

Characterizing Mental Health Status and Service Utilization in Chinese Americans with Type 2 Diabetes in New York City: Cross-Sectional Study

Yun Shi, Bei Wu, Nadia Islam, Mary Ann Sevic, Amanda J Shallcross, Natalie Levy, Kosuke Tamura, Han Bao, Ricki Lieu, Xinyi Xu, Yulin Jiang, Lu Hu

Submitted to: JMIR Formative Research
on: April 03, 2024

Disclaimer: © The authors. All rights reserved. This is a privileged document currently under peer-review/community review. Authors have provided JMIR Publications with an exclusive license to publish this preprint on its website for review purposes only. While the final peer-reviewed paper may be licensed under a CC BY license on publication, at this stage authors and publisher expressly prohibit redistribution of this draft paper other than for review purposes.

Table of Contents

Original Manuscript.....	5
Supplementary Files.....	26

Preprint
JMIR Publications

Characterizing Mental Health Status and Service Utilization in Chinese Americans with Type 2 Diabetes in New York City: Cross-Sectional Study

Yun Shi¹; Bei Wu²; Nadia Islam³; Mary Ann Sevvick³; Amanda J Shallcross⁴; Natalie Levy³; Kosuke Tamura⁵; Han Bao⁶; Ricki Lieu⁷; Xinyi Xu³; Yulin Jiang³; Lu Hu³

¹New York University Grossman School of Medicine New York US

²NYU Rory Meyers College of Nursing New York US

³NYU Grossman School of Medicine New York US

⁴Cleveland Clinic Cleveland US

⁵National Institutes of Health Bethesda US

⁶Jacobi Medical Center Bronx US

⁷Creighton University School of Medicine Omaha US

Corresponding Author:

Lu Hu

NYU Grossman School of Medicine

180 Madison Ave. 7th Floor

New York

US

Abstract

Background: Emerging evidence indicates that individuals with Type 2 Diabetes (T2D) are more prone to mental health issues, but there is a significant lack of data concerning the mental health burden in Chinese Americans with T2D.

Objective: To explore the comorbid mental health status, health-seeking behaviors, and mental service utilization among Chinese Americans with type 2 diabetes (T2D).

Methods: A cross-sectional telephone survey was conducted among 74 Chinese Americans with T2D in New York City. We used standardized questionnaires to assess mental health status and to gather data on mental health-seeking behaviors and service utilization. Descriptive statistics were applied for data analysis.

Results: A total of 74 Chinese Americans with T2D completed the survey. Most participants (age 56.4±10.1) were female (56.8%), foreign born (98.7%), and had limited English proficiency (96.0%). Despite nearly half of the participants (34/74, 45.9%) reporting at least one mental health concern (elevated stress, depressive symptoms, and anxiety), only 5.9% (2/34) were currently using mental health services. Common reasons for not seeking care included no perceived need, lack of information about Chinese-speaking providers, cost, and time constraints. The cultural and language competence of the provider was ranked as the top factor related to seeking mental health care.

Conclusions: Chinese Americans with T2D experienced relatively high comorbid mental health concerns, yet had low service utilization. Clinicians may consider team-based care to incorporate mental health screening and identify strategies to provide culturally and linguistically concordant mental health services to engage Chinese Americans with T2D.

(JMIR Preprints 03/04/2024:59121)

DOI: <https://doi.org/10.2196/preprints.59121>

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ Please make my preprint PDF available to anyone at any time (recommended).

Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.

Only make the preprint title and abstract visible.

No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓

Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).

Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v

Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in [A large, light gray watermark is oriented diagonally across the center of the page. It consists of the word 'Preprint' in a large, sans-serif font, followed by a circular logo containing a network diagram of three nodes connected by lines. To the right of the logo, the words 'JMIR Publications' are written in a smaller, sans-serif font.](http</p></div><div data-bbox=)

Original Manuscript

Characterizing Mental Health Status and Service Utilization in Chinese Americans with Type 2 Diabetes in New York City: Cross-Sectional Study

Yun Shi, PhD^{1,2}, Bei Wu, PhD³, Nadia Islam, PhD², Mary Ann Sevick, ScD^{1,2,4}, Amanda J. Shallcross, ND, MPH⁵, Natalie Levy, MD⁴, Kosuke Tamura, PhD⁶, Han Bao, MD⁷, Ricki Lieu, BA^{1,2,8}, Xinyi Xu, BS^{1,2}, Yulin Jiang, BS^{1,2}, Lu Hu, PhD^{1,2}

