

“You Are What You Eat:” Self-Reported Preferences for Food Taste and Cooking Methods of Adult Filipinos (20-50 years old)

Nina T. Castillo-Carandang,^{1,2,3} Olivia T. Sison,^{1,3} Felicidad V. Velandria,³ Rody G. Sy,^{3,4,5} Elmer Jasper B. Llanes,^{3,4} Paul Ferdinand M. Reganit,^{3,4} Wilbert Allan G. Gumatay³ and Felix Eduardo R. Punzalan^{3,4}

¹Department of Clinical Epidemiology, College of Medicine, University of the Philippines Manila

²Institute of Clinical Epidemiology, National Institutes of Health, University of the Philippines Manila

³LIFECourse Study In Cardiovascular Disease Epidemiology (LIFECARE) – Philippines Study Group, Lipid Research Unit, UP–Philippine General Hospital (PGH), UP Manila

⁴Department of Medicine, College of Medicine and Philippine General Hospital, University of the Philippines Manila

⁵Cardinal Santos Medical Center, San Juan City, Metro Manila

ABSTRACT

Objective. To describe the self-reported preferences for food taste and cooking methods of adult Filipinos (20-50 years old).

Methods. This is a cross-sectional community survey of 3,072 adults from Metro Manila, Bulacan, Batangas, Quezon, Rizal.

Results and Conclusion. There were differences in preferred tastes of males (food that tasted “just right”, spicy) vs. females (salty); younger adults (sweet, spicy) vs. older adults (bland); urban (salty, spicy) vs. rural adults (“just right”); adults with higher education (sweet, salty, spicy) vs. those with less schooling who liked food which tasted “just right.” Smokers preferred spicy taste vs. non-smokers who liked sweet-tasting food. Adults who reported having had alcohol intake preferred spicy food. Those who reported feeling stressed liked savoury taste (sweet, salty) while those who were not stressed liked food which tasted “just right.” Cooking with oil was the usual and the most preferred cooking method. Younger adults and smokers liked to use oil in cooking. Food which tasted “just right”/moderate was most preferred by adult Filipinos with hypertension or MeTS. Diabetics did not prefer sweet tasting food. More diabetics ($p=0.05$) and those with MeTS ($p=0.003$) usually use other cooking methods instead of frying. Eliciting self-reported taste preferences as well as the usual and preferred cooking methods is important for nutritional management and relevant lifestyle advice which healthcare providers should

incorporate in their management of patients, especially those with hypertension, diabetes, and metabolic syndrome.

Key Words: self-reported taste preferences, cooking methods, Philippines, LIFECARE Study

Introduction

“*You are what you eat*” is “the notion that to be fit and healthy you need to eat good food,” and that “the food one eats has a bearing on one’s state of mind and health.”¹ Dotson, Babich, and Steinle² in a 2012 article stated that “nutritional intake can profoundly impact the development of human disease, mainly by driving the progression of obesity-related conditions such as type 2 diabetes, cardiovascular disease, and cancer.”

Garcia-Bailo, Toguri, Eny, and El-Soheymy³ in a review article on genetic variation in taste and its influence on food selection contended that “taste perception plays a key role in determining individual food preferences and dietary habits. Individual differences in bitter, sweet, umami, sour, or salty taste perception may influence dietary habits, affecting nutritional status and nutrition-related chronic disease risk.”

Drewnowski⁴ had a similar argument that “sensory responses to the taste, smell, and texture of foods help determine food preferences and eating habits.” Multiple variables (genetic, physiological, metabolic, etc) affect taste responses which, in turn, influence food intake. One’s sex and age as well as the presence of health conditions such as “obesity, eating disorders and other pathologies of eating behaviour,” socio-cultural and economic factors are linked to food preferences and choices. What we eat and the availability of highly palatable food impacts on the prevalence of so-called lifestyle diseases such as hypertension, diabetes, and metabolic syndrome.

