Chronic noncommunicable diseases cause two out of three deaths in the general population of Latin America and nearly half of all deaths in persons under 70 years of age (1). It is estimated that their contribution to the global burden of disease will increase in future years, mainly in the countries with fewer economic resources (2), partly due to aging of the population, reduced physical activity, and the nutritional transition (3, 4).

Hypertension is the most important risk factor for death and disability in the world. It is considered to be responsible for 50% of deaths due to heart disease and over 60% of deaths due to stroke (5). There is a direct relationship between salt intake and blood pressure, and the evidence shows that up to 30% of the cases of hypertension can be attributed

**Objective.** To identify the knowledge, perceptions, and behavior related to the consumption of salt and sodium in food and its relationship to health and the nutritional labeling of food in three countries of the Region.

**Methods.** Qualitative-exploratory study based on semi-structured interviews, according to the categories of the Health Belief Model. Thirty-four interviews and six focus groups were conducted with community leaders (71 total respondents) in rural and urban areas of Argentina, Costa Rica, and Ecuador.

**Results.** Salt consumption varies in the rural and urban areas of the three countries. Most interviewees felt that food could not be consumed unsalted and that only people who consume an excessive amount of salt would have health risks. They did not know that processed food contains salt and sodium. Although they did not measure the amount of aggregate salt in foods, the participants believed that they consumed little salt and did not perceive that their health was at risk. The majority of the participants did not review nutritional information, and those who did said that they did not understand it.

**Conclusions.** There is public awareness about salt, but not about the term “sodium.” More salt and sodium are consumed than what is reported and there are no prospects of reducing that consumption. Although it is understood that excessive consumption of salt is a health risk, participants do not perceive that they are at risk. Replacing the word “sodium” with the word “salt” would facilitate food selection.

**Key words** Sodium, dietary; health knowledge; attitudes, practice; food habits; food labeling; cardiovascular diseases; Argentina; Costa Rica; Ecuador.

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to salt added to food (6). Reduction of dietary salt—whether alone or in combination with fiber- and grain-rich diets—has been shown to be effective in preventing increased blood pressure (7–10). Since 2004, the World Health Organization (WHO) and the Pan American Health Organization (PAHO) have developed strategies that aim to decrease excessive dietary salt intake in order to reduce cardiovascular disease (11–14). Several countries in the Region of the Americas have also implemented policies on this subject (6, 15–18).

According to the United Nations Food and Agriculture Organization (FAO) and WHO, nutritional labeling is the main means of communication between food manufacturers and consumers (19). It is also a tool that facilitates application of the Global Strategy on Diet, Physical Activity, and Health, which considers that work should be done to reduce sodium intake (19, 20). Recently, the Codex Committee on Food Labeling approved the inclusion of sodium/salt on the list of nutrients that must be stated on the nutritional labels of food. An international working group was also established to discuss which of these two terms should preferably be used on the label (21).

Implementation of successful policies to reduce salt intake should be adapted to the local context. The knowledge, beliefs, and perceptions of the population with regard to salt and sodium, the role they play in health and disease, use of salt in food, and the sodium declaration on the nutritional label can vary according to the country and even within countries. In Latin America and on the worldwide level there are few previous qualitative studies that consider this subject (14, 21–24).

The objective of this study was to identify knowledge, perceptions, and behavior related to dietary salt and sodium intake, and their relationship to health and the nutritional labeling of food in rural and urban populations of Argentina, Costa Rica, and Ecuador.

MATERIALS AND METHODS

In this qualitative-exploratory study sponsored by PAHO, information was obtained by in-depth semi-structured interviews with individuals and focus groups. In Costa Rica and Ecuador this information was supplemented by direct observation in the households to identify inconsistencies and agreement with the reports. Observation focused on the presence or absence of salt shakers on the table, use of salt and food sources of sodium in food preparation, and storage of products that are sources of sodium.

