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Factors Influencing Satisfaction with Traditional Chinese Medicine Care in Diabetic Kidney Disease: Prior Experience, Race, and Treatment Duration

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ABSTRACT

Patient-centered care is a key component of high-quality healthcare, and patient satisfaction has been linked to better clinical outcomes. This study aims to investigate the satisfaction of patients with diabetic kidney disease (DKD) regarding their consultations with Traditional Chinese Medicine (TCM) physicians, and to examine how patients' socio-economic characteristics may influence their satisfaction. We conducted a questionnaire-based study among patients over 21 years old with diabetic kidney disease (DKD). After their visits with Traditional Chinese Medicine (TCM) physicians, participants provided information on their demographic and socioeconomic backgrounds, along with their satisfaction levels using the self-administered Medical Interview Satisfaction Scale (MISS). The MISS is a 26-item tool that evaluates patient satisfaction across three dimensions: cognitive, affective, and behavioral. Statistical analyses were performed using independent samples t-tests and one-way ANOVA to examine differences in satisfaction scores. A total of 137 participants completed the questionnaires and were included in the analysis. The overall mean satisfaction score was 3.1 out of 5, with the cognitive domain scoring significantly higher than the affective and behavioral domains. Cognitive domain scores varied significantly according to participants' housing type and prior experience with TCM. Behavioral domain scores showed significant differences across ethnic groups. Additionally, satisfaction scores across all domains were significantly associated with the duration of follow-up with TCM physicians. Our findings suggest that ethnicity, housing type, prior experience with TCM, and the duration of follow-up with TCM physicians may influence satisfaction scores among patients with diabetic kidney disease (DKD).

words: Patient satisfaction, Diabetic kidney disease, Traditional chinese medicine

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Introduction

Diabetic kidney disease (DKD) is a major microvascular complication of diabetes and represents a growing global health concern due to its increasing prevalence. In local outpatient settings, the prevalence of DKD has been reported to be 53% [1]. DKD is associated with heightened cardiovascular morbidity and mortality and is the leading cause of end-stage renal failure (ESRF) [2]. The rising burden of DKD has also contributed to increased healthcare utilization and economic costs.

Management of DKD remains challenging and requires a holistic, patient-centered approach. Conventional medicine tends to be disease-targeted and has been suggested to be less interpersonal compared to complementary and alternative medicine (CAM), which emphasizes the restoration of harmony between body and mind [3, 4]. Patient-centered care prioritizes holistic care tailored to patients' needs, values, and experiences and is increasingly recognized as a critical component of quality healthcare [5, 6]. Patient perspectives and satisfaction have been linked to improved clinical outcomes, with higher satisfaction scores associated with better adherence to medical treatments and scheduled appointments. Moreover, patient satisfaction fosters trust in the healthcare provider–patient relationship, supporting continuity of care within the same healthcare organization [7, 8].

In recent decades, the measurement of patient satisfaction has garnered increasing attention. As patient-centered care becomes more emphasized, healthcare regulators are incorporating patient satisfaction as a key metric for quality assessment [9–11]. Understanding patient satisfaction enables quality improvement initiatives that ultimately influence healthcare delivery and patient outcomes [12]. Measuring patient satisfaction, however, is complex, and a range of validated tools are commonly used, including the Medical Interview Satisfaction Scale (MISS) [13], Consumer Assessment of Health Plans (CAHPS) [14], and the Patient Satisfaction Questionnaire (PSQ) [15].

Traditional Chinese medicine (TCM), one of the oldest forms of CAM, is widely practiced globally and highly regarded in Asian societies such as Taiwan, Hong Kong, and Singapore. Although both Western medicine and TCM are accessible in Singapore, integration between the two systems remains limited. Some studies suggest that patients seek TCM when dissatisfied with conventional care [16], while others indicate that cultural and personal beliefs, rather than dissatisfaction, drive the use of TCM [3, 17]. Despite its widespread use, research on patient satisfaction with TCM consultations is limited.

Patient satisfaction is multidimensional, encompassing cognitive, affective, and behavioral domains, and TCM consultations may differentially influence these domains. In a multicultural society like Singapore, socio-economic and cultural factors may further shape patients' satisfaction with TCM care. Therefore, this study aims to evaluate patient satisfaction with TCM consultations among individuals with DKD and to explore how socio-economic characteristics influence satisfaction scores.

