

# ARE THERE DIFFERENCES IN THE TYPE OF HIGH-SODIUM FOOD GROUPS AND THE LEVEL OF SODIUM CONSUMED AMONG TREATED MIGRANT AND NATIVE HYPERTENSIVE PATIENTS

## FOLLOWED AT PRIMARY CARE LEVEL IN LISBON, PORTUGAL?



Pinto, Ana <sup>1</sup>; Alarcão, Violeta <sup>1</sup>; Cardoso, Isabel <sup>1</sup>; Fernandes, Milene <sup>1</sup>; Guerra, Filipa <sup>1</sup>;

Guiomar, Sofia <sup>1,2</sup>; Nicola, Paulo <sup>1</sup>; Rocha, Evangelista <sup>1</sup>

<sup>1</sup> Epidemiology Unit, Institute of Preventive Medicine, Faculty of Medicine, University of Lisbon, Portugal

<sup>2</sup> National Health Institute Doutor Ricardo Jorge (INSA), Lisbon, Portugal



### Background

Hypertension (HTN) is a serious public health problem since it affects more than 40% of the Portuguese adult population<sup>1</sup>. Studies have consistently shown dietary salt intake as a major cause of raised blood pressure (BP)<sup>2</sup>. This study aims to: 1) identify major dietary sources of sodium intake and 2) identify groups of high and low consumers with a sodium score.

### Methods

This is an observational, population-based cross-sectional study, where treated hypertensive patients, followed at Primary Care Health Centres of the Lisbon Region, were stratified in two samples, according to their status as migrant or native. This research is integrated in the DIMATCH study (Determinants and Impact of Medication Adherence and Therapeutic Change in the Control of Arterial Hypertension).

In this study, migrants were defined as subjects who were born in Portuguese Speaking African Countries that arrived in Portugal after 1980 and with an African background. Natives must have been born in Portugal and with a Caucasian background. The sampling process followed a multistage approach, by clusters, aiming to draw a sample from the native and another from the migrant populations who access primary care centres of the Lisbon Health Region. The final study sample involved 465 patients, 191 migrants and 274 natives. After all participants provided written informed consent to participate in the study, trained interviewers conducted a structured interview to obtain data about socio-demographic characterization, health status (measurement of BP); and anthropometry (weight, height and waist circumference (WC)). The participants answered to a salty food frequency questionnaire with 41 high-sodium food choices (>500mg sodium/100g) organized in 15 groups. To identify high and low sodium consumers, a scale was built by attributing scores for frequency of salty foods intake as well as for the average sodium content of each food group. The higher the intake frequency and the sodium content of foods per portion size, the higher the score. The 75 percentile cut-off was used to define high consumers. Controlled BP was defined as systolic BP < 140 mmHg and diastolic BP < 90 mmHg. BP values were determined as the mean of three measurements. The  $\chi^2$  test was used for categorical variables and the Mann-Whitney U test for continuous variables, to assess the differences between natives and migrants within each sodium intake group ( $P < 0.05$ ).

| Characteristics                    | Low sodium consumers |                 |        | High sodium consumers |                |       |
|------------------------------------|----------------------|-----------------|--------|-----------------------|----------------|-------|
|                                    | Migrants (N=157)     | Natives (N=187) | P      | Migrants (N=34)       | Natives (N=87) | P     |
| Age, years (mean ± sd)             | 58 ± 11.0            | 66 ± 8.7        | <0.001 | 57 ± 10.5             | 62 ± 8.4       | 0.015 |
| Sex (% males)                      | 31                   | 51              | <0.001 | 32                    | 67             | 0.001 |
| SBP, mmHg (mean ± sd)              | 143 ± 24             | 142 ± 21        | 0.916  | 137 ± 19              | 143 ± 20       | 0.188 |
| DBP, mmHg (mean ± sd)              | 89 ± 13              | 84 ± 12         | <0.001 | 89 ± 11               | 85 ± 11        | 0.207 |
| Controlled BP (%)                  | 40.8                 | 47.1            | 0.144  | 43.7                  | 44.1           | 0.562 |
| Increased CV risk* (%)             | 75                   | 71              | 0.294  | 90                    | 76             | 0.089 |
| BMI, kg/m <sup>2</sup> (mean ± sd) | 30.2 ± 5.1           | 29.8 ± 4.2      | 0.767  | 33.4 ± 5.5            | 30.6 ± 4.4     | 0.019 |
| Sodium score (mean ± sd)           | 27 ± 13.4            | 30 ± 14.2       | 0.030  | 67 ± 13.4             | 75 ± 16.2      | 0.006 |

