

Factors associated with non-compliance of sodium restriction in hypertensive and heart failure patients at the National Hospital of Cotonou, Benin

Colette Sylvie Azandjeme,¹
Charles-Jérôme Sossa,¹
Murielle Eliane Hounkponou,²
Yolaine Ahanhanzo-Glèlè,¹
Basilie Sodabi,³ Carmelle Mizehoun,³
Aymeric Darboux,¹ Martin Houenassi²
¹Regional Institute of Public Health,
University of Abomey-Calavi; ²Faculty
of Health Science, University of
Abomey-Calavi; ³National and
University Hospital Hubert Koutoukou
Maga (CNHU-HKM) of Cotonou, Benin

Abstract

Introduction: Nutritional therapy in the treatment of high blood pressure and heart failure is a real challenge in terms of compliance of sodium restriction for success of the treatment. The study aims to assess the level of patient compliance with the sodium restriction by salt consumption, prescribed by care providers and the associated factors.

Materials and Methods: Total daily salt intake was estimated in a cross-sectional study of 166 hypertensive and heart failure subjects monitored in the cardiology department of the “Centre Hospitalier Universitaire - Hubert Koutoukou Maga” (CNHU-HKM), using two 24-hour recalls combined with a food frequency questionnaire for salt-providing foods.

Results: Out of the study, 83.7% of patients had a daily intake above recommendations. Factors associated with the non-compliance of salt restriction were the lack of knowledge of palliative spices and herbs of salty taste ($p=0.009$) and the consumption of salty snack foods and salty peanuts ($p=0.032$).

Conclusion: Nutritional education and support activities should be carried out to improve the salt reduction compliance for these patients.

Introduction

High blood pressure (hypertension) is one of the main risk factors for cardiovascular disease (CVD). According to the World Health Organization (WHO), 49% of coronary events and 62% of all cerebrovascular accidents are consequence of high blood

pressure.¹ Hypertension is often complicated by stroke, renal failure and especially heart failure. The high frequency of hypertension and heart failure is mainly due to changes in the lifestyle of individuals.² Risk factors for these diseases include diet, especially sodium consumption. Excessive salt consumption over many years can have negative effects on the cardiovascular system and the kidneys. A recent study in Benin found that high sodium and low potassium consumption are associated with the occurrence of hypertension and CVD.^{3,4} The treatment of these conditions is a real challenge. Nutritional treatment, especially sodium restriction depends only on the patient's commitment and the observance of this nutritional prescription appear often not be effective. The number of non-observant or poor-observant patients is estimated to 30% to 60% and more. According to the “Euro Heart Failure Survey”, more than 60% of patients do not comply with dietary recommendations prescribed during doctor-consultation.⁵ Reducing sodium intake is a priority public health initiative to lower blood pressure and reduce the distribution of hypertension. Then, improving patient adherence to this recommendation treatment should be more beneficial than any biomedical action. In Benin, care of high blood pressure and heart failure patients is currently carried out by cardiologist and other medical doctors put emphasis on lifestyle measures, including sodium restriction. However, there is no data in the literature on adherence of patients to prescription. The purpose of this study is to assess compliance of the sodium restriction in these patients and the associated factors.

Materials and methods

Study design

This was a cross-sectional study with a descriptive and analytical focus.

Study setting

This study included hypertensive and heart failure patients in the cardiology department of the National and University Hospital Hubert Koutoukou Maga (CNHU-KKM) outpatient clinic. The non-probabilistic sampling method and the convenience technique were used to select the study's participants. Based on their medical records, 180 former patients were selected for the diagnoses of hypertension or heart failure. Looking for evidence of having received the prescription for sodium restriction, only 175 patients whose records contained this information were retained.

Correspondence: Colette Sylvie Azandjeme, University of Abomey-Calavi, Regional Institute of Public Health, Department of Health Promotion, PO Box 384, Ouidah, Benin.

Tel.: +229.61784478.

E-mail: colsyaz@yahoo.fr

Key words: Compliance; sodium restriction; hypertension; heart failure; Benin.

