

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Obesity Pillars

journal homepage: www.journals.elsevier.com/obesity-pillars

Review

Obesity Pillars Roundtable: Obesity and East Asians

Harold Edward Bays^{a,*}, Jennifer Ng^b, Jeffrey Sicut^c, Michelle Look^d

^a *Diplomate of American Board of Obesity Medicine, Medical Director / President Louisville Metabolic and Atherosclerosis Research Center, Clinical Associate Professor / University of Louisville Medical School, 3288 Illinois Avenue, Louisville, KY, 40213, USA*

^b *Diplomate of American Board of Obesity Medicine, 234 East 85th Street, 6th Floor, New York, NY, 10028, USA*

^c *Diplomate of American Board of Obesity Medicine, 4439 Cox Road, Glen Allen, VA, 23060, USA*

^d *Diplomate of American Board of Obesity Medicine, 6699 Alvarado Road, Suite 2100, San Diego, CA, 92120, USA*

ARTICLE INFO

Keywords

Body mass index
Obesity
East asians
Waist circumference
Visceral fat

ABSTRACT

Background: Individuals from East Asia make up about 1/5th of the world's population. Individuals from South Asia with obesity are well-described to have increased susceptibility to cardiovascular disease (CVD) risk factors and increased risk of CVD events. Less well described are the adiposopathic effects of the disease of obesity among East Asians.

Methods: This roundtable discussion includes 3 obesity medicine specialists with experience in the clinical management of obesity among patients of East Asian descent. Included are citations regarding obesity and East Asians.

Results: In general, East Asians are at decreased risk for CVD compared to Whites and South Asians. However, compared to Whites, for the same body mass index, East Asians are at increased risk for metabolic diseases such as type 2 diabetes mellitus. Both obesity and type 2 diabetes mellitus are epidemics in East Asian countries. In this Roundtable, the panelists discuss East Asian nutrition and physical activity, with special attention given to Asian foods, especially rice. The panelists also discuss East Asian genetic predispositions for development of visceral adiposity, type 2 diabetes mellitus, as well as genetic predisposition to drug metabolism and potential drug and herbal interactions, as commonly encountered in patients with obesity. Finally, the panelists give summary tips for managing East Asian patients with obesity.

Conclusion: The three panelists of this roundtable describe their practical diagnostic processes and treatment plans for patients from East Asia, with an emphasis on a patient-centered approach to obesity in this unique population.

1. Introduction

Dr. Bays: Hello. My name is Dr. Harold Bays. I am Editor-in-Chief of Obesity Pillars [official journal of the Obesity Medicine Association (OMA)], and Chief Science Officer of the OMA. Today I am serving as moderator for this “An Obesity Pillars Roundtable on Obesity and East Asians.” Obesity has different clinical implications among different races and ethnicities. South Asians are well-described to have susceptibility to the adverse cardiovascular disease (CVD) consequences of increased adiposity. Less well described are the effects of obesity among East Asians. Today I am honored to have a discussion with 3 obesity specialists, each with experience in management of obesity among those from East Asia.



I would like to start by asking the panelists to briefly provide their background. Dr. Ng, please summarize your clinical background as it

* Corresponding author. Medical Director / President Louisville Metabolic and Atherosclerosis Research Center, Clinical Associate Professor / University of Louisville Medical School, 3288 Illinois Avenue, Louisville, KY, 40213, USA.

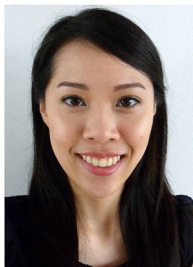
E-mail addresses: hbaysmd@outlook.com (H.E. Bays), jenn56146@gmail.com (J. Ng), jeffsicut@gmail.com (J. Sicut), lookmi808@gmail.com (M. Look).

<https://doi.org/10.1016/j.obpill.2022.100011>

Received 25 January 2022; Received in revised form 11 February 2022; Accepted 15 February 2022

2667-3681/© 2022 The Authors. Published by Elsevier Inc. on behalf of Obesity Medicine Association. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

applies to obesity care for patients from East Asia.



Dr. Ng: Thanks for having me. I did my medical training in New York City and became a diplomate of the American Board of Obesity Medicine in 2017. My practice is in New York City and my patients come from a wide variety of ethnic groups. While I am mainly a primary care physician, I would argue that obesity medicine is primary care. Most of my patients present with complications from pre-obesity / obesity and I'm often the main person they go to for weight loss advice. This is what motivated me to do a fellowship in obesity medicine. Additionally, I am Chinese American. Despite the stereotypes of East Asians being “naturally thin,” I have seen both my own relatives, as well as my patients of East Asian descent, struggle with overweight and obesity. Even among East Asians who are in the “normal” body mass index (BMI) range, based on the lowered BMI cut off definition for Asians, I see increased incidence of metabolic diseases such as diabetes and pre-diabetes, compared to non-Asians. Therefore, I highlight this increased health risk to both other medical providers and patients.

Dr. Bays: Dr. Sicat, please briefly summarize your clinical background as it applies to obesity care for those from East Asia.



Dr. Sicat: It is my pleasure to participate in this panel; I appreciate the opportunity to be involved in this project. My background is in the field of endocrinology, diabetes, and metabolism. I have been practicing in the field of obesity medicine for the last 15 years. I have an obesity medicine/endocrinology practice located in Richmond, Virginia where my colleagues and I focus on the 4 pillars of nutrition, physical activity, behavior, and medication to help create customized, individualized approaches of care for our patients to achieve their best weight and their best health. I have a personal connection to the East Asian population. My family heritage is Filipino, my wife is Vietnamese, and I have many patients of Asian descent. Educationally, I have provided diabetes and obesity continuing education to the Philippine Nurses Association of America at their Eastern Regional Convention. Of note, Filipino Americans are recognized to have the highest BMI of Asian American subgroups with Filipino Americans having a 15.8% prevalence rate of diabetes in the United States, which is second only to Native Americans [1].

Dr. Bays: Dr. Look, please briefly summarize your clinical background as it applies to obesity care for those from East Asia.



Dr. Look: Thank you, Dr. Bays. I am a Family Practice-Sports Medicine-Obesity Medicine physician in private practice at San Diego Sports Medicine and Family Health. I was born and raised in Honolulu, Hawaii, a melting pot of Asian cultures. The local Hawaiian culture consists of a blend of many foods and cultural practices of East Asia. As an “ABC” (**A**merican **B**orn **C**hinese), I have found my upbringing in Hawaii has created insight and assistance with counseling and treating patients with pre-obesity and obesity.