Drewnowski and Almiron-Roig⁵ observed that “fat content contributes to the food’s acceptability, palatability, and enjoyment,” and there is a “link between obesity and liking for higher fat foods.” They further noted that “overall, it seems that men of all sizes tend to derive more fat from

An earlier version of this paper was presented as a poster during the 8th Congress of the Asian-Pacific Society of Atherosclerosis and Vascular Disease, October 20-22, 2012, Phuket, Thailand. Poster No.38. Book of Abstracts. pages 83-90.

Corresponding author: Nina T. Castillo-Carandang, MA, MSC
Department of Clinical Epidemiology
College of Medicine
University of the Philippines Manila
Rm.103 - Paz Mendoza Bldg.
547 Pedro Gil Street, Ermita, Manila 1000 Philippines
Telephone: +632 5228380
Fax No.: +632 5254098
Email: nina.castillo@gmail.com

savoury sources of food; while women (more so if obese) tend to derive more fat from sugar/fat mixtures such as chocolates and desserts."

More than a 'sweet tooth,' Drewnowski⁶ argued that a 'fat tooth' "may be the characteristic feature of human obesity." Garcia-Bailo, Toguri, Eny, and El-Sohemy³ had a similar finding that "there is growing evidence that 'fat taste' may represent a sixth modality" and that this so-called 'fat taste' is beyond the basic tastes of bitter, sweet, umami, sour, or salty.

Magbuhat, Borazon, and Villarino⁷ in a 2011 study on food preferences and dietary intakes of 120 Filipino adolescents (13-17 years old; 40 underweight, 40 normal weight and 40 overweight adolescents) in Metro Manila noted that males had a higher preference for French fries ($p=.0370$), tofu ($p=.0005$), garlic ($p=.0190$) and mussels ($p=.0023$); and that they also had "significantly higher intakes of energy and carbohydrate than female respondents."

Objectives

To describe the self-reported preferences for food taste and cooking methods of adult Filipinos (20-50 years old).

Review of Related Literature

Various studies have been conducted to evaluate the relationship of taste preferences and dietary habits to the development of certain diseases or risk factors. Taste preferences of patients with lifestyle diseases have been examined as well.

Turner-McGrievy, Tate, Moore and Popkin⁸ in 2013 tried to determine the relationship of supertasting and sweet preference with metabolic syndrome and dietary intake in 196 participants. The results of the U.S. study showed that participants who were only an ST (supertaster) or an SL (sweet liker) appeared to have a decreased risk of having metabolic syndrome compared with those who have both taste profiles or are neither of the 2 taster groups ($p=0.047$). Participants that are SL + ST also consumed less fiber than SL + non-ST subjects ($p=0.04$). The authors stated that more customized/personalized strategies for dietary interventions to prevent and treat metabolic syndrome were needed and that evaluating genetic disparities in taster preferences may be a valuable approach for the development of such strategies.

A study by Castetbon et al⁹ in 2013 evaluated the diet of French individuals with diabetes aged 45 to 74 years old ($n=1,476$ including 101 patients with diabetes) compared to their counterparts without diabetes. They found that adults with diabetes consumed less sweetened foods, alcohol, energy-rich food, and simple sugar. On the other hand, they had greater consumption of meat, complex carbohydrates, and vitamins B and E. Diabetics aged 45 to 59 years as compared to adults of same age but with no diabetes

consumed a greater amount of fruits and vegetables, fiber, beta carotene, folate, vitamin C, and potassium. The study concluded that, "overall, 45- to 74-year-old adults with diabetes had a higher-quality diet than individuals without diabetes. However, compared with recommendations, a healthy diet continues to represent a public health challenge in terms of preventing diabetes complications."

In 2003, Poseliugina¹⁰ in a study done in Russia examined 134 hypertensive patients and determined that patients having a high DS (common salt) sensitivity are shown to take more DS and are characterized by more frequent cardiovascular and neurotic complaints, as well as by prevalence of anxiety and tension in their psychological status. It was noted that such patients more frequently have hereditary load of diseases; that arterial hypertension develops 10 years earlier in them; and that hypertensive crises occur more often.

