ID: 20241904

Topic: Reducing Salt and Sugar in Campus Foods: A Malaysian Study

NCT number: Not assigned yet

Document Date: [11 June 2024]

Research Background:

Cardiovascular disease stands as a significant global health challenge, ranking among the primary causes of premature death and disability, especially in developing countries. The burden of cardiovascular disease persists as the primary cause of death in Malaysia.

In Malaysia, high blood pressure (BP) has consistently emerged as a leading contributor to premature mortality. The 2019 National Health and Morbidity Survey (NHMS) revealed a 30% prevalence of hypertension among Malaysian adults aged 18 and above. Alarmingly, despite the prevalence increasing with age, nearly two-thirds of hypertensive individuals remain undiagnosed (1).

Research indicates that a mere 2mmHg rise in systolic blood pressure (BP) significantly elevates mortality rates from stroke and ischemic heart disease in adults. Research has also shown the association of salt/sodium intake to BP and that the reduction in salt/sodium intake is also associated with lower BPs and low CV deaths.

The mean intake of salt in Malaysia is 7.9gm/day much higher than that recommended by WHO of <5 gm /day (2). In fact, the WHO has set the reduction of population salt intake by 30% by 2025.

According to the Malaysian Adult Nutrition Survey (MANS 2014), 70% of Malaysians regularly dine out, especially in urban areas and Peninsular Malaysia (3). In 2019, household spending on out-of-home foods increased to 11.2% from 8.7% in 2004/2005 (4). The trend of consuming meals away from home, particularly during breakfast, has gained popularity in countries like Uganda (5) and Malaysia.

From a study conducted among Malaysians by Arifen and colleagues (6), consumers and food operators in Malaysia perceive high salt intake in the out-of-home food sector. Food operators stress the need for a comprehensive salt reduction policy involving all stakeholders. Consumers face limited awareness and knowledge, counterproductive practices among food operators, and challenges in accessing affordable low-sodium products. Food operators encounter a lack of standardized guidelines, effective enforcement, and uncooperative consumer practices. The interviews among food vendors, caterers and consumers identify barriers such as food quality and salt prices, advocating for awareness campaigns, stricter regulations for manufactured foods, and enhanced enforcement.

University students and staff members on campus, especially those who frequently eat out and spend considerable time on campus, form a crucial demographic facing challenges related to high salt and sugar intake in out-of-home food. Recognizing the prevalence of this lifestyle among these population, it becomes imperative to

understand the perceptions and experiences of both students and campus communities regarding salt and sugar consumption. Furthermore, serving lowered salt foods at workplaces have been shown to be able to reduce salt intake by at least 0.5 g/day.

In this study, we aim to shed light on the dynamics of the university campus food environment, where students and campus communities heavily depend on vendors for their meals. The insights gained will not only benefit the individuals who regularly eat out but will also contribute to creating a healthier food landscape on university campuses, impacting the overall well-being of the individuals. This study holds significance in addressing the shared responsibility between individuals who use out-of-home food and vendors in promoting a healthier lifestyle within the university community.

Thus, this study aims to assess the effects of salt and sugar reduction in foods sold on campus at the university. For the first part of the study, the knowledge, attitude, and practice (KAP) of dietary salt and sugar intake among the university students and staff will be assessed. For the second part of the study, KAP, barriers and enablers of salt and sugar reduction among campus canteen staff will be conducted. Concurrently, a third part of the study involves a 6-month interventional study on salt and sugar reduction in foods sold on campus. For this part of the study, firstly, the sodium and sugar contents of selected foods sold on campus will be assessed. Then, selected participants will be invited to participate in the interventional where they will be exposed to foods sold on campus that have reduced salt and sugar.

