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Original Article

Sodium content of breads available in the markets of Dhaka city, Bangladesh

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Abstract

Background: Bread has been identified as a major contributor to the excessive sodium (Na) intake of consumers in many countries of the world. High sodium intake is associated with high blood Pressure and therefore increases the risk of cardiovascular diseases. So, Na content of bread is one of the most common targets of initiatives to reduce Na intake worldwide. Objective: To determine the sodium (Na) content of white breads available in the markets of Dhaka city, Bangladesh. **Materials and Methods:** This is a cross-sectional study to determine the Na content of white bread available for sale in different markets in Dhaka city. Top selling 10 brands of white bread were identified through retailers' self-report from selected retail outlets of the markets of Dhaka city. Four loaves of white bread from selected packaged brands were analyzed for determination of Na content per 100gm of bread. Flame photometry was used to determine the Na content of the bread. **Results:** Thirty white bread samples of 10 selected brands were analyzed. The Na content varied largely from 314.5 mg/100g to 625.9 mg/100g with significant differences between the brands ($p < 0.001$), where the mean Na content was 503.1 mg/100g of bread. Seven brands had Na content above the maximum allowable level (< 450 mg/100g) recommended by World Health Organization. **Conclusions:** There was significant variation of Na content in various white breads brands in Dhaka city. Majority of the white breads had Na content more than the maximum allowable level.

Key Words: Sodium, Bread, Dhaka, Bangladesh.

Introduction

Currently, non-communicable diseases (NCDs), such as cardiovascular diseases (CVD), cancer, diabetes and chronic respiratory diseases are the leading cause of death and are responsible for 70% of deaths globally¹. In Bangladesh, NCDs are estimated to account for 67% of total death annually and a large proportion of these deaths are due to CVD². High Blood Pressure (BP) is the top most cause of disabilities in the world³. Excess dietary sodium (Na) is associated with high BP and increases the risk of CVD^{4,5}. In Bangladesh, age adjusted prevalence of hypertension among adult aged 25 years or more was 21% according to World Health Organization (WHO)

STEPS survey of 2010⁶. The survey also showed higher prevalence of hypertension in urban population compared to the rural population⁷. WHO recommended salt reduction as one of the top priority actions to tackle the NCDs crisis and proposed a reduction in salt intake to less than 5g/day (equivalent to 2g Na/day) in adults to reduce high BP and risk of CVDs, stroke and coronary heart disease^{4,8,9}. Several studies in Bangladesh have reported varying levels of population salt intake based on assessment of urinary excretion of Na either in spot urine (urban & rural, 17g/day) or in 24-hr urine in urban (11g/day) and costal rural population (6.8g/day) or among pregnant

women (8.5g/day)^{8,10,11,12}. WHO lists population salt reduction as one of the most cost-effective measures to improve public health⁸. Na content in bread is a growing interest in public health^{13,14}. Increase availability and popularity of processed and fast food play an important role to poorer diet quality, particularly among the city's affluent class^{14, 15}. At present, bread has become an important staple food in Bangladesh with an ever increasing consumption trend¹⁶. Per capita consumption of bread and biscuits in urban population in Bangladesh has increased from 42.5g/day to 45g/day between the years 2005 and 2010¹⁷. However, data related to Na content of bread is scarce. The Food Composition Table of Bangladesh reported Na content in white bread as 592mg/100g, but the method of estimation was not clearly described¹⁸. In most countries of Europe, programs for monitoring of sodium content in different foodstuffs, especially breads has been introduced and the maximum allowable level of Na in bread has been established by the UK Food Standards Agency (i.e. < 450mg/ 100g of bread) which is endorsed by WHO^{19,20}. As because bread is an important component of diet around the world, the Na content of bread becomes one of the most common targets of initiatives to reduce Na intake worldwide^{21,22,23}. The present study aimed to determine the Na content of white bread available in the markets of Dhaka city.

Methods and Materials

The study to determine the Na content of different brands of breads available in the markets of Dhaka city was done during the period during October 2015 to March, 2016. Selection of retail outlets and collection of samples Sampling was done in a three stage design by following the method described by Pehrsson et al.^{24,25}, where zones were selected from two City Corporations of Dhaka at first stage. Three zones were randomly selected from each city corporation. Then 60 retail outlets were chosen (10 from each zone) at the second stage. A self-completion questionnaire was administered to the shop owner or employee. The respondents were asked to rank 3 brands of white breads which were displayed in their outlets in order to

identify most popular selling brands by giving number I, II and III, where number I for the most selling brand, number II for second most selling brand and so on. Thick and medium sliced breads measuring between 150-250g loaves available in almost all retail outlets within the city were included. Supermarket own branded breads, homemade and bakery breads were not included in this study. 'Special bread' such as milk bread, butter buns were also excluded. Then we introduced a score 3 for rank I, score of 2 for rank II and score of 1 for rank III. After summation of the given scores, the top scored 10 different branded white breads were selected from the retail outlets at the third stage (based on maximum sell).