In the treatment of lifestyle diseases, dietary habits as part of lifestyle modifications have been established as important components. Literature has shown that reduced salt intake contributes to lowering blood pressure.^{11,12} As for diabetes, a study by Mori et al¹³ in 2013 demonstrated in Japan that low-carbohydrate/high-monounsaturated fatty acid liquid diet (LC/HMD) narrowed the range of glucose variability and also decreased the required insulin dose and HbA1c values in insulin-requiring diabetic patients on tube feeding. Ziaee, Afaghi and Sarreshtehdari,¹⁴ on the other hand, determined that a low glycemic load diet can be effective in glycemic control in Iranian patients with poorly-controlled diabetes.

In 2011, Miguel Soca et al,¹⁵ evaluated the effect of a nutritional program and exercise among Cuban women with metabolic syndrome. The results showed that the interventions tested improved the patients' blood pressure and blood lipid profile.

Methods

This was a cross-sectional community survey of purposively chosen participants ($n=3,072$) from Metro Manila, and the provinces of Bulacan, Batangas, Quezon, and Rizal. Apparently healthy individuals (ages 20-50 years old) who gave informed consent and were able to answer the questionnaire appropriately were recruited for the study. Those who had existing CVD as determined by participant's medical history (previous myocardial infarction, stroke, peripheral arterial disease; history of malignancies (treated or otherwise); women in active pregnancy, breastfeeding or lactating were excluded.

Self-reported personal/individual preferences for food tastes; and usual and preferred cooking methods were elicited through interviewer-administered questionnaires. Participants were asked "How would you describe your taste preference?" (*Paano niyo po ilalarawan ang inyong panlasa?*). Response options included (among others): just

right (*tama lang/katamtaman*), sweet (*matamis*), salty (*maalat*), spicy (*maanghang*), bland (*matabang/walang lasa*), sour (*maasim*). They were then asked “What is your usual cooking method/s?” (*Ano po ang kadalasan ninyong paraan ng pagluluto?*). Among others, possible answers to the aforementioned question were fried/deep fried, sautéed/stir fried, boiled/steamed/stewed, grilled/broiled/roasted, raw/fresh, and baked. The two aforementioned questions were adopted from the 2008 National Nutrition Health Survey of the Department of Science and Technology’s Food and Nutrition Research Institute (DOST-FNRI).

Study physicians elicited medical history, and conducted physical examinations of all participants. Blood pressure, height, weight, waist circumference and hip circumference were measured. Blood was extracted for fasting blood sugar, 75-gram oral glucose tolerance test, total cholesterol, high-density lipoprotein, low-density lipoprotein, and triglycerides.

Based on the physical examination, laboratory test results, and history of intake of medications for hypertension, diabetes and dyslipidemia – the apparently healthy participants were then subsequently diagnosed (when appropriate) as having hypertension, diabetes, and metabolic syndrome (MeTS). The self-reported preferences for food taste as well as cooking methods of the participants with the aforementioned diseases were analyzed vis-à-vis their health status. Variables such as age, sex, residence (rural, urban), smoking status, alcohol consumption, educational attainment, presence or absence of stress in the past year were assessed vis-à-vis self-reported preferences for food taste and usual cooking method.

Limitations of the Study

Information presented in this paper was based on self-reported personal/individual taste preferences of participants, and not on standardized laboratory determination of taste preferences. Standardized sensory tests for taste were not performed among the 3,072 participants as this would require detailed laboratory procedures which were not suited for a community-based study such as the LIFECARE Philippines study.

Preferences for cooking methods and taste (as well as dislikes/aversions for such) are on one hand highly personal in nature while also being influenced by biological, socio-cultural, and familial factors. Therefore, having trained field assistants systematically elicit self-reported personal preferences through face-to-face interviews were deemed appropriate for the objectives of the study.

The present article intends to specify the self-reported preferences of tastes and cooking methods among adult Filipinos who participated in the LIFECARE Philippines study. It is beyond the scope of this paper to establish any causal relationship between self-reported taste and cooking preferences *with* the health status of the study participants.