The interview guide was designed according to the categories of the health belief model (25). Based on the results of analysis of the interview contents, to gain greater understanding of the subjects in which there were knowledge gaps, a specific guide was prepared to conduct the focus groups. A total of 34 individual interviews (10–12 informants per country) and six focus groups (11–12 informants per country) were conducted with the 71 informants. In both cases, half of the informants were from rural areas and half were from urban areas. Table 1 shows the sociodemographic characteristics of the participants according to country.

The participants (key informants) in the interviews and the focus groups were over 18 years of age. They were selected by community leaders in the study areas whose support was requested for introduction and logistic organization in the communities. Recruitment was performed by the “snowball” method, taking into account the area of origin (urban or rural).

The exclusion criteria were: persons with chronic diseases related to salt and sodium intake, and their direct family members when they lived in the same household; and work in the health sector, due to their greater sensitization and knowledge of the subjects analyzed (21, 22). The study areas were selected by desirability according to the resources available to conduct field work.

In order to facilitate comparison of the results, in the three countries studied the same research protocol, guides, and a single model of informed consent were used, adapted to the reality and requirements of each country.

The textual transcriptions of the interviews and focus groups were the unit of analysis. They were classified and coded according to the study objectives based on the categories of the health belief model (25) and theoretical sampling strategy. Although it does not guarantee statistical representativeness, this approach can be used to select cases that are theoretically representative of the beliefs and behavior of the populations studied. Data analysis was carried out in each country. The results were discussed and a consensus was reached by the entire research team.

Approval was obtained from the Scientific Ethics Committee of the Costa Rican Institute for Research and Education on Nutrition and Health (INCIENSA) and the Ethics Committee of Hospital de Clínicas José de San Martín of the University of Buenos Aires, Argentina. All participants signed an informed consent statement before the interview.

RESULTS

Knowledge of salt and sodium

For most of the interviewees, table salt is "a flavoring" or "an essential seasoning" that gives "flavor and taste to foods" and "is one of their customs." Therefore they considered that food could not be consumed without salt.

<p>| TABLE 1. Sociodemographic characteristics of participants in study interviews and focus groups conducted in Argentina, Costa Rica, and Ecuador, 2011 |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Argentina</th>
<th>Costa Rica</th>
<th>Ecuador</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of informants</td>
<td>22</td>
<td>25</td>
<td>35.2</td>
<td>24</td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>18</td>
<td>20</td>
<td>80.0</td>
<td>14</td>
</tr>
<tr>
<td>Men</td>
<td>4</td>
<td>20</td>
<td>80.0</td>
<td>10</td>
</tr>
<tr>
<td>Age group (years, %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 29</td>
<td>4</td>
<td>82.0</td>
<td>8</td>
<td>0.0</td>
</tr>
<tr>
<td>30–49</td>
<td>9</td>
<td>40.9</td>
<td>15</td>
<td>60.0</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>9</td>
<td>40.9</td>
<td>10</td>
<td>40.0</td>
</tr>
<tr>
<td>Educational level (%)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>7</td>
<td>31.8</td>
<td>8</td>
<td>32.0</td>
</tr>
<tr>
<td>Secondary school</td>
<td>8</td>
<td>36.4</td>
<td>12</td>
<td>48.0</td>
</tr>
<tr>
<td>University degree or lower</td>
<td>7</td>
<td>31.8</td>
<td>6</td>
<td>20.0</td>
</tr>
</tbody>
</table>
Perception of health risk of salt and sodium

The interviewees stated that only people who consume an “excessive amount of salt” have “health” risks. They also stated that persons who have “hypertension” or “heart problems” should eliminate salt from food or reduce intake. In Costa Rica and Ecuador, nearly all of the participants considered that the amount of salt they consume is “moderate” or “low” and in some cases “almost no salt.” Therefore, they pointed out that their intake is not a health risk. On the other hand, those that had family members with illnesses such as diabetes, “hypertension,” “kidney problems” or “heart problems” stated that they could be at risk of having some of these diseases due to hereditary causes and that this is not related to salt intake.

“Yes, in my case it is completely hereditary [referring to the father who has hypertension]. Anyway, I don’t take care of myself. It is another way of life, the meals, I tell you, you don’t take care of yourself at all” (man, 51 years, farmer, Argentina).