2. Genetics and culture

Dr. Bays: Thank you for your introductions. In a prior OMA Roundtable, we discussed South Asians and obesity [<https://doi.org/10.1016/j.obpill.2021.100006>]. Some define South Asians as those indigenous to Indian subcontinents such as India, Pakistan, Sri Lanka, Nepal, and Bangladesh, with South Asians making up over 20% of the world population [2]. East Asians include those from China, Japan, Mongolia, North Korea, South Korea, and Taiwan and similarly make up over 20% of the world population. For the purposes of this discussion, we are considering those from the Philippines as also being from East Asia, although Filipinos are often characterized as Pacific Islanders.

3. Body mass index cut-off points for Asians and non-Asians

It may be challenging to define obesity in individuals of Asian descent. Given the predisposition to adverse metabolic consequences at lower BMI compared to those of European descent, I think most would agree it inappropriate to apply Eurocentric BMI criteria to Asians, when defining overweight or obesity. At the same BMI, Asians have approximately 3–5% higher bodyfat compared to Caucasians [3]. However, some may be confused regarding the definitions of overweight and obesity among Asians, depending on the source and when it was published. For example, regarding Asians, both the 2000 World Health Organization (WHO) Expert Group [4] (https://apps.who.int/iris/bitstream/handle/10665/206936/0957708211_eng.pdf?sequence=1) and the 2009 Indian Consensus Group [5] define increased adiposity according to criteria in [Table 1](#).

Table 1

Body mass index cut-off points for Asians and non-Asian populations, with “non-Asian” cut-off points mainly based upon the European and United States populations. Given Asians have an increase in body fat for same body mass index and given the predisposition of Asians to accumulate adipose tissue in the visceral area, body composition analyses may more accurately reflect the amount and location of body fat, and thus improve diagnosis and prognosis [6,7].

Body Mass Index	Asians (kg/m ²)	Non-Asian Populations (kg/m ²)
Underweight	<18.5	<18.5
Normal weight	18.5–22.9	18.5–24.9
Overweight	23.0–24.9	25.0–29.9
Obesity	≥25	≥30

The medical literature also cites another 2004 WHO Expert panel [8], who concluded that while the WHO BMI cut-off points should be retained as international classifications, the proportion of Asian people (e.g., South Asians) with a high risk of type 2 diabetes and cardiovascular disease is substantial at BMIs lower than the existing WHO cut-off point for overweight. They felt the cut-off point for observed risk might vary in different Asian populations. As such, while they made no attempt to redefine cut-off points for each population separately, this consultation has sometimes been interpreted as categorizing 23–27.5 kg/m² as overweight and BMI \geq 27.5 kg/m² as obesity. They also identified public health BMI action points of 23.0, 27.5, 32.5, and 37.5 kg/m² [4,8,9]. All this said, and to limit any confusion, my sense is that the most cited criteria are the ones set by the 2000 World Health Organization (WHO) Expert Group and the 2009 Indian Consensus Group, with overweight defined as a BMI 23–24.9 kg/m² and obesity defined as \geq 25 kg/m² (Table 1).

Dr. Look, epidemiologic studies suggest that, as opposed to South Asians, East Asians are less likely to develop atherosclerotic CVD compared to Whites [10,11]. Beyond the potential influence of genetics, what aspects of nutrition and physical activity help account for why East Asians have a lower rate of obesity compared to many non-Asians populations?

Dr. Look: Historically, most rural East Asians were poor farmers working long days of physical labor. Farming techniques were less mechanized, and the main mode of transportation was on foot or bicycle supporting an active lifestyle. Laborers ate predominantly unrefined grains and vegetables to keep them satiated because animal proteins, and the fuel to cook them, were scarce. Stir frying was a technique involving cutting food into small pieces to cook quickly and utilize as little fuel as possible. Desserts for most East Asians involve fruits. Pastries and baked goods are less traditional. As with many lower income communities, diversity of the diet was low.

However, in the last 3 decades, substantial urbanization of some East Asian countries has changed this picture. When adjusted to the proposed 2004 World Health Organization (WHO) Asian cut off points for BMI (i.e., 23–27.5 kg/m² for overweight and $>$ 27.5 kg/m² for obesity) [9], the obesity prevalence numbers between East Asian and non-Asian populations are closer than previously reported. The rapid socioeconomic growth has brought increased availability of food, in particularly an increase in processed foods with higher salt, fat, and sugar content. Conception, birth, and early childhood often take place in areas that lack adequate nutrition, that when coupled with a subsequent move to food abundance as children get older, increase the risk of future diabetes mellitus, stunt growth in the youth, and increase the risk of obesity as adults. A pattern of low birth weight and undernutrition in utero (with both maternal undernutrition and overnutrition epigenetically increasing offspring risk for obesity and diabetes mellitus) [12] followed by rapid childhood weight gain with migration to greater access to energy-dense foods is building an obesity epidemic [13]. Mechanization of farming techniques and access to motorized transport, television and video games are all contributors to a positive energy balance [14]. China which once had the leanest of populations, now has surpassed USA with respect to the number of people with obesity worldwide [15].

Dr. Bays: To follow-up on Dr. Look's comments, Dr. Ng, while those from East Asia have a lower rate of obesity and lower rate of CVD compared to many other populations, that does not mean obesity is unimportant in East Asia. Among Asians living in the US, the age adjusted percent of persons 20 years or older with *overweight or obesity* [body mass index (BMI) 25 kg/m²] is 43% for Asian Americans and 70% for Non-Hispanic Whites. The age-adjust percent of persons 20 years or older with *obesity* is 13% for Asian Americans versus 37% for Non-Hispanic Whites [16]. The rates of obesity among East Asian countries varies [17]. Given that Asia has a population $>$ 4 billion (with the US "only" $>$ 300 million), then as noted by Dr. Look, Asia has the highest number of patients with overweight or obesity, even if the rate of overweight or obesity is lower.

Those of South Asian ancestry are genetically predisposed to:

- Adiposopathic increased adipocyte size, fewer (functional) adipocytes, and increased visceral adiposity [18].
- Increased risk of metabolic syndrome, at lower body mass index relative to other races
- Insulin resistance and type 2 diabetes mellitus
- Adiposopathic dyslipidemia [i.e., elevated triglyceride levels, reduced high-density lipoprotein cholesterol levels, increased low-density lipoprotein (LDL) particle number and increased prevalence of smaller and denser LDL particles] [2,18].
- Increased lipoprotein (a) levels

East Asians share many of these same characteristics (e.g., predisposition to visceral fat accumulation, insulin resistance, and diabetes mellitus). While true that South Asians may have some additional CVD risk factors compared to East Asians (e.g., South Asians have higher levels of lipoprotein (a) than East Asians) [19], it remains unclear to me why South Asians have such a higher risk for CVD than East Asians. My sense is the explanation is probably a combination of undefined genetic (and epigenetic) predispositions, as well as nutritional, physical activity, and environmental differences.