Acknowledgments: The authors would like to thank the patients who participated in the study and the hospital administration for facilitating access to the data.

Contributions: CA, C-JS, BS, MH, Study design; CA, BS, Y A-G, MEH, data collecting and analysis; CA, AD, manuscript writing; CA, C-JS, CM, AD, Y A-G, MEH, MH, manuscript reviewing.

Conflict of interest: The authors declare no potential conflict of interest.

Funding: None.

Received for publication: 24 November 2019.

Revision received: 20 May 2020.

Accepted for publication: 29 May 2020.

This work is licensed under a Creative Commons Attribution NonCommercial 4.0 License (CC BY-NC 4.0).

©Copyright: the Author(s), 2020

Licensee PAGEPress, Italy

Journal of Public Health in Africa 2020; 11:1303

doi:10.4081/jphia.2020.1303

During data collection, 170 patients really arrived for consultation. Among them, four of them didn't give their consent to participate in the study. At the final point 166 patients therefore include to the sample.

Variables

As a dependent variable, compliance with the sodium restriction was assessed on the basis of the daily salt intake (g) which is the amount of salt from food consumed in addition to the estimated amount of salt used in cooking food. The amount of salt provided by food was determined using the West African food component table.⁵ The amount of salt consumed per day is considered normal if it is less than or equal to 5g per day according to World Health Organization standards.⁶ The socio-demographic characteristics of the respondents (age, sex, marital status, level of education and occupation) were collected, as well as the family history of CVD and variables related to factors that could influence compliance with the sodium restriction (degree

of understanding of the message of the sodium restriction, knowledge of salty foods, knowledge of the herbs and spices used to overcome the salty taste of meals, degree of motivation to comply the sodium restriction, ability to control salt consumption and perception of the beneficial impact of the sodium restriction on treatment).

Data collection and analysis

Data collection took place from October 01 to November 02, 2015. Food habits and quantity of salty food consumption were collected through a questionnaire and two 24-hour recalls, one during the week and the other on weekends. While the first food recall was done in the patient's presence, the second was done by phone.

Data were recorded with EPI Data 3.1 software and analysis was conducted with EPI Info 3.4.5 software. The Chi² test was used to determine factors associated with compliance with the sodium restriction with a significance level of 0.05.

Before data collection, Faculty of Health Science gave authorization and the hospital and cardiology department agreement were also obtained. Oral informed consent of each patient was obtained before data record and confidentiality and anonymity was respected.

Results

Socio-demographic characteristics of respondents

The mean age of the patients was 57.8±13.2 years and the majority of the age groups were 55-65 years (38%) and 65 years and above (27%). Women represented 56% of the sample and 94.6% of the respondents were married. In the following proportion, patients were retired (39.8%), office workers (27.1%) or shopkeepers (22.3%), university (37.3%) or secondary (32.5%) level of education.

Health status

Out of the 166 patients, 10 (6%) had heart failure and 156 (94%) had hypertension. Family story of cardiovascular diseases was present in 47,6% of them.

Frequency of salt-rich foods consumption

The distribution of patients according to their frequency of consumption of salt-rich foods (Table 1) shows that nearly a quarter (21.1%) of patients consumed daily canned food and slightly less (18.7) pastry, bread and pastries. Salted pheasant fish (96.9%) and broths (69.8%) were very frequently consumed.

Practices to reduce daily salt intake

The different practices used by patients to reduce their salt intake are reduction during cooking (95.2%), avoidance of very salty meals (85.5%) and non-addition of salt at table (97.3%). Furthermore, 78.9% of patients consumed out-door meals and this practice is described more than once a day for 19.1% of them (Table 2).

Daily dietary intake of salt

The mean daily salt intake per person calculated was 6.44±2.12 g. According to WHO recommendations, 83.7% of patients daily of salt intake higher than recommend (5g/d), representing the rate of non-observance or non-compliance of salt reduction.

Factors associated with non-compliance the sodium restriction

The sodium restriction advice was poorly or not at all understood by 22.3% of patients and its beneficial impact was also not well perceived by 34.4% of patients.

