

## All About Reducing Salt

**By Camie Kuo**

Master of Science in Nursing, Family Nurse Practitioner Candidate 2015, University of California, San Francisco  
GE-NMF Primary Care Leadership Program Scholar

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**Abstract:** Dietary sodium reduction is an effective way to manage elevated blood pressure. However, patient adherence to this approach is poor due to lack of family involvement, negative perceptions and attitudes towards low-salt diet, and other individual characteristics. To better understand patient beliefs and barriers towards dietary salt restriction, patients with hypertension or diabetes at a community health clinic were surveyed using the Dietary Sodium Restriction Questionnaire, an instrument that examines different behavioral determinants such as attitudes, subjective norm, and perceived behavioral control. A total of 20 participants (13F, 7M) completed this survey. Survey results show that there was a division among those who were prescribed a low-salt diet from those who were not. Half of the participants also reported that they try to follow a low-salt diet by choice. Results show that there is not a universal barrier to following a low-salt diet, as reflected by the fluctuations in the participants' average ratings within the Perceived Behavioral Control subscale. The Subjective Norm Subscale results show that participants found it somewhat important to follow either their doctor's or family members' advice. Participants also recognized the relationship between eating a low-salt diet and health benefits based on the results from the Attitudes Subscale. Findings suggest that treatment and educational sessions should be tailored to individual needs prior to prescribing a low-salt diet.

**Keywords:** sodium, low-salt diet, attitudes, barriers, health beliefs, hypertension, diabetes, Dietary Sodium Restriction Questionnaire, survey

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## **Introduction**

The U.S. Department of Agriculture (USDA) recommends that the daily sodium consumption be less than 2,300 mg among the general population and 1,500 mg for at risk individuals such as those over the age of 50, those who identify as African-American, or those living with one of the following conditions: hypertension, diabetes mellitus, or chronic kidney disease (U.S. Department of Agriculture & U.S. Department of Health and Human Services [USDA & DHHS], 2010). A recent study using the data from the National Health and Nutrition Examination Survey (NHANES) shows that most of the U.S. adults do not adhere to these guidelines however (Cogswell et al., 2012). From 2003 to 2008, the NHANES data reveal that 99.4% of U.S. adults consumed more than 1,500 mg of sodium daily, and 90.7% of adults exceeded the 2,300 mg limit (Cogswell et al., 2012). Provided that there is a substantial amount of evidence supporting the role of excessive dietary sodium intake in the development of high blood pressure and cardiovascular diseases (Ha, 2014; He, Li, & MacGregor, 2013), these national statistics are of particular concern.

## **Background**

It is estimated that 29.9% of U.S. adults had hypertension between years 2005 through 2008 (U.S. Department of Health and Human Services [DHHS], 2014), and the latest data show a slight drop at 29.1% for years 2011 through 2012 (Nwankwo et al., 2013). While this recent decrease is promising, the rate of decline needs to be steeper to reach the target of 26.9% set by the Healthy People 2020's objectives (DHHS, 2014).

One of the strategies clinicians commonly use to help patients manage their blood pressure is recommending a diet low in salt. The available evidence indicates that patient adherence to this approach is quite poor on the other hand (Lennie, Chung, & Moser, 2013;

Fonarow et al., 2008; Van Der Wal, Jaarma, & Van Veldhuisen, 2005). Factors such as the lack of family involvement, negative attitudes and perceptions of low-salt diet, and certain individual characteristics can all interfere with the successful adoption of dietary sodium restriction (Lennie et al., 2013). As such, there is a need to assess and determine at-risk patients' knowledge, attitudes, and barriers towards following a low-salt diet, and this study aimed to do so through surveying patients with either hypertension or diabetes at a community health clinic.

## **Methodology**

### **Setting**

This study took place at Wesley Health Center (WHC), a federally qualified community health center (FQHC) in south central Phoenix, Arizona. WHC was established in 2003 as an extension from the Wesley Community Center to address the growing health needs of the community members. Initially, WHC was created as a free clinic that provided services to uninsured patients and their families. In 2009, WHC became a FQHC through a grant funded by the American Recovery and Reinvestment Act and Health Resources and Services Administration (Wesley Community Center, 2010). As a result of this qualification, the WHC was able to expand its services to both uninsured and insured patients. Patients currently seen at WHC come from all backgrounds, and the majority of the patient population identify themselves as Latino or Hispanic (primarily from Mexico).