The participants from Argentina and Ecuador also reported that salt intake could be a health problem in elderly or pregnant women.

“Blood pressure goes up. When I was pregnant they didn’t let me eat much because they said it makes you bloated, in other words, have liquids” (woman, 33 years, housewife, Ecuador).

Although the majority stated that excessive salt intake could be detrimental for persons with chronic noncommunicable diseases—such as hypertension, chronic renal insufficiency, or diabetes—in Costa Rica and Ecuador they did not know what these conditions were and they confused them with each other.

“I don’t know if hypertension is related to not enough sugar, or a lot of sugar … I don’t know if it’s related to that …” (woman, 33 years, University student, Costa Rica).

“I think it’s cultural. In my case it’s from the family. It’s something I got from the family. In my case this is it. I don’t know. The way my mother used to do things … and later it is very difficult to get over it” (woman, 51 years, shopkeeper, Argentina).

Salt intake and food sources of sodium

In all three countries it was observed that the amount of salt added to foods was not measured. In Costa Rica, the majority considered that the amount of salt consumed daily is only that which is added to food. Unlike that observed in Ecuador, there was no salt shaker on the table used for meals.

“For us, salted food, only at lunch (at home), because in the afternoon we have coffee with bread and cheese, tortilla with custard, bread with mortadella, or soda crackers with butter” (man, 54 years, shopkeeper, Costa Rica).

In Costa Rica and Ecuador it is common to add salt to citrus fruits, melon, guava, pineapple, green mango, and red currants. In Ecuadorian schools, fruits are sold with salt. In Costa Rica the mothers usually add salt to snacks so that the children eat the fruit.

“It’s that I know I shouldn’t eat oranges with salt. There are many fruits that salt shouldn’t be added to. That is why they tell you not to eat so much salt. But I love to add salt to everything, to guava, melon, because it is sweet, and maybe even try to make it a little sour, between sweet and sour” (woman, 33 years, student, Costa Rica).

In rural areas of Costa Rica there is less availability of fast food. Table salt and ketchup are used in these areas, whereas in urban areas they also use garlic salt, Worcestershire sauce, soy sauce, mayonnaise, mustard, and seasonings.

In rural areas of Argentina more sausages and cold meats are consumed. Food is based on beef and stew, in which many canned foods are used. On the other hand, in urban areas there is an attempt to make food “healthier,” with a greater balance between consumption of meat, chicken, fish, and vegetables.

“Yes. And well, cold meats, then, I don’t know, cooked dishes, stew, meat roast; not often, when we are very … soups, something like that, but very rarely” (woman, 46 years, teacher, Argentina).

In Argentina, some people were familiar with low sodium salt and sea salt, even if they did not like the flavor of these and did not use them for this reason. They reported using seasonings such as mayonnaise, balsamic vinegar, lemon, soy sauce, or consommes at times, in order to attempt to reduce the amount of salt (Argentina) and so that the food is not so salty (Costa Rica).

“They don’t like it, no, because I’ve done it for mother, sometimes I cook with that salt, and they don’t like it. They don’t have the natural taste of salt, without so much of the flavoring it has and all these things” (woman, 41 years, household worker, Argentina).

In Argentina, some interviewees stated that they rinse canned products.

In Ecuador some people said that they did not know what sodium is, while others stated that it is “a source of energy for athletes.” In Argentina and Costa Rica, at least half of the informants considered that it was a component of salt and some thought it was “a metal,” “a mineral,” or “a compound, like iodine.”

“Well, I know that sodium is from the periodic table … a supplement of something. I think, I don’t know, that is what I heard mentioned in chemistry …” (woman, 33 years, secretary, Costa Rica).

In Costa Rica and Ecuador nearly all of the interviewees stated that only people who consume an “excessive amount of salt” have “health” risks. They also stated that persons who have “hypertension” or “heart problems” should eliminate salt from food or reduce intake.

“… and in some cases ‘almost no salt.’ Therefore, they pointed out that their intake is not a health risk. On the other hand, those that had family members with illnesses such as diabetes, ‘hypertension,’ ‘kidney problems’ or ‘heart problems’ stated that they could be at risk of having some of these diseases due to hereditary causes and that this is not related to salt intake.