As with other populations, genetics may play a role in obesity among East Asians. Historically, genome-wide associated studies (GWAS) were mostly conducted in Europeans. However, more recently, GWAS in East Asians have identified previously known body mass index-associated loci, as well as novel ones specific to East Asians [20]. Furthermore, while East Asians and genetically-related Japanese individuals are generally thinner than individuals of European ancestry, they are genetically predisposed to accumulate visceral adipose tissue and develop type 2 diabetes mellitus for the same body mass index, resulting in an epidemic of type 2 diabetes mellitus among East Asians [21,22,23,24]. East Asians with type 2 diabetes may have a higher rate of renal complications compared with Europeans and a predisposition for developing strokes [23]. These factors help to account for abdominal obesity diagnostic waist circumference cut-off point for most Asians being \geq 90 cm for men and \geq 80 cm for women [25], which are lower waist circumference cut-off points than for Europeans (i.e., \geq 102 cm or 40 inches in men, \geq 88 cm or 35 inches in women). Dr. Ng, given these similarities and differences, in your obesity medical practice, do you perform clinical evaluations, diagnostic procedures, or recommend treatment plans any differently among patients of South Asian descent versus East Asian descent versus non-Asians?

Dr. Ng: Regarding obesity rates, data from 2015 – 2019 suggest China has a prevalence of 34.3% for overweight and 16.4% for obesity [26]. Regarding obesity management, in general, I try to tailor my treatment plans to the individual patient. But I am more vigilant about screening for diabetes/cardiovascular risk factors as well as counseling on the importance of healthy diet/exercise in South Asians and East Asians, both for those at the lower BMI cut off for overweight/obesity and even at normal BMIs. In both populations, I lean more heavily on the use of abdominal circumference as another tool to help patients understand their risk. There is a lot of education that needs to be done among both populations and the fact that they tend to "look thin" makes convincing them of their health risks an uphill battle to fight. For the older generations, I also try to come up with more culturally appropriate dietary and exercise modifications that may appeal to patients of both backgrounds.

Dr. Bays: Dr. Sicut, many of our patients with obesity have multiple medical disorders and are often treated with polypharmacy. A practical application of genetics in the care of patients of Asian descent with obesity is the high risk for side effects of certain drugs and increased risk for drug interactions. Among the more common drug classes of concern for side effects among Asians includes increased adverse drug events to anticoagulants [27] and higher efficacy and lower recommended statin doses among Asians [28,29].

Challenges exist with recommendations that patients with CVD or patients at high risk for CVD (i.e., commonly found in patients with obesity) be treated with high intensity statins. Rosuvastatin 20 and 40 mg doses are considered high intensity statins. However, the US Food and Drug Administration recommends rosuvastatin doses be reduced in Asians (the rosuvastatin prescribing information suggests considering a 5 mg starting dose). That is because of a 2-fold increase in systemic rosuvastatin exposure compared to Whites for same rosuvastatin dose [30]. Therefore, if rosuvastatin is prescribed, then the clinician needs to consider the rosuvastatin dose that best balances drug efficacy and drug safety. For guidance, it is suggested the recommended dose ranges for most statins in Japanese patients be lower compared to the US prescribing information doses for statins [28]. An exception may be pitavastatin, where pharmacokinetic bioequivalence may exist between Japanese and Whites [31], and the maximum approved doses in both Japan and the US is reportedly 4 mg per day [32].

Another source of potential drug interactions in Asian patients with obesity would involve herbal dietary supplements [33]. So again, Dr. Sicat, our patients with obesity are often on multiple medications. Patients from East Asia (or Asia in general) are at increased risk for being prescribed cardiometabolic drugs, are at increased risk of having adverse side effect of drugs prescribed at doses studied and approved for non-Asians, and at risk for adverse drug interactions. How do you mitigate these risks in your obesity practice? Do you look up the dosing for each drug you prescribe or look up potential drug interaction for each herbal supplement your patient is taking? What is the best way for clinicians to safely prescribe drugs to East Asians and best way for clinicians to assess potential drug interactions with herbal supplements?

Dr. Sicat: In the field of obesity medicine, numerous studies have confirmed the efficacy and safety of anti-obesity drugs in studies primarily evaluating Western populations. Asians are often only a small percent of enrolled study participants. Very few studies are conducted specifically in Asian population. While some differences exist, studies of glucagon like peptide-1 receptor agonists [34], metformin [35], orlistat [36], and sodium glucose co-transporter 2 inhibitors [37] generally demonstrate comparable efficacy and safety in East Asians compared to Caucasians.

It is well documented that genetic differences exist between East Asians and Caucasians in terms of medications and pharmacokinetics. The most reported pharmacokinetic differences are related to the cytochrome P450 enzymes, especially P450 CYP2C19. Asian population subtypes may have poor (15%) or intermediate (47%) drug metabolism via CYP2C19. This can lead to significantly higher blood levels of medications metabolized by CYP2C19 despite, "normal" dosing (e.g., some statins, warfarin, nifedipine). Resources describe 11 medication/medication classes clinicians should consider when prescribing drugs to East Asian patients [38]. For the purposes of this discussion, none of the currently FDA-approved anti-obesity drugs are primarily metabolized by the CYP2C19 enzymes. That said, my general approach to treating East Asian patients is to start with low doses of medication and then slowly titrate up from there based on the efficacy balanced with the side effects. My goal is to find the lowest dose of medication needed to get the desired result.

Regarding herbal supplements, we understand the necessity to obtain a good medication history. But it is also of importance to ask patients if they are taking herbs or supplements. According to the Centers for Disease Control and Prevention (<https://www.cdc.gov/nchs/products/databriefs/db399.htm>), overall dietary supplement use (with herbs being just one component) in U.S. adults aged 20 and over among in 2017–2018 was ~58% (i.e., defined as use of any dietary supplement in the past 30 days). But specifically with herbs, Asian American herbal use is reported at 30% [39]. A United States survey in 2004 suggested the ten most commonly used herbs to be echinacea, ginseng, ginkgo biloba, garlic, St. John's Wort, peppermint, ginger, soy, chamomile, and kava kava [40]. While many herbal supplements may not have reports of clinically meaningful drug interactions, extensive drug interactions

testing for many herbal supplements are lacking. Some notable common herbal dietary supplements having known, clinically meaningful drug interactions include St John's Wort (i.e., inducer of CYP3A4 and P-glycoprotein) and goldenseal (inhibitor of CYP2D6 and CYP3A4). Black cohosh may reduce effectiveness of statins, ginkgo may increase bleeding risk with warfarin, and mild thistle may decrease concentrations of medications metabolized by CYP2C9 [33].

