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Knowledge, attitudes, motivators and salt-related behaviour in a cardiac care unit population: A cross-sectional study in Lebanon

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Abstract.
BACKGROUND: High dietary salt consumption leads to hypertension, a major risk factor for cardiovascular disease. The Eastern Mediterranean region has among the highest prevalence of cardiovascular disease in the world, with high salt consumption.
OBJECTIVE: Characterise knowledge, attitudes, motivators and behaviours related to salt consumption in a high-risk Lebanese population and identify factors associated with favourable and unfavourable salt-related behaviour in order to provide an evidence-base for the design of dietary salt-reduction interventions.
METHODS: We administered a multicomponent questionnaire on cardiac care patients gathering information on socio-demographic factors, medical history, knowledge of salt consumption and its impact on health, attitudes towards salt consumption, salt-related behaviour and motivators perceived to impact upon behaviour. We employed multivariate logistic regression modelling to examine associations with salt-related behaviour.
RESULTS: We identified several salt-related knowledge gaps, negative behavioural practices and motivators for reducing salt consumption. Specific aspects of knowledge and attitude were found to be associated with positive behaviours. Multivariate logistic regression modelling found gender, attitude score, previous salt reduction advice from a healthcare professional, having hypertension and having diabetes affected the likelihood of specific salt-related behviours being reported. Previous advice from a healthcare professional in particular was associated with improved salt-related behaviour.
CONCLUSIONS: These findings provide an evidence-base for the development of salt-reduction interventions targeting this high risk population, particularly in Lebanon.

Keywords: Consumer knowledge, consumer attitudes, consumer behavior, salt, sodium

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1. Introduction

Cardiovascular disease (CVD) is a rapidly growing cause of mortality and morbidity in the Eastern Mediterranean region [1, 2]. In Lebanon 47% of deaths are attributed to CVD, higher than in the USA where the estimate is 31% [3]. Hypertension is firmly established as a major risk factor for CVD and is probably the most important risk factor for CVD and death globally [4]. Higher salt consumption increases blood pressure [5]. Further, higher dietary sodium intake is associated with a greater risk of fatal coronary artery disease and stroke, and dietary salt reduction reduces systolic and diastolic blood pressure, with a greater mean reduction in systolic blood pressure in patients with hypertension [6].

The considerable body of evidence suggesting that reducing salt consumption can reduce hypertension-mediated harm has resulted in recommendations for maximal daily sodium/salt consumption. The World Health Organization (WHO) suggests a reduction of daily intake to <2000 mg of sodium in healthy adults, equivalent to 5 g of salt [7]. In individuals who are over 51, black and/or have a diagnosis of hypertension, the American Heart Association and United States Dietary Guidelines Committee recommend a target of <1500 mg of sodium per day, however, the value and feasibility of this lower target is controversial [8, 9]. Initiatives to reduce dietary sodium consumption have included educational programmes aimed at improving knowledge and changing attitudes regarding sodium consumption, alterations to public policy and development of regulations in the food industry [10–12].

In Lebanon, daily salt intake is high, estimated between 7–14 grams per day [13]. Nasreddine et al. investigated the association between socio-demographic factors, knowledge and attitudes with salt related behaviours in a cohort of supermarket customers in Beirut ($n = 442$). This study found several gaps in knowledge in this population with positive attitudes, higher knowledge and older age being associated with more beneficial salt-related behaviours [14].

Reducing salt consumption in high risk populations may have a larger impact per individual in terms of reducing cardiovascular events, certainly, salt reduction has a more substantial impact on blood pressure in hypertensive and borderline hypertensive patients [6, 15, 16]. In Lebanon (like in many low to middle income countries), funding and organizational infrastructure to deliver national public health initiatives is limited [10, 12]; focusing on the knowledge, attitudes, behaviours and motivators of high-risk groups may guide educational interventions that can be feasibly implemented at the hospital or primary care practice level.