### **Participants**

Due to the limited time allotted for this project, convenience sampling was used to select participants for this study. Adult patients at WHC with either hypertension or diabetes were targeted because they are considered as at-risk population and should follow the USDA's recommendation to reduce their dietary sodium to less than 1,500 mg daily (USDA & DHHS,

2010). Upon diagnosis, patients are encouraged to attend weekly health classes run by WHC's health educator. Because patients' medical appointments are typically scheduled 3 months apart, they tend to come to the classes only on days when they have an appointment to see their provider for follow-up. Adult patients aged 18 and older who attended classes either for hypertension or diabetes between the dates of July 28 to Aug. 8, 2014 were approached to participate in this voluntary survey study.

### **Questionnaire Packet**

Upon checking in for their class, front desk staff provided the participants with a questionnaire packet consisting of a cover sheet with instructions, a demographics questionnaire, and a questionnaire tool for assessing patients' attitudes and barriers towards following a low-salt diet, the Dietary Sodium Restriction Questionnaire (DSRQ) (Bentley et al., 2009). On the cover sheet, participants were instructed that this anonymous survey would help inform WHC's clinicians of the different beliefs and challenges patients have towards dietary salt restriction. Furthermore, participants were informed that their completion of the survey was voluntary, their responses would be kept confidential and not affect their treatment at WHC, and that the results of the survey would be used for preparing reports and presentations. Participants' age, gender, and racial and ethnicity background were collected through the demographics questionnaire.

The DSRQ is a survey instrument constructed by a group of nurse researchers to assess the attitudes and barriers of patients with heart failure (Bentley et al., 2009). Rooted in the Theory of Planned Behavior, the DSRQ is built on the premise that a person's behavioral intention serves as an important determinant of behavior and consists of perceived behavioral control, subjective norm, and attitudes (Montano, Kasprzyk, & Taplin, 1997 as cited in Bentley et al., 2009). As such, the DSRQ contains three different sections that address these behavioral

building blocks (Perceived Behavioral Control Subscale, Subjective Norm Subscale, and Attitudes Subscale) using a five-point Likert scale with 1 corresponding to “not at all” and 5 to “a lot”. The Perceived Behavioral Control Subscale contains a list of statements for participants to rate on how likely these factors would prevent them from following a low-salt diet (Bentley et al., 2009). The Subjective Norm Subscale assesses how important it is for patients to follow their family members’ or doctor’s advice, and the Attitudes Subscale evaluates patients’ view on eating a low-salt diet and health consequences, i.e., “eating a low-salt diet will keep fluid from building up in my body” (Bentley et al., 2009). The DSRQ also has an 11-item section for collecting descriptive information pertaining to whether respondents were prescribed a low-salt diet or not, how closely they followed this diet, and the like (Bentley et al., 2009). The current edition of DSRQ contains 27 items and is validated based on a sample of predominantly Caucasian patients with heart failure (Bentley et al., 2009). Because this study focused on patients with either diabetes or hypertension in a community health setting rather than on heart failure specifically, an earlier version of the DSRQ (34 items) was used instead and was granted permission from the DSRQ’s authors. This 34-item version is displayed in Table 1.

All of the forms in the questionnaire packet were made available in both English and Spanish prior to distribution. The DSRQ was translated into Spanish and back translated by two independent native Spanish speakers. It was then reviewed and finalized by the WHC’s health coach who is also a native Spanish speaker from Mexico. During this process, the WHC’s health coach ensured that the items from the DSRQ were linguistically appropriate and understandable for the predominantly Mexican patients at WHC.

## **Results**

### **Participants**

A total of 20 participants (13F, 7M) completed the questionnaires, and the response rate was 87% due to three other patients' declination to participate in this study. All of the participants identified themselves as Hispanic/Latino and were provided the Spanish version of the DSRQ. Fifty percent of the participants belonged to the 51 to 60 age group, and 10% of the participants reported they were in the 61 to 70 age group. Another 25% of the participants did not state their age. To prevent duplicate sampling, this author had verified that none of the participants had either taken both hypertension and diabetes classes or repeated their classes within the dates of July 28 through Aug. 8 by reviewing the health class rosters.