Materials and Methods

Study population

This study was carried out prospectively at Singapore General Hospital (SGH) and the Singapore Thong Chai Medical Institute over the period from 18 May 2015 to 7 December 2016. Potential participants were identified by screening electronic medical records, and those meeting eligibility criteria were invited to take part. Adults over 21 years with type II diabetes mellitus (T2DM) and chronic kidney disease (CKD) stages II to V were considered eligible. Patients were excluded if they had dementia, a recent doubling of serum creatinine, non-diabetic kidney disease, were on renal replacement therapy, or had severe cardiac failure or chronic liver disease. Eligible participants underwent a consultation at Singapore Thong Chai Medical Institute with the aim of evaluating the presence and severity of DKD; no treatment was administered during this visit [18]. The study protocol received approval from the SingHealth Centralized Institutional Review Board (CIRB Reference: 2015/2004), and written informed consent was obtained from all participants prior to inclusion.

Patient satisfaction score

At the conclusion of their TCM consultation, participants received a copy of the MISS-26 questionnaire to complete at home. The questionnaire was provided in either English or Chinese, and participants were instructed to return it to the study team via a pre-addressed, stamped envelope. The MISS-26, originally developed by Wolf *et al*. in the United States in 1978 [19], was designed to assess patient satisfaction with medical consultations. It is the first version of the instrument to include three subscales—cognitive, affective, and behavioral. Respondents rate each item on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The MISS-26 was selected for this study due to its strong internal consistency, clear structure, and focus on the quality of doctor–patient interactions.

The questionnaire also collected demographic information, including age, gender, ethnicity, housing type, educational level, employment status, and prior experience with TCM. In Singapore, approximately 80% of residents live in public Housing and Development Board (HDB) flats, while the remainder reside in private housing. Among these, 5-room HDB flats and private housing are generally the most costly, making housing type a useful proxy for socioeconomic status in this population.

Analysis

The MISS-26 consists of 26 items distributed across three domains: 9 items each for the cognitive and affective domains, and 8 items for the behavioral domain. The overall mean satisfaction score was calculated by dividing the total score by 26, while domain-specific mean scores were obtained by dividing the sum of item scores within each domain by the number of items in that domain. Differences between domain scores were analyzed using one-

way analysis of variance (ANOVA), with post-hoc comparisons performed using the Bonferroni correction. The effects of categorical variables—including gender, marital status, employment, education level, housing type, language preference, prior TCM experience, and duration of follow-up with TCM physicians—on mean MISS-26 scores were evaluated using independent samples t-tests or ANOVA with post-hoc analysis as appropriate. Missing responses accounted for less than 10% of the dataset and were excluded from the analyses. Statistical significance was defined as $p < 0.05$, and all analyses were conducted using SPSS version 21.

Results and Discussion

Demographic and socioeconomic characteristics

Out of 200 enrolled participants, 137 returned completed questionnaires and were included in the analysis. Participants' demographic and socioeconomic characteristics, along with their prior TCM experience, are summarized in **Table 1.** The mean age of participants was 64 years, and 61.3% were male. The majority were of Chinese ethnicity (80.3%), and approximately half (54%) reported previous visits to a TCM physician. Among those with prior TCM experience, 83.8% had been under follow-up with their TCM physician for less than one year.

Table 1. Characteristics of Study Participants by Demographic and Socioeconomic Factors (N = 137)

		Frequency (percentage)
Mean age, years (SD)	64.1(8.3)	
Gender	Female	53 (38.7%)
	Male	84 (61.3%)
Race	Chinese	110 (80.3%)
	Malay/Indian/Others	27 (19.7%)
Education	Primary or lower	40 (29.2%)
	Secondary or lower	50 (36.5%)
	Post-secondary (non- tertiary)/tertiary	47 (34.3%)
Type of housing	1-/2-/3- room HDB	32 (23.4%)
	4-Room HDB	49 (35.8%)
	5-Room HDB/Private	55 (40.1%)
Employment Status	Working full-time	48 (35%)
	Working part-time	20 (14.6%)
	Not working (e.g., students, retirees, housewives & unemployed)	68 (49.6%)
Spoken Language	English	53 (38.7%)
	Mother Tongue	60 (43.8%)
	English and Mother Tongue	24 (17.5%)
Ever seen a TCM physician	Yes	74 (54%)
Duration of follow up with TCM physician	Less than a year	62 (83.8%)
	More than a year	12 (16.2%)

Satisfaction score.

