



The use of table and cooking salt in a sample of Australian adults

AUTHOR(S)

Carley Grimes, Lynn Riddell, Caryl Nowson

PUBLICATION DATE

01-01-2010

HANDLE

[10536/DRO/DU:30032065](https://hdl.handle.net/10536/DRO/DU:30032065)

Downloaded from Deakin University's Figshare repository

Deakin University CRICOS Provider Code: 00113B

Deakin Research Online

Deakin University's institutional research repository

This is the published version (version of record) of:

Grimes, Carley A., Riddell, Lynn and Nowson, Caryl A. 2010, The use of table and cooking salt in a sample of Australian adults, *Asia Pacific journal of clinical nutrition*, vol. 19, no. 2, pp. 256-260.

Available from Deakin Research Online:

<http://hdl.handle.net/10536/DRO/DU:30032065>

Reproduced with kind permission of the copyright owner.

Copyright : ©2010, HEC Press

Short Communication

The use of table and cooking salt in a sample of Australian adults

Carley A Grimes BNutrDiet (Hons), Lynn J Riddell PhD, Caryl A Nowson PhD

Centre for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Melbourne, Australia

Background: Dietary sodium, the major source being salt, is associated with hypertension. Australian adults consume more than the recommended amount of salt and approximately 15% of dietary sodium comes from salt added at the table and during cooking. **Objective:** To determine the frequency of and the demographic characteristics associated with discretionary salt use. **Design:** A cross sectional survey conducted in shopping centres within Metropolitan Melbourne. Participants completed a questionnaire assessing discretionary salt use and attitudes to salt intake. **Outcomes:** Four hundred and seventy four surveys were collected (65% female, 77% Caucasian, 64% holding a university qualification). Eighty nine percent of respondents were classified as salt users and 11% as non-salt users. Of the salt users 52% reported that they always or sometimes add salt during cooking and at the table. Those of Asian descent and younger respondents aged 18-24 years were more likely to be salt users ($\chi^2=12.3$, $df=2$, $p<0.001$; $\chi^2=19.2$, $df=5$, $p<0.01$). **Conclusion:** Discretionary salt use remains high. To successfully reduce population dietary salt intake public health campaigns are urgently required and need to include consumer advice to reduce discretionary salt use, whilst reducing the salt added to processed foods. Such campaigns should include younger age groups and should be appropriate for all ethnic backgrounds to raise the awareness of the risks of a high salt diet on health.

Key Words: sodium, dietary, table salt, Australia, public health

INTRODUCTION

Similar to other developed nations the population salt intake of Australian adults is estimated to be above dietary recommendations.^{1,2} As salt intake is a modifiable risk factor in the development of cardiovascular disease a number of public health strategies are being implemented both globally and within Australia in an attempt to reduce population salt consumption.³ The Australian Division of World Action on Salt and Health (AWASH), founded at the end of 2005, aims to reduce Australian population salt intake to 6 grams per day by 2012.⁴ As the majority (75%) of salt consumed in developed nations is derived from processed foods,⁵ it is imperative that salt reduction initiatives involve the commitment of the food industry to reformulate food products with the goal of reducing salt levels.⁶

However a substantial proportion of daily salt intake, approximately 15%, comes from salt added during cooking and at the table.⁷ To successfully reduce population salt intake it is recognized that salt reduction policy must combine strategies to reduce discretionary salt use, with strategies to lower the salt content of processed foods. The aim of this study was to determine the frequency of adding salt at the table and during cooking in a sample of Australian adults and the demographic characteristics related to discretionary salt use. This information is essential for identifying groups to target salt education campaigns.

MATERIALS AND METHODS

Participants

Participants were shoppers aged over 18 years and recruited in metropolitan Melbourne shopping centers over five consecutive weekdays in June 2008 between the hours of 9.00 am and 6.00 pm. Two researchers approached passing shoppers and invited them to take part in the study by completing a questionnaire. The study was approved by the Deakin University Human Research Ethics Committee.

Questionnaire

The development of the questionnaire has previously been reported,⁸ and only those questions related to the current analysis are reported here.