Results and Discussion

Taste Preferences

Eight out of 10 adult Filipinos reported only 1 taste preference. Two-thirds of participants (64.9%) expressed preference for food which had tasted “just right”/moderate while one-fourth (25.8%) liked sweet tasting food, and less than a fifth (17.5%) liked salty tasting food (Table 1). Diabetics did not opt for sweet tasting food ($p=0.044$). On the other hand, there were no statistically significant relationships between taste preferences and the participants who were hypertensive or had MeTS (Table 2).

Table 1. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos* (20-50 years old, rural and urban, both sexes)

Taste Preferences	No.	Percent
Just right / Moderate (<i>Tama lang / Katamtaman</i>)	1,994	64.91
Sweet (<i>Matamis</i>)	794	25.85
Salty (<i>Maalat</i>)	537	17.48
Spicy (<i>Maanghang</i>)	403	13.12
Bland (<i>Matabang / Walang Lasa</i>)	121	3.94
Sour (<i>Maasim</i>)	15	0.49
Only 1 reported taste preference	2,471	80.44
2 reported taste preferences	412	13.41
More than 2 reported taste preferences	172	5.61
No reported taste preference	17	0.55

* Multiple responses

Table 2. Frequency and Percent Distribution of Taste preferences and Health Status of Adult Filipinos

Taste Preferences*	N	Hypertension	Diabetes	MeTS (mNCEP)
Just right / Moderate (<i>Tama lang/ Katamtaman</i>)				
Yes	1,999	274 (13.74)	92 (4.62)	513 (25.73)
No	1,079	139 (12.89)	63 (5.86)	274 (25.42)
Sweet (<i>Matamis</i>)				
Yes	747	90 (11.34)**	47 (5.92)	190 (23.93)
No	2,284	323 (14.18)	108 (4.75)	597 (26.21)
Salty (<i>Maalat</i>)				
Yes	513	64 (11.92)	23 (4.29)	145 (27.00)
No	2,541	349 (13.77)	132 (5.21)	642 (25.33)
Bland (<i>Matabang/Walang Lasa</i>)				
Yes	122	13 (10.74)	4 (3.31)	32 (26.45)
No	2,956	400 (13.55)	151 (5.12)	755 (26.58)
Spicy (<i>Maanghang</i>)				
Yes	403	58 (14.39)	17 (4.22)	101 (26.06)
No	2,675	355 (13.30)	138 (5.18)	686 (25.70)
Sour (<i>Maasim</i>)				
Yes	15	4 (26.67)	2 (13.33)	5 (33.33)
No	3,063	409 (13.38)	153 (5.01)	782 (25.58)

*Multiple responses accepted

** p-value = 0.044

There were some differences in self-reported taste preferences of male and female adult Filipinos. More males than females favoured food which tasted “just right” ($p=0.044$) and spicy ($p<0.001$). There were more females than

males who liked salty food ($p < 0.001$). There were no statistically significant differences in preferences of males vs. females for sweet, bland, and sour tasting food (Table 3).

Table 3. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Sex

Taste Preferences	Sex		p value
	Male (n=1,329)	Female (n=1,743)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/Katamtaman</i>)	889 (66.89)	1,105 (63.40)	0.044
Sweet (<i>Matamis</i>)	326 (24.53)	468 (26.85)	0.146
Salty (<i>Maalat</i>)	191 (14.37)	346 (19.85)	< 0.001
Bland (<i>Matabang/Walang Lasa</i>)	48 (3.61)	73 (4.19)	0.416
Spicy (<i>Maanghang</i>)	235 (17.68)	168 (9.64)	< 0.001
Sour (<i>Maasim</i>)	6 (0.45)	9 (0.52)	0.798

Adults who were less than 40 years old preferred food which tasted sweet ($p=0.043$) or spicy ($p < 0.0001$). Those who were older (40-50 years old) liked their food to be bland in taste ($p=0.003$) (Table 4).

