Dietary salt intake estimation by routine healthcare workers in an urban slum of Chandigarh: A feasibility study

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ABSTRACT

Context: Hypertension is an important modifiable risk factor for cardiovascular disease (CVD). From numerous studies, it was observed that excess dietary salt is responsible for 17–30% of high blood pressure and increases the risk of blood pressure-related CVD events in normotensives also. Employing the most appropriate method is important to assess the baseline consumption as well as to evaluate the impact of potential salt reduction initiatives.

Aim and Objective: The aim and objective of this study is to collect salt data at population level by health workers, with a standard questionnaire, as they regularly visit household level for other national programs.

Methods: A cross-sectional study was conducted in an urban slum of Chandigarh for salt data collection using the WHO STEPS instrument version 3.1. Sample size of 255 was calculated by Epi Info software. However, we have taken 300 participants for our study. Six health staff from Urban Health Training Centre, Indira Colony, Department of Community Medicine, PGIMER, Chandigarh, were involved. They were trained regarding filling the questionnaire. Investigator then re-interviewed 20% of the respondents interviewed by health workers, and a comparison of agreement was done.

Results: The range of agreement was observed to be 55–90%, and percentage agreement varies between 63% and 83%, except in 3 questions which could be considered reasonable for initiating public health interventions.

Conclusion: From this study, we can conclude that even in resource-poor settings, it is possible to collect salt data by proper training of health workers, and thus, we can initiate evidence-based salt reduction interventions in the community.

Key Words: Data collection, hypertension, salt

Introduction

High blood pressure (HBP) is an important modifiable risk factor for cardiovascular disease (CVD). According to the current scenario, it is seen that it accounts for about 7.6 million global deaths.[1] It accounts for 54% of all stroke events and 47% of all coronary heart diseases worldwide.[1] In low- and middle-income countries, most of the hypertensive bears a disproportionate burden of HBP-related risk of death and it is double that of high-income countries.[1] Over 50% of this burden occurs in this age group of 45–69 years who are the most productive segment of the population.[1] INTERSALT study has confirmed the harmful health effect of excess salt consumption, particularly on cardiovascular health. Excess salt intake in the diet is responsible for 17–30% of HBP and increases the risk of blood pressure-related CVD events in normotensives also.[1] In India, it is seen that population level salt intake is very high across the country, with the average intake being 9–12 g/day with limited available data. Intake is reported to be higher in urban settings as compared to rural.[3] Various methods of

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assessing salt intake are by dietary recall, estimating salt content of food using food composition tables/databases, estimating household per capita or adult equivalent salt intake by salt weighing, measuring 24 h urinary sodium excretion, and measuring urinary sodium from spot urine samples.

Most of these methods, however, are not ideal and there are issues of validation. Among them, 24 h urinary sodium excretion is considered the gold standard method (sensitivity and specificity 90–95%) of assessment. However, this method is difficult to implement when assessing populations. Simpler methods, such as dietary recall and estimating salt content of food using food consumption tables/databases, are less reliable when assessing populations. There is considerable amount of intra-individual variability in intake and a single day’s measurement may not be accurate. Furthermore, recall methods do not accurately quantify salt added while cooking or at the table, leading to underestimation. This is particularly of concern in SEAR populations.

From above discussion, we conclude that worldwide very few data are available regarding salt intake estimation. As it is a major modifiable risk factor for hypertension (HTN), it is seen from literature that salt reduction strategy is very much cost-effective (best buy). There are various methods of salt intake estimation as discussed above. Among them, standard questionnaire is useful for large population. As health workers regularly visit household level for other national programs, it will be useful if we can involve them for data collection. We conducted the present study to explore whether the estimation of dietary salt intake can be done by regular healthcare workers or not.

Aims and objectives
The aim and objective of this study is to assess the reliability of data collection for salt intake practices by routine health care staff in Chandigarh.

Methods

This study was conducted in an urban slum in Chandigarh from November 1, 2013, to June 31, 2014. It was a cross-sectional study. For salt data collection – the WHO STEP-wise approach to noncommunicable disease (NCD) risk factor surveillance (STEPS) instrument version 3.1 “questionnaire” for salt estimation was used for assessing the agreement of salt data collection by the health workers.

It has been found that 30% of population has high salt intake as per the CHHAP study. The population of Indira Colony was 26000; taking prevalence 30%, 80% power of the study, 90% confidence level, design effect equals to 1, with 5% precision (absolute), our sample size came around 225 by Epi -info software Version-6 was developed by CDC Atlanta. However, we have taken 300 participants for our study. Six health staff from Urban Health Training Centre (UHTC), Indira Colony, School of Public Health, PGIMER, Chandigarh, were involved. They had conducted the interviews for 300 populations with each worker covering fifty participants each. A total of 300 populations were interviewed randomly. The investigator also re-interviewed 20% (i.e. 60) [Figure 1] for salt intake estimation, and we have calculated overall (question-wise) percentage agreement between health worker and investigator. For interviewing residents for data on salt intake, informed written consent was taken from the participants. Privacy and confidentiality of the records were maintained strictly by avoiding names. Accesses to the records were restricted only to the investigator. In UHTC, Indira Colony, 6 health workers were trained regarding NCDs by the investigator on February 28, 2012, for half a day training session. In the same setting, pre- and post-test were conducted. Details about common NCDs, its risk factors, relation of salt intake and hypertension and its cost effective interventions were discussed in details.

