Health-Related Quality of Life and Influencing Factors in Traditional Chinese Medicine Preventive Treatment Patients: A Study Based on the EQ-5D-5L Scale (Postprint)

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Abstract

Background: TCM preventive treatment (治未病) represents a distinctive advantage of Traditional Chinese Medicine health management services, yet the overall health status of patients seeking such care remains to be elucidated and evaluated. Objective: To assess the health-related quality of life (HRQoL) and its influencing factors among patients receiving TCM preventive treatment. Methods: In May-June 2022, stratified cluster sampling was employed to randomly select one district-level Traditional Chinese Medicine hospital from each of four administrative districts in Guangzhou (Liwan, Tianhe, Baiyun, Huadu) as survey sites. The EuroQol Five-Dimensional Five-Level Questionnaire (EQ-5D-5L) was administered to primary care patients receiving TCM preventive treatment. Health utility values were calculated using the Chinese health utility value scoring system. Optimal scaling regression analysis was utilized to analyze factors influencing EQ-5D-5L utility values and Visual Analogue Scale (EQ-VAS) scores. Results: A total of 660 questionnaires were completed, with 630 valid questionnaires (effective response rate 95.45%). Among the 630 patients receiving TCM preventive treatment, 29.4% (185/630) sought care for daily health maintenance; 38.4% (242/630) for initial discomfort or early-stage disease; 34.6% (218/630) for existing disease to prevent further progression; and 10.6% (67/630) for post-illness rehabilitation. The top three TCM disease categories for the most recent preventive treatment service were insomnia, epigastric pain, and bi syndrome. The EQ-5D-5L health utility value was 0.942 (0.893, 1.000), and the EQ-VAS score was 80 (70, 90). Dimensions ranked by frequency of reported problems were: pain/discomfort (50.2%), anxiety/depression (46.9%), usual activities (14.4%), mobility (9.9%), and self-care (6.0%). Factors influencing EQ-5D-5L utility values, in order of importance, were: primary

reason for most recent TCM preventive treatment (0.366), age (0.281), TCM disease comorbidity (0.145), occupation (0.111), and education level (0.098). Factors influencing EQ-VAS scores, in order of importance, were: marital status (0.378), understanding of TCM preventive treatment (0.353), age (0.176), and monthly income (0.092). Conclusion: HRQoL among primary care TCM preventive treatment patients in Guangzhou is at a moderate level. Patients with TCM disease categories such as lung cancer, stroke, chronic obstructive pulmonary disease, osteoporosis, and breast cancer, those aged over 60 years, with two or more TCM disease comorbidities, engaged in physical labor, and with lower education levels had lower health utility values. Those not in marital union, with very poor understanding of TCM preventive treatment, aged over 60 years, and with higher monthly income had poorer self-rated health status. HRQoL should be utilized as an important outcome evaluation indicator, with focused attention on TCM preventive treatment patients with poorer HRQoL, and strengthened promotion of TCM preventive treatment concepts and connotations. Chronic disease health management programs guided by TCM preventive treatment concepts should be developed and implemented based on characteristics of TCM disease categories and sociodemographic features.

Full Text

Health-Related Quality of Life and Its Influencing Factors in Patients Receiving Traditional Chinese Medicine Preventive Treatment: A Study Based on the EQ-5D-5L Scale

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Abstract

Background: Traditional Chinese Medicine (TCM) preventive treatment ("Zhi Wei Bing") represents a distinctive advantage of TCM health management services, yet the holistic health status of patients seeking such care remains to be fully elucidated and evaluated.

Objective: To assess the health-related quality of life (HRQoL) and its influencing factors among patients receiving TCM preventive treatment.

Methods: From May to June 2022, a stratified cluster sampling method was employed to randomly select one district-level TCM hospital from each of four

administrative districts in Guangzhou (Liwan, Tianhe, Baiyun, and Huadu) as research sites. Patients receiving TCM preventive treatment at primary care facilities were surveyed using the EQ-5D-5L questionnaire. Health utility values were calculated based on the Chinese EQ-5D utility scoring system, and optimal scale regression analysis was used to identify factors influencing both EQ-5D-5L utility values and visual analogue scale (EQ-VAS) scores.