To allow planning of effective salt-reduction interventions the WHO recommends evaluating knowledge, attitudes and behaviours regarding salt as a health risk, in the targeted population [17]. Here, in a cardiac care unit (CCU) population we aim to: 1) quantify baseline knowledge, attitudes, salt-related behaviour and motivators for behavioural change, using a previously validated multicomponent survey [14]; 2) investigate associations of socio-demographic factors, medical history, previous advice, knowledge and attitudes with self-reported salt-related behaviour. The main behaviours we aimed to measure were: checking food labels for sodium content; altering purchase decisions based on sodium content; trying to purchase lower salt products; and cutting down on salt.

2. Methods

Ethical approval was obtained for the Institutional Review Board at the American University of Beirut.

2.1. Participant recruitment

On the CCU at the American University of Beirut Medical Centre, participants were randomly selected from a patient list. On selection of a patient, their notes were checked and staff were questioned regarding suitability for the study. Inclusion criteria were, a history of: hypertension, coronary artery disease, heart failure, and/or a history

of stroke/transient ischemic attack, the exclusion criterion was: being judged by staff to be too unwell to answer a questionnaire. Suitable patients were approached and asked if they would agree to answer a questionnaire. Written informed consent was obtained prior to administration of the questionnaire. Based on the prevalence of expected knowledge 115 patients were recruited. In Nasreddine et al., it was estimated that 78% of adults know that salt/sodium worsens health [14]. Taking this percentage into consideration with confidence interval of 7%, and considering a type 1 error of 5%, a sample of 115 patients was determined to be appropriate. All known medical conditions for each patient were obtained from patient notes and subsequently confirmed by the patient. Participants were recruited between May and August 2014.

2.2. The questionnaire

We utilized a multicomponent questionnaire previously designed and implemented to gather knowledge, attitudes and behaviour regarding salt consumption and health in a population of Lebanese supermarket shoppers, with 5 additional questions exploring motivation for changing behaviour. The motivation questions were piloted on 15 CCU patients, with investigators subsequently asking respondents if they felt other answer options or questions needed to be added and if they felt the language was clear. A piloted Arabic version of the questionnaire was also available. The questionnaire was designed from a review of the literature in which similar questionnaires were used, with culture specific modifications such as inclusion of common local foods. The internal consistency for the knowledge and attitude components of this questionnaire were previously evaluated by calculating Cronbach's alpha coefficients, which were 0.748 and 0.724, respectively [14]. Questionnaires were administered by the investigators, who read out the questions and recorded the responses.

2.3. Socio-demographic variables

The initial component of the questionnaire obtained: age category; gender; educational level; health-related major (work or study in: biomedical science, nutrition, food science, medicine, public health or nursing); number of rooms and people in their household. Crowding index (an indicator of socio-economic status) was calculated as the total number of co-residents per household divided by the total number of rooms, excluding the kitchen and bathrooms [18]. For each individual, a knowledge score was calculated based on the number of correct answers to knowledge questions, with scores ranging from 0 to 27, the higher the score the higher the knowledge. Similarly, an attitude score was created based on the number of favourable attitude statements, with scores ranging between 0 and 4 (the higher the score the more favourable is the attitude towards reducing salt intake).

2.4. Knowledge, attitude, behaviour and motivation questions

Twenty seven questions regarding salt-related knowledge, four questions related to salt-related attitude, nine questions regarding salt-related behaviour and five questions exploring motivation for behaviour change were contained in the questionnaire (Appendix). For analysis, knowledge questions were recoded into three different categories to ensure the same measurement scale across all items: correct answer, wrong answer, and don't know.

2.5. Statistical analysis

Descriptive statistics were performed for demographic variables as well as responses to all questions included in the questionnaire. Continuous and categorical data were expressed as mean (±standard deviation) or counts and percentages respectively. Bivariate analyses were done with independent *t*-tests or chi-square ($\chi 2$) as applicable. Multivariate logistic regression modelling was conducted and odds ratios and their 95% confidence intervals were reported. The co-variates: knowledge score, attitude score, sex, age, crowding index, education, physician advice, history of hypertension, history of dyslipidaemia, history of diabetes, history of vascular disease and

Table 1
Socio-demographic characteristics and medical history of participating cardiac care unit patients ($n = 115$)