Affiliation:

¹Center for Healthful Behavior Change, Institute for Excellence in Health Equity, NYU Grossman School of Medicine, NYU Langone Health, New York, NY, USA

²Department of Population Health, NYU Grossman School of Medicine, NYU Langone Health, New York, NY, USA

³NYU Rory Meyers College of Nursing, New York, NY, USA

⁴Department of Medicine, NYU Grossman School of Medicine, NYU Langone Health, New York, NY, USA

⁵Department of Wellness and Preventive Medicine, Cleveland Clinic, Cleveland, OH, USA

⁶Socio-Spatial Determinants of Health Laboratory, Population and Community Sciences Branch, Intramural Research Program, National Institute on Minority Health and Health Disparities, National Institutes of Health, Bethesda, MD, USA

⁷Jacobi Medical Center, Bronx, NY, USA

⁸Creighton University School of Medicine, Omaha, NE, USA

Corresponding author: Lu Hu, PhD

Center for Healthful Behavior Change
Institute for Excellence in Health Equity
NYU Langone Health
180 Madison Ave, New York, NY 10016
lu.hu@nyulangone.org; phone: 646-501-3438

Funding statement: Dr. Lu Hu received support from Grants NIH R01MD017579-01A1, AHRQ R18HS029813, NIH K99MD012811, NIH R00MD012811, American Diabetes Association 7-22-ICTSN-08, NIH P50MD017356 pilot award, NIH U54MD000538-15 pilot award, and NIH P30DK111022 pilot award. Funding for the Socio-Spatial Determinants of Health (SSDH) Laboratory is provided through the Division of Intramural Research at the National Institute on Minority Health and Health Disparities (NIMHD), the National Institute of Health (NIH), and the NIH Distinguished Scholars Programs.

Conflicts of interest: The authors have no conflicts of interest to declare.

Disclosure: The views of this study are those of the authors listed and do not necessarily represent the views of the National Institute on Minority Health and Health Disparities, NIH,

or the U.S. Department of Health and Human Services. We used ChatGPT to enhance the English language and clarity of this manuscript. However, it was not used for study design, content generation, or any other aspects of the research.

Data availability statement: The data presented in this study are available on request from the corresponding author.

Institutional Review Board Statement: The study protocols were approved by the Institutional Review Board of the New York University Grossman School of Medicine (s18-00609)

Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Abbreviations

DDS: Diabetes Distress Scale

HADS-A: Hospital Anxiety and Depression Scale Anxiety Subscale

NYC: New York City

PHQ: Patient Health Questionnaire

PSS: Perceived Stress Scale

SD: Standard Deviation

T2D: Type 2 Diabetes

Author Contributions:**Yun Shi:**

Data curation; Formal analysis; Writing – original draft; Writing – review & editing

Bei Wu:

Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing

Nadia Islam:

Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing

Mary Ann Sevick:

Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing

Amanda J. Shallcross:

Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing

Natalie Levy:

Writing – review & editing

Kosuke Tamura:

Writing – review & editing

Han Bao:

Writing – review & editing

Ricki Lieu:

Data curation; Writing – review & editing

Xinyi Xu:

Data curation; Writing – review & editing

Yulin Jiang:

Data curation; Project administration; Writing – review & editing

Lu Hu:

Conceptualization; Data curation; Funding acquisition; Investigation; Methodology; Project administration; Supervision; Writing – original draft; Writing – review & editing

Abstract

Background: Emerging evidence indicates that individuals with Type 2 Diabetes (T2D) are more prone to mental health issues, but there is a significant lack of data concerning the mental health burden in Chinese Americans with T2D.

Objectives: To explore the comorbid mental health status, health-seeking behaviors, and mental service utilization among Chinese Americans with T2D.

Methods: A cross-sectional telephone survey was conducted among 74 Chinese Americans with T2D in New York City. We used standardized questionnaires to assess mental health status and to gather data on mental health-seeking behaviors and service utilization. Descriptive statistics were applied for data analysis.