To assess frequency of discretionary salt use subjects were asked the following questions. 'Do you add salt during cooking?' and 'do you add salt at the table?' To which subjects could respond 'always', 'sometimes' or 'never'. Both of these questions were modeled on those used in a

Corresponding Author: Dr Caryl A Nowson, Centre for Physical Activity and Nutrition Research, School of Exercise and Nutrition Sciences, Deakin University, 221 Burwood Highway, Burwood, Victoria 3125, Australia.
Tel: 613 9251 7272; Fax: 613 9244 6017
Email: nowson@deakin.edu.au; carley.grimes@deakin.edu.au
Manuscript received 3 September 2009. Initial review completed 25 December 2009. Revision accepted 22 February 2010.

previous survey.⁹ To categorize respondents as either 'salt users' or 'non salt users' these two questions assessing discretionary salt use were combined. Non-salt users were defined as those that reported never adding salt either at the table or during cooking. The salt users category includes those who reported that they add salt 'always/sometimes' both at the table and during cooking; and those that reported that they only add salt either at the table or during cooking.

Data analysis

All data was analysed using SPSS for Windows version 14.0 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were used to calculate the frequency of respondents in categorical variables. Chi-square test was used to determine significant associations between categorical variables and demographic characteristics. A *p*-value of <0.05 was taken as significant.

RESULTS

Demographic characteristics

A sample of 493 shoppers were recruited, and of these 474 provided a valid response to at least 80% of the questions. Over half of the participants were female (65%) and the majority were Caucasians (77%). Age was evenly distributed between the six age groups (Table 1). Approximately two thirds of participants had completed tertiary qualifications (64%) and were responsible for the food shopping in the household (64%). In comparison to the Australian population our sample is over representative of females, those with tertiary qualifications and younger age groups (Table 1)^{10,11}

Discretionary salt usage

Just over half of all respondents reported that they always or sometimes added salt during cooking and at the table (Figure 1), with a greater number of respondents reporting that they always add salt during cooking (29%) than at

Table 1. Demographic characteristics of participants (n=474) and comparison to Australian population[†]

Characteristic	% (n)	%
Gender		
Female	65 (310)	51
Male	35 (164)	49
Ethnicity		
Caucasian	77 (366)	
Asian	12 (58)	
Other	11 (50)	
Age (years)		
18-24	17 (82)	9
25-34	22 (104)	13
35-44	17 (82)	15
45-54	15 (73)	14
55-64	17 (78)	11
65+	12 (55)	13
Education level		
Some high school	8 (36)	
Completed high school	17 (81)	
Technical/trade school certificate/ apprenticeship	11 (53)	
University/tertiary qualification	64 (304)	27
Main shopper in household		
Yes	64 (303)	
No	10 (49)	
Share the responsibility	26 (122)	

[†]This data is taken from the 2006 Australian census data.^{10,11} Comparative data on ethnicity, other levels of education and main shopper in household are not provided due to differences in classification methods.

the table (12%). Forty nine percent of participants report adding salt both at the table and during cooking (Figure 1). After combining the results from salt usage during cooking and at the table, 89% of respondents were classified as salt users and 11% were defined as non-users. There was a significant relationship between ethnicity and salt usage (Pearson $\chi^2=12.3$, *df*=2, *p*<0.01) with 86% of Caucasian descent, 98% of Asian descent and 98% of