### **Part 1**

The survey results indicate that there was a division among the participants who were prescribed a low-salt diet and those who were not; 40% of the participants reported they were prescribed a low salt diet, 45% reported that they were not prescribed such diet, and 15% did not respond. Among the participants who responded "yes" (N=8), half of them reported that they were instructed to "reduce their salt intake" by their provider, and one reported the instructions given were to "eat in small portions and not eat salt." When asked how closely they followed their prescribed low salt diet, five out of these eight participants reported they "sometimes" followed this diet, two responded "most times", and one reported "always". When asked to rate how easy it was for them to follow this diet, the majority responded that it was "easy" (N=6) and two participants rated it as "hard". Most of these participants with a prescribed salt restriction diet reported that following this low salt diet had "slightly" helped manage their heart condition (N=5) while a smaller proportion of the participants felt that the diet helped "a lot" (N=2).

In comparison, half of the participants (N=10) reported that they try to follow a low salt diet while a smaller proportion (10%, N=2) responded that they do not adhere to this diet;

interestingly, the remaining 45% of the participants did not respond to this question (N=8). When asked to provide a reason for following such diet, three participants reported that their family or friends had recommended it, two participants stated health reasons, two reported that they heard it on the news, and one reported that their doctor had recommended it. When asked to provide specific examples on how they adhere to such diet, most of the participants (N=7) provided vague responses such as “eating less salt” or “not eating salt” in their diet. Only two participants had stated specific behavioral strategies in following a low salt diet by either “reading food labels” or “not adding salt” to their food. Similarly, when asked how closely these 10 participants followed their low salt diet by choice, more than half reported that they “sometimes” adhered to this diet (N=6) while a smaller proportion responded either “most times” (N=2) or “always” (N=1). When asked how easy it was to follow a low salt diet, the reverse trend was observed; half reported that it was “hard” (N=5), three responded that it was “easy”, and only one reported that it was “very easy.” Furthermore, most of the participants who responded that they followed a low salt diet by choice felt that their diet has helped manage their heart condition by “a lot” (N=6); a minority of these participants reported “slightly” (N=3). Note that the two categories of following a low-salt diet by prescription and by choice are not mutually exclusive; there was an overlapping of five participants who reported they were prescribed a low-salt diet and had also chosen to follow such diet.

## **Part 2: Perceived Behavioral Control Subscale**

As depicted in Figure 1, this section has the lowest overall average at 2.7 (SD=1.5). Upon closer examination of Figure 2, the item-to-item averages fluctuated which would suggest that a universal barrier for eating a low salt diet does not exist. In this section, participants were instructed to rate on a scale from 1 through 5 (1 corresponds to “not at all”; 5 “a lot”) how much

each of the items kept them from following a low salt diet. The item with the lowest average rating was “time to prepare foods” with an average of 2.0 (SD=1.1); this average rating would suggest that most of the participants did not view time as a barrier that impeded them from adopting a low salt diet, which was an unanticipated finding. On the other hand, the item with the highest average rating was “can’t pick out low-salt foods in restaurants” with an average of 3.4 (SD=1.5) indicating that participants had most trouble adhering to low-salt diet when dining out.

### **Part 3: Subjective Norm Subscale**

Shown in Figure 3, the average ratings for the four-item Subjective Norm Subscale are generally consistent with an overall average of 3.5 (SD=1.7). This suggests that participants found it somewhat important to align their behaviors based on their family members’ or doctor’s advice. The item with the highest average rating was “generally, I want to do what my doctor thinks I should do” with an average of 3.6 (SD=1.5). Participants seemed ambivalent about whether or not their doctor wanted them to adhere to dietary salt restriction as evidenced by the average score of 3.0 (SD=1.6) on the statement, “my doctor thinks I should follow a low-salt diet”; this is in agreement with the finding from Part 1 that there was a division among those who were prescribed a low-salt diet and those who were not.

### **Part 4: Attitudes Subscale**

Compared to the other two subscales, the Attitudes Subscale has the highest overall average at 3.7 (SD=1.5). The item-to-item average ratings are depicted in Figure 4. It appears that these participants recognized the relationship between eating a low-salt diet and subsequent health benefits as suggested by the finding that the statement “eating a low-salt diet will keep my heart healthy” has the highest average (average=3.9, SD=1.5) within this section. Despite this

recognition, participants somewhat agreed with the statement that “salty food is not good for me” (average=3.3, SD=1.9); this statement has the lowest average rating within this section.

