

REVIEW ARTICLE

A Review of the Role of Cultural Practices, Values, and Norms in Type 2 Diabetes Treatment for Chinese Immigrants

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Although Type 2 diabetes (T2D) prevalence in US Chinese immigrants continues to rise, research and clinical care gaps persist. These gaps are largely due to generalizations of the Asian immigrant population, barriers within biomedical culture, and a lack of culturally sensitive treatment plans. Little attention is paid to the unique sociocultural factors and contexts within each subpopulation, such as family influences or traditional medicine approaches. After analyzing available literature, folk interpretations of disease, the family unit, and cultural food practices were found to significantly influence T2D treatment. As they navigate their treatment, Chinese immigrants grapple with issues such as the stigmatization of insulin, the importance of providing food as care, and family well-being and harmony. Understanding how and why these elements of practices, values, and norms (PVN) affect T2D treatment is crucial to tailoring medical care to the needs of Chinese immigrant communities.

Key Words: Type II diabetes ■ Asian immigrants ■ Chinese American ■ Chinese traditional medicine ■ culture ■ immigrant health

Presently, Chinese Americans comprise 24% (5.4 million) of Asian Americans, roughly 2.4 million of which are born outside the United States (US).^{1,2} Migration to the US from China began in the early-19th century and scaled up rapidly in the mid-1800s in response to the California Gold Rush.¹ In 1870, 63,000 Chinese immigrants were in the US, many of whom lived in California (9% of the state's population; majority of Chinese immigrants lived in California), Wyoming (29% of the state's population), and Montana (10% of the state's population).^{3,4} Fueled by xenophobia, racist attacks, burnings of Chinatowns, evictions, and legal anti-Chinese restrictions on housing and jobs forced Chinese immigrants to concentrated and segregated urban areas, known as enclaves.^{1,3} These enclaves became and continue to be places of protection, belonging, cultural retention, and employment for many Chinese Americans.⁵

The Asian American immigrant population has well-documented heightened risk and prevalence of Type 2 Diabetes (T2D), a gap in effective care persists due to current treatments often lacking knowledge of the

patient's cultural context. Furthermore, research and treatment often fail to recognize the heterogeneity within Asian immigrant populations, generalizing the Asian American population and treating them as one group when designing T2D treatment plans and policies.⁶

Much of what is known about T2D among Chinese immigrants is based on generalized findings on Asian immigrants. Fan et al.⁷ found that Asian immigrant pre-diabetes/diabetes prevalence between 2003 and 2013 increased from 6.8 to 12.4%, while only increasing 5.5 to 6.9% for non-Hispanic White (NHW) Americans. Asian immigrants have elevated diabetes rates relative to other ethnic groups despite having lower average body mass index (BMI). In fact, in 2013, Asians were 2.17× more likely to have T2D than White individuals when having the same BMI ($P < 0.01$), 1.97× more likely to have diabetes than NHWs ($P < 0.01$), and had a 60% higher prevalence rate.^{7,8} Despite insufficient research into the diabetes prevalence among individual Asian immigrant populations⁶, recent findings highlight alarming trends. A cross-sectional survey of Chinese immigrants in New

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York City (NYC) found an 8.6% T2D prevalence despite having a lower average BMI than NHWs.⁹

One study on Chinese immigrants living in NYC found 75% reported low levels of physical activity. Studies on Chinese Americans and Chinese immigrants have shown only 24–31% meet physical activity guidelines – the lowest of all Asian subgroups.^{10–12} Additionally, a community-based study found only 15% of Chinese immigrants eat ≥ 5 servings of fruit/vegetables and Chinese immigrant men (21%) smoke significantly more than Chinese immigrant women (1%).¹² Literature on smoking patterns of Chinese immigrants show they smoke more than their US-born counterparts¹³, have higher smoking rates than the general US population (17–18% vs. 14%)¹⁴, and differences by gender among Chinese Americans exist (smoking rates are 21–39% for men, 2–4% for women).^{12,14} Length of time in America may also play a role in risk factor development, with Taylor et al.¹² finding that length of stay is inversely associated with daily fruit and vegetable consumption and physical activity among Chinese immigrants, indicating a change in dietary and physical lifestyle after migrating. Furthermore, Chinese immigrants who had stayed in the country for ≥ 10 years had significantly less fruit and vegetable consumption than those who had just arrived ($P = 0.045$).

Since there is a plethora of reviews and studies on the specific risk factors and social determinants of health for Asian immigrants with T2D, this paper will focus on how cultural practices, values, and norms (PVN) shape T2D treatment. Cultural PVN inform one's understanding of diabetes, ultimately shaping their treatment and self-management. In performing an in-depth literature review, three themes in relation to PVN and T2D treatment for Chinese immigrants were noted: 1) traditional interpretations and remedies for diabetes, 2) the family, and 3) cultural food practices.

METHODS

Given this is a broad traditional literature review and a conceptual article, I utilized a review of available peer-reviewed articles in PubMed, Google, Google Scholar, Embase, PsycINFO, and JSTOR. Search terms included but were not limited to Asian immigrant, Asian American, diabetes, diabetes mellitus, Chinese traditional medicine, migration, Chinese immigrants, Chinese migrants, cultural perceptions of diabetes, diabetes risk, diabetes treatment, Chinese American, and sociocultural factors of diabetes. The initial search yielded 71 peer-reviewed articles published from 1998 to 2020. A total of 34 articles were ultimately included in this study. Based on my literature analysis, I present a critical perspective on the role of cultural PVN in T2D treatment for Chinese immigrants.