“It is a seasoning for all foods. It gives them flavor, and for those of us that like to eat food with a certain flavor, we put on as much as needed for this, so that it is neither salty nor unsalted” (woman, 32 years, professional, Ecuador).

In Ecuador some people said that they did not know what sodium is, while others stated that it is “a source of energy for athletes.” In Argentina and Costa Rica, at least half of the informants considered that it was a component of salt and some thought it was “a metal,” “a mineral,” or “a compound, like iodine.”

“Well, I know that sodium is from the periodic table … a supplement of something. I think, I don’t know, that is what I heard mentioned in chemistry …” (woman, 33 years, secretary, Costa Rica).

In Ecuador and Argentina some reported that they knew the international recommendations for daily salt intake: “a small teaspoonful of salt” or “5 grams a day,” respectively. In Costa Rica, the majority stated that they did not know the recommendations.

Although the majority identified processed foods, they did not know that they contained salt. In Costa Rica, some assumed that they contained salt because of the “good flavor” of these foods.

“No, not tomato, or corn either, because it is sweet; not yellow and creamy either, and only tuna has salt, only tuna” (woman, 41 years, housekeeper, Argentina).
This is not done to reduce the amount of sodium, but rather to improve the flavor.

“No, no, no, that is, if the olives, when you are going to use them, in a pizza or whatever, if you rinse them so that they aren’t so strong…” (man, 32 years, radio operator, Argentina).

Knowledge of nutritional food labeling and its use

Most of the informants did not read the nutritional information on the food labels. Some only reviewed the expiration date and in some cases the caloric content, fat, or the term “light.” None of them mentioned that they were interested in knowing the amount of sodium or salt.

“We don’t know what happens to me with the labels? I don’t believe them completely. It happened to me with things that say 0% trans fats, you know. And then in the middle of the ingredients it says completely hydrogenated vegetable oil. Then since that’s it, I don’t know, I can’t believe them completely. It is like there is a play on words” (woman, 30 years, playwright, Argentina).

When asked about preferences for the terms used in nutritional labeling, in Ecuador and Argentina they said they prefer to use the term salt rather than sodium. In Costa Rica, the majority did not state any preference.

Barriers to reducing salt and sodium intake

In Costa Rica and Ecuador it was found that the majority consider that they do not consume an excessive amount of cooking salt and, therefore, this does not pose any risk to their health. Likewise, they do not consider other sources of sodium, such as salt and sodium itself, that are present in processed and prepared food. The participants considered that some food preparation practices were well-established in the population, such as adding salt to fruit and use of seasoning, sauces, and consommés in the same dish.

Those that indicated they review nutritional information do not find it to be clear and in some cases they consider it to be unreliable (Argentina and Costa Rica). Other barriers identified less frequently were the higher price of unsalted products (Costa Rica), access (distance) to towns with greater diversity of products, and the lack of healthy foods (Argentina). Some stated that they were not satisfied with the health team, because they do not provide information about this subject (Costa Rica).

DISCUSSION

The lack of knowledge about the subject, particularly with regard to the term sodium and the relationship between salt and sodium, is similar to that found in some qualitative studies conducted in other contexts (21, 23) in which, although they had knowledge and understanding of what salt is, the participants confused or did not know its relationship to sodium. In spite of the sociocultural differences, in the United Kingdom, as in this study, salt is defined as a flavoring, seasoning, or ingredient, and in several cases sodium was defined as a chemical term (21, 23). The lack of knowledge of the salt and sodium content of food is also consistent with the findings of other studies (8, 21, 23).

The results with regard to knowledge of the relationship between salt intake and health, as well as the recommendations for intake, agree with that which was found in Australia (24). This may be due to the fact that the risk of having “hypertension” is attributed more to a “hereditary” factor and, although there is family history, people do not perceive their susceptibility. However, these results differ from other results (22–24) in which the majority do not know that salt and sodium are associated with hypertension and other medical conditions.