Characteristics	%
Age (years)	
<50	21
51–60	30
>60	49
Gender	
Male	64
Female	36
Health related major*	
Yes	10
No	90
Educational level	
Intermediate or lower	35
High school or technical degree	22
University	43
Crowding index	
<1 person/room	79
≥1 person /room	21
Medical history	
Hypertension	75
Dyslipidemia	64
Left ventricular dysfunction**	64
Diabetes mellitus	43
Percutaneous coronary intervention	39
Myocardial infarction	34
Angina	33
Congestive heart failure	33
Coronary artery bypass graft	28
Vascular disease	24

*Health-related major includes medicine, biochemistry, nutrition, food science, public health, and nursing. **Left ventricular ejection fraction <40%.

history of congestive heart failure were adjusted for in the multivariate model. All tests with p-value of less than 0.05 were considered statistically significant. Data were analysed using SPSS v.21.0 (SPSS, Chicago, IL, USA).

3. Results

3.1. Population characteristics

The study population consisted of 115 CCU patients, 38% females. Five of the 120 suitable study candidates identified declined to answer the questionnaire. Table 1 details the socio-demographic characteristics and medical history of the participants.

3.2. Knowledge results

Mean knowledge score for the cohort was 17.6 ± 3.3 (out of 27). Eighty percent of participants knew that a high salt/sodium diet worsens health, but only 19% could identify the recommended maximum daily salt intake. A high proportion of participants knew that high dietary salt can cause or aggravate high blood pressure (93%), however, only 50% knew it could cause or aggravate stroke (50%) (Table 2).

3.3. Attitude and behaviour results

Mean attitude score was 3.38 ± 0.88 (out of 4), with most of the cohort giving positive responses to attitude questions. Behavioural responses were less positive with 34% checking labels specifically for salt/sodium content and 50% reporting to adding salt at the table often (Table 3).

3.4. Motivation results

A dramatic change in health status was selected by most participants as the main motivator for reducing salt intake (65%), followed by being advised by a doctor (30%). The main barrier to decreasing salt intake was salt tasting good, with 86% of the cohort selecting this response. Most participants reported getting their health information from their doctor (43%), followed by the media (28%), then the internet (17%). Thirty six percent of participants felt that their doctor should be most responsible for helping them reduce their salt/sodium intake, followed by 28% believing they were most responsible for reducing their own intake, 23% believed the government were the most responsible and 13% believed the food industry were most responsible. Seventy-nine percent of participants reported to being previously advised by a physician, nurse or dietitian about the risks of a salt-rich diet and the need to moderate their intake.

3.5. Associations of sociodemographic factors and medical history with knowledge and attitude scores (bivariate comparisons)

Having a health related major was associated with a significantly higher knowledge score (20 ± 2.66) compared to not having a health related major (17.31 ± 3.28), $p = 0.007$, t-test. Looking at components of medical history, dyslipidaemia was associated with a significantly higher knowledge score (18.11 ± 2.70), $p = 0.035$, t-test. No other socio-demographic factors or components of medical history were associated with significantly higher or lower knowledge or attitude scores on bivariate comparisons.

3.6. Associations of specific knowledge responses, specific attitude responses and previous advice with specific salt-related behaviours (bivariate comparisons)

Certain answers to knowledge and attitude questions were associated with specific salt-related behaviours. Also, whether or not patients were previously advised to modify salt intake by a healthcare professional was also associated with specific salt-related behaviours.

Knowing that high dietary salt/sodium worsens health and giving positive responses to each of the four attitude questions, was significantly associated with reporting cutting down on salt ($p = <0.05$). Additionally, individuals that knew processed foods were the main source of salt in the Lebanese diet and knew that a high salt diet could cause/aggravate stroke, osteoporosis and fluid retention, were more likely to report buying low salt foods ($p = <0.05$). Individuals giving positive responses to each of the four attitude questions, were significantly more likely to report trying to buy low salt foods ($p = <0.05$). Further, being previously advised by a physician, nurse

Table 2
Knowledge related to dietary salt in a cohort of cardiac care unit patients ($n = 115$)