Table 4. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Age

Taste Preferences	Age		p value
	< 40 yrs old (n=1,963)	40-50 yrs old (n=1,109)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/Katamtaman</i>)	1,260 (64.19)	734 (66.19)	0.265
Sweet (<i>Matamis</i>)	531 (27.05)	263 (23.72)	0.043
Salty (<i>Maalat</i>)	347 (17.68)	190 (17.13)	0.703
Bland (<i>Matabang/Walang Lasa</i>)	62 (3.16)	59 (5.32)	0.003
Spicy (<i>Maanghang</i>)	292 (14.88)	111 (10.01)	< 0.0001
Sour (<i>Maasim</i>)	12 (0.61)	3 (0.27)	0.193

Urban adults liked foods with more savoury tastes such as salty ($p=0.017$) or spicy ($p=0.012$). This was in contrast to rural adults who preferred their food to taste "just right" ($p=0.001$) (Table 5).

Table 5. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Residence

Taste Preferences	Residence		p value
	Rural (n=2,255)	Urban (n=817)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/Katamtaman</i>)	1,501 (66.56)	493 (60.34)	0.001
Sweet (<i>Matamis</i>)	583 (25.85)	211 (25.83)	0.988
Salty (<i>Maalat</i>)	372 (16.50)	165 (20.20)	0.017
Bland (<i>Matabang/Walang Lasa</i>)	85 (3.77)	36 (4.41)	0.423
Spicy (<i>Maanghang</i>)	275 (12.20)	128 (15.67)	0.012
Sour (<i>Maasim</i>)	14 (0.62)	1 (0.12)	0.137

Adults who had higher education (post high school and above = 10 years formal education and above) liked their

food to be sweet ($p=0.004$) or savoury (salty $p=0.029$, spicy $p < 0.001$). Food which tasted "just right" ($p < 0.001$) was preferred by adults who had lower educational attainment (high school graduate and below) (Table 6).

Table 6. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Educational Attainment

Taste Preferences	Educational Attainment		p value
	High school graduate and below (n=2,024)	Post High School and above (n =1,048)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/Katamtaman</i>)	1,389 (68.63)	605 (57.73)	< 0.001
Sweet (<i>Matamis</i>)	490 (24.21)	304 (29.01)	0.004
Salty (<i>Maalat</i>)	332 (16.40)	205 (19.56)	0.029
Bland (<i>Matabang/Walang Lasa</i>)	80 (3.95)	41 (3.91)	0.957
Spicy (<i>Maanghang</i>)	228 (11.26)	175 (16.70)	< 0.001
Sour (<i>Maasim</i>)	11 (0.54)	4 (0.38)	0.542

Adults who reported having smoked preferred their food to be spicy ($p=0.022$) while those who never smoked like sweet-tasting food ($p=0.009$) (Table 7)

Table 7. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Smoking Status

Taste Preferences	Smoking Status		p value
	Ever Smoked (n=1,064)	Has Never Smoked (n = 2,008)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/Katamtaman</i>)	699 (65.70)	1,295 (64.49)	0.506
Sweet (<i>Matamis</i>)	245 (23.03)	549 (27.34)	0.009
Salty (<i>Maalat</i>)	180 (16.92)	357 (17.78)	0.550
Bland (<i>Matabang/Walang Lasa</i>)	45 (4.23)	76 (3.78)	0.547
Spicy (<i>Maanghang</i>)	160 (15.04)	243 (12.10)	0.022
Sour (<i>Maasim</i>)	6 (0.56)	9 (0.45)	0.662

Adults who reported having had alcohol intake preferred spicy food ($p < 0.001$) (Table 8).

Table 8. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Alcohol Intake

Taste Preferences	Alcohol Intake		p value
	With Alcohol Intake (n= 1,812)	No Alcohol Intake (n= 1,260)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/ Katamtaman</i>)	1,161 (64.07)	833 (66.11)	0.244
Sweet (<i>Matamis</i>)	468 (25.83)	326 (25.87)	0.978
Salty (<i>Maalat</i>)	305 (16.83)	232 (18.41)	0.257
Bland (<i>Matabang/Walang Lasa</i>)	64 (3.53)	57 (4.52)	0.165
Spicy (<i>Maanghang</i>)	284 (15.67)	119 (9.44)	< 0.001
Sour (<i>Maasim</i>)	12 (0.66)	3 (0.24)	0.097

Savoury foods (sweet $p=0.004$, salty $p=0.004$) were favoured by adults who reported feeling stressed in the past year while food which tasted "just right" (<0.001) was preferred by those who did not report having had stress (Table 9).