The project acknowledges the interconnectedness of diet and cardiovascular health,

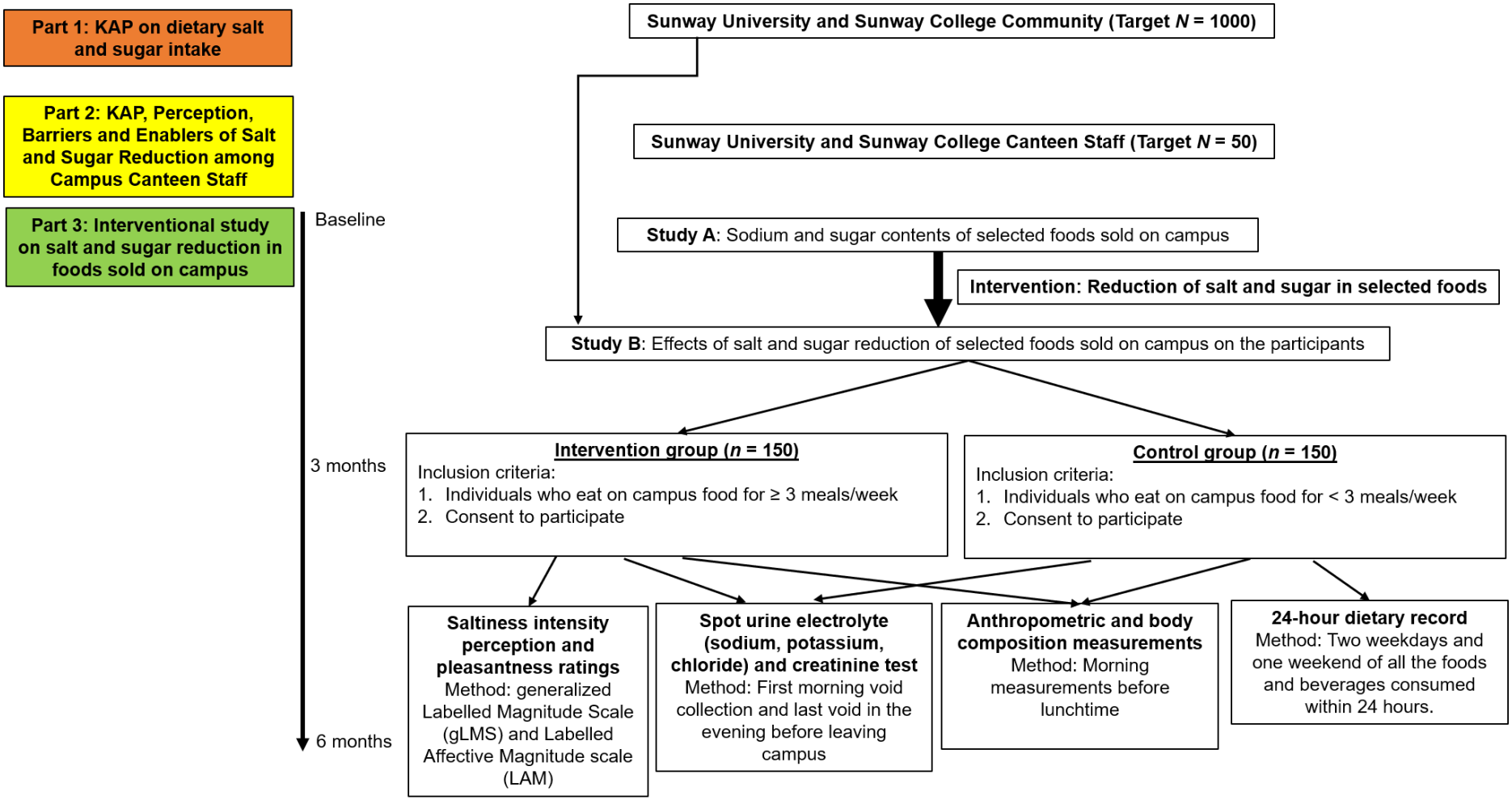

Figure 1: Diagram of the study design

Study methodology
This study will be conducted among the the university community comprising of students and staff.

Part 1: KAP on dietary salt and sugar intake
It will be open to the entire community, and the community has the right not to do the survey or withdraw at any point.