Question	Correct responses (%)
Effect of high salt/sodium diet on health (correct answer: "worsens health")	80
High blood pressure	93
Stroke	50
Osteoporosis	28
Fluid retention	53
Heart attacks	70
Stomach cancer	12
Kidney disease	77
Relationship between salt and sodium (correct answer: "salt contains sodium")	57
Maximum daily amount of salt recommended for adults (correct answer: "five grams, <1 teaspoon")	19
Main source of salt in the diet of Lebanese people (correct answer: "processed foods . . . ")	37
Correctly identified foods as either high, medium or low sources of salt/sodium	
Bread (medium)	43
Manaeesh-traditional thyme or cheese-filled pies (high)	74
Traditional pies (high)	74
Pizza (high)	74
Rice (low)	33
Cheese (high)	83
Milk (low)	85
Pear (low)	98
Vegetable ragouts (medium)	87
Sandwiches e.g., shawarma, fajita, hamburger (high)	85
Soya sauce (high)	66
Fresh carrot (low)	86
Ketchup (high)	56
Bottled salad dressings (high)	67
Traditional roasted nuts (high)	91
Sausages and hot dogs (high)	91

or dietitian about the risks of a salt-rich diet and the need to moderate their intake was significantly associated with cutting down on salt ($p = 0.001$) and trying to buy low-salt foods often ($p = 0.03$), chi-square.

3.7. Associations of sociodemographic factors with specific salt-related behaviours (bivariate comparisons)

Gender, health major and age were associated with specific salt-related behaviours. Females were more likely to both check food labels for salt/sodium content and have their purchase decision influenced by the salt/sodium content ($p = <0.05$). Not having a health-related major significantly increased the likelihood of reporting to cut down on salt ($p = <0.05$). Finally, participants aged 51–60 were significantly more likely to check food labels for salt/sodium content often ($p = <0.05$), chi square.

Table 3
Salt-related attitude and behaviour in a cohort of cardiac care unit patients ($n = 115$)

Attitude	%
You are concerned about the amount of salt/sodium in your diet (Yes)	59
Reducing the amount of salt you add to foods is definitely important to you (Agree*)	90
Reducing the amount of processed foods you eat is definitely important to you (Agree*)	93
Reducing your sodium intake is definitely important to you (Agree*)	92
Check labels (Often**)	54
Information on food labels affects purchasing decisions (Often**)	55
Check labels specifically for salt/sodium content (Often**)	**34**
Salt/sodium content indicated on label affects purchasing decisions (Often**)	**35**
Try to buy "low salt" foods (Often**)	66
Try to buy "no added salt" foods (Often**)	21
Add salt during cooking (Often**)	43
Add salt at the table (Often**)	50
Is cutting down on salt intake (Yes)	78

*Attitude questions were evaluated on a five-point Likert scale ranging from "strongly disagree" to "strongly agree". Responses "agree" and "strongly agree" were merged. **Response options for these behaviour questions were often, sometimes and never. Answers of often and sometimes have been merged. **Bold values** indicate that female gender is significantly associated with a positive response to these items ($P = <0.05$, chi square).

3.8. Associations of medical history components with specific salt-related behaviours (bivariate comparisons)

A history of hypertension significantly increased the likelihood of reporting cutting down on salt and a history of congestive heart failure increased the likelihood of checking food labels for salt, reporting cutting down on salt and trying to buy low salt foods ($p = <0.05$), chi square.

3.9. Associations after multivariate regression modelling

Table 4 shows associations between salt-related behaviours and knowledge score, attitude score, socio-demographic factors, components of medical history, and previously receiving advice from a healthcare professional to modify salt intake; after adjusting for co-variates.

Variables not displayed in Table 4 (age group, education level, health major, hypertension, crowding index, dyslipidaemia, vascular disease, myocardial infarction, percutaneous coronary intervention, coronary artery bypass graft, angina and left ventricular dysfunction) were not associated with a significantly higher or lower likelihood of any of the four salt-related behaviours, by multivariate regression modelling.