Defining cultural norms, values, and practices

Cultural norms are a standard of behavior each member of a cultural group is expected to adhere to. These norms vary across different cultural groups.¹⁵ For example, cultural norms predict who people turn to when sick, with NHWs more likely to use professional help and Asians more likely to look to their family and community social networks.¹⁶ This is likely due to the stigma of using professional medical services within Asian communities. Related to norms, cultural practices involve 'shared perceptions of how people routinely behave in a culture', shaping daily activities and diet.¹⁷ Values, on the other hand, are common ideals, priorities, and prescribed roles within a community.¹⁸ Although family roles and relationships are discussed in a binary, cisgender, and heterosexual sense in this review, that does not indicate these are the only possible or relevant relationships and that there are not other identities that experience these issues. All three interact with each other, oftentimes synergistically, to shape Asian immigrants' approach and management of T2D. Given the variability of PVN across different cultural groups, however, a 'one size fits all' treatment plan for patients with T2D is not effective.

The analytical framework

Instead of framing perceived cultural barriers that hinder clinical care as being the patient's fault, Chinese cultural PVN should be analyzed as part of the patient's identity and embraced – the cultural barriers are within biomedicine, not the patient. Known as inverting the problem, this approach addresses several barriers and misconceptions within biomedicine, such as believing biomedicine is always right, patients who do not perform so-called healthy behaviors do not care about their health, and that the patient always prioritizes their own health.¹⁹ Challenging these assumptions is crucial to understanding how PVN shapes treatment and management of T2D for Chinese immigrants.^{20,21}

CULTURAL PERCEPTIONS, INTERPRETATIONS, AND REMEDIES FOR DIABETES

Perceptions and attitudes towards T2D are learned behaviors and beliefs that act as a lens through which a patient will frame their own diagnosis, and these shape how a community will view T2D and people with T2D. These interpretations subsequently guide who one should turn to when feeling sick and what medicines or healing techniques are used. Contrasting with Western society, Chinese perceptions of success often emphasize

one's relationships and family, self-regulation, and emotional attachment, as opposed to attributing success to the individual and their ability.²² Success depends on how well one establishes harmony within their family and themselves. Furthermore, collective well-being and harmony are seen as essential paths to life fulfillment.²² Collectivism drives several relationship dynamics: children are expected to place their grandparents and parents above themselves, and the wife should be obedient to the husband.²² A study on the cultural norms of Chinese American immigrants with T2D ($n = 40$) found 'sensitivity to social hierarchy, monitoring public display of strong emotions, face concerns, and emphasis on group harmony' were seen as the most important when managing T2D.²³

It is important for clinicians to understand how US Chinese immigrants frame the etiology and appropriate approach to T2D as this allows them to integrate their patients' cultural context into clinical care effectively. Additionally, some traditional interpretations of well-being define health as a lack of symptoms, prescribed medication, need for regular physician visits, and diagnosis – disease and ill health are marked by visible symptoms.^{24,25} T2D, a 'silent disorder', presents a complication, however, since it does not always fit the traditional definition of disease.²⁶ Diabetes is, therefore, not always viewed as a serious disease, and traditional Chinese medicine (TCM) is often the first line of treatment since biomedical approaches are only considered necessary for more extreme issues.²⁷

Stigmatization of diabetes

T2D is a highly stigmatized disease among Chinese immigrants, with patients and families worried others may perceive them or their family member with T2D as having lower educational status²⁸, being unable to take care of themselves, or a burden to others. In examining the language used to discuss T2D among Chinese immigrants, T2D can be referred to as *Xiao-Ke* (a wasting and thirsting disease) and *tangniao-bing* ('sugar urine illness').²⁹ The language used gives insight into how one might interpret and view a diabetes diagnosis – by perceiving diabetes as wasting disease and having an imbalance in one's internal system or being, diabetes can carry a stigma within communities. As we will discuss in a later subsection on Chinese traditional medicine, maintaining Yin-Yang balance and internal harmony is essential to achieving health. Thus, high sugar levels in one's urine is a quantifiable measure of their inability to maintain balance – a Yin deficiency – and a way that their body is signaling to them the need to regain internal harmony. Also, the common T2D symptom of excessive thirst is viewed as kidney and lung Yin deficiency.²⁹ What's more, the stigmatizing language of T2D as a

wasting disease reinforces the perception of people with T2D as a waste or burden to their family members. Practitioners should therefore have conversations with both their patients and their patient's family members on empowering patients and highlighting their ability to still be a contributing member of the family or community.

Disease deservingness refers to patients with T2D being defined by their disease and being told they are lazy and unable to control their desires or appetites, implying and oftentimes convincing them that they deserve to have T2D. These beliefs can be seen in Chinese immigrants; however, it appears to depend on age.²⁴ Lee and Woo found older Chinese immigrants are 3.5× more likely than younger Chinese immigrants to view diabetes negatively, and 1 in 4 older Chinese immigrants believe T2D-related costs should not be covered by insurance ($n = 449$).²⁸ Their reasons are two-fold: 1) distrust of US healthcare systems due to historical discrimination and lack of cultural humility, and 2) people with T2D are looked at unfavorably and are not seen as deserving of coverage.²⁸ While the first point will be covered in a future subsection ('Cosmopolitan' medicine and traditional medicine approaches), the second reason highlights the stigma and use of disease deservingness within the older adult Chinese immigrant community – since patients with T2D deserve to have diabetes, their disease is their fault and therefore should not be covered by insurance. Moreover, since Chinese immigrants hold the belief of disease deservingness towards others and themselves, they often do not seek care from a primary care physician or disclose their diagnosis to others.²⁴

Traditional perceptions of T2D may represent a paradox within a collectivist culture. While health and well-being are seen as communal responsibilities, and one is expected to place others' health over their own, people with T2D are isolated from society and blamed and shamed for acquiring T2D. If clinicians understand the stigma associated with T2D for Chinese immigrant patients, they can also utilize language to mediate T2D stigma and challenge ideas such as disease deservingness.