Table 9. Frequency and Percent Distribution of Taste Preferences of Adult Filipinos by Presence or Absence of Stress in the Past Year

Taste Preferences	Stress		p value
	Never Experienced Stress (n=520)	Had Experienced Stress (n =2,552)	
	No. (%)	No. (%)	
Just right / Moderate (<i>Tama lang/Katamtaman</i>)	375 (72.12)	1,619 (63.44)	< 0.001
Sweet (<i>Matamis</i>)	108 (20.77)	686 (26.88)	0.004
Salty (<i>Maalat</i>)	68 (13.08)	469 (18.38)	0.004
Bland (<i>Matabang/Walang Lasa</i>)	27 (5.19)	94 (3.68)	0.107
Spicy (<i>Maanghang</i>)	58 (11.15)	345 (13.52)	0.145
Sour (<i>Maasim</i>)	1 (0.19)	14 (0.55)	0.491

Preferred Cooking Method

Almost all study participants said that they usually fried (99%) and/or stir fried (92.5%) their food, and an almost equal proportion reported boiling/stewing (92.2%) their food (Tables 10). Two-thirds of participants ranked frying/deep frying 1st among their usual cooking method (Tables 11). There was a significantly higher proportion of respondents with diabetes ($p=0.040$) and MeTS ($p=0.008$) among those who usually cook by other methods than frying. No such differences were noted for respondents with hypertension (Table 12).

Table 10. Frequency and Percent Distribution of Usual Cooking Methods* of Adult Filipinos

Usual Cooking Methods	Freq	Percent
Fried / Deep fried (<i>Prito</i>)	3,040	98.96
Boiled / Steamed / Stewed (<i>Nilaga</i>)	2,925	92.21
Sautéed / Stir fried (<i>Guisado</i>)	2,842	92.51
Grilled / Broiled / Roasted (<i>Ihaw</i>)	1,885	61.36
Raw / Fresh (<i>Hilaw</i>)	557	18.13
Baked (<i>Hurno</i>)	190	6.18

* Multiple responses

Table 11. Frequency and Percent Distribution of Most Preferred Cooking Methods (Ranked 1st in Usual Cooking Method)

Usual Cooking Methods	Freq	Percent
Fried / Deep fried (<i>Prito</i>)	1,928	62.76
Boiled / Steamed / Stewed (<i>Nilaga</i>)	578	18.82
Sautéed / Stir fried (<i>Guisado</i>)	513	16.70
Grilled / Broiled / Roasted (<i>Ihaw</i>)	49	1.60
Raw / Fresh (<i>Hilaw</i>)	4	0.13
Baked (<i>Hurno</i>)	1	0.03

Table 12. Most Preferred Cooking Method (Ranked 1st in Usual Cooking Method) and Health Status

	WITH COOKING OIL (n = 2440)	OTHER COOKING METHODS (n = 632)	p-value
	No. (%)	No. (%)	
	Hypertension	328 (13.44)	
Diabetes	113 (4.64)	42 (6.65)	0.040
MeTS (mNCEP)	599 (24.55)	188 (29.75)	0.008

Nearly equal proportions of rural (80%) and urban (77%) residents cooked with oil. Those who were younger (less than 40 years old) preferred cooking with oil ($p=<0.001$). There were no statistically significant differences in terms of other socio-demographic factors (residence, sex, and educational attainment) With regard to risk factors (alcohol, smoking, stress) adults who reported having smoked preferred cooking with oil ($p=0.006$). No significant differences were noted for those who reported having consumed alcohol or having had experienced stress in the past year (Table 13).