Key findings are: Female gender is associated with a higher likelihood of salt/sodium label content affecting purchasing decision ($p = 0.005$). Higher attitude score ($p = 0.001$), having hypertension ($p = 0.03$) and previously receiving advice from a healthcare professional ($p = 0.007$) were all associated with an increased likelihood of reporting to cut down on salt. Higher attitude score ($p = 0.004$) was associated with a higher likelihood of trying to buy low salt foods. Conversely, having diabetes mellitus significantly reduced the likelihood of trying to buy low salt foods ($p = 0.015$).

4. Discussion

We investigated salt-related knowledge and attitudes, socio-demographic factors, medical history and the association of these factors with self-reported behaviours in a sample of high-risk patients in the CCU at the

Table 4

Associations of salt-related behaviours with knowledge score, attitude score, socio-demographic characteristics, medical history and previous advice from a healthcare professional to modify salt intake (multivariate regression analysis). Co-variates adjusted for in this model were: knowledge score, attitude score, sex, age, crowding index, education, physician advice, history of hypertension, history of dyslipidaemia, history of diabetes, history of vascular disease and history of congestive heart failure

Variables	Often checks label for for salt/sodium content of	Salt/Sodium label content often often affects purchase decision	Is cutting down on salt	Often trying to buy low salt foods
	O.R (95% C.I)	O.R (95% C.I)	O.R (95% C.I)	O.R (95% C.I)
Knowledge score*	0.98 (0.82–1.17)	0.97 (0.82–1.15)	0.95 (0.74–1.23)	1.19 (0.98–1.46)
Attitude score*	1.26 (0.68–2.34)	1.58 (0.81–3.11)	**4.42 (1.85–10.57), $p = 0.001$**	**2.92 (1.41–6.06), $p = 0.004$**
Gender				
Male	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Female	2.75 (0.95–7.95)	**4.86 (1.63–14.52), $p = 0.005$**	2.83 (0.53–15.00)	1.60 (0.47–5.50)
Hypertension	1.28 (0.31–5.05)	0.78 (0.20–2.93)	**6.56 (1.19–36.11), $p = 0.03$**	1.14 (0.27–4.88)
Diabetes mellitus	0.81 (0.27–2.48)	1.19 (0.39–3.56)	0.65 (0.14–3.10)	**0.21 (0.06–0.74), $p = 0.015$**
Previous advice**	0.32 (0.09–1.20)	0.87 (0.23–3.33)	**8.70 (1.79–42.25), $p = 0.007$**	0.98 (0.22–4.44)

*considered as continuous variables. **Given previous advice by a physician, nurse or dietitian about the risks of a salt-rich diet and the need to moderate salt intake. **Bold values** are significant at $p = <0.05$. O.R = odds ratio, C.I. = confidence interval.

American University of Beirut Medical Centre in Lebanon. In addition, we explored perceived motivators for modifying salt consumption in this population.

Mean knowledge score in the CCU population was relatively high (17.6 ± 3.3) compared to the mean score previously found in the general Lebanese population (15.2 ± 4.1), mean attitude score was also higher in the CCU population [14]. Despite higher overall knowledge and more positive attitudes, a similarly low proportion of individuals had adopted favourable salt-related behaviours and common knowledge gaps were identified. Specifically, we found only 34% checked and were influenced by salt content on food labels, 28% try to buy no added salt products and 50% add salt at the table. Common knowledge gaps identified are that few (19%) can correctly identify the recommended maximal salt intake and only 37% identified processed foods as the main source of salt/sodium in the Lebanese diet. Similar knowledge gaps and unfavourable behavioural practices related to salt intake have been highlighted in other studies globally [19–23]. Inadequate use of food labels has been highlighted particularly consistently in previous studies [22, 24, 25]. These specific knowledge gaps and negative behavioural practices could be targeted in dietary salt-reduction interventions, for example, developing educational material on interpreting food labels and introducing clearer food labelling.