Interpreting symptoms and the association of T2D management with relationships and behavior

As with any disease or illness, each culture interprets and communicates the symptoms of disease differently, often reflective of the values and priorities of that culture.³⁰ For Chinese immigrants, the cultural interpretation of T2D is largely driven by cultural priorities of family and socioemotional balance.

In their study on the cultural and family challenges to T2D management for immigrant Chinese Americans ($n = 40$), Chesla, Chun and Kwan found study participants

often associated their glucose levels with socio-behavioral changes, such as irritability towards family members during hyperglycemic events, as opposed to common physiological symptoms, such as sweating or frequent urination.³¹ T2D can therefore be seen as a disease that destabilizes one's emotions and subsequently undermines family harmony. Furthermore, the authors found patients rarely recalled physiological symptoms and instead remarked on how T2D affected their social and relationship priorities, giving insight into how the values of social and behavioral harmony drive patients' hypervigilance of T2D-induced social dilemmas or problems. Moreover, framing life with T2D in behavioral terms highlights how patients are more in tune with how T2D conflicts with family roles and one's ability to show love and benevolence towards others; a lack of emotional control implied a lack of T2D control and a failure in adhering to cultural norms. Patients subsequently attempt to temper their emotions as a means of both managing T2D and upholding cultural expectations.

Interpretations of T2D symptoms can also be driven by Yin-Yang theory.²⁹ Yin-Yang represents the balance of hot and cold, and illness symptoms can be explained by insufficient or surplus Yin and Yang. For T2D, Yin manifests in symptoms of fatigue, lethargy, and frequent urination. Yang symptoms are fevers, thirst, large food consumption, and irritability. Exhibiting excessive thirst or irritability is therefore attributed to insufficient Yin or surplus Yang. The inability to control or balance Yin-Yang is thus seen as a cultural or moral failure as it signifies an imbalance of cultural values, resulting in disease.

Spouses and family members also interpreted their family member with T2D's symptoms in emotional and behavioral terms, attributing strong negative emotions to the disease instead of bouts of fatigue or frequent urination.³¹ Patients and family members alike looked to improve their behavioral issues and thus prevent T2D from interfering with family relationships, balancing their socioemotional lives.

To summarize, while Chinese patients with T2D acknowledged the effects of T2D on glucose levels and health, they interpreted T2D's symptoms and framed T2D's impact on their life in terms of social impairments. This may be due to the greater emphasis placed on collectivist approaches to health and behavior, and prioritizing family harmony or family health over one's own well-being to avoid family conflict.

'Cosmopolitan' medicine and traditional medicine approaches

When faced with illness, numerous treatment options exist for Chinese immigrants, from folk and traditional medicines to biomedical – or 'cosmopolitan' – approaches. Unfortunately, several biomedical assumptions and

misconceptions regarding traditional medical approaches can hinder treatment for Chinese immigrants. These assumptions and misconceptions may make patients hesitant to disclose they use TCM, with 5–7% of Chinese immigrant patients reporting they discussed TCM use with their provider.^{32,33} Some incorrect assumptions biomedicine makes are that Asian patients always accept traditional approaches without question, biomedicine is always right, traditional approaches do not work, and patients prioritize their health over others.^{19,23} In fact, in their study on Chinese immigrants with T2D's attitudes towards TCM ($n = 40$), Kwan et al. found study participants had concerns about TCM product quality and safety, provider ethics, and contraindications with medication.³⁴ Chinese immigrants thus think critically on these issues and weigh the best, most viable treatments for themselves, as opposed to blindly accepting TCM. Furthermore, TCM approaches are typically popular for health promotion, maintaining general health, and recovery. It is important that practitioners become educated on TCM therapies to collaborate with their patients on the role of TCM in their patient's life or care plans. These discussions can be key to patient-physician trust and positive healthcare experiences. A study on Chinese and Vietnamese immigrant complimentary and alternative medicine (CAM) use found those who discussed CAM with their physician were more likely to perceive the exam as thorough, report higher health care ratings of the most recent visit, have more confidence and trust in their doctor, feel that they were treated with respect and courtesy, and recommend the health center to a family or friend ($P < 0.05$).³²

Even though traditional medicines are not the end-all-be-all for Asian patients with T2D, they still hold an important role as at-home and adjunct treatment plans and should be mentioned. Indeed, a study on CAM use among a predominantly first-generation Chinese American sample, 55–68% reported having ever used CAM and 30–48% reported using CAM and cosmopolitan medicine in the same week ($n = 1,799$).³² Another study comprised of 198 Chinese immigrant patients found 43% use herbal TCM products weekly and 100% had used TCM in the past year.³³