Retail samples (30 in number) of 10 brands of white breads were purchased within 24 hour of supply by the manufacturer. Samples were coded using capital letters (A-J) to identify the brand names and send to the laboratory of Institute of Food Science and Technology, Bangladesh Council of Scientific & Industrial Research (BCSIR), Dhaka, Bangladesh for Na analysis²⁶. The codes identifying the different brands were kept confidential all the way through the laboratory and statistical analysis.

Laboratory Analysis and Na Determination Four thick loaves of white bread were taken from each of one of the selected brand. Immediately after the preparation of sample in the laboratory, they were analyzed in accordance with the different stages of analytic procedure mentioned elsewhere^{27, 28}. Na content was determined by flame photometry using a JENWAY PFP7 Flame Photometer, Made in U.K. according to AOAC method 990.23z where the reading of the Na on a Flame Photometer was done by comparing the emission with that from standards made in distilled water containing 0.5, 10, 20 and 40 ppm of Na^{29,30}. The results obtained from photometer reading were compared with various standards in the graphs and is expressed in ppm or m.e.L-1. A quantity equivalence of Na in milligrams per 100gm (mg/100g) was determined for all selected brands.

Statistical analyses Na content in 10 different brands of white bread was presented as means, SD and 95% Confidence Interval (CI), were computed by using MS

Excel 2013. All Statistical analyses was done by using statistical software package (IBM® SPSS® Statistics version 21.0., Chicago, IL, USA).

Results

In this study, the approximate daily sell of the selected brands were collected through the interview of the retailers. From the reports of the salesman, brand 'D' was found to be most selling brands with approximately 316 packets daily followed by brand 'A' (222 packets) in surveyed outlets (Fig. 1).

The results for the presence of Na contents in 10 different brands of white breads purchased in retail outlets localized in two city corporations of Dhaka are listed in Table-I. The Na concentration in the white breads ranged between 314.5 mg/100g $\pm$ 14.1 and 625.9 mg/100g $\pm$ 12.7.

Table-I: Na content (mg/100g of bread) of white breads in selected brand (n=10)

Brand Code	Na content (mg/100g)		
	Mean	SD	Range
A	314.5	14.1	
B	455.5	10.0	
C	610.0	12.2	
D	450.1	11.5	
E	503.7	11.0	314.5 – 625.9
F	594.2	13.8	
G	362.8	10.8	
H	584.6	10.5	
I	625.9	12.7	
J	530.0	12.8	

The highest Na concentration was determined in brand I and the lowest in brand A (Fig. 2). Most (70%) of the brands of bread had Na concentration (mg/100g of bread) more than maximum allowable level of 450mg/100g of bread set by United Kingdom Food Standard Agency (UK-FSA) (Table 1). The mean Na concentration of white breads was 503.1 mg/100g of bread, with significant differences ($p<0.01$) between the brands (data not shown). Figure 3 showed the

comparison of Na content (mean of individual value $\pm$ SD), in different brands of bread, with maximum allowable level.

Discussion

In the present study, 10 most selling brands of white breads were selected using a recommended product sampling method to determine Na content in different brands consumed by urban population in Bangladesh, especially in Dhaka city²⁵. The study showed that the mean value of Na in white breads of the selected brands was 503.1 mg/100gm, which was higher than maximum allowable level (<450mg/100g) set by UK FSA and endorsed by WHO^{8, 20}. Our results were interpreted according to the maximum target level mentioned above as because there were no specific guidelines for the maximum Na content of bread in Bangladesh. In Food Composition Tables for Bangladesh, the average Na content of white bread was reported as 592mg/ 100g¹⁸ which was approximately 17% higher than the value of Na content in white breads of selected brands analyzed in our study. Taking into account recent reports on this topic, the mean Na content of bread was 400 mg/100g (range: 232-480 mg/100g) in a study from UK²⁰, which is lower than that of our study as well as maximum allowable level. The mean value of Na in bread samples of selected brands of Dhaka city was also higher than the mean value of Na in white breads in Australia (427mg/100g), New Zealand (463mg/100g) and The United States (491mg/100g)^{19,31}. However, the concentrations of Na in different white breads vary markedly across the 10 selected brands which was found statistically significant ($p<0.01$). This indicates a lack of uniformity in recipes and in adequate control of Na addition. The possible reason behind the higher level of Na in selected brands with a wide variation between them may be due to absence of standard guideline regarding the use of salt in bread manufacturing. The highest Na content was recorded in the brand 'I' (625.9 mg/100g $\pm$ 12.7) and the lowest in brand 'A' (314.5 mg/100g $\pm$ 14.1). Variation of Na content in the brands is relatively large. In multiple comparison of Na content in different brands, most of the brands showed significant differences of Na