The theory of planned behaviour states that knowledge, attitudes, subjective norms and perceived behavioural control influence intention, with intention subsequently influencing behaviour [26]. Here we identified associations between aspects of knowledge and attitude with reported behaviour. Strictly applying the theory of planned behaviour one could make the assumption that these aspects of knowledge and attitude are what influences salt-related behaviour. However, there are limitations with this theory, for example, it does not account for several variables that may also influence behaviour such as: emotional, economic and environmental factors [27]. Therefore, identified associations between knowledge and attitudes with behaviour warrant further study to elucidate likely causality.

The specific knowledge responses we found to be associated with more favourable behaviours were knowing: processed foods are the main source of salt in the Lebanese diet, high dietary salt/sodium worsens health, and a high salt diet can cause/aggravate stroke osteoporosis and fluid retention. Interestingly the same aspects of knowledge were associated with more positive behaviours in the general Lebanese population, corroborating

these associations [14]. This may justify designing an educational initiative incorporating these aspects of knowledge. However, knowledge score was not associated with more favourable behaviour on multivariate regression analysis. Conversely, higher attitude score was strongly associated with more positive salt-related behaviours, which remained significant after adjusting for confounders. This replicates the findings of a recent study in China where attitudes but not knowledge impacted upon salt-related behaviours after adjustment through multivariate analysis [28].

Therefore, educational initiatives should aim to elicit positive attitudes towards reducing salt consumption, rather than focusing on increasing knowledge.

The other factors significantly associated with positive behavioural practices after adjusting for confounders in a multivariate regression model were: previous advice to reduce salt consumption from a healthcare professional, having hypertension and female gender. Female gender predisposing to positive behaviour is in line with previous studies reporting that women have better health-related awareness and are generally more adherent to dietary recommendations [29–31]. Nasresddine et al. posits that favourable salt-related behaviours in females may be related to higher salt-related awareness and health consciousness [14], however, as behaviour is self-reported, this association could be related to higher social desirability and social approval biases in females [32].

The association of hypertension and favourable salt-related behaviour is perhaps related to dietary salt-reduction advice routinely given to patients diagnosed with hypertension. In line with this, is that "previous advice from a physician, nurse or dietitian about the risks of a salt-rich diet and the need to moderate intake" was the factor most strongly associated with cutting down on salt. Additionally, change in health status and doctors advice were reported as the strongest motivators for behaviour change. Neither previous advice nor perceived motivators have been examined in previous studies investigating salt related behaviour. These unique findings support the assertion that a physician-led hospital-based educational initiative may encourage positive behavioural change amongst high-risk patients. However, to validate such an initiative, a longitudinal study monitoring salt-related behaviour and/or consumption over time is required. Previous educational interventions have demonstrated positive impacts on salt-related behaviour or consumption, for example, school based health education lessons in China have recently been demonstrated to reduce salt intake in children and their families (as measured by urinary sodium) [33]. A number of delivery methods including leaflets, text messaging and peer group meetings have been used to successfully deliver educational interventions in other healthcare settings [34–36].

Having diabetes mellitus was the one factor we identified associated with less positive salt-related behaviour on multivariate regression analysis. Considering this association and studies demonstrating the significant impact lifestyle advice can have on the health of diabetic individuals [37, 38], it may be an important group to target in future salt-reduction interventions.

Limitations of this study should be noted. The use of a questionnaire-based approach means that the results depend on participant's perceptions. Moreover, respondents may be susceptible to social approval and social desirability bias, disposing them to choose socially favourable answers, particularly in regards to reported attitudes and behaviours [32]. For example, in this study the CCU environment may be a factor that influences responses. Methods such as documenting food intake or urinary sodium excretion to verify sodium consumption could not be reliably utilised in this study as intake was controlled by the hospital and may have been impacted upon by concurrent illness. Also urinary sodium would have been affected by the use of diuretics is several patients. A key limitation is that this is a single-centre study. In our sample there is a high proportion of: participants with a low crowding index (a marker of high socio-economic status), males and individuals with a high level of education.