Common TCM therapies include acupuncture, herbalism, and Yin-Yang diet therapies. Acupuncture can lower blood sugar levels and achieve endocrine homeostasis by using pressure points and needles.²⁹ Acupuncture targets the endocrine point, lung point (thirst), stomach point (appetite), kidney and bladder points (frequent urination), and pancreas point (insulin secretion).³⁵ Although criticized as lacking scientific evidence, acupuncture has shown effectiveness in lowering glucose levels when used in conjunction with metformin or other T2D therapies.^{36–38} A 12-week randomized control trial where the intervention group ($n = 40$) received acupuncture treatment combined with metformin and control group ($n = 40$) received sham

acupuncture combined with metformin found the treatment group had significantly lower fasting plasma glucose ($P = 0.034$) and HbA1c levels ($P = 0.007$) compared with placebo.³⁶ Also, a review of human and animal studies investigating acupuncture's effect on insulin resistance reported acupuncture when used alone or in conjunction with herbal medicines, metformin, or lifestyle changes can lower insulin resistance.³⁸ Acupuncture has especially shown promise in treating neuropathy, a common complication of T2D. In Abuaisa, Costanzi, and Boulton's study on treating T2D-induced peripheral neuropathy ($n = 46$), 77% of participants reported improvement in their primary and/or secondary symptoms ($P < 0.01$), and 67% of these participants stopped or significantly reduced their medications a year after the study.³⁹ Percutaneous Nerve Stimulation (PENS), a contemporary offshoot of acupuncture, not only improves neuropathic pain symptoms, but also improves sleep quality, physical activity levels, self-reported well-being, and reduced pain medication requirements.⁴⁰ Thus, when performed by trained acupuncturists with sterile techniques, acupuncture could be presented as either an adjunctive treatment for T2D or an effective standalone, non-pharmacologic treatment for T2D-induced conditions such as neuropathy.^{29,41}

Herbalism is also an important therapy in TCM and is used as a component of one's daily diet and an at-home treatment option. Certain herbs will be prescribed to reestablish bodily harmony depending on the symptoms and associated Yin-Yang levels. For example, Yin deficiency in the lungs – excessive thirst – is treated with *yu chuan wan*, an herb mixture for mild to moderate diabetes symptom severity and thirst due to Yin deficiency.⁴² Several TCM herbal remedies have exhibited effectiveness in treating T2D, with *Panax ginseng* (100–200 mg/day)^{29,43}, *Momordica charantia* (50–100 mL/day; 18 g/day)^{29,44,45}, *Psidium gnajava* (600 mL/day; 9 g/day)^{29,46}, and *Lagenaria siceraria* (3 g/day)²⁹ all showing potential evidence in reducing glucose levels.^{35,47} However, further research, especially rigorous clinical trials, needs to be done on its interactions with medications. Physicians should be aware of the herbal treatments their patients may already be taking and look into possible contraindications.

Chinese immigrant perceptions of biomedicine also influence their approach and reception towards medications such as insulin and metformin. Given cultural notions that biomedicine is only necessary for extreme illnesses or as a last resort and that diabetes is often seen as a 'silent' or non-serious disease, Chinese patients are apprehensive about taking insulin. The need for insulin may lead to increased attention, social embarrassment and stigma, and self-perceived burden to others. Furthermore, insulin is viewed as a handicap and

a symbol of failure to adequately take care of oneself and an indication that their illness has become severe, as opposed to the 'natural progression of diabetes'.⁴⁸ Apprehension towards insulin also stems from the belief that it's an excuse for pharmaceutical companies to make money.²⁸ The distrust of the American medical system is likely due to historically poor healthcare given to Asian patients compared to White patients and studies showing Asian patients are more likely than White patients to report their physicians 'do not understand their backgrounds and values or listen to them'.²⁸ As a result, Asian immigrant populations are the least likely ethnic group to receive recommended diabetes screening and for adults >45 years old, they are less likely than NHW at all BMI levels ($n = 526,000$).^{49,50} Screening disparities may be attributed to Asians having a higher risk for T2D at lower BMI levels compared with all other racial/ethnic groups.⁵⁰ Alarming, this has likely led to a high prevalence of undiagnosed diabetes among Chinese Americans (11.4% of Chinese Americans vs. 3.8% of general population).⁵¹ As a result, the American Diabetes Association recommends diabetes screening begin at BMI ≥ 23 for Asian patients as opposed to the general cutoff of ≥ 25 .⁵²

THE FAMILY AND ITS INFLUENCES ON TREATMENT

The family unit is an essential institution of Chinese culture, determining the code of conduct and prescribed roles. In relation to T2D, family and social support have been described as the most important factor in successful disease management for Chinese immigrants.^{53,54} Treatment and medical decisions are rarely made without consulting one's family members and considering family face, social standing, family roles, and the well-being of other family members. Given the cultural importance placed on family, it is critical to understand how families navigate and approach diabetes care and management. Having established the cultural background in which these processes occur, we can begin to analyze the effects of family culture on T2D treatment.

Maintaining family image and family relations

The conflict between feeling obligated to maintain the family image and managing diabetes is a common narrative for Asian immigrant patients with T2D. Patients often worry their diagnosis will destabilize their family's standing in the community and bring shame to the family.

In their study on accommodating T2D in Chinese immigrant families, Chesla and Chun found Chinese American families attempted to persuade family members with T2D to improve their self-management of T2D by

stressing the importance of avoiding attention or becoming a burden on the family or community ($n = 20$).⁵⁵ For example, spouses would remind their husband/wife with T2D of the potential death or the potential loss of a limb and subsequent required use of a wheelchair if they did not take their self-management plan seriously enough.⁵⁵ While the idea of death or losing a leg poses an apparent threat to one's quality of life, functional status, and mobility, the authors point out that the spouse's reminder was, in actuality, referring to the potential loss of face and social standing. If they were to lose a limb or have a physical disability, their diabetes diagnosis would become more obvious to the community and their lost limb would become a physical, unmistakable symbol of their failure to control their diabetes. These beliefs mirror perceptions of insulin, where the patient is cognizant of how their community or traditional culture views parts of T2D treatment and disease progression, sometimes prioritizing social standing.