\*WC ≥ 88cm for women or WC ≥ 102cm for men

### Results

465 treated hypertensive individuals were analysed: 274 were natives (44% women) and 191 were migrants (69% women) with a mean age of 65 ± 8.8 years and 58 ± 10.9 years, respectively. Overall, the majority of the individuals had an education level under the 7th grade (59%).

#### Main findings:

- In the natives' group, a higher percentage of BP control was observed among the low sodium consumers when compared to the high sodium consumers (47.1% vs. 44.1%). On the contrary, in the migrants' group, a lower percentage of BP control was observed among the low sodium consumers when compared to the high sodium consumers (40.8% vs. 43.7%) (Table 1).
- Higher rates of controlled BP were found in women compared to men (54% vs. 46%,  $p=0.001$ ) (results not shown).
- Overall, a very high prevalence of overweight and obesity was observed, being more marked in the migrants' group of high sodium consumers.
- Significant differences between gender ( $p < 0.001$ ) were found in relation to CV risk assessment, with 87% of women and 58% of men having a WC indicative of higher CV risk (results not shown).
- A significant positive correlation was observed between sodium scores and BMI ( $r=0.128$ ,  $p=0.009$ ) and sodium scores WC ( $r=0.155$ ,  $p=0.002$ ).
- Overall, the major sources of Na<sup>+</sup> intake were hard cheeses and processed meat.
- Natives reported olives and commercial oatcakes as high contributors to Na<sup>+</sup> intake, while migrants reported ketchup.

### Conclusions

Differences in major dietary sources of sodium were found between the study groups with natives reporting olives and commercial oatcakes, and migrants reporting ketchup, as major contributors to Na<sup>+</sup> intake. Differences in the control of BP were reported within migrants and natives in low and high sodium consumer groups. While natives in the low sodium group had higher rates of controlled BP, migrants in the low sodium group had lower rates of controlled BP. In addition to the previous findings, there was an extremely high percentage of overweight and obese individuals when compared to the general Portuguese adult population<sup>4</sup>, as well as a very high rate of individuals at higher cardiovascular risk according to the waist circumference, specially women. Further analyses will be taken by performing a logistic regression model in order to understand the determinants of sodium consumption and controlled BP and their relationship with overweight and obesity. In conclusion, establishing and validating a sodium scale tool to distinguish between high and low consumers can be useful to direct dietary advice and intervention strategies towards priority groups.

### Bibliography

- [1] Espiga Macedo M, Lima MJ, et al. Prevalence, awareness, treatment and control of hypertension in Portugal: the PAP study. *Journal of Hypertension* (2005) 23(9):1661-6.
- [2] He FJ and MacGregor GA 'Reducing population salt intake worldwide: from evidence to implementation.', *Prog Cardiovasc Dis* (2010) 52(5):363-82.
- [3] do Carmo I, dos Santos O, Camolas J, Vieira J, Carreira M, Medina L, et al. Prevalence of obesity in Portugal. *Obes Rev* (2006) 7(3):233-7.

### For more information

Ana Margarida Pinto  
Unidade de Epidemiologia, Instituto de Medicina Preventiva, FML  
ampinto@live.com.pt

### Acknowledgments

Programa "Educação pela Ciência", GAPIC / FMUL  
Epidemiology Unit Interviewers Team  
DIMATCH Study Research Team  
Astrazeneca Foundation  
Directorate-General of Health