Results: A total of 74 Chinese Americans with T2D completed the survey. Most participants (age 56 ± 10) were female (42/74, 57%), foreign born (73/74, 99%), and had limited English proficiency (71/74, 96%). Despite nearly half of the participants (34/74, 46%) reporting at least one mental health concern (elevated stress, depressive symptoms, and anxiety), only 3% (2/74) were currently using mental health services. Common reasons for not seeking care included no perceived need, lack of information about Chinese-speaking providers, cost, and time constraints. The cultural and language competence of the provider was ranked as the top factor related to seeking mental health care.

Conclusions: Chinese Americans with T2D experienced relatively high comorbid mental health concerns yet had low service utilization. Clinicians may consider team-based care to incorporate mental health screening and identify strategies to provide culturally and linguistically concordant mental health services to engage Chinese Americans with T2D.

Keywords: mental health, depression and mood disorder, anxiety disorders, health equity, diabetes & endocrinology

Type 2 diabetes (T2D) is a growing public health concern within the Chinese American community [1]. Recent epidemiological data has brought to light the startling prevalence of T2D among Chinese Americans, with 13.3% diagnosed with T2D and an additional 33.8% classified as having prediabetes [2]. These statistics are especially worrisome considering that Chinese Americans constitute one of the fastest-growing immigrant populations in the United States, making up the largest Asian demographic with a population exceeding 5 million [3,4]. In comparison to their non-Hispanic White counterparts, Chinese Americans face distinct challenges with managing diabetes, including higher rates of poverty, limited English proficiency, and limited access to healthcare services [5,6]. This underscores the pressing need for research efforts to mitigate these disparities and improve diabetes management within the Chinese American community.

Accumulating evidence suggests that individuals with T2D have a higher likelihood of experiencing mental health issues, such as depression, anxiety, and distress, compared to those without T2D [7]. Among patients with T2D, those experiencing mental health issues are more likely to exhibit suboptimal adherence to diabetes self-care behaviors and poorer glycemic control compared to their counterparts without such issues [8,9]. Therefore, there are increasing calls from national organizations such as the American Diabetes Association and the Association of Diabetes Care and Education Specialists to screen for mental health issues and integrate mental health into diabetes care [10,11].

Cultural context significantly influences mental health-seeking behaviors and service utilization. For instance, in Chinese culture, mental health conditions are often stigmatized, leading to reluctance to discuss these issues or seek professional help [12]. This cultural barrier contributes to a significant gap in understanding the mental health burden among Chinese

Americans with T2D, including their mental health status and health-seeking behaviors. The lack of data on these aspects hampers efforts to highlight the critical need for tailored mental health services in this underserved community, making it imperative to address these informational gaps to improve diabetes care outcomes.

This study aimed to bridge critical knowledge gaps by assessing the comorbid mental health burden of Chinese Americans with T2D, including levels of depression, anxiety, general stress, and diabetes-specific stress. It also investigated both past and current health-seeking behaviors of these individuals, identified barriers to accessing mental health services, and evaluated preferences for mental health care. This report serves as the important first step to provide critical formative data to understand mental health challenges faced by Chinese Americans with T2D and to inform the development of more effective, culturally sensitive interventions to address comorbid mental health and T2D burden in underserved communities.

Methods

Study Design

This cross-sectional survey was conducted as an ancillary study to a pilot randomized controlled trial testing the potential efficacy of a culturally tailored text messaging-based diabetes intervention to improve glycemic control in Chinese Americans with T2D [13]. The survey data was collected in New York City (NYC) between October 2022 and January 2023. Standardized questionnaires were used to collect data on participants' mental health status, mental health-seeking behaviors, and demographic information. Study materials were available in both English and Mandarin Chinese. A bilingual community health worker administered the surveys over the phone in the participant's preferred language. The study protocols were approved by the Institutional Review Board of the New York University

Grossman School of Medicine (s18-00609), and all participants provided informed consent before participating in the study. To minimize participant burden, we opted for a phone-based survey over in-person interviews or online surveys. This approach is particularly well-suited for our target population of low-income, aging Chinese Americans with limited education and digital literacy, as phone surveys offer greater accessibility and inclusivity compared to the other two methods. During the call, a community health worker read the IRB-approved telephone consent script and obtained verbal consent. The entire process was recorded.

