4.4 mmol/L.

Table 3: Distribution of Sodium in the Oru refugee camp population.

Sodium level	Frequency	Cum. Frequency	Percentage
130-134	25	25	27
135-139	56	81	60
140-144	12	93	13
145-149	0	93	0

60% of the refugee population had sodium levels between 135-139mmol/L and 87% within 130-139mmol/L.

Table 4: Distribution of Potassium in the Oru refugee camp population.

Potassium level	Frequency	Cum. Frequency	Percentage
3.0-3.4	4	4	4
3.5-3.9	60	64	65
4.0-4.4	26	90	28
4.5-4.9	3	93	3

Table 4 shows that 65% of the refugee population had Potassium levels between 3.5-3.9mmol/L and 93% had Potassium levels within 3.5-4.4mmol/L.

Table 5: Distribution of age, Na⁺ and K⁺ in the refugees and local Oru resident population expressed in mean ± 2SD.

Population	No	M/F	Age 2SD	Na ⁺ 2SD	K ⁺ 2SD
Refugees	93	56/37	32.9 8.5	136 2.4	3.9 0.3
Residents	98	50/48	32.8 6.4	137 2.6	3.7 0.2

Key:

M = males, F = females, SD = standard deviation,

Na⁺ = Sodium, K⁺ = Potassium

Using the t-test for K⁺ in both populations, t from table = 2.0, calculated t = 1.279. H₀ accepted since -2.0 < 1.279 < 2.0 (Table 9 above).

Using the t-test, t from table = 2, while calculated t = -3.202, H₀ was rejected since the calculated value fall outside the acceptable range (-2 to +2).

There is no significant difference between the means of both groups α = 0.05. H₀ accepted since -2 < -1.458 < 2 (decision rule α = 0.05, t = 2.0 calculated t = -1.458).

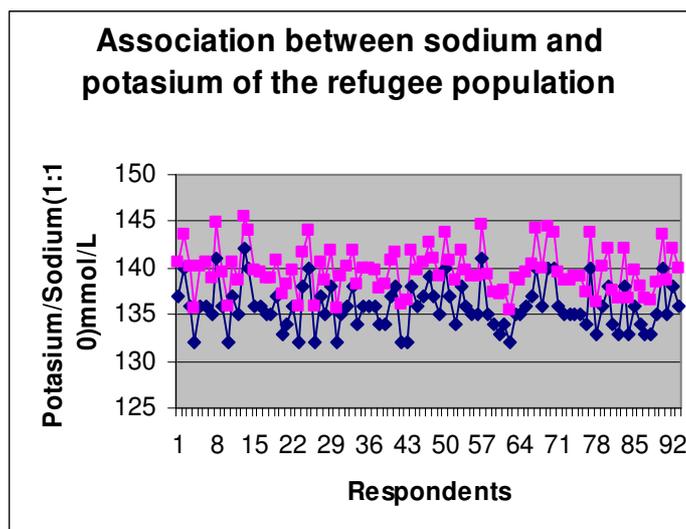


Fig.1: The association between Sodium and Potassium in the refugee population.
 There is an association between sodium and potassium in the refugee population.

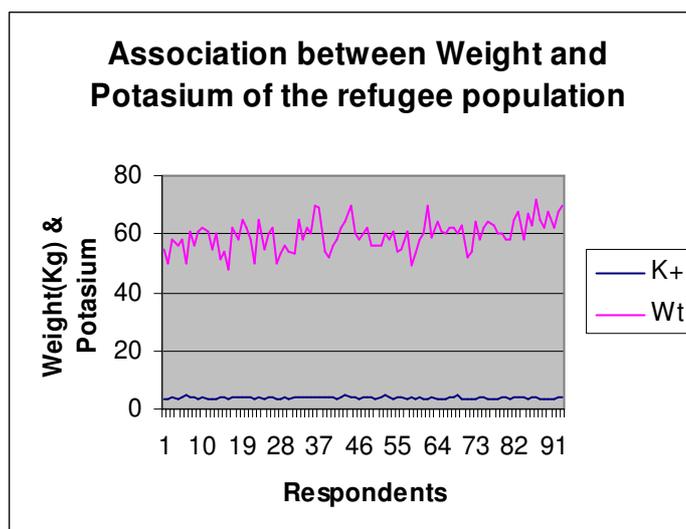


Fig.2: The association between weight and potassium in the refugee population.

The line graph shows that there is no marked association between weight and potassium in the refugee population.

4. Discussion

The studied populations are comparable since the respondents are from the same locality while the difference is only in the circumstances warranting each population's presence, nationalities and their life experience.

The refugees' population comprised of Liberians, Sierra Leoneans, Sudanese, Congolese, Nigeriens, Rwandans and Senegalese in order of frequency of occurrence while the local residents are made up of Nigerians with only two Ghanaians (Pius 2005).

The plasma levels of sodium in both groups (ref. 136 ± 2.4 , res. 137 ± 2.6) are within the reference ranges of the Royal College of Pathologists of Australia (RCPA 2009), 135-145mmol/L, Royal College of Pathologists (RCP 2009), UK, 130-145mmol/L and that obtained by Baron (1988), 135-145mmol/L. There is no significant difference between the means of sodium in both groups $p < 0.05$ (Table 5).

The mean values of Potassium in both populations (ref. 3.9 ± 0.3 , res. 3.7 ± 0.2) compare well with those of (RCPA 2009) 3.1-4.2mmol/L, (RCP) 3.5-5.0mmol/L and that obtained by Baron (2008) 3.6-5.0mmol/L. There is

no significant difference between the mean values of Potassium in both populations $p < 0.05$ (Table 5).

The correlation studies show that there is lack of correlation between any of the parameters studied among the refugees where as there is positive association between Sodium and Potassium level (0.3), age and Sodium (0.11) and much less between age and Potassium (0.06). This is important because it is an indication of the functional state of the internal mechanism necessary to control fluid and electrolyte balance. There is evident stability in the local residents while that of the refugees is disturbed most likely because of hormonal imbalance from flight and settlement.

It can be seen from Table 1 that 64% of the local residents have Sodium between 135-139mmol/L, and 88% of them had Sodium within 130-139mmol/L while in the refugee population, 60% had Sodium levels between 135-139 and 87% (130-139) mmol/L as in Table 2.

The Potassium distribution in the local Oru resident population revealed a higher preponderance between 3.5-3.9mmol/L (83%), and 98% between 3.5-4.4mmol/L (Table 2), while the Oru refugee population had 60% (3.5-3.9) and 93% between 3.5-4.4mmol/L of Potassium (Table 4). The relative higher level of Potassium in this population may be due to the additional physical stress the refugees have had to go through on daily basis to make ends meet.

There is an association between sodium and potassium of the refugee population (Fig 1).

5. Conclusion

This study has shown how Sodium and Potassium are affected in conflict situations. While planning for the health care needs of refugees, the concerned authorities should endeavour to include interval assessment of plasma electrolytes especially sodium and potassium so that a holistic approach to their problems can be marshaled and followed to a conclusive end. Part of the relief aid should include fluid and electrolyte supplements. This can be in form of candies and fortified for materials that can be easy to carry from one place to the other because of the migratory nature of refugees.

This finding should be of interest to the world health organization and the United Nations High Commission for Refugees (UNHCR). UNHCR should sponsor or facilitate a wider study on the effect of forced migration on electrolytes so that it can be more effective and helpful.

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