In Asian patients, it is not uncommon for patients to obtain herbal supplements from their herbalist or acupuncturist. They may not know what herbs they are taking, making it challenging to predict the potential for drug interactions. For these patients, we discuss the potential drug interactions with their prescribed medications. If patients prefer to stay on the herbal supplements, then I might preferentially prescribe GLP-1 agonists, which are metabolized by proteolytic cleavage, and not via CYP proteins. I also encourage patients to obtain all their medications from one pharmacy. Before starting a dietary supplement, herbal, or a medication, I ask my patients speak with their pharmacist to assess the potential of drug interactions.

While gaps exist, potential herbal and prescription drug interactions may be detected by built-in functions of electronic health records [41]. Other resources include Lexicomp online, which is a powerful, extensive database to find potential medication, supplement, and herbal interactions (<https://www.wolterskluwer.com/en/solutions/lexicomp>). Lexicomp requires a yearly subscription but may be available for those who work in a hospital system or academic institution. While not as robust, the "Medscape Drug Interaction Checker" (<https://reference.medscape.com/drug-interactionchecker>) and "Medline Plus – Herbs and Supplements" can be accessed online for free (https://medlineplus.gov/druginfo/herb_All.html).

4. Rice

Dr. Bays: Shortly after I began travels to Asia decades ago, I quickly developed a greater understanding of the importance of rice, and the nuance of rice, in this part of the world. While I obviously associated rice with Asian cuisine, it was not until I more frequently traveled to the region that I had a better understanding of the degree Asians perceive different rice uniqueness, depending on their country. (See [Tables 2–4](#)). I found some Asians can get quite possessive/protective about rice types from their region. Differences in rice grain length (long, medium, and short grain) seemed substantially important to my Asian colleagues, especially regarding the general principles that longer grain rice separates when cooked (i.e., better for stir fry) while shorter grain rice tends to clump (i.e., better used in sushi).

In nutritional counseling, rice is often discussed regarding its nutrients, fiber, and affect upon glucose and insulin levels (glycemic index/load). Another related aspect is specifically nutrient content. During our obesity medicine board prep, we often learn that Beriberi is a deficiency of Vitamin B1 thiamine. Beriberi is a word possibly derived from a Sinhalese phrase meaning "weak, weak." Beyond weakness, "dry" beriberi is manifest by central and peripheral nervous system damage (i.e., Wernicke-Korsakoff syndrome and peripheral neuropathy). Conversely, wet beriberi is manifest by weakness and congestive heart failure and peripheral edema. The jejunum absorbs the greatest amounts of vitamins (as well as simple sugars, fatty acids, proteins, and minerals). Multivitamin supplements containing thiamine B1 (as well as other vitamins such as folate B9 and cyanocobalamin B12 and minerals such as calcium and iron) are routinely recommended for patients undergoing bariatric surgical interventions that may impair nutrient absorption (e.g., gastric bypass, sleeve gastrectomy, or biliopancreatic diversion).

Regarding Asia, beriberi can also occur when thiamine in cereals (e.g., grains of rice, wheat, rye, corn millet) is removed through ultra-refined, polished, or pearled "washing," where the nutrient dense germ and fiber dense bran are removed, leaving the white endosperm, which is high in carbohydrates and largely devoid of other nutrients. Conversely, whole grains foods contain all 3 layers of the fibrous bran (outer layer),

Table 2
Chinese dining tips (ADAPTED WITH PERMISSION FROM YOURBODY-GOAL): Table suggests some healthful Chinese food options.

HEALTHFUL CHINESE DINING
BACKGROUND
Chinese cuisine, and similar foods are reflective of food eaten in several regions of Asia. Many foods described as Chinese food are not really eaten in China, such as Americanized deep-fried crab wontons, chicken-battered fried and sweetened General Tso's chicken, sweet and sour chicken and pork, large fried egg rolls, chicken wings, spareribs, and fortune cookies. While not everyone eats Chinese foods, understanding Chinese food is a good way to understand basic nutrition principles.
RICE
Brown rice and wild rice are more healthful than white rice because they have more grain, nutrients, fiber, and will not increase blood sugars as much. However, many Chinese restaurants only serve steamed or fried white rice. If the white rice is steamed and combined with vegetables or lean meats (think moo goo gai pan), and not drenched in salt, then it is a reasonably healthful choice.
SALT AND SODIUM
A potential hazard with many Chinese foods is the high amount of sodium (i.e., table salt). The high amount of salt depends on the way the dishes are prepared (e.g., spice mixes, marinades, and sauces). Both teriyaki and soy sauce have about 1000 mg of sodium per tablespoon. The upper limit of sodium per day for most adults is 2300 mg. It is often recommended that African Americans, or patients with high blood pressure or kidney disease consume no more than 1500 mg per day.
STARTERS
Whether it be starters, or regular menu items, steamed or lightly stir-fried food is much more likely to be more healthful than deep fried food. Salads at Chinese restaurants can often be high in calories. Good starters that are usually low in calories include hot and sour, egg drop, or wonton soup cups (not bowls), or steamed dumplings.
BE SMART WHEN GOING TO CHINESE RESTAURANTS
Many foods served at Chinese restaurants are healthful. Nonetheless, it is best to research the calories of restaurant foods before going to the restaurant, or before ordering food at the restaurant. Fried appetizers (e.g., fried dumplings, egg rolls, wontons) are high in fats and calories. Some of the salads and vegetable dishes can also be high in calories, such as coconut curry vegetables. Among other menu items that may be higher in calories are almond and cashew chicken, crispy honey or spicy chicken dishes, sesame chicken, beef with broccoli in high calorie sauce, Chow Mein (fried noodles), and Kung Pao Chicken. Deep fried sweet and sour chicken is moderately high in calories, and made worse with the sweet and sour sauce, which has about 50 Calories per 2 tablespoons, with almost all calories from sugar. More healthful choices are moo goo gai pan, non-fried beef or chicken with broccoli, mixed vegetables, non-fried shrimp, grilled tofu, and brown rice with a scrambled egg. For the same serving size, fried rice may have ~500 Calories compared to white or brown steamed rice which may have ~200 calories. Fried rice with meat or even vegetables will likely have around 1000 Calories. As before, rather than try to guess the number of calories in Chinese restaurant foods, or any restaurant foods, it is best to research before you go, so you can make informed, healthful choices.
TIPS
Usually healthful choices: Steamed, grilled, lightly stir-fried, brown rice, broth
Often less healthful choices: Fried rice, deep fried, teriyaki, sweet sauces

middle layer (endosperm) and the innermost nutrient dense layer (germ) and are typically with color (brown). Thus, brown rice is often considered a more healthful food choice. Given the importance of rice in Asian cuisine, I ask each of you to provide your perspective of healthful tips regarding rice consumption.