Participants

Participants were recruited from a registry comprised of Chinese Americans with T2D who had previously taken part in diabetes studies led by the same study team. These earlier studies employed community based participatory research methods and partnered with several community-based organizations to evaluate mobile health interventions that were culturally and linguistically tailored to enhance glycemic control in low-income Chinese Americans with T2D. The general inclusion criteria were as follows: 1) self-identified as Chinese American, 2) age 18 or older, 3) ability to speak and understand Mandarin or English, 4) self-reported or medical diagnosis of T2D, and 5) currently living in their homes and self-managing T2D at home. Exclusion criteria were individuals who were unable or unwilling to provide informed consent and those who had gestational diabetes. Further details regarding the inclusion and exclusion criteria for the study have been reported elsewhere [13,14].

Measures

Mental health status

We used four standardized questionnaires to measure participants' mental health status. The 9-item Patient Health Questionnaire (PHQ-9) [15], Hospital Anxiety and Depression Scale Anxiety Subscale (HADS-A) [16], Perceived Stress Scale (PSS) [17], and Diabetes Distress Scale

(DDS) [18] were used to measure depressive symptoms, anxiety, general stress, and diabetes-specific distress, respectively. All these questionnaires are available in Chinese and have been validated among the Chinese population [19–22]. The PHQ-9 has a score range of 0 to 27, with higher scores indicating more severe depressive symptoms. A PHQ-9 score of 0-4, 5-9, 10-14, 15-19, or ≥ 20 indicates no depression, mild, moderate, moderately severe, or severe depression, respectively [23]. A score of ≥ 10 indicates a significant risk for major depression [23]. The HADS-A has a score range of 0 to 21, with higher scores indicating more severe anxiety symptoms. A score of 0-7, 8-10, or ≥ 11 on the HADS-A scale indicates normal, borderline abnormal, or abnormal anxiety, respectively [16]. The PSS has a score range of 0 to 40, with higher scores indicating higher perceived stress. A score of 0-13, 14-26, or ≥ 27 indicates low-, moderate-, or high- stress levels, respectively [24]. The DDS has a score range of 1 to 6, with higher scores indicating higher diabetes-specific distress. A total score ≥ 2 indicates a moderate or higher distress level and is considered clinically important [25].

Mental health-seeking behavior

We used an investigator-developed questionnaire to collect information regarding participants' mental health service use and health-seeking behavior, including whether they had a mental health-related diagnosis, whether they had seen a mental health provider in the past 12 months, whether they were currently seeking mental health services, reasons for not seeing a provider, coping strategies for stress, preferences for mental health services, and factors to consider when seeking mental health services.

Statistical analysis

In this study, we performed descriptive analyses for all variables, reporting frequency and percentage for categorical variables and mean and standard deviation for continuous

variables. To evaluate the internal consistency of the standardized questionnaires, we computed Cronbach's alpha coefficients (see Table 2). We used R version 4.2.1 [26] for data analysis.

Results

Demographic characteristics

Data from 74 Chinese Americans with T2D were analyzed in this analysis. As shown in Table 1, most participants (mean age 56 [SD±10] years) were female (42/74, 57%) foreign-born (73/74, 99%), currently married (57/74, 77%), had a high school education or less (56/74, 76%), and had a household annual income < \$25,000 (49/74, 66%). About 18% (13/74) of the participants were unemployed and 58% (43/74) had Medicaid. On average, participants have resided in the United States for 18 [SD ± 11] years, but 96% (71/74) of them had limited English proficiency.

Mental health status

Table 2 displays the mental health status of the participants. Among the 74 participants in the study, 46% (34/74) had at least one mental health concern, which included 9% (7/74) with a diagnosis of either major depression or anxiety disorders before study entry, and an additional 36% (27/74) with either elevated stress, depressive symptoms, or anxiety. Specifically, 27% (20/74) had moderate or higher levels of general stress, 26% (15/57) had moderate or higher levels of diabetes-specific distress, 9% (7/74) reported mild or higher levels of depressive symptoms, and 7% (5/74) had borderline or abnormal anxiety.