However, 80.1% of patients were motivated to comply with the sodium restriction prescribed. Table 3 presents the results of the analysis of the relationship between salt consumption and patients' perception, knowledge and attitude towards the prescription of sodium restriction. The degree of understanding of the message of the sodium restriction was similar among patients who observed or not the sodium restriction but in relation to their understanding of the message "not to feel the salty taste in your meals" there were significantly more "non-observers" who interpreted it as "little or no salt in cooking" ($p<0.001$). The level of knowledge of salt-rich foods, the degree of motivation, the ability to control salt intakes and the perception of the beneficial impact of sodium restriction were similar in both groups. In addition, there were significantly more observers with an acceptable level of knowledge of palliative herbs and spices of salty taste ($p=0.009$).

In assessing patients' behaviors and atti-

Table 1. Distribution of patients by frequency of consumption of salt-rich foods (N=166).

	≥ 1/day	≥ 1/week	≥ 1/month	Rarely/never
Canned food	21.1	33.7	23.5	21.7
Processed meats	1.8	20.5	45.2	32.5
Pastries, bread	18.7	33.2	17.4	30.7
Salty snacks (cashew nut, peanut)	1.2	10.8	30.8	57.2
Salted cheese, popcorn, chips	3.6	6.6	39.2	50.6
Salted pheasant fish	90.2	6.0	3.0	0.8
Broths	60.3	9.6	14.4	15.7

Table 2. Distribution of patients by eating behavior in relation to salt consumption.

Attitudes/Practices	Frequency	%
Reduction of salt in the meal (N=166)		
Yes	158	95.2
No	8	4.8
Adding salt to the table (N=166)		
Yes	21	12.7
No	145	87.3
Attitude towards salty meals (N=166)		
Consume	24	14.5
Refuse	142	85.5
Eating of outdoorfood (N=166)		
Yes	131	78.9
No	35	21.1
Number per dayof outdoormeals (N =131)		
Not everyday	56	42.7
1/day	50	38.2
Several /day	25	19.1
Number of days per week of outdoormeals (N =131)		
Not every week	66	50.4
≥ Once a week	65	49.6

tudes (Table 4), it was found that adding salt to food at table and eating out-door meals were no different in the two groups. Acceptance of fairly salty meals was significantly less frequent among “non-observers” of the sodium restriction ($p=0.001$). In Table 5, it is shown that the high frequency of consumption of some salt-rich foods, such as salty snacks (peanuts and salted cashews), is associated with non-compliance of the sodium restriction ($p=0.032$). No significant differences were observed in the two groups for the other food groups explored.

Discussion

The mean salt intake in this study was 6.44 ± 2.12 g/d, which is higher than the nutritional recommendations of the Beninese Food Guide⁶ and the WHO.⁷ Higher consumption (9.72 ± 2.43 g/d) was reported in hypertensive patients elsewhere,⁸ but the salt intake was assessed on the basis of sodium and creatinine concentrations detected in urine samples in contrary to the current study where salt consumption was assessed by patient declara-

tion. The rate non-compliance of salt intake was high (83.7%) as in other studies showing low compliance rate less or equal to 15%.⁹ This shows that some barriers exist at the patient level to the practice of sodium restriction.

In assessing the frequency of consumption of salt-rich foods among the patients in the study, we found that the frequency of daily consumption of certain foods such as bread and pastries (18.7%), salted pheasant fish (96.9%), canned food (21.1%) and broth (69.8%) were very high although it was the consumption of salty snacks

Table 3. Relationship between sodium restriction compliance and patient perception, knowledge, attitudes and behaviors.