Dr. Ng: Not eating rice is often not an option for many East Asian patients, especially older patients. Rice is consumed in many forms – not just as simple white rice but also as rice noodles and other rice flour products – and often the consumption of such foods is intertwined with cultural traditions. Sometimes, I'll start with recommending either cutting down on the portions at each meal or substituting at least one meal of the day with another healthier food such as brown rice or whole wheat products (i.e., noodles). In other cases, I may recommend trying to shift to a mix of white and brown rice instead of just white rice. In most cases, I'll just see how my patients best respond to more healthful nutritional recommendations.

Dr. Look: Do you know the Japanese language has more words for rice than love? Telling an East Asian patient to stop eating rice can be interpreted by some to stop living. "Meshi no tane" can be interpreted as the rice is the seed of the meal, a means of living. I encourage my patients with excess weight to reduce, but not necessarily eliminate their rice

Table 3
Thai and Vietnamese dining tips (ADAPTED WITH PERMISSION FROM YOURBODYGOAL): Table suggests some healthful Thai and Vietnamese food options.

HEALTHFUL THAILAND AND VIETNAMESE DINING
BACKGROUND
Indochina is a peninsula of Southeast Asia that includes Thailand, Vietnam, Laos, Cambodia, Myanmar, and peninsular Malaysia. These regions are influenced by India to the west, and China to the north. At their closest point, Thailand and Vietnam are about 500 miles apart. Like other Asian foods, Thai and Viet foods emphasize rice and noodles, but use more pork, chicken, and beef compared to Japanese, who eat more fish. Sichuan China and the Hunan Province of China are in the Southeastern portion of China. Sichuan and Hunan are often said to have foods hotter and spicier than other, more bland foods of other areas of China. Similarly, Southeast Asian Thai and Viet foods can also be hot and spicy, with Thai food often having more spicy chili peppers than Viet food. Thai cuisine may have more of an Indian influence, with more soup curry. Vietnamese cuisine may have more of a French influence, with more soup-based noodle dishes.
THAI AND VIET RICE
Both Thailand and Vietnam are exporters of rice. Thailand produces Jasmine aromatic rice, which (like Basmati rice in India) is a long-grained rice. Jasmine rice can be white or brown (light tan), may take a year to harvest, and is often considered a high-quality rice. As with most rice, the brown Jasmine rice has more nutrients than the white Jasmine rice, because it still has the bran. Vietnam grows a variety of rice. Compared to Thai food wherein rice is typically served in a bowl, Viet rice is often included in noodles, rice paper, rice cakes, and rice dumplings. Although lower in calories, rice cakes, steamed white rice, and even rice noodles have a high glycemic index, and are best avoided in patients with diabetes mellitus or pre-diabetes. Regarding Thai breads, spring rolls are often deep-fried, and summer rolls are often not deep-fried – with summer rolls typically a more healthful choice.
MEATS
Thai and Viet meats are most often pork, beef, fish, and chicken. Fried foods, such as breaded and fried calamari or coconut shrimp, may have 700–800 calories. Also, adding sausage slices to sweet white rice is an unhealthy combination. A better choice is lean grilled meat on a stick. Even better is to ensure most of your meal is composed of vegetables.
SPICES
Common spices in Thai food include basil, mint, and lemon grass. Viet foods often contain pepper, basil, mint, polygonum, sawtooth. Spices are often more healthful than sodium.
OTHER CONSIDERATIONS
Be careful of black Thai iced tea containing condensed milk and sugar (300 Calories). Also, whether Thai or Viet foods, if the objective is to limit calories, then it may be best to avoid peanut dishes and avoid caramel or honey sauces.
COOKING STYLES
Both Thai and Viet foods stir fry, boil, and fry herbs and leaf vegetables. Vietnamese foods also include raw herbs and vegetables. Be cautious of stir frying, deep frying, or pan frying, which can add hundreds of calories due to the oil. Fried rice can contain as much as 1200 Calories. Tofu is a meat-free protein that can absorb lots of oil (fats). If fried, tofu can be very high in calories. Sautéed (dry heat cooking for short time with very little oil), grilling, boiling, or steaming are healthier ways to cook. Finally, cooking foods in a coconut cream or curry cream base will add lots of fats, and hundreds of calories.

consumption (even the shiny white, polished rice). Some substitution of brown or red rice for white rice or mixing brown and white rice together will increase whole grain intake and may lower the glycemic response. There is even a rice developed for this in Japan called Haiga -mai; it is half milled, so the bran layer is removed, but the germ (haiga) is intact. I often recommend this to rice lovers, as the flavor is very similar to white rice but has increased fiber and nutrients.

Special rice cookers are also made for brown rice which soaks the brown rice before cooking and improves the flavor. I also recall my mother telling me that at banquets and celebrations, the meat, seafood, and vegetables are served first, while the cheaper starches rice, and noodles are served at the end of the meal for satiation. If you are a host and serve your guest fried rice or noodles first, you would be thought of as cheap and not very hospitable. I encourage patients to think like a wealthy host, eat the vegetables and protein first, and then finish with a small bowl of rice on the side. Studies have shown that when people eat in this order, they consume less starch. Also, the effect of consuming refined foods with less refined foods produces a mixed meal effect, with less increase in postprandial insulin and glucose, compared to isolated consumption of foods high in glycemic index/load.

Table 4
Japanese dining tips (ADAPTED WITH PERMISSION FROM YOURBODY-GOAL): Table suggests some healthful Japanese food options.