Furthermore, needing an amputation due to T2D would be interpreted in the community as being a poor role model for their children. Since parents' value as human beings is judged by how well they perform as parents, the idea of being unable to sufficiently function as a role model and a parent is a major driver for Asian immigrant patients with T2D.⁵⁶ Furthermore, when considering traditional perceptions of success, having an amputation would also signify the inability to adequately self-regulate oneself, leading to further stigmatization. Maintaining the family image thus drives T2D self-management for Chinese immigrant patients.

Living according to a collectivist approach, Chinese patients with diabetes often consider the livelihood of those around them and prioritize efforts to maintain family relations over their own health. Fatigue and irritability, two common symptoms of T2D and glucose dysregulation, frequently conflict with a patient's ability to preserve family harmony. For instance, Chinese immigrant patients recalled having to interact with their families in a socially acceptable manner that hid their symptomatic distress and facilitated 'interpersonal ease'.⁵⁵ Patients also described how cultural values of avoiding outwardly expressing emotions and inconveniencing family members were significant reasons for suppressing their irritation and symptoms. In fact, overt expressions of emotion were described as contributors to hyperglycemia and adverse diabetes experiences, believing a lack of emotional control led to a lack of glucose control and vice versa. The lack of emotional control would, in turn, harm family ties and face since they behaved outside of behavioral norms. Patients subsequently felt responsible to control their glucose levels to decrease irritability and emotional outbursts and for the sake of their family. The awareness of emotional variability and its effects on the family during glucose regulation highlights a similar theme seen in the traditional interpretations and remedies for diabetes, where successful glucose control was

viewed as an issue driven by emotion and behavior, as opposed to physiology.³¹

In addition, maintaining family relations goes both ways, with the patient's family members' desire to keep family harmony intact exerting influence on T2D management. For example, while the patient felt responsible to control their emotions to maintain family cohesion, their support systems (e.g. spouse, children, family members) also felt it was their duty to be sympathetic and used forgiveness during bouts of irritability as a means of treating and caring for the patient.³¹ Indirect forms of communication are often employed to avoid family conflict, where a spouse will ask someone, typically of higher cultural or social authority, to encourage the person with T2D to take their self-management more seriously. For example, one spouse looked to her husband's clinician and extended family members to influence her husband's management behaviors.⁵⁵ By doing so, she avoided possible conflict or arguments with her husband while simultaneously exerting influence on her husband's T2D treatment. Arguments are also avoided by minimizing disagreements or expressions of concern with a spouse's behavior, even if the behavior is detrimental to the spouse's health.

Additionally, levels of family involvement can be predictors of recovery progress. Given traditional views on interdependency (depending on others for support) and each family member having distinct roles and expectations, high levels of involvement are expected when a family member is sick.⁵⁷ Known as overinvolvement, family members often see the patient's illness as their fault and blame the disease or themselves, and thus insert themselves into the patient's care plan.⁵⁶ Similar to interdependency and overinvolvement, conjoined care is often expected in Chinese immigrant couples when one has T2D. Conjoined care is when couples have shared 'community service engagements...meal planning, shopping, and/or cooking practices' to ensure they are in the same place at the same time for most of the day.⁵⁵ These forms of care, overinvolvement and/or conjoined care, which maintain family cohesion, have become expected and culturally accepted parts of T2D self-management and are often prioritized over physician advice or care.²⁸ In fact, lower levels of involvement can adversely affect the family member with T2D ($n = 385$).⁵⁸ Conversely, studies on non-Chinese families show that family member involvement has a detrimental effect on diabetes management and mental health, underscoring the necessity of cultural context in treatment plans.⁵⁹ For Chinese families, family cohesion has been shown to be directly related to the success of T2D management.^{58,60}

Prescribed roles and role strain

Given the level of involvement and attention required to manage T2D adequately, care requirements can run in

conflict with prescribed family roles. As a result, these conflicts have differential effects and difficulties depending on age and sex. While men report being supported by their spouses and expect their wife to do all the cooking, cleaning, and basic tasks to ensure they have little to no stress, women with T2D must rely on themselves or the beneficence of other family members.⁶¹ Furthermore, this dynamic is primarily driven by cultural norms that dictate the wife as the provider of meals and source of care for children and the rest of the family. Failure to meet these expectations brings both a loss of face and shame. Moreover, some female patients describe how their family can be unwilling to help with household chores since cultural norms dictate that the wife undertakes all responsibilities, limiting spousal collaboration in T2D management ($n = 40$).²⁵ For example, one patient with T2D explains '[I] had to cook dinner and make food for [her husband] to eat [while also going to school]. After school, I washed the dishes for him. That's how I did it so it wouldn't affect him. I never affect my family with my private business. In regard to household chores...my husband doesn't help me out so I do everything myself...it affects my emotional stability'.²⁵ Unfortunately, the disproportionate burden placed upon women with T2D in Chinese families has drastic health outcomes, with Chinese immigrant women with T2D reporting significantly worse T2D-related mental health and general health compared to Chinese immigrant men with T2D.⁶¹ What's more, cultural expectations placed on women and collectivist principles of placing family members over their own priorities prevent them from spending time on their own T2D self-care and management, limiting their ability to manage their T2D adequately.⁶² This issue is particularly important when discussing food practices, where Chinese women with T2D often do not change the family meals to be T2D-friendly to maintain their family role and family harmony.