	Salt consumption (g)/day		p-value
	Observant, n (%)	Non-observant, n (%)	
Understanding of the sodium restriction message			0.497
Not very understandable	8 (29.6)	29 (20.9)	
Understandable	13 (48.1)	87 (62.6)	
Quite understandable	6 (22.2)	23 (16.5)	
Understanding the message			< 0.001
Little or no salt in the kitchen	23 (85.2)	137 (98.6)	
Little salt in the kitchen and no salt at the table	4 (14.8)	2 (1.4)	
Degree of motivation			0.094
Somewhat acceptable	7 (25.9)	26 (18.7)	
Acceptable	11 (40.7)	80 (57.6)	
Fairly to very acceptable	9 (33.4)	33 (23.7)	
Perception of the benefit			0.848
None	3 (11.1)	13 (9.4)	
Not good enough	8 (29.6)	33 (23.7)	
Acceptable	6 (22.2)	46 (33.1)	
Good	10 (37.1)	47 (33.8)	
Knowledge of herbs and spices palliative of salty			0.009
None	20 (74.1)	102 (73.4)	
Not good enough	3 (11.1)	29 (20.8)	
Acceptable	4 (14.8)	8 (5.8)	

Table 4. Relationship between patients' perception, knowledge, attitudes and behaviors and daily amount of salt consumed.

	Salt consumption (g)/day		p-value
	Observing, n (%)	Non-observant, n (%)	
Level of knowledge of salt-rich foods			0.835
No one	14 (51.9)	72 (51.8)	
Not good enough	7 (25.9)	40 (28.8)	
Acceptable	6 (22.2)	27 (19.4)	
Ability to control salt intake			0.767
Yes	26 (96.3)	132 (95.0)	
No	1 (3.7)	7 (5.0)	
Adding salt to the table			0.711
Yes	4 (14.8)	17 (12.2)	
No	23 (85.2)	122 (87.8)	
Attitude towards fairly salty meals			0.001
Refusal	22 (81.5)	120 (86.3)	
Consumes	5 (18.5)	19 (13.7)	
Number of outdoor meals/day			0.129
<1 meal /d	6 (30.0)	50 (45.0)	
One day meal	7 (35.0)	43 (38.7)	
>1 meal /day	7 (35.0)	18 (16.2)	
Number of days/week of outdoor meals			0.135
Rarely	7 (35.0)	59 (53.2)	
Several days/week	13 (65.0)	52 (46.8)	

(peanuts and salted cashews) that was associated with non-compliance with the sodium restriction ($p=0.032$). The contribution of these foods to salt intake in hypertensive people has been highlighted in other studies, particularly for bread and pastries in the general population as well as in hypertensive and diabetic people.¹⁰ The association of the consumption of salty snack foods (salted cheese, crisps, popcorn, salted biscuits, mustard) with the non-observance of the sodium restriction ($p<0.001$) could be related to the small amount they are usually consumed compared to salty snacks.

The high consumption of broth (10g broth = 40g sodium) observed in this study contrasts with the proportions of patients who reported understanding the message conveyed by providers, being motivated and also eating low salt. No significant association has been identified between the observance of the sodium restriction and the level of knowledge of salt-rich foods, the degree of motivation, the ability to control salt intakes and the perception of the beneficial impact of this restriction. In the literature, studies have highlighted that patient information, financial income levels and adherence to physical activity recommendations are predictive factors for adherence to dietary recommendations as a whole.

With respect to understanding the message “not to smell the salty taste in your meals”, there were significantly more “non-

observers” in this study who interpreted it as “little or no salt when cooking” ($p<0.001$). This result would mean that “non-observers” are more willing to add salt to their meals even if in this study the observance of the sodium restriction and the addition of salt were not linked.

Knowledge of palliative herbs and spices of salty taste ($p=0.009$) was associated with sodium restriction compliance in the patients surveyed. This would reflect the ability of “observers” to reduce their salt intake and thus comply with the recommendations. Refusal of fairly salty meals, on the other hand, was associated with non-compliance with the sodium restriction ($p=0.001$) in this study. This result, although contradictory, could be explained by the fact that the “non-observers” wanted to hide the non-compliance with the recommendations or that they rely much more on taste to judge the “salty” nature of the meals, which is not always reliable when we know that some foods may contain significant amounts of sodium without this being detected when they are mixed with others.