HEALTHFUL JAPANESE EATING
<p>BACKGROUND</p> <p>The cuisine of Japan is often based upon rice and seafood. In Japan, seafood is often grilled, but also served raw as sashimi or sushi.</p> <p>RICE</p> <p>When served at meals, rice is a common alternative to potatoes and pasta. Rice is a seed of grasses. Rice comes in different sizes (long, medium, and short) and different colors (brown, white, red, and black). Rice can be classified as long, medium, and short. Long-grain rice (e.g., basmati) separates (i.e., does not clump) after cooking, and usually has a lower glycemic index than shorter grain rice. Medium-grain and short-grain rice tends to stick together with cooking. Darker rice maintains many of the nutrients lost when rice is processed to create white rice. Black and red rice are particularly high in antioxidants. While some Japanese rice is brown, most is white. Japanese rice is usually shorter grain. While many in Japan eat rice with a spoon, if eaten with chopsticks, shorter grain may be better because it sticks together.</p> <p>SUSHI VERSUS SHASHIMI</p> <p>Japan is a nation of islands. Fish is among the most common food. People in Japan generally have a higher level of healthful omega-3 fatty acids (largely derived from cold water ocean fish) in their bodies compared to people in the United States. Sushi is not simply raw fish. Sushi is a vinegar rice dish that usually includes raw fish, combined with other ingredients such as seaweed, cucumber, soy paper, omelets, and avocados. Sashimi is thinly sliced fresh saltwater seafood. Sashimi can be served on top of white radish (daikon), along with pickled ginger, wasabi, and soy sauce.</p> <p>SUSHI ROLLS:</p> <p>Sushi and sashimi are generally healthful. However, as with all foods, it depends on how the food is prepared. A typical shrimp tempura sushi roll is made of shrimp, rice, vinegar, and avocado (along with seaweed and cucumber). It may therefore appear to be healthful. However, a shrimp tempura roll often has mayonnaise, and the shrimp is deep-fried. It may have over 500 Calories. Conversely, a tuna sushi roll may be less than 200 Calories. Finally, sometimes it is important to know what kind of fats are in the foods you eat. An avocado sushi roll has no fish and is less than 200 Calories. What calories it has is largely due to the fats in avocados. Similarly, while a salmon avocado roll still has 300 Calories, its calories are largely from the monounsaturated fats from the avocado, and the omega-3 fats from the salmon, which are both more healthful fats.</p> <p>SOY SAUCE:</p> <p>Among the most well-known Japanese sauces is soy sauce. Soy sauce is made from soybeans, grains, and fungi molds. Another ingredient is sodium. One tablespoon of typical soy sauce contains about 900 mg of sodium. (One teaspoon of table salt is 2300 mg.) The sodium in soy sauce tastes salty, as opposed to high sodium often found in cereals, cakes, pies, and pastries. It is easier to taste when limited amounts are added to food. Nonetheless, lower sodium soy sauce is a healthier choice.</p>

Dr. Sicut: Rice is a staple of many of my Asian patients with rice and rice products (i.e., rice vermicelli noodles and rice paper) used in appetizers, main dishes, and desserts. It is not uncommon for Asian Americans to ingest >450 grams (3 cups) of cooked rice per day. While brown rice may be a more healthful choice, brown rice is not as commonly accepted in the Asian culture. This is possibly due to the longer cooking time, different visual appearance, different taste and texture, and longer chewing time. In terms of rice intake and the risk of developing diabetes mellitus, when compared to lower rice intake (<150 grams or 1 cup daily) very high rice intake (i.e., >450 grams/day or 3 cups) can increase the risk of developing diabetes by as much as 61% in South Asian populations; this effect of high rice intake on diabetes rates may have no significant association for those in other regions, such as East Asians in China [42].

Whether high rice intake increases the risk of diabetes or not, high amounts of rice can be a contributor to higher caloric intake. Because many of my patients have excess body fat, insulin resistance, and carbohydrate intolerance, I commonly counsel these patients on a carbohydrate restricted diet. However, in my experience it's very hard for Asians to get rid of all carbs. Suggesting a very low carbohydrate approach to Asians, such as with the ketogenic diet, is often perceived as an unreasonable approach. Ethnic foods such as rice are so connected to people's "being" that it would be unrealistic to completely give it up for a prolonged period. In my personal experience, many Asian meals are generally about 80% rice or noodles where the rice or noodles are the

base or main portion of the meal with the remaining 20% being composed of protein and vegetables. However, this leads to an extraordinarily high amount of starchy carbohydrate which further fuels the metabolic syndrome components seen even in lower BMI Asians. There are some studies in Asian Americans that the average carbohydrate intake is about 400 grams daily. I try to encourage patients to "flip it" where the protein and the vegetables become the 80% portion of the plate and the rice/noodle comprise the remaining 20% so that the rice is the "side dish" part of the meal as opposed to the "main dish" part of the meal. That said, in my experience, it is very hard for many patients to practice "portion control." Once available during a meal, then the rice on the plate becomes a lot of rice, followed by another serving of rice. What I find works better is not negotiating how much rice to have at a meal, but instead how many meals a day does one have rice. We commonly discuss trying to limit eating rice just one meal a day, preferably lunch or dinner. This way, our patients can enjoy the food they grew up with, enjoy it (albeit at one meal a day) and preferably reserve rice with the meal they eat with their family.

5. Practical tips and recommendations

Dr. Bays: Thank you for this practical information. I now know more about rice than I thought I ever needed to know. One thing we have not discussed much is bariatric surgery among those from East Asia [43]. While a thorough discussion of bariatric surgery is beyond the scope of this discussion, some sentinel takeaway messages might be:

- East Asians have an increased risk of diabetes risk at a lower BMI than Europeans [43].
- The threshold of BMI values for metabolic and bariatric surgery (MBS) is lower in East Asians, with MBS being considered upon reaching a BMI of 27.5 kg/m² and BMI of ≥ 32.5 kg/m², depending on the status of glucose homeostasis [43].
- The most common MBS in East Asia is sleeve gastrectomy, followed by Roux-en-Y gastric bypass (RYGB) [43].
- The degree of weight reduction with MBS in East Asians is not inferior to other ethnic groups; however, the diabetes remission rate in East Asians may be higher than other ethnic groups [43].

That said, I would like to end this discussion by asking each of you to provide your top three tips in managing patients with obesity from East Asia:

Dr. Sicut: Thanks again Dr. Bays for allowing me to participate with this panel in this important discussion of treatment of obesity in East Asian patients. Here are a few practical tips to consider with your Asian patients:

- 1) Negotiate reasonable degrees of carbohydrate restriction. Nutritionally, we previously discussed how many Asian American patients can have a high intake of starchy carbohydrates, commonly from rice and rice products. We discussed trying to "flip it" from 80%/20% rice to meat/vegetable ratio to more like 80% meat/vegetable and 20% rice. We also discussed an alternative to simplify even further is to try to have rice just one meal per day preferably lunch or dinner.
- 2) Because each Asian country has so many fantastic vegetable dishes, I try to emphasize that ideally at least ½ of their plate should be vegetable based. Many online resources for cooking Asian style vegetables are available, and I commonly look for recipes with my patients for them to try.
- 3) Use of Anti-Obesity Drugs: Asia-Pacific guidelines (Can be found on page 35 Table 6.2 of https://apps.who.int/iris/bitstream/handle/10665/206936/0957708211_eng.pdf?sequence=1&isAllowed=y#:~:text=In%20Asians%2C%20the%20cut%20Doffs,of%20studies%20and%20clinical%20experience) suggest the use of anti-obesity drugs in Asian-Pacific patients with a BMI of 23 to <25 kg/m² if an