content ($p < 0.01$) by Least Significant Difference analysis. The large variation indicates that there are real opportunities to formulate the guideline of uses of Na in white bread products of different brands available for sell in Dhaka city.

Despite wide range values observed, most brands (7 out of 10) had Na content above the maximum allowable level recommended by WHO though the Na content of a few brands of white bread³ fell well within the limit of 450 mg/100g, there is an urgent need to reduce the amount of Na in most of the selected brands. Our study has some limitations that should be taken under consideration. As the study was conducted only in the capital city of Bangladesh, the whole country scenario could not be evaluated through this study. The market survey was not nationally representative, as only urban markets were selected. Another potential limitation of the study was the inclusion of white bread brands sold in some selected retail outlets, but a good number of unpackaged bread available in the city has been observed. There were also a wide variety of bread products other than white bread sold from large supermarkets and bakeries in the urban area.

The study findings presented a picture of the Na content of selected branded breads available in the markets of Dhaka city. The mean Na concentration of different white breads varied significantly among the selected brands. About two-third of the branded white breads had higher Na concentration than the maximum allowable level set by UK FSA and endorsed by WHO. The study findings should be disseminated to the bread manufacturers to aware them about excess Na content in their products. Specific manufacturing guideline for producing white breads need to be formulated considering the Na content. Public campaign and advocacy should be initiated through a coordinated way aiming to increase the awareness of the people on the presence of excess Na in processed foods like bread as well as encourage healthy eating. Considering the popularity of bread in Dhaka city, and the risk of exceeding the recommended daily intake for Na through the consumption, further research is needed to assess the Na content of white breads and bread like products with bigger national sample.

Limitation

In this study, Sodium (Na) analyses were performed for thirty (30) white bread samples of 10 different types of selected brands. If it is possible to include more samples then it will become more authentic. Furthermore, Sodium content in different kinds of processed foods consumed by Bangladeshi population will be determined if adequate fund is available. As the study was conducted only in the capital city of Bangladesh, the whole country scenario should be reflected in future study including urban and rural population. Considering the popularity of bread in Dhaka City and the risk of exceeding the recommended daily intake for Na through the consumption, further research will be conducted to assess the overall Na intake and the sources of Na in the Dhaka city population.

References

1. World Health Organization: Noncommunicable diseases progress monitor 2017. Geneva, World Health Org., 2017.
2. GBD 2015 Mortality and Causes of Death Collaborators (2016) Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 388;1459-1544.
3. Hay SI. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390:1345–1422.
4. Asaria P, Chisholm D, Mathers C, Ezzati M, Beaglehole R. Chronic disease prevention: health effects and financial costs of strategies to reduce salt intake and control tobacco use. *Lancet* 2007;370(9604):2044-2053.
5. Johnson C, Raj TS, Trieu K, Arcand J, Wong MM, McLean R, et al. The science of salt: a systematic review of quality clinical salt outcome studies June 2014 to May 2015. *J Clin Hypertension* 2016;18(9):832-839.