### **Discussion**

Dietary salt reduction is an effective non-pharmacological strategy to manage elevated blood pressure (Ha, 2014), but research shows that adherence to a low salt diet is challenging for patients (Lennie et al., 2013; Fonarow et al., 2008; Van Der Wal et al., 2005). Because successful adoption of such diet modification requires the involvement of family members and an active approach in helping patients tackle their barriers (Lennie et al., 2013), the research aim of this study was to evaluate these beliefs and barriers towards following a low-salt diet among patients with either hypertension or diabetes in a community health setting. The overall findings from this study suggest that participants differed in their views of potential barriers preventing them from adhering to a low-salt diet. While not all of the participants were prescribed a low salt diet or told to follow such diet, they found it somewhat important to follow their doctor’s advice. Furthermore, most of the participants recognized the potential health benefits from dietary sodium restriction.

There are consistent trends throughout this study. A little less than half of the participants reported that they were prescribed a low-salt diet, and a similar proportion of these participants reported that they were not prescribed such diet. This trend is again observed in the Subjective Norm Subscale when they were asked to rate whether they agreed with the statement that their doctor wanted them to follow a low-salt diet; the average score of “3.0” indicates that the participants were divided on this matter. Participants were also ambivalent about the difficulty of following a low salt diet, although individuals who followed a low-salt diet by choice found it more difficult to adhere to such diet than those who were prescribed a low-salt diet. Another

consistency found within this study is that participants recognized the relationship between low-salt diet and health benefits. For instance, most of the participants reported that following a low-salt diet has helped manage their heart condition at least to some extent, and none of the participants had denied that this was the case. Furthermore, the high average ratings within the Attitudes Subscale further support this.

Several limitations must be taken into consideration however. First, this is a small sample size. Due to the limited time allotted for this study and a small number of patients who attended these health classes within the study time frame, only 20 patients were recruited. Because of this small sample size, it is not possible to generalize the study findings to a larger population. Also, these 20 participants might have been more motivated than their counterparts with hypertension or diabetes at the clinic because the former did set aside time to attend their health classes in addition to their medical appointments. Thus, their responses on the survey would not necessarily be representative of other patients with the same condition. Another possibility is response bias among these motivated participants for wanting to respond in a favorable manner. It is interesting to note that there were nearly twice as many female participants than there were males, and it is unclear whether or not this distribution was related to a higher volume of female patients attending the clinic than male patients in general. Also, this study did not directly assess participants' literacy level and whether or not they truly understood how to use the rating scale on the DSRQ. While this author had worked closely with the WHC's health educator to ensure the readability of the questionnaire packet, there was no opportunity to individually evaluate the participants' reading level. Based on the finding that a few of the participants had either left many of the items blank or had trouble following directions (e.g., answering all the questions despite being instructed to skip ahead), it is likely that reading levels were fairly low among this

sample. On that note however, patients who attend the health classes are also accustomed to completing standardized questionnaires that use a rating scale; for this reason, the non-response is unlikely to be related to participants' lack of exposure or familiarity with self-report, Likert-type questionnaires. Other factors that might contribute to non-response are lack of effort, lack of time to complete the survey, or a combination. Nevertheless, the consistency within the study findings suggests otherwise and that the majority of the participants read through the items and responded appropriately. Lastly, the DSRQ was constructed for patients with heart failure and not necessarily for those living with diabetes or hypertension (Bentley et al., 2009). Because hypertension and diabetes are milder conditions compared to heart failure, some of the participants might not have found the DSRQ items relevant to their condition. The 27-item version of the DSRQ was also validated based on a predominantly White/Caucasian population (Bentley et al., 2009). In comparison, all of the study participants were Latino or Hispanic. It is possible that the 34-item version used in this study might not have been culturally appropriate for this sample population. To address this issue upfront, the WHC's health coach had reviewed the DSRQ closely and ensured that the phrasing from each of the statements was linguistically and culturally appropriate for native Spanish speakers from Mexico. Also, DSRQ has been translated into Portuguese and has demonstrated adequate internal consistency in a Brazilian study (d'Almeida, Souza, & Rabelo, 2011).

### **Recommendations**

For clinical practice, there are several recommendations to make based on the findings of this study. As previously discussed, barriers are different from patient to patient. Rather than making assumptions, addressing patients' barriers should be individualized and discussed. Similarly, educational materials and treatment plans should be sensitive to these individual

needs. Other key determinants such as how they view low-salt diets (attitude) or how important it is for them to follow either their doctor's or family members' advice (subjective norm) should also be explored. Provided that the majority of U.S. adults consume more sodium than what is recommended (Cogswell et al., 2012), clinicians should discuss nutrition with their patients regardless of the latter's condition. Because the DSRQ has been shown to be a useful instrument in assessing patients' beliefs and attitudes toward low-salt diet (Bentley et al., 2009; d'Almeida, et al., 2011), the DSRQ should be distributed to all patients as a way to identify learning needs or barriers. While motivational level was not directly assessed in this study, clinicians should utilize motivational interviewing techniques to gauge the patients' readiness prior to implementing a low sodium diet (Lennie et al., 2013).