For men, T2D-induced disability, and beliefs that T2D prevents one's ability to work and is a weakening disease that makes one vulnerable, threatens their role as the head of the family, and sometimes even flips the cultural gender role dynamic – the wife becomes the financial provider.^{25,31} This role shift can cause family conflict, and heightened stress as men with T2D feel their social face is at risk. One male patient explained that dietary restrictions due to T2D treatment had limited his ability to provide for his family: 'My physical abilities have diminished...I am not able to help my family...If I...didn't have any illness...I could wash dishes in restaurants or do whatever to lighten my family's financial burdens'.²⁵ Conversations with the patient and their family about how one can still go to work while having T2D and how to effectively embed daily treatment requirements, such as insulin shots or glucose control, into one's life could help mediate potential stresses or conflicts.

Female spouses and family members also sometimes struggle to encourage their male spouse or family member to adhere to his T2D management due to the diminished cultural status of women. As seen in the aforementioned story of a spouse utilizing indirect forms of communication to influence her husband's T2D management, she had to resort to asking individuals of higher sociocultural authority – the doctor and male family members – for help since her husband refused to follow her advice.⁵⁵ Conversely, since men, particularly older men, hold the highest status in families, it can be looked down upon if members of lower family status admonish them for their T2D management.

Age: Does it play a role?

Age may also influence diabetes treatment as sex and age determine one's family social standing. For example, children are sometimes not allowed to criticize their parents or grandparents for not being strict enough in their regimen. What's more, if children are allowed to encourage better management towards their parents, only the son can without being scolded for it – the daughter is not even allowed to ask about diabetes.⁵⁵

Additionally, Washington and Wang-Letzkus reported that elderly Chinese immigrants with diabetes don't see diabetes as a condition that affects family lifestyle or harmony.⁶³ This could be due to different family roles across age groups – it's expected that elderly family members are always cared for by their family. Moreover, it is the younger family members' responsibility to maintain family harmony and prioritize the older family members' concerns. Thus, elderly patients' social role doesn't change because they are supposed to be taken care of by their children or younger members of the family regardless of their disease status.

CULTURAL FOOD PRACTICES

Although certain heart-healthy diets, such as the Mediterranean diet or plant-based diets, are prescribed to patients who are at risk or have T2D, adhering to these dietary interventions is not always feasible and is often cited as the hardest part of T2D management for Asian immigrants.³¹ For example, recommendations of restricting rice or other culturally vital foods directly conflict with daily meals, sociocultural roles, and expectations regarding meal preparation and family meals, and cultural perceptions of nutrition and health.

Food as the foundation of care

In Chinese culture, providing food is the foundation of providing care and healing. In fact, it is culturally expected that when a family member gets sick, those close to them

step in, 'buy more things for them to eat', and use food as a form of treatment.⁵⁵ The provision of food is both a physical and symbolic expression of care, with the food itself and actions made to purchase and prepare the food being a physical representation of care, and one's efforts to provide symbolize one's care, concern, and love for the individual with diabetes. Unfortunately, these expressions of care often contradict what the patient's doctor is telling them: to cut down on certain foods and restrict their diet. What's more, this can make it difficult for patients with T2D to maintain emotional balance and family harmony as they are caught between two opposing viewpoints, expressing frustration at being told to eat by their family and not eat by their doctors. They subsequently feel sadness at not being able to experience 'the joy of living' because their diet has become restricted.⁶⁴ Dietary restrictions threaten general and mental health balance, with culturally important and pleasurable food playing an important role in assigning meaning to one's meals.³¹ In addition, implementing dietary restrictions while sick or ill is counterintuitive and conflicts with daily Chinese cultural food practices, which makes it difficult for families and spouses to support their family members or partner with T2D. In fact, Chesla et al. found spouses of Chinese immigrant patients with T2D preferred to provide 'abundant foods to comfort and fortify the patients' health' over restricting their partner's diet.³¹ Knowing the cultural importance and significance of food as a form of care, practitioners should look to reframe diabetes management balance and moderation, as opposed to control and restriction.

Herbal remedies and tea are also considered in Chinese culture to have healing properties.²⁹ In fact, one patient described their family traveling to China to purchase medicinal tea leaves for several hundred dollars per pound.⁵⁵ The current literature on tea and its effects on T2D prevention and treatment has shown tea (e.g. green, black, yellow, and white) may have antidiabetic effects and improve diabetes complications such as retinopathy *in vivo* and *in vitro*.⁶⁵⁻⁷⁰ A meta-analysis of randomized control trials reported tea consumption attenuated the decrease of fasting blood insulin (1.30 U/L, 95% confidence interval [CI] = 0.36, 2.24) and reduced waist circumference (-2.70 cm, 95% CI = -4.72, -0.69), however did not significantly affect fasting glucose levels, insulin resistance, or BMI among patients with T2D.⁶⁷ One retrospective cohort study reported drinking ≥ 6 cups of green tea a day was associated with 33% lower odds of developing T2D compared with drinking < 1 cup of green tea a day.⁶⁶ In a cohort study of 500,000 Chinese adults, daily green tea consumers had a lower risk of T2D (hazard ratio [HR] = 0.92, 95% CI = 0.88, 0.97), all-cause mortality (HR = 0.90, 95% CI = 0.83, 0.97), and microvascular complications (HR = 0.88, 95% CI = 0.78, 1.00).⁷¹ Although the literature is promising, more research is

needed on specific tea types and their effects on T2D risk and management.