Mental health-seeking behaviors

As shown in Table 3, only 7% (5/74) have ever seen a mental health professional and 3% (2/74)

were currently seeking mental health services. Not seeking mental health services was attributed to no perceived need (69/74, 93%), lack of information about Chinese-speaking providers (3/74, 4%), cost (1/74, 1%), and time constraints (1/74, 1%). Participants managed stress through various means such as listening to music/watching TV (52/74, 70%), engaging in physical activities (20/74, 27%), or talking to family and friends (26/74, 35%). Concerning preferences for the format of mental health services, most participants favored individual sessions (28/74, 38%) and in-person consultations (32/74, 43%). The three primary factors participants considered when seeking mental health services were the cultural and language competence of the provider (26/74, 35%), confidentiality (16/74, 22%), and cost (13/74, 18%).

Discussion

To the best of our knowledge, this is the first study to examine the comorbid mental health status and health-seeking behaviors among Chinese Americans with T2D. Nearly half (34/74, 46%) of the participants had mental health concerns. However, only 7% (5/74) have previously sought help from a mental health professional, while 3% (2/74) were using mental health services. The major reasons for not seeking mental health services were no perceived need (69/74, 93%), lack of information about Chinese-speaking providers (3/74, 4%), cost (1/74, 1%), and time constraints (1/74, 1%).

Our results indicate a high prevalence of mental health issues among Chinese Americans with T2D. This prevalence rate is higher than the rates reported in another study. According to a secondary data analysis utilizing information from the 2019 US Medical Expenditure Panel Survey, the rates of mental health burden were 25.7% in Whites, 14.9% in Blacks, 12.8% in Hispanics, and 10.2% in Asian/Native Hawaiian[27]. Our higher percentage may be due to the national data focused only on self-report diagnoses of mental health issues, whereas our study

included self-reported diagnoses plus the screening results of elevated levels of depressive symptoms, anxiety, general stress, and diabetes-specific stress. Notably, our findings based on self-report mental health-related diagnoses (7/74, 9%) align closely with the data reported in national data (10.2%).

Despite a relatively high mental health burden, our participants reported a low utilization rate and perceived no need to seek mental health services. These findings align with previous studies reporting that Chinese Americans may view mental health symptoms as negative emotions rather than a disorder, thus are less likely to seek professional help [28]. This could be attributed to traditional Chinese values of viewing negative emotions as “part of life”, accepting destiny, and withstanding hardship [29]. These cultural influences can contribute to the under-recognition of mental health issues and further prevent health-seeking behaviors.

Other studies have previously identified stigma as a significant contributor to the under-utilization of mental health services among Chinese [12]. Surprisingly, none of our participants reported stigma as a barrier to mental health-seeking. This finding could be related to social desirability bias, where participants might deny their stigmatized perceptions of mental health services to conform to societal expectations. In subsequent focus group discussions, participants brought up the stigma surrounding mental health within Chinese communities. Another piece of evidence that supports why our patients did not report stigma as a barrier is our finding that participants ranked confidentiality, a factor often associated with stigma, as the second most important consideration in service-seeking. This emphasis on confidentiality suggests an underlying concern, indicating that although participants may not have reported stigma, their fear of mental health service usage disclosure may serve as a significant stigma-related barrier to mental health service access.

Additionally, our participants indicated a key barrier to seeking mental health services: the lack of information about providers proficient in their language and cultural context. This finding is largely because Chinese Americans do not feel comfortable speaking to a mental health professional who does not share the same cultural background nor speak the same language [30]. This highlights a gap in the system where the dearth of culturally competent providers leads to a reluctance to seek necessary mental health services. Indeed, our findings reveal that the presence of a culturally and linguistically competent provider is the most frequently attributed factor Chinese Americans with T2D consider when seeking mental health services. Consequently, these findings emphasize the urgent need to embrace cultural competency and intervention adaptation to meet the unique needs of diverse populations.

Strength and limitations

To our knowledge, this study is the first to describe the comorbid mental health burden and health-seeking behaviors in Chinese Americans with T2D. By addressing this significant gap, our study lays the foundation for future investigations and interventions that target the mental health and diabetes management needs of this particular minoritized group. In addition, this study employed community-based participatory research and included many low-income Chinese Americans with limited English proficiency, who are often understudied and not included in large national datasets due to language barriers. This study provided critical preliminary data on this underserved population.