increased adiposity complications are present such as hypertension, diabetes, hyperlipidemia, or cardiovascular disease. Anti-obesity drugs should be considered in Asians with a BMI ≥ 25 kg/m² regardless of increased adiposity complications. As before, many patients of Asian-Pacific descent may have a normal BMI, or a BMI below the United States FDA-approved threshold for anti-obesity drugs. However, the BMI applicable to non-Asians may not adequately reflect the pathogenic potential of increased adiposity among those from Asia. As an obesity medicine specialist, while considered off-label use, the use of anti-obesity drugs should be considered in Asian patients with a BMI as low as 23 kg/m² if an increased adiposity complication is present and any Asian patient with a BMI ≥ 25 kg/m² if lifestyle medication attempts have not been successful. Of note, if you performed a body composition on these patients, you might be surprised to see a higher percent body fat (and increase in visceral adiposity) than expected for their BMI. Their percent body fat measurements are often in the obesity range despite a “normal” BMI. If using anti-obesity drugs in these patients under these circumstances, it is best to discuss off-label use with your patients and make sure to document your discussion in your clinic notes and your line of reasoning if using an anti-obesity drug for an Asian patient having a lower-BMI than indicated in the prescribing information.

Dr. Look: My top three tips in managing patients with obesity from East Asia include:

1. Screen and follow patients from East Asia with waist circumference measurements. BMI alone, especially in this population, can be very misleading. I advise my BMI centric patients and colleagues of the prevalence of abdominal obesity and its risks.
2. Eat like your ancestors. Double your portions of vegetables with every meal and enjoy fruit as dessert. Rice can be a part of a healthy eating plan when kept in small portions. Measure your rice or noodles and put them on the side or in a separate rice bowl. Patients may also consider switching to a more whole grain rice or mixing different types of rice to satisfy their palate.
3. Eat like a rich person at a banquet. Eat your rice or noodles last. For ramen or Pho, eat the bowl from top to bottom, starting with the vegetables and meat, and then the mein or Bun (noodles) - preferably at least 15 minutes from the start of the meal.

Dr. Ng:

1. Education: Many East Asian patients assume that because they are “thin” compared to other populations, they are protected against many of the complications associated with being overweight and obesity. Often, they are unaware of the lower BMI cutoff for being overweight and obesity among the Asian population or increased abdominal waist circumference as a risk factor.
2. Nutritional counseling: There is a commonly held belief among East Asians that traditional East Asian diets are healthier than the Western or standard American diets, again making them feel protected from cardiovascular and metabolic diseases. Some patients have in fact expressed to me that not eating rice will make them weak or malnourished.
3. Encourage exercise: A lot of my East Asian patients have expressed to me their concern over “Western” exercises (such as running, weightlifting, kickboxing) as difficult or too strenuous for their bodies. While letting them know that what they've said is untrue, I also encourage them to do exercises that they may be more familiar with such as tai chi, ping pong, badminton, biking or traditional East Asian dances.

6. Conclusion

Dr. Bays: Thanks to all of you for this unique discussion of obesity and East Asians. I was concerned we would overlap with the topics covered in the prior Obesity Pillars publication on Obesity and South Asians. But we covered a lot of new and yet complementary ground. Given the number of Asian individuals on the planet, given the number of Asian patients we encounter in our clinical practice, given the worldwide scope of the obesity and diabetes epidemic, and given the unique importance of obesity in this population, I believe readers will benefit from your perspective from this Roundtable discussion.

Thanks again!

Disclosures

HEB discloses being Medical Director of Your Body Goal, which provides body composition services. JN, JS, and ML report no disclosures.

Author contribution

HEB conceptualized the submission, wrote/sent questions to the other authors, and assisted with editing the manuscript. JN, JS, and ML responded to their assigned questions, reviewed their sections for accuracy, and gave final approval of their contribution.

Ethical review

This Obesity Medicine Association Roundtable represents original works, with work and/or words of others appropriately cited or quoted in the submission. This submission did not involve human test subjects or volunteers. HEB was not involved in the peer review process, nor the acceptance/rejection of this submission. Responsibility for the editorial process for this article was delegated to an independent Editor and/or Associate Editor.

Source of funding

Other than payment for editorial and submission support disclosed in the Acknowledgement, this submission received no funding.

Acknowledgement

Editorial and submission support was provided by Savannah Logan who was funded by the Obesity Medicine Association.

References

- [1] Shih M, Du Y, Lightstone AS, Simon PA, Wang MC. Stemming the tide: rising diabetes prevalence and ethnic subgroup variation among Asians in Los Angeles County. *Prev Med* 2014;63:90–5.
- [2] Bays HE, Taub PR, Epstein E, Michos ED, Ferraro RA, Bailey AL, et al. Ten things to know about ten cardiovascular disease risk factors. *Am J Prev Cardiol* 2021;5: 100149.
- [3] Deurenberg P, Deurenberg-Yap M, Guricci S. Asians are different from Caucasians and from each other in their body mass index/body fat per cent relationship. *Obes Rev* : an official journal of the International Association for the Study of Obesity 2002;3:141–6.
- [4] Misra A. Ethnic-specific criteria for classification of body mass index: a perspective for Asian Indians and American diabetes association position statement. *Diabetes Technol Therapeut* 2015;17:667–71.
- [5] Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, et al. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. *J Assoc Phys India* 2009;57:163–70.
- [6] Fitch AK, Bays HE. Obesity definition, diagnosis, bias, standard operating procedures (SOPs), and telehealth: an Obesity Medicine Association (OMA) Clinical Practice Statement (CPS) 2022. *Obesity Pillars* 2022;1.