Food as the foundation of balance and health

In addition to the act of providing food, certain foods themselves hold cultural significance in maintaining health and treating disease for Chinese immigrants. Rice is a permanent fixture of family meals and holds an especially important role in health, providing energy and maintaining well-being. Patients also report rice to be a comforting food, and the substitution of white rice with brown or red rice can be perceived as an infringement on a patient's well-being and sometimes even survival.³¹ T2D treatments that require a patient to remove or modify their rice intake are therefore seen to have numerous cultural and behavioral implications, disrupting the values of harmony and interdependency, limiting their ability to participate in important cultural events, and distancing them from their culture.

Going further, certain foods seen as healthy (e.g. rice, meat) may conflict with prescribed diets. Having a doctor tell you that the foods you have grown up seeing as good for you are not healthy can create internal cultural and moral dilemmas. Social gatherings involving food can exacerbate these issues as patients have to choose between saving face and eating food outside of their prescribed diet or declining to eat, breaking collectivist norms, drawing attention to themselves, and possibly losing family face. Li-Geng et al. further discuss how Chinese immigrant patients with T2D fear being a burden on others by requiring dietary modifications and see modifications as harmful to their cultural identity, leading them to choose social harmony and politeness by hiding their diagnosis and eating the food that is served to them.⁶⁴

Yin and Yang, the epitome of balance, is a central theme of cultural food practices and provides the framework for TCM diet therapies for T2D. For Chinese immigrants, T2D is often seen as a disease caused by Yin deficiency, excess internal heat, and an imbalance of hot and cold foods, as opposed to an insulin dysregulation-based etiology. As noted in the previous subsection, food is a critical component of quality of life, health, and family sociocultural well-being. According to Covington, 'foods are valued and prescribed for their energetic and therapeutic properties rather than solely for their chemical makeup'.²⁹ Furthermore, TCM views food holistically, not only considering the patient's characteristics (age, body type), but also their location, how and when the food was made, and the season. To counteract their Yin deficiency, patients avoid foods with hot qualities and consume cooling foods, such as tea, spinach, soybeans, sweet potatoes, and fruits.^{27,29} Moreover, white rice and meat are considered natural healing agents and should be

eaten frequently to strengthen health and social bonds, while brown rice, raw vegetables, and multigrain foods should be avoided.²⁴ Prescribed diets that don't focus on Yin-Yang or hot-cold foods can introduce confusion since they often flip cultural ideas on good and bad foods, with white rice labeled as potentially harmful, and brown rice and multigrain foods labeled as healthier options.

Diabetes management and its infringement on cultural food practices and social expectations

The value of shared meals can also conflict with Asian immigrants' abilities to adequately manage diabetes. For Chinese immigrants, eating and sharing food with family or community symbolizes harmony and strong kinship or social ties. Park et al. discuss how eating alone or having a separate, modified meal can be viewed as worthless because 'meals were sustaining only if shared'.²⁴ Ensuring strong social ties and family harmony, therefore, takes precedence.

Dietary restrictions on rice can also inhibit one's ability to adhere to social roles and expectations. In fact, Chinese immigrants report rice as essential to fueling strength and energy – some patients describe how restricting rice prevented them from fulfilling their cultural role as the provider because they lacked the energy to work ($n = 40$).²⁵ Here, rice plays a multifaceted role in Chinese culture, acting as a staple for diet and both general health and sociocultural health. Patients are thus caught between eating rice to maintain physical strength or decreasing rice consumption to prevent hyperglycemia. Patients thus can feel threatened by a potential loss of face if they cannot eat rice, given it may lead to diminished energy and renders them unable to fulfill gendered expectations. Similarly, women often prepare household meals, and since rice is so important, women with T2D face potential backlash from their families if they remove or limit rice from family meals.

Dietary modification within spousal relationships also appears to go one way, as men with T2D expect their wife to modify their meals to be T2D-friendly. Women with T2D, however, are expected to neglect their self-care strategies and cook what their husband wants, regardless of whether it is T2D-friendly.⁶⁴ In fact, men are not expected to be involved with their wife's T2D management. This can make women feel isolated and guilty about modifying their meals or making food for themselves because it goes against cultural values and expectations.²⁴

LOOKING AHEAD

It is essential to recognize the differences across patient populations and a patient's cultural context

when diagnosing and constructing care plans for patients with T2D. Lack of knowledge of how cultural PVN can influence treatment for Chinese immigrants can alienate them and hinder their ability to successfully manage their symptoms. Addressing this issue starts with improving practitioner education and training on culturally-specific nutrition and T2D therapies. Treatment plans should be tailored to both the patient and diagnosis, not just the diagnosis, and practitioners should acknowledge there is no one size fits all treatment. For example, since cultural food practices are vital for emotional and cultural well-being, nutritional counseling should involve teaching healthy cooking methods of traditional Chinese foods instead of prohibiting these foods altogether. Also, given balance is a central theme of health, emphasizing balance as opposed to restriction and presenting prescribed diets in terms of Yin-Yang or hot-cold philosophy can make prescribed diets easier to understand and follow.