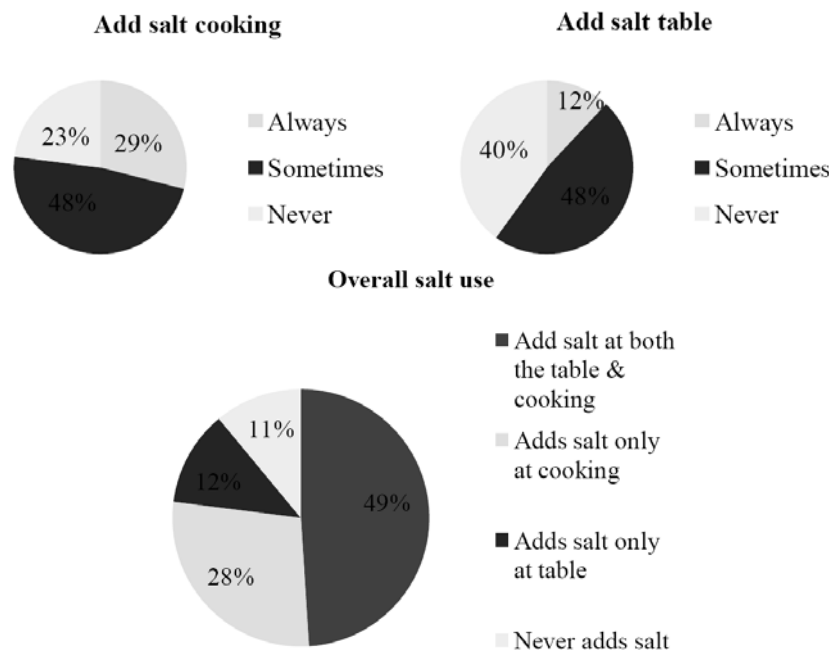


Figure 1. Frequency of discretionary salt usage (% participants). ¹refers to salt added always/sometimes

Table 2. Association of age with discretionary salt use (% of participants)

Age (years)	Total (%)	Salt user (%) [†]	Non-salt user (%) [‡]
18-24	17	99	1
25-34	22	92	8
35-44	17	88	12
45-54	15	89	11
55-64	17	81	20
65+	12	80	20
Total (n)	473	420	53

Pearson $\chi^2=19.2$, $df=5$, $p<0.01$.

[†] salt used in cooking and/or table

[‡] no salt added at cooking or table

other descent defined as salt users. In addition a significantly greater proportion of younger participants were salt users than those in the older age groups (Table 2). There was no significant association between gender or education level and salt usage (data not shown).

DISCUSSION

The results from this convenience sample of adults indicate that the majority of respondents were salt users (89%), that is they add salt either at the table or when cooking or on both occasions. We found that 60% reported that they always/sometimes add table salt and 40% report never adding table salt. Our results are similar to previous health surveys which found 39% to 45% of participants reported that they always/sometimes add salt after cooking and 55% to 61% report never adding salt after cooking.¹² When we assessed those that reported adding salt always at the table and always during cooking we found that 12% always add table salt and 29% always add salt during cooking. This is consistent with another recent study assessing discretionary salt use in 1016 Australian adults that found 17% always add table salt and 23% always add salt during cooking (Jacquie Webster, Coordinator/Project Manager, AWASH, personal communication). Together all study results indicate that there has been little change in discretionary salt use from the mid 1990's to early 2000. The findings from this survey and past surveys support the premise that the use of discretionary salt is unlikely to have fallen over the past 10 years.

Similar to our findings a consumer intercept survey (n=360) administered within shopping areas throughout Northern Ireland found a high level of discretionary salt use with 65% and 61% of participants reporting that they add salt occasionally/always at the table and during cooking, respectively.¹³ This study also assessed the relationship between discretionary salt use and socio-economic background however, no significant differences were observed. In the present study we did not assess the relationship between discretionary salt use and socio-economic background, we did however find no relationship with discretionary salt use and education level. However, as our sample was over-representative of those with tertiary qualifications it may have been difficult to detect such differences.

Other demographic characteristics that were found to be related to discretionary salt use were ethnic background and age. We found that those of Asian descent were more likely to be salt users than those of Caucasian descent. This result may be explained by the heavy reliance of salt as a flavour enhancer in many traditional Asian meals. This finding is particularly concerning when considering the high sodium content of many other ethnic food items, such as soy sauce and fish sauce.¹⁴

The greater proportion of younger participants being classified as salt users as opposed to those in the older age groups may be explained by differences in attitudes towards health. It could be that younger respondents may be more carefree at this point in their life stage and do not feel that they are at risk of the health consequences of a high salt diet. Whereas in agreement with past studies the elderly, those with pre-existing health conditions are more likely to partake in positive dietary related behaviours.¹⁵⁻¹⁸ Emerging evidence has demonstrated the importance of salt intake in the regulation of blood pressure in children and adolescents,¹⁹ and that blood pressure follows a tracking pattern from childhood into adulthood.²⁰ Thus it is critical that preventative public health strategies aiming to reduce the burden of salt related chronic disease include younger age groups, where discretionary salt use remains high.