Table 13. Most Preferred Cooking Method (Ranked 1st in Usual Cooking Method) and Socio-demographic Characteristics and Risk Factors (Alcohol, Smoking, Stress)

	Usual Cooking Method		p value
	WITH COOKING OIL	OTHER COOKING METHODS	
	No. (%)	No. (%)	
SEX			
Male (n=1,330)	1,042 (78.40)	287 (21.60)	0.221
Female (n=1,748)	1,398 (80.21)	345 (19.79)	
AGE			
< 40 yrs old (n=1,963)	1,618 (82.42)	345 (17.58)	<0.001
40-50 yrs old (n=1,109)	822 (74.12%)	287 (25.88)	
EDUCATIONAL ATTAINMENT			
High school graduate and below (n= 2,024)	1,591 (78.61)	433 (21.39)	0.118
Post High School and above (n=1,048)	849 (81.01)	199 (18.99)	
RESIDENCE			
Rural (n=2,255)	1,810 (80.27)	445 (19.73)	0.056
Urban (n= 817)	630 (77.11)	187 (22.89)	
SMOKING STATUS			
Ever Smoked (n=1,064)	816 (76.69)	248 (23.31)	0.006
Has Never Smoked (n =2,008)	1,624 (80.88)	384 (19.12)	
ALCOHOL INTAKE			
With Alcohol Intake (n=1,812)	1,447 (79.86)	365 (20.14)	0.480
No Alcohol Intake (n=1,260)	993 (78.81)	267 (21.19)	
STRESS (Presence or Absence of Stress in the Past Year)			
Never Experienced Stress (n=520)	402 (77.31)	118 (22.69)	0.190
Had Experienced Stress (n =2,552)	2,038 (79.86)	514 (20.14)	

Conclusions

Food which tasted "just right"/moderate was most preferred by adult Filipinos who had hypertension or MeTS while those who were diabetics did not favor sweet tasting food ($p=0.044$). Males favoured food that tasted "just right" ($p=0.044$) as well as food that was spicy ($p<0.001$). Salty food was more preferred by females than males ($p<0.001$). Younger adults (less than 40 years old) preferred sweet ($p=0.043$) or spicy ($p<0.0001$) food while older adults (40-50 years old) liked bland tasting food ($p=0.003$). Urban residents liked salty ($p=0.017$ or spicy ($p=0.012$) food vs. rural adults who favoured food which tasted "just right" ($p=0.001$). Those who had post high school education and above liked sweet ($p=0.004$) or savoury (salty $p=0.029$, spicy $p<0.001$) food whereas adults who had less formal schooling liked food which tasted "just right" ($p<0.001$). Smokers preferred spicy taste ($p=0.022$) vs. non-smokers who never smoked liked sweet-tasting food ($p=0.009$). Adults who reported having had alcohol intake preferred spicy food ($p<0.001$). Savoury foods (sweet $p=0.004$, salty $p=0.004$) were preferred by adults who felt stressed those who did not report having experienced stress like food which tasted "just right" ($p<0.001$).

Cooking with oil was the usual and the most preferred cooking method. Younger adults (<40 years old, $p<0.001$) and smokers ($p=0.006$) liked to use oil in cooking. It could be hypothesized that cooking with oil was more convenient for younger adults, and that fried food tasted more savoury for smokers. The percentage of participants with diabetes ($p=0.04$) and those with MeTS ($p=0.008$) was higher among those who usually cooked by other cooking methods than by frying. It is possible that the aforementioned participants (with diabetes, with MeTS) may be more conscious of how they prepare what they eat, hence, their expressed preference to use other cooking methods (boiled/steamed/stewed, grilled/broiled/roasted, raw/fresh, baked) instead of cooking with oil.

Establishing the self-reported taste preferences as well as the usual and preferred cooking methods for food is an important step for adequate nutritional management and relevant lifestyle advice which healthcare providers (physicians, nutritionists, nurses, and allied medical workers), wellness consultants, and fitness professionals should incorporate in their discussions with all patients, and specially for adults with hypertension, diabetes, and MeTS.