Conclusions

This study shows that the proportion of hypertensive and heart failure patients monitored at CNHU who comply with the sodium restriction prescription is low and that

the application of measures to reduce salt intake is insufficient. This high non-compliance is associated with a lack of knowledge of salty-tasting spices and palliative herbs and the consumption of salty snacks. The practical measures claimed by patients are not very credible and only the amount of salt consumed reflects the degree of compliance with this recommendation. Actions are needed to increase patients’ knowledge of food sources of salt and salty-tasting palliative spices and herbs, but also to raise their awareness of the benefits of sodium restriction and the consequences of non-compliance. At the individual level, resolving ambivalence, increasing motivation and a sense of personal effectiveness are actions to be taken by providers.

References

1. Uzan A, Delaveau P. The salt content of food: a public health problem. *Ann Pharma Franc* 2009;67:291-4.
2. Mizehoun C, Desport FC, Houehanou C, et al Food consumption of sodium (Na) and potassium (K) in urban and rural population in Benin. *Rev Epi San* 2015;63:73.
3. Yessito C, Houehanou N, Lacroix Philippe, et al. Ampleur des facteurs de risque cardiovasculaires dans les régions rurales et urbaines au Bénin: résultats d’une enquête nationale. 2015 doi:10.1371/Journal.pone.0126441
4. Levesque S, Delisle H, Agueh V. Contribution to the development of a food guide in Benin: linear programming for the optimization of local diets. *Public Health Nutr* 2015;18:622-31.
5. Food and Agriculture Organization of the United Nations Rome. *West African Food Composition Table*. 2012, 171p.
6. World Health Organization, *New WHO Guidance on Salt and Potassium in Food*. 2013.
7. Takahashi N, Tanabe K, Adachi T, et al. Awareness of salt restriction is not reflected in the actual salt intake in Japanese hypertensive patients. *Clin Exp Hypert* 2015;37:388-92.
8. Ohta Y, Ohta K, Ishizuka A, et al. Awareness of salt restriction and actual salt intake in hypertensive patients at a hypertension clinic and general clinic. *Exp Hypert Clin* 2015;37:172-5.
9. Colin-Ramirez E, Espinosa-Cuevas Á, Miranda-Alatriscite PV, et al. Food sources of sodium intake in an adult Mexican population: a sub-analysis of the SALMEX study. *Nutrients* 2017;9:810.

Table 5. Frequency of consumption of salt-rich foods and daily amount of salt consumed.

	Frequency	Amount of salt _ n (%)		p-value
		< 5g	≥ 5g	
Canned food	≥1/day	4 (14.8)	31 (22.3)	0.374
	≥1/week	11 (40.8)	45 (32.4)	
	≥1/month	6 (22.2)	33 (23.7)	
	Never/Rarely	6 (22.2)	30 (21.6)	
Processed meats	≥1/week	9 (33.3)	28 (20.2)	0.610
	≥1/month	12 (44.5)	63 (45.3)	
	Never/rarely	6 (22.2)	48 (34.5)	
Pastries, bread,	≥1/day	8 (29.7)	23 (16.5)	0.441
	≥1/week	7 (25.9)	48 (34.5)	
Viennese pastries	≥1/month	5 (18.5)	24 (17.3)	
	Never/rarely	7 (25.9)	44 (31.7)	
Salty appetizers	≥1/Week	3 (11.1)	17 (12.2)	0.032
	≥1/Month	14 (51.9)	37 (26.6)	
	Never/Rarely	10 (37.0)	85 (61.2)	
Salty snacks	≥1/Week	6 (22.2)	11 (7.9)	< 0.001
	≥1/Month	9 (33.3)	56 (40.3)	
	Never/Rarely	12 (44.5)	72 (51.8)	
Salted pheasant fish	≥1/day	24 (88.9)	127 (91.4)	0.903
	≥1/week	3 (11.1)	12 (8.6)	
Broth	≥1/day	16 (59.3)	84 (60.4)	0.293
	≥1/week	3 (11.1)	13 (9.4)	
	≥1/month	5 (18.5)	19 (13.7)	
	Never/Rarely	3 (11.1)	23 (16.5)	