While this study failed to objectively determine discretionary salt use the findings do indicate a high level of reported discretionary salt use among participants. Other studies, from the UK and Europe, that have used objective measures, such as the lithium marker technique to determine discretionary salt use have found that discretionary salt intake accounts for between 9-15% of total salt intake.^{7,21} As the majority of salt consumed (75%) in developed nations is derived from processed foods,⁵ it is generally recognized that salt reduction initiatives must involve the reformulation of food products to lower the salt content.^{22,23} While we agree that this approach is an integral component to reducing population salt intake, the findings from the present study indicates that discretionary salt use is high in this sample of Australian consumers, with a greater proportion of participants adding salt during cooking than at the table. Undoubtedly salt preferences vary across individuals leading to a wide variation in the amount of salt used in cooking and at the table. It is however, possible over time to adjust taste preferences to accept foods with lower levels of salt without effecting palatability.²⁴ The addition of table salt on the surface of food is likely to lead to a liking for higher salt foods. There is evidence in adults that exposure to highly salty foods results in an increased preference for these foods²⁵ and a comprehensive salt reduction policy should include both a reduction in discretionary salt use and product reformulation with lower levels of salt.

In conclusion the findings from our study indicate that discretionary salt use is common amongst a sample of Australian adults. This study failed to assess why respondents engage in adding salt to food however, we speculate that the most common reasons may be due to cultural preferences, for flavor enhancement or simply out of habit. Public health campaigns should continue to promote a reduction in the use of salt added at the table and

during cooking. Education strategies starting early in life are likely to reduce lifetime exposure to salt and reduce risk of future cardiovascular related disease. Such strategies should encourage the development of a preference for lower salt, which could reduce lifetime exposure to salt.

ACKNOWLEDGMENTS

Financial support for this research was provided by the School of Exercise and Nutrition Sciences, Deakin University.

AUTHOR DISCLOSURES

The authors do not have any industrial affiliations or conflict of interest.