Participants reported a mean overall satisfaction score of 3.1 out of 5. Analysis of the three MISS-26 domains revealed significant differences ($p < 0.05$), with the highest satisfaction observed in the cognitive domain, intermediate satisfaction in the affective domain, and the lowest scores recorded in the behavioral domain **(Table 2).**

Table 2. Domain-Specific Satisfaction Scores and Pairwise Comparisons (Bonferroni Adjustment)

Domain	**Mean ± SD (out of 5)**	**Comparison**	**Mean Difference (95% CI)**	**p-value**
Cognitive	3.40 ± 0.90	Cognitive vs Affective	0.24 (0.04–0.44)	0.015
Affective	3.10 ± 0.60	Affective vs Behavioral	0.48 (0.27–0.68)	<0.001
Behavioral	2.60 ± 0.50	Behavioral vs Cognitive	-0.72 (-0.92 – -0.51)	<0.001

∗The mean difference is significant at the 0.05 level.

Comparison of satisfaction scores with different demographic and socioeconomic characteristics

Participants residing in 4-room HDB flats reported significantly higher cognitive domain satisfaction scores compared to those living in 5-room HDB flats or private housing (3.65 vs. 3.11, p = 0.005) **(Table 3).** Similarly, individuals with prior TCM consultation experience had higher cognitive satisfaction scores than those without previous TCM visits (3.53 vs. 3.21, p = 0.038) **(Table 4).** Regarding the behavioral domain, Chinese participants reported lower satisfaction scores than non-Chinese participants (2.60 vs. 2.82, p = 0.048) **(Table 4).** Participants who had been followed up by their TCM physician for less than one year had lower mean scores across all three domains compared to those with follow-up exceeding one year (2.89 vs. 3.47, p = 0.001) **(Table 4)**. No significant differences in MISS-26 satisfaction scores were observed based on gender, age, marital status, employment, education level, or language spoken. A sensitivity analysis, in which missing values were imputed using domain-specific averages, confirmed that the results were consistent.

Table 3. Cognitive Domain Satisfaction Scores by Housing Type with Bonferroni-Adjusted Post-Hoc Comparisons

Housing types	Mean cognitive satisfaction score (SD)	Post-hoc analysis		
		Housing type	Mean Difference (95% CI)	Sig.
1-3 room HDB	3.31 (0.9)	1-3 room HDB vs 4-room HDB	-0.335 (-0.811–0.142)	0.273
4-room HDB	3.65 (0.7)	4-room HDB vs 5-room HDB/pte	0.541 (0.130–0.950)	**0.005**
5-room HDB/private	3.11 (0.9)	1-3 room HDB vs 5-room HDB/pte	-0.206 (-0.673–0.260)	0.854

∗The mean difference is significant at the 0.05 level.

Table 4. Comparison of patient satisfaction scores by prior TCM experience (with vs. without), ethnicity (Chinese vs. Malay/Indian/Others), and duration of follow-up with the TCM physician (>1 year vs. ≤1 year).

Satisfaction score	Previous TCM experience			Ethnicity			Duration of follow up with the TCM physician		
	No N = 63	Yes N = 74	P	Chinese N = 110	Malay/Indian/others N = 27	P	<1 year N = 62	>1 year N = 12	P
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Cognitive	3.53 (0.90)	3.21 (0.87)	**0.038**	3.42(0.80)	3.11 (1.20)	0.102	3.07 (0.84)	3.95 (0.62)	**0.001**
Affective	3.18 (0.66)	3.07 (0.60)	0.350	3.12 (0.59)	3.14 (0.78)	0.841	3.00 (0.59)	3.45(0.49)	**0.017**
Behavioural	2.66 (0.52)	2.63 (0.53)	0.662	2.60(0.50)	2.82 (0.57)	**0.048**	2.57 (0.54)	2.93 (0.27)	**0.028**
Overall	3.14 (0.63)	2.98 (0.56)	0.119	3.06 (0.55)	3.03 (0.77)	0.799	2.89 (0.54)	3.47 (0.36)	**0.001**

Data presented as mean (SD) p <0.05.

This study is among the few to examine patient satisfaction with TCM consultations specifically in individuals with diabetic kidney disease (DKD). TCM is widely practiced and highly valued worldwide, including in Singapore, where socio-economic and cultural diversity can significantly shape patients' experiences and satisfaction. Positive patient–physician interactions and active patient participation in self-management have been shown to enhance satisfaction, improve adherence to medical care, and ultimately lead to better health outcomes [20, 21]. In our cohort, 54% of participants reported previous TCM consultations, which is notably higher than the 22% prevalence reported in earlier studies [17].