Results: A total of 660 questionnaires were completed, yielding 630 valid responses (95.45% valid response rate). Among the 630 patients, 29.4% (185/630) sought care for daily health maintenance; 38.4% (242/630) for early symptoms or incipient disease; 34.6% (218/630) for preventing progression of existing conditions; and 10.6% (67/630) for post-illness rehabilitation. The top three TCM conditions for which patients most recently received preventive treatment were insomnia, epigastric pain, and arthralgia. The median EQ-5D-5L utility value was 0.942 (0.893, 1.000), and the median EQ-VAS score was 80 (70, 90). Dimensions ranked by difficulty frequency were: pain/discomfort (50.2%), anxiety/depression (46.9%), usual activities (14.4%), mobility (9.9%), and self-care (6.0%). Factors influencing EQ-5D-5L utility values, in descending order of importance, were: primary reason for most recent TCM preventive treatment (0.366), age (0.281), TCM condition comorbidity (0.145), occupation (0.111), and education level (0.098). Factors influencing EQ-VAS scores, in descending order of importance, were: marital status (0.378), understanding of TCM preventive treatment (0.353), age (0.176), and monthly income (0.092).

Conclusion: HRQoL among primary care patients receiving TCM preventive treatment in Guangzhou is at a moderate level. Lower utility values were observed in patients with conditions such as lung cancer, stroke, COPD, osteoporosis, and breast cancer; those aged 60+; those with $ $2 TCM conditions; those engaged in manual labor; and those with lower education levels. Poorer self-rated health was found in unmarried patients, those with very limited understanding of TCM preventive treatment, those aged 60+, and those with higher monthly incomes. HRQoL should be utilized as an important outcome measure, with targeted attention to vulnerable subgroups and enhanced promotion of TCM preventive treatment concepts. Chronic disease management protocols guided by TCM preventive treatment principles should be developed based on TCM condition characteristics and sociodemographic profiles.

Keywords: Preventive treatment of disease; Traditional Chinese Medicine; Health utility value; Health-related quality of life; Root cause analysis; Guangzhou

Introduction

Against the backdrop of China's Healthy China strategy advocating "co-construction, sharing, and health for all," TCM preventive treatment, with its unique health preservation philosophy and advantages of being "simple,

convenient, effective, and economical," embodies a preventive-oriented holistic approach through four aspects: health maintenance before illness, early intervention at incipient stages, timely treatment to prevent progression, and post-illness rehabilitation to prevent recurrence [1]. Providing TCM preventive treatment services in community elderly care settings has demonstrated strong public acceptance and technical feasibility [2]. However, public understanding of TCM preventive treatment remains relatively low, limiting its effective application in health management activities [3].

Health-related quality of life represents a crucial component of patient-reported outcomes (PRO), describing individual health status across multiple dimensions including physical and psychological well-being, and enabling calculation of health utility values that reflect patient preferences for specific health states—widely used in health service evaluation [4]. Applying HRQoL as a key outcome indicator for TCM preventive treatment holds important reference value for evaluating the effectiveness of whole-process health management.

The European Quality of Life Five-Dimensional Questionnaire (EQ-5D) is a standardized, universal instrument for measuring HRQoL, designed to describe and evaluate health status across disease populations and general communities. The adult version includes EQ-5D-3L and EQ-5D-5L variants, with a Chinese population-based utility scoring system now established [5-6]. The EQ-5D-5L significantly improves reliability and sensitivity while potentially reducing ceiling effects [7], demonstrating superior measurement properties compared to EQ-5D-3L across multiple domains [8-9]. Previous domestic research has primarily applied EQ-5D-5L to study health status in cancer [10-11], hypertension [12], chronic disease [13], rural residents [14], and community populations [15], with few studies from a TCM perspective [16]. This study innovatively focuses on patients receiving TCM preventive treatment at primary-level TCM institutions as a distinct population, examining their HRQoL and influencing factors to provide evidence for developing targeted health management protocols guided by TCM preventive treatment principles.

Methods

Study Population and Sampling

This survey was conducted in Guangzhou from May to June 2022. Using stratified cluster sampling, we selected four administrative districts (Liwan, Tianhe, Baiyun, and Huadu) based on geographic location (urban center, urban-rural fringe, suburban area), economic development level, and population distribution. One district-level TCM hospital was randomly selected from each district as a research site, where patients visiting TCM preventive treatment clinics were conveniently sampled for on-site survey.