For further data collection, obtaining a larger sample size is advisable. Because literacy levels were not assessed in this study, enrollment criteria should also include reading levels to ensure that participants understand how to complete a self report questionnaire. Additionally, providing more hands-on guidance can prevent non-response and lack of effort from participants.

### **Conclusion**

In summary, this study is a small-scale survey that assessed patients' perceived behavioral control, subjective norm, and attitudes towards following a low-salt diet. Due to the small sample size, study findings are limited to the participants and are used for descriptive purposes. While not all of the participants from this study adhered to a low-salt diet, the majority recognized the relationship between a low-salt diet and health benefits and shared a generally positive view towards dietary salt restriction. More studies will be needed to further delineate patients' likelihood to adhere to a low salt diet in the long term.

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Table 1

*Original and Translated Versions of the Dietary Sodium Restriction Questionnaire (34-Item)*

Original Version	Translated and Adapted Version (Spanish)
<b>Part 1</b>	<b>Parte 1</b>
1. Were you prescribed a low salt diet by your health care provider?	1. ¿Su médico le ha recetado una dieta baja en sal?
2. What specific instructions were you given? (For example: "Watch your salt", "Follow a 2 gram sodium diet")	2. ¿Qué instrucciones le dieron para esta dieta baja en sal? (Por ejemplo: Reducir el consumo de sal o seguir una dieta de 2 gramos de sal)
3. How closely do you follow your prescribed low salt diet?	3. ¿Usted realmente sigue la dieta baja en sal que le indicaron?
4. How easy is it to follow your salt-restricted diet?	4. ¿Qué tan fácil es para usted seguir su dieta baja en sal?
5. Has following this diet helped you manage your heart condition?	5. ¿El seguir esta dieta, le ha ayudado a controlar su problema cardiaco?
6. Do you try to follow a low salt diet?	6. ¿Intenta seguir una dieta baja en sal?
7. Why did you decide to follow this diet? (For example: Read it in a magazine; Head about it on a news program; A friend recommended it)	7. ¿Por qué decidió seguir una dieta baja en sal? Ejemplo: Lo leyó en una revista, escuchó un comentario en las noticias, un amigo le recomendó esta dieta baja en sal.
8. What specifically do you do?	8. ¿Qué es lo que usted hace para seguir esta dieta baja en sal?
9. How closely do you follow this diet?	9. ¿Con que frecuencia usted sigue esta dieta baja en sal?
10. How easy is it to follow this diet?	10. ¿Le resulta fácil seguir con la dieta baja en sal?
11. Has following this diet helped you manage your heart condition?	11. ¿El seguir esta dieta, le ha ayudado a controlar su problema cardiaco?
<b>Part 2: Perceived Behavioral Control Subscale</b>	<b>Parte 2: Subescala de Control de Comportamiento Percibido</b>
12. Cost of low-salt foods:	12. El costo de los productos bajos en sal:
13. Time to prepare foods:	13. El tiempo para preparar los alimentos:
14. Don't understand or know how:	14. No sabe como, o no entiende cómo hacerlo:
15. Taste of low-salt foods:	15. El sabor de los alimentos bajos en sal:
16. Can't pick out low-salt foods in restaurants:	16. Es difícil ordenar platillos bajos en sal, en restaurantes:
17. The restaurants I like don't serve low-salt foods:	17. Los restaurantes que me gustan, no preparan platillos bajos en sal:
18. Can't pick out low-salt foods at the grocery:	18. No puedo comprar alimentos bajos en sal en la tienda:
19. I don't cook:	19. No cocino:
20. The person who cooks for me doesn't prepare low-salt foods:	20. La persona que cocina para mí, no sabe preparar alimentos bajos en sal:
21. The people around me don't eat low-salt foods:	21. Mi familia y amistades no consumen alimentos bajos en sal:
22. The foods I like to eat are not low-salt	22. La comida que me gusta no es baja en sal:
23. I don't have the willpower to change my diet	23. Se me hace difícil y no puedo cambiar mi dieta alimenticia:
<b>Part 3: Subjective Norm Subscale</b>	<b>Parte 3: Subescala de Norma Subjetiva</b>
24. My doctor thinks I should follow a low-salt diet.	24. Mi doctor piensa que debo seguir una dieta baja en sal.
25. My spouse or other family members think I should follow a low-salt diet.	25. Mi esposa/o y familiares piensan que debo seguir una dieta baja en sal.
26. Generally, I want to do what my doctor thinks I should do.	26. Generalmente sigo las instrucciones de mi doctor.
27. Generally, I want to do what my spouse or family members think I should do.	27. Generalmente sigo las instrucciones de mi esposa/o y familiares.
<b>Part 4: Attitudes Subscale</b>	<b>Parte 4: Subescala de Actitudes</b>
28. It is important for me to follow my low-salt diet.	28. Es importante para mí seguir una dieta baja en sal.
29. Eating a low-salt diet will keep fluid from building up in my body.	29. Seguir una dieta baja en sal evitará que los líquidos se acumulen en mi cuerpo.
30. Eating a low-salt diet will keep my swelling down.	30. Seguir una dieta baja en sal evitara la inflamación/hinchazón en mi cuerpo.
31. Eating a low-salt diet will help me breathe better.	31. Una dieta baja en sal me ayudara a respirar mejor.
32. When I follow a low-salt diet, I feel better.	32. Cuando sigo una dieta baja en sal, me siento mejor.