Moreover, knowing that family holds significant weight in the patient's decision-making and T2D management, methods facilitating family support and collaboration may improve T2D treatment outcomes. Mao et al. performed an RCT study on using WeChat, a text-messaging service that is popular among Chinese phone users, to promote diabetes management ($n = 222$).⁷² The intervention arm involved sending the patient's family information on diabetes control and the importance of family support. The authors found this intervention provided sustained, improved support for the patient. Considering family is important for Chinese patients with diabetes, especially for immigrants who can feel cut off from their family after migration and patients who feel moral shame or guilt for having T2D, a text messaging-based intervention can help the patient feel connected to their family.

In terms of education and improving health literacy on T2D for Chinese immigrants, an Asian grocery-store cancer education outreach program could serve as an adaptable model.⁷³ The program trained university students to provide culturally and linguistically tailored education and resources for breast cancer. Screening compliance improved after speaking with the study educators. The authors found those who received breast cancer education were significantly more likely to obtain a mammogram screening test than those who did not receive such education.⁷³ This program highlighted the efficacy, cost-effectiveness, and ability of grocery education programs to reach multiple subgroups of Asian Americans (ethnicity, age, socioeconomic status [SES]). Based on these findings, a similar outreach program could be adapted for diabetes, providing more topically relevant information given the link between food and diabetes and encouraging shoppers to have their glucose or HbA1c checked.

Table 1. Recommendations for improving T2D treatment among Chinese immigrants.

Recommendation	Potential benefits
Providing culturally responsive care (e.g. relate issues and treatment plan to what's important to the patient and culture, language concordance, understanding cultural importance of food), education, and training ^{51,74}	<ul style="list-style-type: none"> • Reduces treatment disparities^{75,76} • Can improve health outcomes, patient satisfaction, patient self-efficacy, and patient-provider relationships^{77,78}
Engage in open, non-judgmental conversations with patients regarding CAM and collaborate with TCM providers when applicable	<ul style="list-style-type: none"> • May improve patient's openness to share⁷⁴ • May improve T2D management⁷⁹
Collaborate with community members, family, and other stakeholders during treatment process (e.g. leverage cultural importance of family and social networks)	<ul style="list-style-type: none"> • Can improve motivation and treatment adherence⁷⁴ • Can form trust and respect between provider and patient, community, and family⁸⁰ • Reduce isolation and improve T2D management⁷²

Future directions of research

Issues beyond cultural PVN play a role in treatment for Chinese immigrants, with further research needed in areas such as acculturation and health literacy and communication. Studying acculturation and its effects on Asian immigrants, Ro⁸¹ found chronic disease risk increased as length of stay increased for Chinese immigrants and Asian immigrants with <10 years of residence were significantly less likely to see a doctor and more likely to report they had no access to care compared to those with >10 years of residence. A cross-sectional survey of 211 Chinese Americans reinforces Ro's findings, highlighting how acculturation improved the help-seeking behaviors and use of health services by Asian immigrants with T2D.⁸² Juxtaposing these findings, acculturation's effects may depend on the presence of a T2D diagnosis: when a diabetes diagnosis has not occurred, acculturation can be a barrier to health and risk factor for T2D since it results in increased consumption of 'Western diet' foods and less physical activity. However, when a diabetes diagnosis has occurred, acculturation is crucial to giving a patient the agency and ability to communicate with doctors, self-manage their diabetes, and perform help-seeking behaviors. This highlights the complexity of acculturation's effects on immigrant health.

One mechanism that may explain the link between better T2D self-management and higher acculturation is the positive relationship between acculturation and SES. Higher SES would allow patients to change their current lifestyles and participate in healthier behaviors due to greater financial flexibility.⁸³ Studies have also highlighted gender differences, with men being more acculturated than women, likely due to traditional family structures that allow men to interact with mainstream culture.^{82,83} It should be noted that overall, the literature is inconsistent on acculturation's effects on T2D risk and management^{82, 84-86} possibly due to differing definitions of acculturation or use of self-reported or proxy measures of acculturation that don't fully capture acculturation (e.g. diet, clothing, type of media consumed, cultural values/identity, years lived in the US, language used, acculturation questionnaire). As such, further research on the impact

of acculturation on T2D treatment and management is warranted.

Health literacy also plays an influential role in how Asian immigrants are able to successfully manage their T2D, affecting their ability to interact with the US medical system. In fact, when faced with English language barriers, Chinese immigrant patients associated their illness with a physical disability, preventing them from doing daily tasks and diminishing their self-efficacy.²⁵ Green et al.'s⁸⁷ study on language barriers to healthcare for Chinese immigrants shows that using an interpreter can hinder communication and is strongly linked to the patient's assessment of quality of care. Furthermore, it was found patients were more likely to avoid asking questions related to their health when using an interpreter compared to when using a language-concordant physician, highlighting a possible gap in disease detection and health communication. Further analysis showed English proficiency is directly correlated with the likelihood of asking questions about their health when an interpreter is involved, suggesting non-English speakers will experience maximal benefit and comfort when paired with a language-concordant physician. These findings ultimately show the possible directions of research on how language barriers and health literacy can influence T2D treatment.

CONCLUSION

In performing a literature search, folk interpretations of disease and medicine, the family unit, and cultural food practices were found to be significant PVN influences on T2D treatment. These PVN shaped how patients approached and incorporated their prescribed treatment plans, interacted with others, and ultimately how patients viewed themselves. Traditional culture provides guiding principles of behavior and responsibilities for the patient and their family members. Considering how important cultural PVN are for Chinese immigrant patients when navigating T2D treatment and management, it is therefore paramount for clinicians to understand how to adapt their clinical practices and provide better treatment.

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