Inclusion criteria: (1) Age $ $18 years; (2) Visited TCM preventive treatment

clinics at primary-level TCM institutions within the past 2 weeks or regularly received TCM preventive treatment services within the past year; (3) Clear consciousness, able to complete questionnaire independently or with assistance; (4) Provided informed consent.

Sample size calculation: Based on 5% of monthly outpatient volume at each institution's preventive treatment department, 150 participants were planned per district (total n=600). Considering potential invalid responses, we increased the sample by 10% to 660 participants.

Survey Instruments

A general information questionnaire collected sociodemographic data including gender, age, education, household registration, marital status, monthly income, current/former occupation, and medical insurance type, as well as understanding of TCM preventive treatment and specific reasons for most recent service utilization.

The EQ-5D-5L assessed health status, comprising two parts: (1) A descriptive system evaluating five dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression), each with five response levels (no problems, slight problems, moderate problems, severe problems, unable/extreme problems). For analysis, responses were dichotomized into "no problems" (Level 1) versus "any problems" (Levels 2-5) to calculate difficulty rates for each dimension (difficulty rate = patients with problems / total patients $\times$ 100%). Unique health states were defined by combining levels across dimensions, yielding 3,125 possible health states [17]. Utility scores ranged from <0 (0=death; negative values=worse than death) to 1 (full health), calculated using the Chinese EQ-5D-5L utility value system (range: -0.391 to 1.000) [5]. (2) A visual analogue scale (EQ-VAS) where patients rated their perceived health from 0 (worst imaginable) to 100 (best imaginable). The Chinese version demonstrates good reliability and validity [18].

Quality Control

TCM preventive treatment physicians from each hospital served as surveyors, explaining the study purpose and obtaining informed consent before respondents completed questionnaires independently. Questionnaires were collected immediately, with designated quality control personnel at each hospital checking for completeness and response quality. Invalid questionnaires were excluded if: >70% single-option responses, >70% missing data, or obvious contradictions/errors.

Statistical Analysis

Data were double-entered and verified using Epidata software. SPSS 24.0 was used for statistical analysis. Sociodemographic characteristics and EQ-5D-5L dimension distributions were described descriptively. Non-normally distributed

continuous data were presented as median (P25, P75), with group comparisons using Mann-Whitney U or Kruskal-Wallis H tests. Given that most independent variables were nominal or ordinal, optimal scale regression was employed for analyzing factors influencing utility values and EQ-VAS scores, converting categorical variables to numeric values for analysis [19]. Statistical significance was set at $P<0.05$.

Results

Sociodemographic Characteristics

A total of 660 questionnaires were completed, with 630 valid responses (95.45% valid response rate). Sample characteristics are presented in Table 1 . Among participants, 29.4% (185/630) sought care for daily health maintenance; 38.4% (242/630) for early symptoms or incipient disease; 34.6% (218/630) for preventing progression of existing conditions; and 10.6% (67/630) for post-illness rehabilitation. The top three TCM conditions were insomnia, epigastric pain, and arthralgia. Comorbid TCM conditions ($ $2 conditions) were present in 14.0% (88/630) of patients. Regarding understanding of TCM preventive treatment, 6.1% (38/630) reported "very good understanding," 24.3% (153/630) "good understanding," 18.7% (118/630) "limited understanding," and 3.3% (21/630) "very limited understanding" (Table 1).

Overall Health Status

The median EQ-5D-5L utility value was 0.942 (0.893, 1.000), and median EQ-VAS score was 80 (70, 90). Difficulty levels across dimensions showed decreasing distributions, with at least 49.8% of patients reporting no problems in any dimension. Dimensions ranked by difficulty frequency were: pain/discomfort (50.2%), anxiety/depression (46.9%), usual activities (14.4%), mobility (9.9%), and self-care (6.0%) (Table 2).