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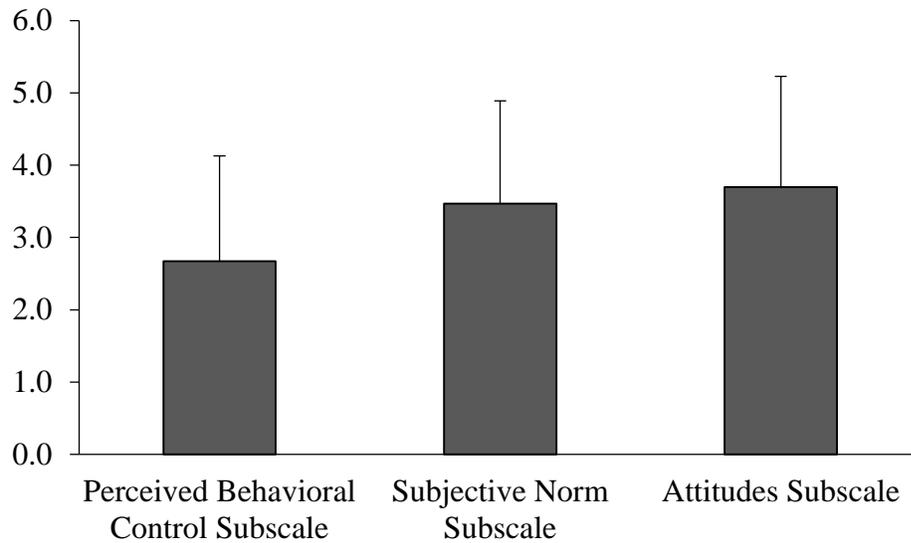
33. Eating a low-salt diet will keep my heart healthy.  
34. Salty food is not good for me.