There were several limitations of our study. First, the study's sample size was relatively small, with all participants recruited from New York City, which may limit the generalizability of our findings to the broader Chinese American community. Factors such as access to Chinese-speaking healthcare providers and community support may vary significantly across different

regions of the United States. Furthermore, the participants of this study had previously taken part in our study team's prior research studies, potentially biasing our sample towards individuals more inclined to seek care. This suggests that the mental health status and underutilization of mental health services could be even more pronounced in the broader population. While two of our recent studies used electronic medical records to confirm T2D diagnosis, one of our earlier studies relied on self-report diagnosis of T2D. In addition, our study relied on self-report measures, thus there may be inherent biases and limitations associated with self-reported data, such as social desirability bias or recall bias. For example, participants may conceal their previous diagnosis or mental health service use due to stigma and/or feelings of shame. Future studies could incorporate electronic medical records or utilize multiple sources of data to overcome these limitations to provide a more comprehensive understanding of the mental health status and health-seeking behaviors among Chinese Americans with T2D.

Conclusions

Mental health issues among Chinese Americans with T2D are prevalent, yet their utilization of mental health services remains strikingly low. This discrepancy can be attributed to several factors, including the low perceived need for mental health support and the lack of knowledge of culturally and linguistically competent providers. To address this issue, it is imperative to incorporate mental health screening into comprehensive T2D care and raise awareness of mental health issues within this population. Moreover, the development and implementation of culturally tailored interventions are crucial to effectively reach and engage Chinese Americans in mental health treatment.

References

1. Rajpathak SN, Wylie-Rosett J. High prevalence of diabetes and impaired fasting glucose among chinese immigrants in New York City. *J Immigr Minor Health* 2011;13(1):181–183. doi: 10.1007/s10903-010-9356-2
2. Vicks WS, Lo JC, Guo L, Rana JS, Zhang S, Ramalingam ND, Gordon NP. Prevalence of prediabetes and diabetes vary by ethnicity among U.S. Asian adults at healthy weight, overweight, and obesity ranges: an electronic health record study. *BMC Public Health* 2022 Oct 22;22:1954. PMID:36273116
3. Asian American Federation. Profile of New York City's Chinese Americans. 2019.
4. US Census Bureau. Chinese, except Taiwanese, was the largest Asian alone or in any combination group; Nepalese population grew fastest. 2023 Sep. Available from: <https://www.census.gov/library/stories/2023/09/2020-census-dhc-a-asian-population.html> [accessed Dec 4, 2023]
5. McNeely MJ, Boyko EJ. Type 2 diabetes prevalence in Asian Americans: results of a national health survey. *Diabetes Care* 2004 Jan;27(1):66–9. PMID:14693968
6. Fan W, Lee DH, Billimek J, Choi S, Wang PH. The changing landscape of diabetes prevalence among first-generation Asian immigrants in California from 2003 to 2013. *BMJ Open Diabetes Res Care BMJ Specialist Journals*; 2017 Jan 1;5(1):e000327. doi: 10.1136/BMJDRC-2016-000327
7. Centers for Disease Control and Prevention. Diabetes and mental health. 2023 May. Available from: <https://www.cdc.gov/diabetes/managing/mental-health.html> [accessed Mar 7, 2024]
8. Lerman I, Lozano L, Villa AR, Hernández-Jiménez S, Weinger K, Caballero AE, Salinas CA, Velasco ML, Gómez-Pérez FJ, Rull JA. Psychosocial factors associated with poor diabetes self-care management in a specialized center in Mexico City. *Biomed Pharmacother Bioméd Pharmacothérapie* 2004 Dec;58(10):566–70. PMID:15589064
9. Gonzalez JS, Safren SA, Cagliero E, Wexler DJ, Delahanty L, Wittenberg E, Blais MA, Meigs JB, Grant RW. Depression, self-care, and medication adherence in type 2 diabetes: Relationships across the full range of symptom severity. *Diabetes Care* 2007 Sep;30(9):2222–2227. PMID:17536067
10. Ducat L, Rubenstein A, Philipson LH, Anderson BJ. A review of the mental health issues of diabetes conference. *Diabetes Care* 2015;38(2):333–338. PMID:25614689
11. Gonzalvo JD, Hamm J, Eaves S, Muñoz CE, De Groot M, Hill-Briggs F, Cypress M, Streisand R. A practical approach to mental health for the diabetes educator. *AADE Pract SAGE Publications*; 2019 Mar 1;7(2):29–44. doi: 10.1177/2325160319826929
12. Shi W, Shen Z, Wang S, Hall BJ. Barriers to professional mental health help-seeking among Chinese adults: A systematic review. *Front Psychiatry* 2020;11. Available from: <https://www.frontiersin.org/articles/10.3389/fpsy.2020.00442> [accessed Dec 29, 2022]
13. Hu L, Islam N, Zhang Y, Shi Y, Li H, Wang C, Sevvick MA. Leveraging social media to

increase access to an evidence-based diabetes intervention among low-income Chinese immigrants: Protocol for a pilot randomized controlled trial. *JMIR Res Protoc* 2022 Oct 28;11(10):e42554. doi: 10.2196/42554