- [7] Burridge K, Christensen SM, Golden A, Ingersoll AB, Tondt J, Bays HE. Obesity history, physical exam, laboratory, body composition, and energy expenditure: An Obesity Medicine Association (OMA) Clinical Practice Statement (CPS) 2022. 2022. p. 1.
- [8] Consultation WHOE. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet* 2004;363:157–63.
- [9] Jih J, Mukherjee A, Vittinghoff E, Nguyen TT, Tsoh JY, Fukuoka Y, et al. Using appropriate body mass index cut points for overweight and obesity among Asian Americans. *Prev Med* 2014;65:1–6.
- [10] Chua A, Adams D, Dey D, Blankstein R, Fairbairn T, Leipsic J, et al. Coronary artery disease in East and South Asians: differences observed on cardiac CT. *Heart* 2021.
- [11] Volgman AS, Palaniappan LS, Aggarwal NT, Gupta M, Khandelwal A, Krishnan AV, et al. Atherosclerotic cardiovascular disease in South Asians in the United States: epidemiology, risk factors, and treatments: a scientific statement from the American heart association. *Circulation* 2018;138:e1–34.
- [12] Fernandez-Twinn DS, Hjort L, Novakovic B, Ozanne SE, Saffery R. Intrauterine programming of obesity and type 2 diabetes. *Diabetologia* 2019;62:1789–801.
- [13] Prentice AM. The emerging epidemic of obesity in developing countries. *Int J Epidemiol* 2006;35:93–9.
- [14] Parizkova J, Chin M-K, Chia M, Yang J. An international perspective on obesity, health and physical activity: current trends and challenges in China and Asia. *J Exerc Sci Fit* 2007;5:7–23.
- [15] Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *Lancet* 2016;387:1377–96.
- [16] U.S. Department of Health & Human Services. U.S. Department of health and human services office of minority health. <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=55> Obesity and Asian Americans. [Accessed 1 January 2022].
- [17] Lu Y, Wang P, Zhou T, Lu J, Spatz ES, Nasir K, et al. Comparison of prevalence, awareness, treatment, and control of cardiovascular risk factors in China and the United States. *J Am Heart Assoc* 2018;7.
- [18] Bays HE. Adiposopathy is "sick fat" a cardiovascular disease? *J Am Coll Cardiol* 2011;57:2461–73.
- [19] Pare G, Caku A, McQueen M, Anand SS, Enas E, Clarke R, et al. Lipoprotein(a) levels and the risk of myocardial infarction among 7 ethnic groups. *Circulation* 2019;139:1472–82.
- [20] Sun C, Kovacs P, Guiu-Jurado E. Genetics of obesity in East Asians. *Front Genet* 2020;11:575049.
- [21] Nakayama K, Inaba Y. Genetic variants influencing obesity-related traits in Japanese population. *Ann Hum Biol* 2019;46:298–304.
- [22] Ji L, Chan JCN, Yu M, Yoon KH, Kim SG, Choi SH, et al. Early combination versus initial metformin monotherapy in the management of newly diagnosed type 2 diabetes: an East Asian perspective. *Diabetes Obes Metabol* 2021;23:3–17.
- [23] Ma RC, Chan JC. Type 2 diabetes in East Asians: similarities and differences with populations in Europe and the United States. *Ann N Y Acad Sci* 2013;1281:64–91.
- [24] Chan JC, Malik V, Jia W, Kadowaki T, Yajnik CS, Yoon KH, et al. Diabetes in Asia: epidemiology, risk factors, and pathophysiology. *JAMA : J Am Med Assoc* 2009;301:2129–40.
- [25] Sun X, Liu Z, Du T. Secular trends in the prevalence of abdominal obesity among Chinese adults with normal weight, 1993-2015. *Sci Rep* 2021;11:16404.
- [26] Pan XF, Wang L, Pan A. Epidemiology and determinants of obesity in China. *Lancet Diabetes Endocrinol* 2021;9:373–92.
- [27] Baehr A, Pena JC, Hu DJ. Racial and ethnic disparities in adverse drug events: a systematic review of the literature. *J Racial Ethn Health Disparities* 2015;2:527–36.
- [28] Liao JK. Safety and efficacy of statins in Asians. *Am J Cardiol* 2007;99:410–4.
- [29] Naito R, Miyauchi K, Daida H. Racial differences in the cholesterol-lowering effect of statin. *J Atherosclerosis Thromb* 2017;24:19–25.
- [30] Wu HF, Hristeva N, Chang J, Liang X, Li R, Frassetto L, et al. Rosuvastatin pharmacokinetics in asian and white subjects wild type for both OATP1B1 and BCRP under control and inhibited conditions. *J Pharmaceut Sci* 2017;106:2751–7.
- [31] Warrington S, Nagakawa S, Hounslow N. Comparison of the pharmacokinetics of pitavastatin by formulation and ethnic group: an open-label, single-dose, two-way crossover pharmacokinetic study in healthy Caucasian and Japanese men. *Clin Drug Invest* 2011;31:735–43.
- [32] Taguchi I, Iimuro S, Iwata H, Takashima H, Abe M, Amiya E, et al. High-dose versus low-dose pitavastatin in Japanese patients with stable coronary artery disease (REAL-CAD): a randomized superiority trial. *Circulation* 2018;137:1997–2009.
- [33] Asher GN, Corbett AH, Hawke RL. Common herbal dietary supplement-drug interactions. *Am Fam Physician* 2017;96:101–7.
- [34] Kang YM, Cho YK, Lee J, Lee SE, Lee WJ, Park JY, et al. Asian subpopulations may exhibit greater cardiovascular benefit from long-acting glucagon-like peptide 1 receptor agonists: a meta-analysis of cardiovascular outcome trials. *Diab metab j* 2019;43:410–21.
- [35] Chinese expert consensus statement on metformin in clinical practice. *Chin Med J* 2020;133:1445–7.
- [36] Shi YF, Pan CY, Hill J, Gao Y. Orlistat in the treatment of overweight or obese Chinese patients with newly diagnosed Type 2 diabetes. *Diabet Med : a j Bri Diab Associat* 2005;22:1737–43.
- [37] Deerochanawong C, Chan SP, Matawaran BJ, Sheu WH, Chan J, Man NH, et al. Use of sodium-glucose co-transporter-2 inhibitors in patients with type 2 diabetes mellitus and multiple cardiovascular risk factors: an Asian perspective and expert recommendations. *Diabetes Obes Metabol* 2019;21:2354–67.
- [38] Lo C, Nguyen S, Yang C, Witt L, Wen A, Liao TV, et al. Pharmacogenomics in asian subpopulations and impacts on commonly prescribed medications. *Clin Transl Sci* 2020;13:861–70.
- [39] Gardiner P, Whelan J, White LF, Filippelli AC, Bharmal N, Kaptchuk TJ. A systematic review of the prevalence of herb usage among racial/ethnic minorities in the United States. *J Immigr Minority Health* 2013;15:817–28.
- [40] Barnes PM, Powell-Griner E, McFann K, Nahin RL. Complementary and alternative medicine use among adults: United States, 2002. *Adv Data* 2004:1–19.
- [41] Zhang R, Manohar N, Arsoniadis E, Wang Y, Adam TJ, Pakhomov SV, et al. Evaluating term coverage of herbal and dietary supplements in electronic health records. *AMIA Annu Symp Proc* 2015;2015:1361–70.
- [42] Bhavadharini B, Mohan V, Dehghan M, Rangarajan S, Swaminathan S, Rosengren A, et al. White rice intake and incident diabetes: a study of 132,373 participants in 21 countries. *Diabetes Care* 2020;43:2643–50.
- [43] Oh TJ, Lee HJ, Cho YM. East Asian perspectives in metabolic and bariatric surgery. *Journal of Diabetes Investigation*. 2022 Jan. <https://doi.org/10.1111/jdi.13748>. PMID: 35029061.