Overall, the cognitive domain received the highest mean satisfaction score, followed by the affective and behavioral domains. Our findings indicated that participants with prior TCM experience and those residing in larger public flats or private housing reported lower cognitive satisfaction. Chinese participants had lower

satisfaction in the behavioral domain, and participants with shorter follow-up durations with their TCM physicians exhibited lower satisfaction across all domains.

The cognitive domain assesses communication, including the physician's explanation of medical conditions, diagnosis, prognosis, and treatment options, ensuring that patients understand the information conveyed [19]. This domain is closely linked to the exchange of information during consultations. Given that TCM emphasizes interpersonal interaction and verbal communication, it is unsurprising that participants reported higher satisfaction in the cognitive and affective domains. Effective communication is well recognized as a cornerstone of the doctor–patient relationship and is particularly important in chronic disease management [22], whereas communication breakdowns can negatively impact satisfaction and treatment outcomes [23].

The affective domain reflects patients' perceptions of the therapeutic relationship, including trust, confidence, and the provider's attentiveness to patient concerns [19]. It is most relevant during the initial interview process and captures the humanistic aspects of the encounter. In contrast, the behavioral domain evaluates the provider's professionalism, diagnostic procedures, examinations, investigations, and medical advice [19]. The relatively lower scores in the behavioral domain may reflect the diagnostic nature of the TCM visits in this study, which did not include treatment.

Interestingly, participants with prior TCM experience reported lower cognitive domain satisfaction than those without such experience. In Singapore, TCM practice is regulated, and practitioners are expected to demonstrate professionalism comparable to Western-trained physicians [24]. Patients' prior experiences may shape their expectations, and those with previous TCM encounters may have had expectations that were not fully met during a consultation focused solely on diagnosis [25].

We also observed that participants residing in 5-room HDB flats or private housing had lower cognitive domain scores compared to those in 4-room HDB flats. As home ownership is often used as a proxy for socioeconomic status, this finding contrasts with previous research suggesting that lower socioeconomic status is typically associated with lower patient satisfaction [26].

Another notable finding was that Chinese participants reported lower satisfaction in the behavioral domain compared to non-Chinese participants. This is unexpected, as prior studies suggest that race concordance between patients and providers generally correlates with higher satisfaction and trust [27]. These results highlight the need for further exploration of the roles of socioeconomic status and ethnicity in shaping patient satisfaction.

Finally, our study found that longer follow-up with TCM physicians was associated with higher satisfaction across all three domains. This aligns with evidence indicating that sustained patient–physician relationships foster greater satisfaction and confidence due to continuity of care [28]. No significant differences in satisfaction were observed with respect to gender, age, marital status, employment, education level, or language spoken. While some studies have reported higher satisfaction among older patients [16, 29] or females [4], these effects were not observed in our cohort.

Strengths and limitations

This study is the first to examine patient satisfaction with TCM consultations specifically among individuals with diabetic kidney disease (DKD) in a multi-ethnic setting where conventional medicine and TCM coexist. Our findings underscore the critical role of effective communication, addressing patient concerns, and fostering active patient engagement in healthcare encounters to enhance self-management and overall satisfaction [22].

Several limitations should be acknowledged. First, the TCM consultations in this study were purely diagnostic, which may not capture the full range of services and treatments typically provided by TCM practitioners, potentially influencing satisfaction scores. Second, the study population was limited to patients with diabetes and chronic kidney disease, limiting the generalizability of the findings to individuals with other chronic or acute conditions. Third, although the MISS instrument demonstrates strong internal consistency and is widely used to assess patient satisfaction, it has not been formally validated in the local population.

Conclusion

In summary, our study demonstrates that ethnicity, housing type, prior TCM experience, and duration of follow-up with TCM physicians influence satisfaction levels among patients with diabetic kidney disease (DKD). Future research comparing patient satisfaction between conventional medical care and TCM consultations could provide valuable insights into patients' perceptions of these two healthcare systems. As patient-centered and

individualized care continues to gain prominence, patient satisfaction will remain a key metric in evaluating the quality of healthcare delivery.

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Conflict of Interest: None

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Ethics Statement: None

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