Acknowledgments

The following organizations provided financial assistance to the LIFECARE Philippines project: Pfizer International, Pfizer Asia, Pfizer Philippines, Department of Health (Philippines), Philippine Council for Health Research and Development, Diabetes Philippines, Philippine Society of Hypertension, and the Philippine Lipid and Atherosclerosis Society. The University of the Philippines

Manila through the College of Medicine, and the National Institutes of Health's Institute of Clinical Epidemiology have also supported the project. The assistance of our support team (Rona May de Vera, Rachel Longalong, and Alma Amparo), field interviewers, and barangay health workers is gratefully acknowledged. Dr. Marilette S. Falagne, MD provided technical assistance in the preparation of the paper.

References

1. Martin G. You Are What You Eat [Online]. 2014 [cited 2014 Oct]. Available from <http://www.phrases.org.uk/meanings/you-are-what-you-eat.html>.
2. Dotson CD, Babich J, Steinle NI. Genetic predisposition and taste preference: impact on food intake and risk of chronic disease. *Curr Nutr Rep.* 2012; 1(3):175-83.
3. Garcia-Bailo B, Toguri C, Eny KM, El-Sohehy A. Genetic variation in taste and its influence on food selection. *OMICS.* 2009; 13(1):69-80.
4. Drewnowski A. Taste preferences and food intake. *Annu Rev Nutr.* 1997; 17:237-53.
5. Drewnowski A, Almiron-Roig E. Human Perceptions and Preferences for Fat-Rich Foods (Chap 11). In: Montmayeur JP, le Coutre J, eds. *Fat Detection: Taste, Texture, and Post Ingestive Effects.* Boca Raton (FL): CRC Press; 2010.
6. Drewnowski A. Energy intake and sensory properties of food. *Am J Clin Nutr.* 1995; 62 (5 Suppl):1081S-1085S.
7. Magbuhat RM, Borazon EQ, Villarino BJ. Food preferences and dietary intakes of Filipino adolescents. *Malays J Nutr.* 2011; 17(1):31-41.
8. Turner-McGrievy G, Tate DF, Moore D, Popkin B. Taking the bitter with the sweet: relationship of supertasting and sweet preference with metabolic syndrome and dietary intake. *J Food Sci.* 2013; 78(2):S336-42.
9. Castetbon K, Bonaldi C, Deschamps V, et al. Diet in 45- to 74-year-old individuals with diagnosed diabetes: comparison to counterparts without diabetes in a nationally representative survey (Etude Nationale Nutrition Santé 2006-2007). *J Acad Nutr Diet.* 2014; 114(6):918-25.
10. Poselagina OB. Clinical features of arterial hypertension regarding gustatory sensitivity to common salt. *Klin Med (Mosk).* 2003; 81(8):23-5.
11. De Brito-Ashurst I, Perry L, Sanders TA, et al. The role of salt intake and salt sensitivity in the management of hypertension in South Asian people with chronic kidney disease: a randomised controlled trial. *Heart.* 2013; 99(17):1256-60.
12. Koliaki C, Katsilambros N. Dietary sodium, potassium, and alcohol: key players in the pathophysiology, prevention, and treatment of human hypertension. *Nutr Rev.* 2013; 71(6):402-11.
13. Mori Y, Ohta T, Yokoyama J, Utsunomiya K. 2013. Effects of low-carbohydrate/high-monounsaturated fatty acid liquid diets on diurnal glucose variability and insulin dose in type 2 diabetes patients on tube feeding who require insulin therapy. *Diabetes Technol Ther.* 2013; 15(9):762-7.
14. Ziaee A, Afaghi A, Sarreshtehdari M. Effect of low glycemic load diet on glycated haemoglobin (HbA1c) in poorly-controlled diabetes patients. *Glob J Health Sci.* 2011; 4(1):211-6.
15. Miguel Soca PE, Peña Pérez I, Niño Escofet S, Cruz Torres W, Niño Peña A, Ponce De León D. Randomised controlled trial: the role of diet and exercise in women with metabolic syndrome. *Aten Primaria.* 2012; 44(7):387-93.