Comparisons Across Patient Characteristics

Statistically significant differences in difficulty rates were observed: male patients reported more self-care problems ($P<0.05$); patients aged 60+ showed highest difficulty rates in mobility, self-care, and usual activities ($P<0.05$); patients with college education or higher reported the fewest difficulties in these three dimensions ($P<0.05$); unmarried patients had higher difficulty rates in mobility and usual activities compared to married patients ($P<0.05$); patients with monthly income 2,000-4,000 yuan reported most difficulties in usual activities, while those with 6,000-8,000 yuan reported most pain/discomfort problems ($P<0.05$); patients with $ $2 TCM conditions showed higher difficulty rates in mobility, usual activities, and anxiety/depression compared to those with single conditions ($P<0.05$) (Table 3).

Utility values differed significantly by age, education, primary reason for recent service, and TCM condition comorbidity (P<0.05), with lower values observed in patients with lung cancer, stroke, breast cancer, COPD, and osteoporosis. EQ-VAS scores differed significantly by age, marital status, monthly income, and understanding of TCM preventive treatment (P<0.05), with higher scores among patients with good understanding versus very limited understanding (Table 3).

Factors Influencing Health Utility and EQ-VAS Scores

Optimal scale regression analysis with utility value as the dependent variable and statistically significant factors from univariate analysis (age, education, occupation, primary reason for recent service, TCM condition comorbidity) showed a significant model fit (P<0.05). Influencing factors in descending order of importance were: primary reason for recent TCM preventive treatment (0.366), age (0.281), TCM condition comorbidity (0.145), occupation (0.111), and education level (0.098) (Table 4).

Analysis with EQ-VAS score as the dependent variable and significant factors (age, marital status, monthly income, understanding of TCM preventive treatment) also showed significant model fit (P<0.05). Influencing factors in descending order of importance were: marital status (0.378), understanding of TCM preventive treatment (0.353), age (0.176), and monthly income (0.092) (Table 5).

Discussion

Overall HRQoL Status and Dimension-Specific Findings

This study measured HRQoL in 630 patients receiving TCM preventive treatment at primary-level facilities in Guangzhou and analyzed influencing factors. Using the Chinese health utility scoring system, we converted health states to utility values. The EQ-5D utility value represents a societal perspective (general population valuation of health states), while EQ-VAS reflects the patient's own perspective [17]. Our sample primarily comprised middle-income, married, non-agricultural household registration patients. The median utility value was 0.942 (0.107) and EQ-VAS score was 80 (20), lower than national urban population norms (utility: $0.957\$\pm0.069; EQ-VAS$: $86.0\pm\$11.4$) [20] but higher than findings from Shenzhen middle-aged community residents [15] and hemorrhoid patients [16]. This indicates moderate HRQoL among TCM preventive treatment patients, likely reflecting Guangzhou's strong acceptance of Lingnan TCM characteristics and broad service utilization. Most participants sought care for pre-illness health maintenance (29.4%) or early symptom intervention (38.4%), though some sought treatment for disease progression prevention (34.6%) or post-illness rehabilitation (10.6%). Notably, 89%, 93.5%, and 83.7% of patients

reported no problems in mobility, self-care, and usual activities, respectively, while pain/discomfort and anxiety/depression showed higher problem rates than general population studies [21], consistent with Shenzhen research [15], suggesting most patients seek TCM preventive treatment for pain and emotional distress.

Clinical and Cognitive Factors

The primary reason for recent TCM preventive treatment was the most important factor influencing utility values (importance: 0.366). The five most common conditions were insomnia, epigastric pain, arthralgia, hypertension, and osteoporosis, while the five conditions with lowest utility values were lung cancer, stroke, COPD, osteoporosis, and breast cancer—all chronic diseases. Lung cancer patients had a utility value of only 0.493$±$0.400, lower than previous research [11], possibly due to small sample size. Lung cancer patients commonly experience multiple symptoms including pain, cough, fatigue, dyspnea, and insomnia that significantly impact emotional well-being and quality of life, representing an important target for TCM preventive intervention [22]. Insomnia was the most frequent reason for seeking care, characterized by difficulty falling or staying asleep with associated daytime dysfunction and mood disturbances [23]. TCM treatments including acupuncture, herbal medicine, auricular therapy, thread embedding, moxibustion, and massage are cost-effective with fewer adverse effects than Western medicine [24], demonstrating TCM preventive treatment advantages.