Sample size calculation
Using Raosoft sample size online calculator (http://www.raosoft.com/samplesize.html), a minimum sample size of 370 is needed in order to achieve a 5% margin of error, 95% confidence level,

Instrument
The online validated questionnaire will assess:
1. Socio-demographic and lifestyle factors – questions such as age, gender, ethnicity, medical history, smoking and alcohol-drinking practices
2. KAP towards dietary salt and sugar intakes, and diabetes
3. Barriers and enablers for salt reduction

Inclusion criteria
1. Students and staff aged 18 years and above
2. Able to provide informed consent (verbal/written) to participate
3. Understands English

Exclusion criteria
1. Individuals with acute illness, psychological or psychiatric conditions

Compensation to participants
No compensation but they are entitled to enter a lucky draw to win three lucky draw food hampers.

Part 2: KAP, Perception, Barriers and Enablers of Salt and Sugar Reduction among Campus Canteen Staff

Sample size calculation
The estimated number of campus canteen staff that are involved in food preparation is around 65 people, and given an estimate response rate of 80%, the targeted number of participants is around 50 people.

Instrument
A questionnaire on KAP, perceptions, barriers and enablers to salt and sugar reduction will be administered among the canteen staff that are involved in food preparation.

The online validated questionnaire will assess:
1. KAP towards salt and sugar usage in food preparation (including on campus) and in dietary intake
2. Perception, barriers and enablers for salt reduction during food preparation on campus

Inclusion criteria
1. Canteen staff that are involved in food preparation aged 18 years and above
2. Able to provide informed consent (verbal/written) to participate
3. Understands English

Exclusion criteria
1. Individuals with acute illness, psychological or psychiatric conditions

Compensation to participants
They will be given RM 10 for each successful completion of questionnaire.

Part 3: An interventional study for 6 months will expose them to foods sold on campus that have reduced salt and sugar.

Study A

Selected samples of food sold on campus will be analysed for their sodium and sugar contents at baseline and also 3 months after the intervention of salt and sugar reduction. This will be performed using dry ashing method, followed by flame atomic absorption spectrometry (FAAS) at the Department of Nutrition, Universiti Putra Malaysia.

A targeted 5 food samples per vendor for 17 vendors – taken at baseline and 3 months after invention will yield a total number of 170 samples.

Study B

Before the actual lowering of salt and sugar in foods sold at SEG, all the food vendors will be briefed on the amount of salt and sugar to be reduced for all the foods sold.

Sample size calculation
According to WHO/PAHO Regional Expert Group for Cardiovascular Disease Prevention through Population-wide Dietary Salt Reduction Sub-group for Research and Surveillance (7), to meet the 0.5 g difference in sodium (salt), the sample size required will be 150 per arm.

Therefore, a total of 150 participants who eat often foods sold on campus will be selected from Part 1 in a randomized manner and they form the intervention group who will be eating the foods sold on campus that have reduced salt and sugar. Another 150 participants who do not eat often the food sold on campus will be the control group.

Participants will need to provide urine samples for the measurement of urinary sodium, potassium, chloride, and creatinine, have body composition and anthropometric measurements taken, perform 24-hour dietary records, perform saltiness intensity perception and pleasantness ratings of the foods on campus, at three timepoints - at the start of the study, after 3 months and after 6 months.

Inclusion and exclusion criteria

Inclusion criteria for intervention group
1. Individuals who eat on campus food for at least 3 meals per week
2. Consent to participate

Inclusion criteria for control Group
1. Individuals who do not eat on campus food or for <3 meals per week
2. Consent to participate

Exclusion criteria
Individuals with acute illness, psychological or psychiatric conditions

Compensation to participants
They will be given RM 10 for each successful completion of questionnaire, dietary records, anthropometric and body composition measurements, saltiness intensity perception and pleasantness ratings, and providing urine samples at three timepoints - at the start of the study, after 3 months and after 6 months (maximum RM 30 per participant).

Instruments
Urine analysis
Intervention and control participants will provide two spot urine samples - first morning void and last void in the evening before leaving campus, at three timepoints - at the start of the study, after 3 months and after 6 months. This will yield a total of 300 × 2 × 3 = 1800 samples. Urine electrolytes (sodium, potassium, chloride) and creatinine will be measured using the potentiometry method (Alinity Abbott) at the laboratory department.