In summary, frequency of using food labels to consider salt content and purchasing food with no added salt was low, whilst frequency of adding salt at the table was high. The factors most robustly associated with positive behaviours were female gender, having hypertension, high attitude score and previous salt-related advice from a healthcare professional. Having diabetes was associated with less positive behaviour. The negative behavioural practices and factors associated with salt-related behaviour identified can be utilised to design salt-reduction interventions for high-risk patients in Lebanon, where effective salt reduction is likely to significantly impact on

public health. As previous advice from healthcare professionals was associated with more positive behaviours and patients perceived ill health and doctors advice to be motivational, trial of a hospital-based educational intervention is justified.

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Conflict of interest

None.

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Appendix – Items contained within the study questionnaire by category

Knowledge items

The Knowledge questions asked participants:

1) What they think the general effect of dietary salt/sodium is on health ("improves health", "has no effect on health", "worsens health" or "don't know").
2) Whether they thought high dietary salt caused or aggravated each of a list of 7 health conditions (high blood pressure, stroke, osteoporosis, heart attacks, stomach cancer and kidney disease) by indicating either: "yes", "no" or "don't know".
3) To identify which statement best describes the relationship between sodium and salt: "they are exactly the same", "salt contains sodium", "sodium contains salt" or "don't know".
4) To identify which statement identifies the maximal recommended daily salt intake: "3 grams (½ teaspoonful)", "5 grams (<1 teaspoonful)", "9 grams (1 ½ teaspoons)", "12 grams (2 teaspoons)", "15 grams (2 ½ teaspoons)" or "don't know".
5) To identify the statement they thought represented the main source of salt in the Lebanese diet: "salt added during cooking", "salt added at table", "salt in processed foods such as breads, cured meats, canned foods and takeaway", "salt from natural sources such as vegetables and fruits" or "don't know".
6) To classify a list of 16 common foods into "high", "medium", Low" or "don't know" salt/sodium content.

Attitude

The attitude questions comprised:

1) Three questions that utilize a five-point Likert scale ranging from "strongly disagree" to "strongly agree", which are: "reducing the amount of salt you add to foods is definitely important to you"; "reducing the amount of processed foods (e.g. breads, cured meats, canned foods and takeaway) you eat is definitely important to you" and "reducing your sodium intake is definitely important to you". For analysis "strongly agree" and "agree" were collapsed into one category to represent agreement with the statement, and "strongly disagree" and "disagree" to represent disagreement.
2) The final question was a "yes or no" question enquiring if the participant is concerned about the amount of salt/sodium in their diet.

Behaviour

The self-reported behaviour questions comprised:

1) Two questions on the use of food labels in general: "How often do you check food content labels when you are shopping?" and "Does what is on the food content label affect whether or not you purchase a food item?".
2) Two questions on the use of salt-related food labels: "How often do you look at the salt/sodium content on food labels when you are shopping?". and "How often does the salt/sodium content shown on the food label affect whether you purchase a product?".
3) Two questions on the frequency of behaviours that increase salt consumption: "Do you add salt during cooking?". and "do you add salt at the table?".
4) Two questions on the frequency of behaviours that reduce salt intake: "do you try to buy 'low salt' foods?" and "do you try to buy 'no added salt' foods?".

All of these questions enquiring about frequency had the possible responses: "often", "sometimes", "never" or "not applicable".

5) A single "yes or No" question asking: "Are you cutting down on the amount of salt you eat?".

Motivation

The questions exploring motivators for behaviour change were:

1) "What would motivate you to reduce your salt intake?" with the options: "A dramatic change in health status", "if my doctor advised it", "if family members or friends advised it" or "other, please specify".
2) "What are the barriers against decreasing your salt intake?" with the options: "It tastes good", "I am not concerned with decreasing my salt intake", "I don't know which foods to avoid" and "Other, please specify".
3) "Where do you get your health information from" with the options: "My doctor, "my family and friends", "the internet", "the media" and "other, please specify".
4) "Who is most responsible for helping you reduce your sodium/salt intake?", with the options: "the government (public health campaign)" "Companies that make or sell foods with salt in them (food industry)", "your doctor", "yourself" and "other, please specify".
5) "Have you been previously advised by a physician, nurse or dietitian about the risks of a salt-rich diet and the need to moderate salt intake?" with the options: "yes" or "no".