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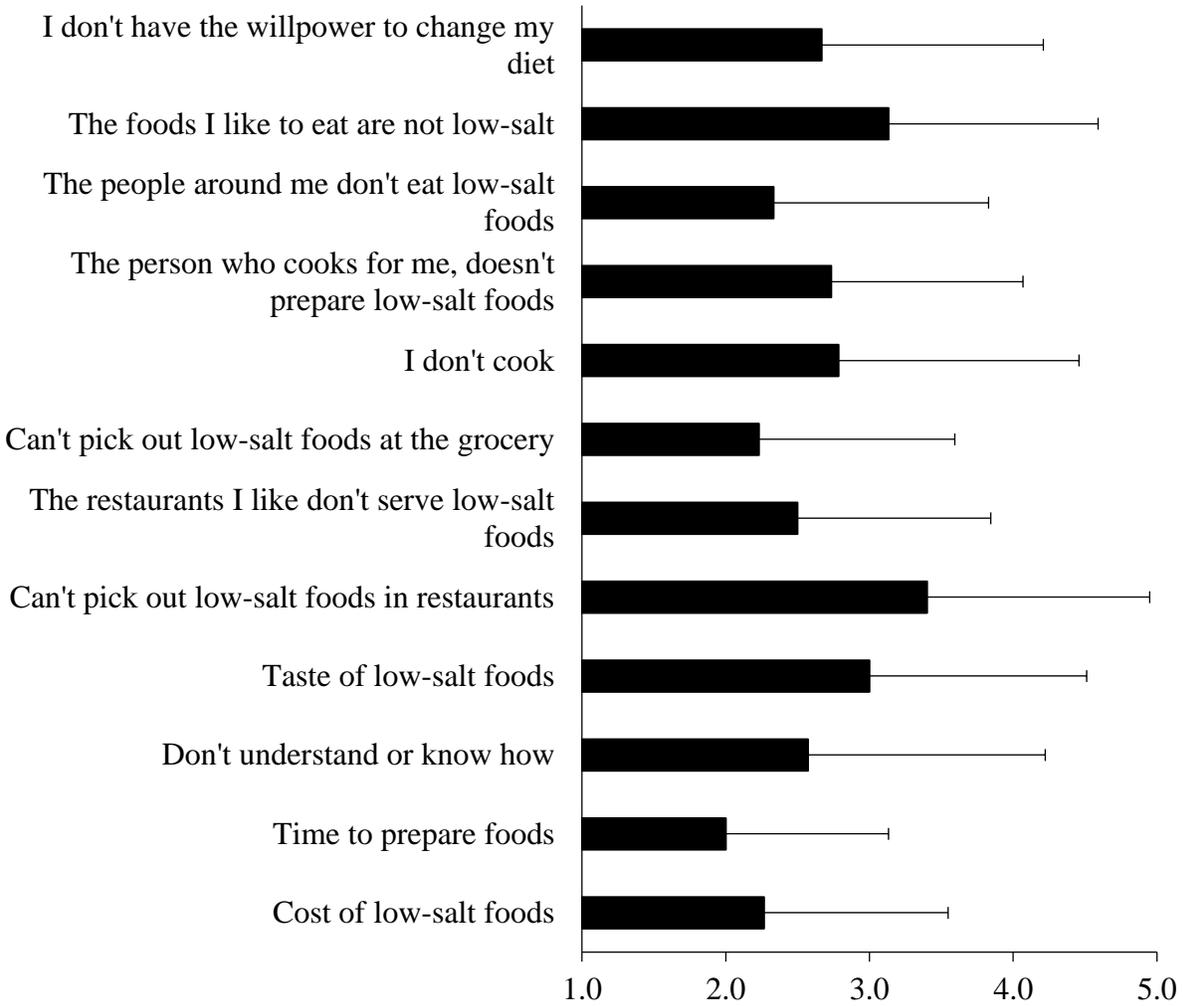
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33. Una dieta baja en sal mantendrá mi corazón saludable.  
34. La comida salada no es buena para mí.