Assessment of saltiness intensity perception and pleasantness ratings
Participants will receive verbal and written English instructions and then completed two rating scales assessing the intensity of saltiness of the selected foods sold on campus they perceived (hereafter referred to as 'intensity perception'), and the extent to which they liked or disliked this level of saltiness of the selected foods sold on campus (hereafter referred to as 'pleasantness rating'). The perceived saltiness intensity will be measured by using the generalised Labelled Magnitude Scale (gLMS) (8) where the participants will be asked to make a horizontal marking on the paper versions of it. A 100 mm scale was constructed with six different descriptors which were ''barely detectable'',''weak'', ''moderate'', ''strong'', ''very strong'' and ''strongest imaginable sensation of any kind'' were spaced at 1.4 mm, 6 mm, 17 mm, 35 mm, 53 mm, and 100 mm, respectively. For pleasantness, the Labelled Affective Magnitude (LAM) scale (9) will be used. It is a 100 mm scale that is constructed with 11 different levels – ''greatest imaginable disliking'' (0 mm), ''dislike extremely''(12 mm), ''dislike very much'' (22 mm), ''dislike moderately''(34 mm), ''dislike slightly'' (45 mm), ''neither like or dislike''(50 mm), ''like slightly'' (56 mm), ''like moderately'' (68 mm), ''like very much'' (78 mm), ''like extremely'' (87 mm), ''greatest imaginable liking'' (100 mm).

Anthropometric and body composition measurements
Clinical measurements indicative of vascular health namely systolic blood pressure (SBP), diastolic blood pressure (DBP) and pulse rate will be taken using an automated blood pressure monitor (HEM-7121, Omron, Japan) after the subjects have rested for 5 min. The height, waist and hip circumferences will be measured using a measuring tape and waist-hip ratio (WHR) will be calculated by dividing waist circumference by hip circumference. A bio-impedance body composition scale (Omron HBF-375 Karada Scan) will be used to determine weight, body mass index (BMI), total body fat (TBF), visceral fat (VF), subcutaneous fat (SF), skeletal muscle percentage (SM) and resting

metabolism rate (RM). The cut-off points for overweight, obesity, overall adiposity (TBF) and central adiposity (WHR) are $\geqslant$23 kg/m^2, $\geqslant$25 kg/m^2 (10), 20% (males) or 30% (females) (11) and 0.90 (males) or 0.85 (females)(12), respectively.

Data analysis

All statistical analysis will be done using the Statistical Package for Social Sciences (SPSS) version 27. The prevalence of KAP will be computed. Continuous data will be described as mean and standard deviation if the distribution is normal. However, when the data is a skewed distribution; median and interquartile range (25-75th percentiles) will be used. Categorical data will be reported as proportions (percentage). Chi-square test or Fisher exact tests will be used for the categories or dichotomous predictors. Factors associated with KAP towards intention to reduce salt and sugar intake will be determined using multiple logistic regression analysis.

The change in amount of salt and sugar reduced in food and the change in the amount of salt intake by participants will be analysed by a comparisons of means All analyses will be done with 95% confidence intervals (CI), and the level of significance will be set at $p<0.05$.

Ethics approval

Ethics approval will be obtained from the Ethics Committee of the Organization.

CONSENT FORM

I, _____

consent to participate in the study of

An Interventional Study of Salt and Sugar Reduction in Foods Sold On Campus

I understand the procedures described above. My questions have been answered to my satisfaction, and I acknowledge that I am participating in this study of my own free will. I understand that I may refuse to participate or stop participating at any time.

By signing this consent form, I agree to the collection of my name, contact number, and email address, solely for the purpose of follow-up in Part 2 of the study. All my information obtained in this study will be kept and handled confidentially, in accordance with the Malaysian Personal Data Protection Act 2010 ("PDPA")

Participant	**Investigator conducting the informed consent**
Signature: _____	Signature: _____
Date : _____	Date : _____
Contact No : _____	Name : _____
E-mail: _____	