14. Hu L, Trinh-Shevrin C, Islam N, Wu B, Cao S, Freeman J, Sevic MA. Mobile device ownership, current use, and interest in mobile health interventions among low-income older Chinese immigrants with type 2 diabetes: Cross-sectional survey study. *JMIR Aging* 2022 Feb 2;5(1):e27355. PMID:35107426
15. Spitzer RL, Kroenke K, Williams JBW, and the Patient Health Questionnaire Primary Care Study Group. Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *JAMA* 1999 Nov 10;282(18):1737–1744. doi: 10.1001/jama.282.18.1737
16. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 1983;67(6):361–370. doi: 10.1111/j.1600-0447.1983.tb09716.x
17. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav US: American Sociological Assn*; 1983;24(4):385–396. doi: 10.2307/2136404
18. Polonsky WH, Fisher L, Earles J, Dudl RJ, Lees J, Mullan J, Jackson RA. Assessing psychosocial distress in diabetes development of the Diabetes Distress Scale. *Diabetes Care American Diabetes Association*; 2005 Mar 1;28(3):626–631. PMID:15735199
19. Leung DY, Lam T, Chan SS. Three versions of Perceived Stress Scale: Validation in a sample of Chinese cardiac patients who smoke. *BMC Public Health* 2010 Aug 25;10:513. PMID:20735860
20. Li Q, Lin Y, Hu C, Xu Y, Zhou H, Yang L, Xu Y. The Chinese version of hospital anxiety and depression scale: Psychometric properties in Chinese cancer patients and their family caregivers. *Eur J Oncol Nurs Off J Eur Oncol Nurs Soc* 2016 Dec;25:16–23. PMID:27865248
21. Yeung A, Fung F, Yu S-C, Vorono S, Ly M, Wu S, Fava M. Validation of the Patient Health Questionnaire-9 for depression screening among Chinese Americans. *Compr Psychiatry* 2008;49(2):211–217. PMID:18243896
22. Zhang Y-Y, Li W, Sheng Y. The Chinese version of the revised Diabetes Distress Scale for adults with type 2 diabetes: Translation and validation study. *Int J Nurs Sci* 2022 Mar 8;9(2):243–251. PMID:35509697
23. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001 Sep 1;16(9):606–613. doi: 10.1046/j.1525-1497.2001.016009606.x
24. Townsend S, Medvedev ON. Perceived Stress Scale (PSS). In: Medvedev ON, Krägeloh CU, Siegert RJ, Singh NN, editors. *Handb Assess Mindfulness Res Cham: Springer International Publishing*; 2022. p. 1–13. doi: 10.1007/978-3-030-77644-2_91-1
25. Fisher L, Hessler DM, Polonsky WH, Mullan J. When Is diabetes distress clinically meaningful? Establishing cut points for the Diabetes Distress Scale. *Diabetes Care*

American Diabetes Association; 2012 Feb 1;35(2):259–264. PMID:22228744

- 26. R Core Team. R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2021. Available from: <https://www.R-project.org/>**
- 27. Bounthavong M, Medina A, Wallace BM, Sepassi A, Morello CM. Impact of increasing number of mental health conditions on healthcare costs and resource utilization among individuals with type 2 diabetes: A cross-sectional study. J Pharm Health Serv Res 2024 Jun 1;15(2):rmae008. doi: 10.1093/jphsr/rmae008**
- 28. Parker G, Chan B, Tully L. Depression and help-seeking in a western sample of ‘highly acculturated’ Chinese and controls. J Affect Disord 2006 Aug 1;94(1):239–242. doi: 10.1016/j.jad.2006.03.012**
- 29. Parker G, Chan B, Tully L, Eisenbruch M. Depression in the Chinese: The impact of acculturation. Psychol Med Cambridge University Press; 2005 Oct;35(10):1475–1483. doi: 10.1017/S0033291705005623**
- 30. Lee S, Juon H-S, Martinez G, Hsu CE, Robinson ES, Bawa J, Ma GX. Model minority at risk: Expressed needs of mental health by Asian American young adults. J Community Health 2009 Apr 1;34(2):144–152. doi: 10.1007/s10900-008-9137-1**