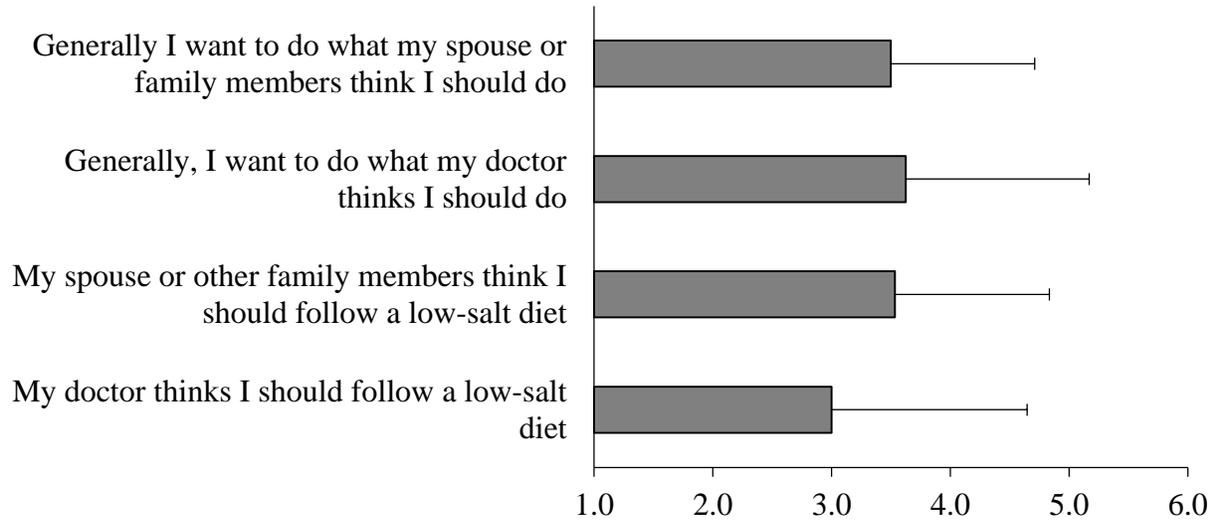
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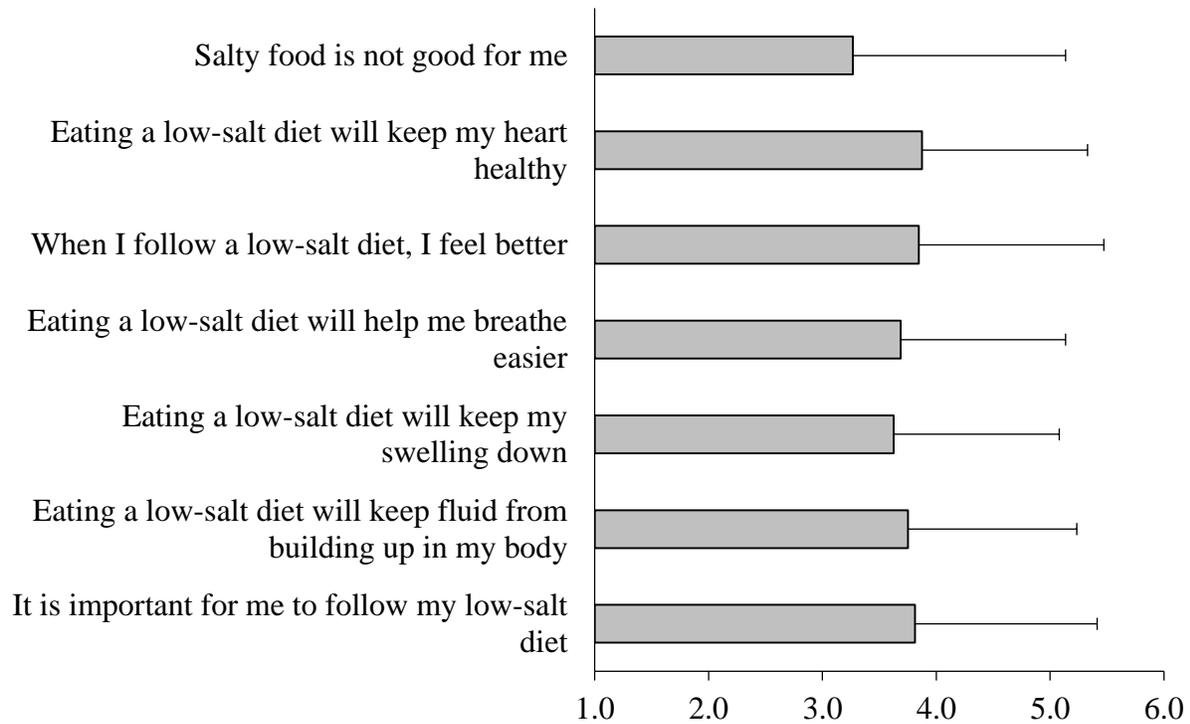
*Figure 1.* A comparison of the average ratings between the three subscales in DSRQ. The y-axis represents the rating scale from 1 through 5 with “1” corresponding to “not at all” and “5” to “a lot”; “6.0” is included in here in the figure only to capture error bars that extend past the rating. Standard deviations are represented in the figure by the error bars attached to each column.



*Figure 2.* Average ratings from the Perceived Behavior Control Subscale. The x-axis represents the rating scale from 1 through 5 with “1” corresponding to “not at all” and “5” to “a lot”. Standard deviations are represented in the figure by the error bars attached to each column.



*Figure 3.* Average ratings from the Subjective Norm Subscale. The x-axis represents the rating scale from 1 through 5 with “1” corresponding to “not at all” and “5” to “a lot”; “6.0” is included in here in the figure only to capture error bars that extend past the rating. Standard deviations are represented in the figure by the error bars attached to each column.



*Figure 4.* Average ratings from the Attitudes Subscale. The x-axis represents the rating scale from 1 through 5 with “1” corresponding to “not at all” and “5” to “a lot”; “6.0” is included in here in the figure only to capture error bars that extend past the rating. Standard deviations are represented in the figure by the error bars attached to each column.