Results

Before discussion, pretest was done using a set of questionnaire which includes twenty multiple-choice questions having four options to each question. For
each right answer, 1 mark was given, and for each wrong answer, zero mark was given. It was found that the mean score for pretest was 13.67 ± 1.54 and posttest was 19 ± 0.25. In posttest, there was improvement of 5.33 ± 1.24, i.e. there was 26.65% improvement of mean score occurred after training. The age and sex distribution of respondents for salt estimation are given in Table 1. Among study population, it was observed that about half (48%) of the respondents were in 30–39 years age group, followed by 26% in 40–49 years, 17% in 50–59 years, 7% in 60–69 years, and 2% in 70–79 years. Regarding sex distribution, it was observed that total percentage of male was 30% in the study population and it is given in Table 1. The range of agreement between health workers and investigator for salt estimation is observed to be 55–90% in Table 2. Investigator re-interviewed 20% of the respondents interviewed by health workers, and comparison of agreement was done between health workers and investigator. The minimum agreement 55% came for question “adding salt before diet.” Maximum agreement came for the question “adding salt during cooking” and “frequency of eating processed foods.” It is seen that the percentage agreement varies between 63% and 83%, except in 3 questions.

### Table 1: Age- and sex-wise distribution of study population for salt estimation

| Age range (years) | Male | Female | Total | Percentage |
|-------------------|------|--------|-------|------------|
| 30-39             | 33   | 111    | 144   | 48         |
| 40-49             | 20   | 60     | 80    | 26         |
| 50-59             | 9    | 42     | 51    | 17         |
| 60-69             | 7    | 14     | 21    | 7          |
| 70-79             | 1    | 3      | 4     | 2          |
| Total (n)         | 70   | 230    | 300   | 100        |

### Table 2: Quantitative data of salt estimation by health worker and investigator

| Topic of questions                      | Total number of questions agreed by investigator (out of 60 questions) | Total number of questions disagreed by investigator (out of 60 questions) | Overall agreement between workers and investigator (%) |
|-----------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|
| 1. Adding salt to diet before eating    | 33                                                                     | 27                                                                     | 55                                                    |
| 2. Adding salt during cooking           | 54                                                                     | 6                                                                      | 90                                                    |
| 3. Frequency of eating processed foods  | 33                                                                     | 27                                                                     | 55                                                    |
| 4. Knowledge about individual salt intake | 46                                                                    | 14                                                                     | 76                                                    |
| 5. Knowledge about health problem by eating too much salt | 38                      | 22                                                                     | 63                                                    |
| 6. Importance of lowering salt in diet  | 38                                                                     | 22                                                                     | 63                                                    |
| 7a. Avoidance of processed foods       | 46                                                                     | 14                                                                     | 76                                                    |
| 7b. Looking salt levels on food        | 50                                                                     | 10                                                                     | 83                                                    |
| 7c. No added salt to food while eating | 50                                                                     | 10                                                                     | 83                                                    |
| 7d. Buying low sodium salts            | 47                                                                     | 13                                                                     | 78                                                    |
| 7e. No added salt while cooking        | 50                                                                     | 10                                                                     | 83                                                    |
| 7f. Using of spices                    | 50                                                                     | 10                                                                     | 83                                                    |
| 7g. Avoid eating out                    | 34                                                                     | 26                                                                     | 56                                                    |

**Discussion**

Worldwide, very few data are available regarding salt intake estimation. As it is a major modifiable risk factor for HTN, it is seen from literature that salt reduction strategy is very much cost-effective. There are various methods of salt intake estimation as discussed above. The present study has tried to use routine health workers for salt estimation, and it has been found to be feasible with a reasonable agreement in data generated by health workers and investigators. From our results, it is seen that the percentage agreement between health workers and investigator came good, except 3 questions. As we previously discussed that lack of data is one of the major problems for implementation of monitoring framework. Salt data are also an important indicator of the WHO global NCD monitoring framework. Regarding salt data collection, it was seen that the percentage agreement varies between 63% and 83%, except in 3 questions which could be considered reasonable for initiating public health interventions. Although salt reduction strategy is very cost-effective for lowering the blood pressure, there is lack of relevant data available for salt intake in population level. It is possible to train health workers to collect relevant salt data to initiate evidence-based salt reduction interventions in the community.

**Conclusion**

Hence, from this study, we can say that health workers can be used at district level for salt data collection to initiate evidence-based salt reduction interventions and further studies are recommended at district level.
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Conflicts of interest
There are no conflicts of interest.

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