Table 1 Demographic Characteristics

Characteristics	n/M	%/SD
Age in years, M (SD)^a	56	(10)
Female, n (%)	42	(57)
Currently married or living as married, n (%)	57	(77)
Education, n (%)		
Less than high school	29	(39)
High school graduate	27	(37)
More than high school	18	(24)
Annual income, n (%)		
<US \$25,000	49	(66)
>= US \$25,000	23	(31)
Declined to answer or don't know	2	(3)
Employment status, n (%)		
Employed	45	(61)
Not employed, not working	13	(17)
Retired	16	(22)
Insurance type, n (%)^b		
Private insurance	7	(9)
Medicaid	43	(58)
Medicare	16	(22)
Other types of public/government insurance	15	(20)
No insurance	6	(8)
Foreign born, n (%)	73	(99)
Limited English proficiency, n (%)	71	(96)
Duration of residency in years, M (SD)^a	18	(11)

Note. The total sample size is 74. ^aThere were missing values for age and duration of residency. The sample size for these variables was 73 and 72, respectively. ^bParticipants were asked to select all insurance types they possessed (i.e., 'check all that apply').

Table 2 Mental Health Status

Mental health status	n/M	%/SD	Potential range	Cronbach alpha
Self-reported mental health-related diagnosis				
No	67	(91)		
Yes (depression or anxiety)	7	(9)		
Major depression	4	(5)		
Anxiety disorders	3	(4)		
Depressive symptoms (PHQ-9 level), n (%)			0-27	0.82
no	67	(91)	0-4	
mild	4	(5)	5-9	
moderate	2	(3)	10-14	
moderate-severe	1	(1)	15-19	
severe	0	(0)	20-27	
Anxiety (HADS-A level), n (%)			0-21	0.79
normal	69	(93)	0-7	
borderline abnormal	3	(4)	8-10	
abnormal	2	(3)	11-21	
Perceived stress (PSS level), n (%)			0-40	0.56
low	54	(73)	0-13	
moderate	19	(26)	14-26	
high	1	(1)	27-40	
Diabetes distress (DDS level) ^a , n (%)			1-6	0.92
Moderate to higher distress	15	(26)	2-6	
Low distress	42	(74)	1	

Note. The total sample size is 74. ^aThe sample size for diabetes distress is 57. PHQ-9 = Patient Health Questionnaire-9; HADS-A = Hospital Anxiety and Depression Scale Anxiety Subscale; PSS = Perceived Stress Scale; DDS = Diabetes Distress Scale.

Table 3 Health-Seeking Behaviors

Health-seeking behaviors	n	%
Have seen a provider in the past 12 months	5	7
Currently seeking mental health services	2	3
Talk to a therapist	1	1
See a psychiatrist	1	1
Taking medication	1	1
Reasons for not seeking mental health services		
No need	69	93
Lack of information about Chinese-speaking providers	3	4
Cost	1	1
Don't have time	1	1
Stigma	0	0
Transportation barriers	0	0
Strategies to cope with stress		
Listen to music/watch TV/ entertainment	52	70
Talk to family/friends	26	35
Physical activity/exercise	20	27
No stress	5	7
Drinking	2	3
Seek help from mental health providers	1	1
Meditation	1	1
Smoking	1	1
Binge eating	1	1
Keep silence	1	1
Sleep	1	1
Mental health services preference		
Individual	28	38
Neither. I don't want to use mental health services	25	34
Either	12	16
Group	9	12
Mental health services format preference		
In-person	32	43
Don't want to use mental health services	20	27
Phone	12	16
Any format	8	11
Video-based	2	3
Factors to consider when seeking mental health services		
A provider that understands my language/culture	26	35
Confidentiality	16	22
Cost	13	18
Access	7	9
Close to home	5	7
Flexibility	4	5

Others	10	14
No need	8	11
Qualified doctor	1	1
No idea	1	1

Note. The total sample size is 74.

Supplementary Files