In this study, as in other studies (8, 23), processed foods were not identified as a source of sodium and the majority did not look for it on the labeling. The results are different from what was observed in Canada (22), probably since their health policies promote reduced intake of sodium rather than using the term “salt.” In the capital cities of Argentina and Ecuador, as in the United Kingdom (21), it was found that there was strong preference for the statement on the nutritional label with the term “salt” rather than “sodium” due to familiarity with the term. This differs from that which was observed in Costa Rica, where there was no preference for the term used, possibly because they are not aware of the implications of high salt intake. The communication programs based on nutritional labeling and teaching recommend the use of terminology that is easy to understand and acceptable for most of the population. In addition, the information stated should be clear, attractive, and should not lead to confusion.

This study has some limitations. First of all, it is a pilot study in two specific populations (a rural area and an urban area) in three countries, selected by desirability, that are not representative, although they allow to approach the knowledge, perceptions, and behavior of these populations. Therefore, these results cannot be generalized or extrapolated to other population groups from these countries or Latin America. Secondly, in the studies in Argentina and Costa Rica few male informants were recruited, which means that the results for men and women could not be compared. Thirdly, due to logistic restrictions, other population groups were not included and the field work period was not extended, which would have facilitated even greater knowledge of the subject.

In spite of these limitations, this study provides preliminary knowledge that will facilitate the design of sensitization campaigns and educational interventions in national programs and plans that aim to reduce dietary salt/sodium intake. In addition, the need for the health sector to give greater attention to prevention and treatment of chronic noncommunicable diseases, State coordination with the food fortification program, and interventions to reduce salt intake were identified.

It is concluded that the social groups studied have popular knowledge with regard to salt but not with regard to the term “sodium.” There is lack of knowledge of whether processed food contains salt and sodium, as well as salt substitutes, except in the urban area of Argentina. The populations studied consider that excessive salt intake represents a risk of having diseases such as hypertension and other cardiovascular diseases, but it is not perceived as a personal risk since they believe that they consume little salt. For some, these are hereditary diseases.

It is estimated that more salt and sodium are consumed daily than that which is reported and there are no signs that indicate reduction is considered. In the rural and urban areas of the three countries, differences were found...
in behavior related to salt and sodium intake. Finally, although FAO and WHO have established the leading role of nutritional labeling in support of the policies favored by the Global Strategy on Healthy Diet, most of the interviewees do not understand or use the nutritional information.

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REFERENCES


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Objetivo. Identificar los conocimientos, percepciones y comportamientos relacionados con el consumo de la sal y el sodio alimentarios y su relación con la salud y el etiquetado nutricional de los alimentos, en tres países de la Región.

Métodos. Estudio cualitativo-exploratorio basado en entrevistas semiestructuradas, según las categorías del modelo de creencias en salud. Se realizaron 34 entrevistas y 6 grupos focales con líderes comunales (71 informantes en total) en áreas rurales y urbanas de Argentina, Costa Rica y Ecuador.

Resultados. El consumo de sal varía en las áreas rurales y urbanas de los tres países. Para la mayoría de los entrevistados, los alimentos no se podrían consumir sin sal y solo las personas que consumen una cantidad excesiva de sal tendrían riesgos para la salud. Se desconoce que los alimentos procesados contienen sal y sodio. Aunque no medían la cantidad de sal agregada a las comidas, los participantes consideraban que consumían poca sal y no percibían su salud en riesgo. La mayoría de los informantes no revisaba la información nutricional y los que lo hacían manifestaron no comprenderla.

Conclusiones. Existe un conocimiento popular en relación con la sal, no así con el término “sodio”. Se consume más sal y sodio de lo informado y no hay perspectivas de reducción. Aunque se sabe que el consumo excesivo de sal representa un riesgo para la salud, no se perciben en riesgo. El reemplazo de la palabra sodio por sal facilitaría la elección de los alimentos.

Palabras clave

- Sodio en la dieta
- Conocimientos, actitudes y práctica en salud
- Hábitos alimenticios
- Etiquetado de alimentos
- Enfermedades cardiovasculares
- Argentina
- Costa Rica
- Ecuador