6. Zaman MM, Rahman MM, Rahman MR, Bhuiyan MR, Karim MN, Chowdhury MA. Prevalence of risk factors for non-communicable diseases in Bangladesh: results from STEPS survey 2010. *Indian J Public Health* 2016; 60 (1):17-25.
7. World Health Organization: Non-communicable disease risk factor survey Bangladesh 2010. Dhaka, World Health Org., 2011.
8. World Health Organization: Creating an Enabling Environment for Population-Based Salt Reduction Strategies: Report of a joint technical meeting held by WHO and the Food Standards Agency. Geneva, World Health Org., 2010.
9. World Health Organization: Guideline: Sodium intake for adults and children. Geneva, World Health Org., 2012.
10. Zaman MM, Choudhury SR, Ahmed J, Khandaker RK, Rouf MA, Malik A. Salt intake in an adult population of Bangladesh. *Global heart* 2017;12(3):265-266.
11. Rasheed S, Jahan S, Sharmin T, Hoque S, Khanam MA, Land MA, et al. How much salt do adults consume in climate vulnerable coastal Bangladesh? *BMC public health* 2014;14(1):584.
12. Khan AE, Ireson A, Kovats S, Mojumder SK, Khusru A, Rahman A, et al. Drinking water salinity and maternal health in coastal Bangladesh: implications of climate change. *Environ Health Perspect* 2011;119(9):1328.
13. Ni Mhurchu C, Capelin C, Dunford EK, Webster JL, Neal BC, Jebb SA. Sodium content of processed foods in the United Kingdom: analysis of 44,000 foods purchased by 21,000 households. *Am J Clin Nutr* 2010;93(3):594-600.
14. Sharp D. Labelling salt in food: if yes, how? *Lancet* 2004;364(9451):2079-2081.
15. Saquib N, Saquib J, Ahmed T, Khanam MA, Cullen MR. Cardiovascular diseases and type2 diabetes in Bangladesh: a systematic review and meta-analysis of studies between 1995 and 2010. *BMC public health* 2012; 12(1):434.
16. Rupa AZ, Hussain I and Goni O. Production of potato breads. *Bangladesh J Sci Ind Res* 2013; 48(3):201-204.
17. Sadika S, Bayezid MI and Mannan WA. A Comparison of Food Consumption Pattern in Rural and Urban areas of Bangladesh between 2005 and 2010. *Health and the Environment Journal* 2013;4.
18. Shaheen N, Rahim AT, Mohiduzzaman M, Banu CP, Bari L, Tukun AB, et al. Food composition table for Bangladesh. Final Research Results 2013:187.
19. Dunford EK, Eyles H, Ni Mhurchu C, Webster JL, Neal BC. Changes in the sodium content of bread in Australia and New Zealand between 2007 and 2010: implications for policy. *Med J Aust* 2011; 195(6):346-349.
20. Brinsden HC, He FJ, Jenner KH, MacGregor GA. Surveys of the salt content in UK bread: progress made and further reductions possible. *BMJ open* 2013;3(6):e002936.
21. Silva V, Padrão P, Novela C, Damasceno A, Pinho O, Moreira P, et al. Sodium content of bread from bakeries and traditional markets in Maputo, Mozambique. *Public Health Nutr* 2015;18(4):610-614.
22. Martins CA, de Sousa AA, Veiros MB, González-Chica DA, da Costa Proença RP. Sodium content and labelling of processed and ultra-processed food products marketed in Brazil. *Public Health Nutr* 2015;18(7):1206-1214.
23. Webster JL, Dunford EK, Hawkes C, Neal BC. Salt reduction initiatives around the world. *J hypertens* 2011;29(6):1043-1050.
24. Pehrsson P, Perry C, Daniel M. ARS, USDA updates food sampling strategies to keep pace with demographic shifts. *Procedia Food Science* 2013;2:52-59.
25. Perry CR, Pehrsson P. A national sampling plan for obtaining food products for nutrient analysis. *Population* 2001;66(65,245,265):68-014.

26. Parengam M, Judprasong K, Srianujata S, Jittinandana S, Laoharojanaphand S, Busamongko A. Study of nutrients and toxic minerals in rice and legumes by instrumental neutron activation analysis and graphite furnace atomic absorption spectrophotometry. *Journal of food composition and analysis* 2010; 23(4):340-345.
27. Castanheira I, Figueiredo C, André C, Coelho I, Silva AT, Santiago S, et al. Sampling of bread for added sodium as determined by flame photometry. *Food chemistry* 2009; 113 (2): 621-628.
28. Vieira E, Soares ME, Ferreira IM, Pinho O. Validation of a fast sample preparation procedure for quantification of sodium in bread by flame photometry. *Food Anal Meth* 2012; 5(3):430-434.
29. Chen MJ, Hsieh YT, Weng YM, Chiou RY. Flame photometric determination of salinity in processed foods. *Food chemistry* 2005;91 (4): 765-770.
30. Huq SI, Alam MD. A handbook on analyses of soil, plant and water. BACER-DU, University of Dhaka, Bangladesh. 2005; 246.
31. Showell B, Pehrsson P. Reduction of sodium in baked products over the last decade. *The FASEB Journal* 2011;25(1 Supplement): 594.