TCM condition comorbidity significantly influenced utility values (importance: 0.145), with patients having $ $2 conditions showing greater difficulties in mobility, usual activities, and anxiety/depression. Understanding of TCM preventive treatment was the primary factor affecting EQ-VAS scores (importance: 0.353), with well-informed patients reporting significantly higher scores than those with very limited understanding. This likely reflects greater trust in TCM efficacy among knowledgeable patients, yielding higher subjective health ratings. Only 191 patients (30.3%) reported good or very good understanding, while 139 (22.0%) had limited or very limited understanding. As a valuable heritage of Chinese health preservation, TCM preventive treatment aligns with the Healthy China strategy, yet public awareness remains limited due to insufficient promotion and misconceptions [3], warranting enhanced multi-channel education and workforce development.

Sociodemographic Factors

Age substantially influenced both utility values (0.281) and EQ-VAS scores (0.176), with patients aged 60+ showing the lowest scores—consistent with research on Shenzhen elderly residents [15] and chronic disease patients [13]. This age group also reported the most difficulties in mobility, self-care, and usual activities, reflecting age-related declines in physiological and psychological resilience, increased chronic disease burden, and reduced HRQoL. TCM preven-

tive treatment advantages should be leveraged to promote traditional health exercises and healthy lifestyles among elderly populations while strengthening TCM interventions for existing chronic conditions.

Marital status was the most important factor influencing EQ-VAS scores (0.378), with unmarried patients reporting more difficulties in mobility and usual activities than married patients, aligning with previous findings [12,13] and highlighting marriage as an important source of family support directly impacting quality of life. Occupation and education influenced utility values (0.111 and 0.098, respectively), with manual laborers (agriculture, forestry, animal husbandry, fishery, and water conservancy workers) showing lower utility values, while higher education was associated with higher utility values and fewer difficulties in mobility, self-care, and usual activities. This may reflect better health awareness, resource utilization, and trust in TCM services among more educated patients.

Monthly income influenced EQ-VAS scores (0.092), with higher-income patients reporting lower scores—contrary to some previous research [21]. Further analysis revealed that middle-high income patients experienced the most pain/discomfort, possibly due to work stress, irregular lifestyles, and sedentary work causing chronic conditions like insomnia, epigastric pain, arthralgia, and hypertension, creating strong demand for TCM preventive treatment. Lower-income patients primarily reported difficulties in usual activities, likely due to reduced work capacity and income from illness.

Implications and Recommendations

This study innovatively examined HRQoL in TCM preventive treatment patients using EQ-5D-5L, finding moderate HRQoL in Guangzhou's primary care settings. Lower utility values were identified in patients with specific chronic conditions (lung cancer, stroke, COPD, osteoporosis, breast cancer), those aged 60+, those with multiple TCM conditions, manual laborers, and less-educated patients. Poorer self-rated health was found in unmarried patients, those with limited understanding of TCM preventive treatment, those aged 60+, and higher-income patients.

We recommend strengthening public education about TCM preventive treatment to enhance health literacy, particularly targeting patients with poor HRQoL and self-rated health. Chronic disease management protocols guided by TCM preventive treatment principles should be developed based on TCM condition characteristics and sociodemographic profiles. For patients seeking pre-illness health maintenance or early intervention, efforts should enhance understanding and trust in TCM preventive treatment to achieve "Yin-Ping-Yang-Mi" (balanced) health states. For those seeking disease progression prevention or post-illness rehabilitation, sustained chronic disease management should be encouraged to maintain balanced coexistence with chronic conditions. The *Medium and Long-Term Plan for Chronic Disease*

Prevention and Treatment in China (2017-2025) emphasizes developing and promoting TCM health intervention protocols for chronic diseases where TCM holds advantages [25]. HRQoL should be utilized as an important outcome measure in these efforts.

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Author Contributions: GAO Jing and GAO Sande conceptualized the study, designed the research, implemented the investigation, and drafted the manuscript. GAO Jing and CHEN Yingrao collected and organized data, performed statistical analysis, and prepared tables. ZOU Guanyang revised the manuscript. ZHOU Shangcheng supervised quality control, reviewed the article, and provided overall oversight.

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Note: Figure translations are in progress. See original paper for figures.