REFERENCES

1. Beard TC, Woodward DR, Ball PJ, Hornsby H, Von Witt RJ, Dwyer T. The Hobart Salt Study 1995: few meet national sodium intake target. *Med J Aust.* 1997;166:404-7.
2. Notowidjojo L, Truswell A. Urinary sodium and potassium in a sample of healthy adults in Sydney Australia. *Asia Pac J Clin Nutr.* 1993;2:25-31.
3. He FJ, MacGregor GA. A comprehensive review on salt and health and current experience of worldwide salt reduction programmes. *J Hum Hypertens.* 2008;23:363-84.
4. AWASH. Drop the Salt! Brochure. [cited 2009/8/26]; Available from: http://www.awash.org.au/documents/Drop_the_Salt_Campaign_Brochure.pdf
5. Dyer A, Elliot P, Chee D, Stamler J. Urinary biochemical markers of dietary intake in the INTERSALT Study. *Am J Clin Nutr.* 1997;65:1246S-1253S.
6. World Health Organization. Reducing salt intake in populations: Report of a WHO forum and technical meeting. [cited 2010/1/29]; Available from: http://www.who.int/dietphysicalactivity/reducingsaltintake_EN.pdf
7. James PT, Ralph A, Sanchez-Castillo CP. The dominance of salt in manufactured food in the sodium intake of affluent societies. *Lancet.* 1987;329:426-9.
8. Grimes CA, Riddell LJ, Nowson CA. Consumer knowledge and attitudes to salt intake and labelled salt information. *Appetite.* 2009;53:189-94.
9. AWASH. Report: 2007 survey of Australian consumer awareness and practices relating to salt. [cited 2010/04/02]; Available from: http://www.awash.org.au/documents/AWASH_ConsumerSurveyReport_2007_05_15.pdf
10. ABS. 2006 Census tables: Australia 20680-Non-School Qualification: Level of Education by Age by Sex - Australia. Canberra: Australian Bureau of Statistics, 2008.
11. ABS. 2006 Census tables: 20680-age (full classification list) by sex – Australia Canberra: Australian Bureau of Statistics, 2008.
12. ABS. Occasional paper: measuring dietary habits in the 2001 National Health Survey, Australia, 2001. Canberra: Australian Bureau of Statistics, 2003.
13. Purdy J, Armstrong G, McIlveen H. The influence of socio-economic status on salt consumption in Northern Island. *Int J Cons Stud.* 2002;26:71-80.
14. Food Standards Australia New Zealand. Food Composition Data. AUSNUT 2007 – Nutrient database per 100 g per edible portion. [cited 2010/1/29]; Available from: <http://www.foodstandards.gov.au/consumerinformation/ausnut2007/ausnut2007microsoft4060.cfm>
15. Drichoutis AC, Lazaridis P. Nutrition knowledge and consumer use of nutritional food labels. *Eur Rev Agr Econ.* 2005;32:93-118.
16. Food Standards Agency. Consumer attitudes to food standards: Wave 8 UK Report Final. [cited 2010/1/29]; Available from: <http://www.food.gov.uk/multimedia/pdfs/cas2007ukreport.pdf>
17. Grunert KG, Wills J. A review of European research on consumer response to nutrition information on food labels. *J Public Health.* 2007;15:15.
18. Australia New Zealand Food Authority. Qualitative Research with Consumers Food Labelling Issues. [cited 2010/04/27]; Available from: http://www.privacyconference2003.org/forms/Consumer_Research.pdf
19. He FJ, Marrero NM, MacGregor GA. Salt and blood pressure in children and adolescents. *J Hum Hypertens.* 2008;22: 4-11.
20. Lauer RM, Clarke WR. Childhood risk factors for high adult blood pressure: The Muscatine Study. *Pediatrics.* 1989;84: 633-41.
21. Andersen L, Rasmussen LB, Larsen EH, Jakobsen J. Intake of household salt in a Danish population. *Eur J Clin Nutr.* 2009;63:598-604.
22. Cobcroft M, Tikellis K, Busch JLHC. Salt reduction - a technical overview. *Food Australia.* 2008;60:83-7.
23. He FJ, MacGregor GA. A comprehensive review on salt and health and current experience of worldwide salt reduction programmes *J Hum Hypertens.* 2009;23:363-84.
24. Grigis S, Neal B, Prescott J, Prendergast J, Dumbrell S, Turner C, Woodward M. A one-quarter reduction in the salt content of bread can be made without detection. *Eur J Clin Nutr.* 2002;57:616-20.
25. Bertino M, Beauchamp GK, Engleman K. Increasing dietary salt alters salt taste preference. *Physiol Behav.* 1986;38:203-13.

Short Communication

The use of table and cooking salt in a sample of Australian adults

Carley A Grimes BNutrDiet (Hons), Lynn J Riddell PhD, Caryl A Nowson PhD

Centre for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Melbourne, Australia

澳洲成人對餐桌用鹽與烹調用鹽的使用

背景：飲食中的鈉主要來源為食鹽，而其攝取被認為與高血壓有關。澳洲成人鹽的攝取量高於建議量，而且約 15% 的飲食中鈉是來自於用餐及烹調時添加的食鹽。目的：調查自主性用鹽的頻率及相關的人口學特性。研究設計：在墨爾本市區購物中心進行橫斷性調查。利用問卷評估參與者對食鹽的使用以及對鹽攝取的態度。結果：此調查共有 474 位參與者(65% 為女性，高加索白人佔 77%，有大學學歷者佔 64%)，其中 89% 的參與者被歸類為鹽使用者，11% 為非鹽使用者。鹽使用者當中有 52% 自述在烹調時及用餐時總是或有時候會添加鹽。亞洲裔或年齡為 18 至 24 歲者較有可能為鹽使用者。結論：自主性用鹽者的比例仍是高的。為了有效降低國民食鹽的攝取，相關的公共衛生活動是迫切需要的，包括建議消費者減少自主性用鹽，同時減低加工食品中鹽的添加。這些活動應涵蓋較年輕的族群及應適合所有種族背景者，以提升對於高鹽飲食危害健康的風險之體認。

關鍵字：鈉、飲食、食鹽、澳洲、公共衛生