Factors affecting quality of life among older adults with hypertension in Wenzhou, China: A cross-sectional study

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Abstract

Background: In China, the incidence of hypertension rises significantly with age, resulting in a markedly reduced quality of life (QoL) among older patients compared to the general population. Therefore, it is essential for healthcare providers, particularly nurses, to identify the predictive factors that influence QoL in this demographic.

Objective: This study aimed to describe the QoL levels and investigate the predictive power of perceived health status, self-care behavior, and social support on QoL among older patients with hypertension in Wenzhou, China.

Methods: A cross-sectional study was conducted with 131 patients with hypertension aged 60 and above, visiting the Cardiovascular Outpatient Department of The Second Affiliated Hospital of Wenzhou Medical University. Data were collected using validated instruments between November and December 2022 and analyzed using descriptive statistics and stepwise multiple regression.

Results: The overall QoL was moderate (Mean = 75.52, SD = 5.86). Self-care behavior (β = 0.421, p <0.001), social support (β = 0.416, p <0.001), and perceived health status (β = -0.170, p <0.001) were significant predictors of QoL, collectively explaining 82.7% of the variance.

Conclusions: The findings highlight the importance of self-care behavior, social support, and perceived health status as critical factors influencing QoL among older patients with hypertension. Nurses and other healthcare providers should focus on enhancing these areas through targeted education and support initiatives to improve the overall well-being of this vulnerable population.

Keywords

Background

Hypertension is one of the most common chronic diseases and a significant public health challenge worldwide. It contributes to 8.5 million deaths annually, including those from stroke, renal disease, ischemic heart disease, and other vascular diseases (Zhou et al., 2021). The global burden of hypertension is expected to affect approximately 1.56 billion individuals by 2025, with a prevalence increase of 60%, as reported in the Global Burden of Disease study conducted in 2017 (Stanaway et al., 2018). Notably, hypertension shows a significant increase in incidence related to advancing age, affecting over 60% of individuals aged over 60 years (Chow et al., 2013).

Hypertension has been a heavy burden on Chinese families and society, owing to the impact of urbanization, rising incomes, and population aging (Bao & Wang, 2020). Research conducted in China has found that more than half of the older population with target organ damage suffers from hypertension (Lu et al., 2017). For instance, a study in Wenzhou involving 784 middle-aged and older individuals found that the overweight rate is 37.76%, the central obesity rate is 40.17%, and the dyslipidemia rate is 42.86% (Wang et al., 2016). Alarmingly, in 2019, 66.2% of individuals aged ≥65 years in Wenzhou experienced hypertension (Zhang et al., 2020). This rising prevalence of hypertension not only affects physical health but also significantly impacts the quality of life (QoL) of affected individuals.

Quality of life (QoL) refers to the perception of the position in the life of an "individual" within the value and culture systems where they live and in association with the corresponding standards, expectations, goals, and concerns (Chantakeeree et al., 2022). Several dimensions of life, including vitality, social function, mental health, mood, and psychological function, are reported to be negatively influenced by hypertension; therefore, all of these conditions will lead to a decline in QoL, especially for older people (Barlow et al., 2020; Mukuria et al., 2019). Most studies at home and abroad have consistently indicated that the overall QoL of older patients with hypertension significantly decreases compared with the general population (Benetos et al., 2019; Lu et al., 2017).

Previous studies indicate that patients aged 60-69 are particularly representative in studies of hypertension, which has a high prevalence in this age group. These patients often

express a strong desire for improved QoL and are significantly affected by their condition, seeking care and professional assistance (Mirzaei et al., 2020; Wu et al., 2023). The challenge in managing hypertension among older patients lies not only in considering their age but also in evaluating their overall physical, medical, and social characteristics (Oliveros et al., 2020). Therefore, it is crucial to investigate the factors that can enhance the QoL of older patients with hypertension.

Our study is grounded in the conceptual framework provided by the WHOQOL-BREF model developed by the WHOQOL group (Goes et al., 2021). This model serves as a Patient-Reported Outcome (PRO) instrument that independently evaluates patients' overall health status, regardless of specific illnesses. The questionnaire comprises 26 questions: the first two assess subjective perceptions of QoL and personal health, while the remaining 24 questions evaluate four domains of QoL: physical, psychological, social, and environmental. The physical domain addresses pain perception, medication needs, and daily life and work performance satisfaction. The psychological domain assesses satisfaction with life and personal appearance. The social domain focuses on interpersonal relationships and the support received, while the environmental domain examines safety, housing, material conditions, fulfillment of interests, and communication (Goes et al., 2021; Rowthorn et al., 2019. In essence, the WHOQOL-BREF reflects the multifaceted dimensions of QoL.

Using the WHOQOL-BREF framework, the theoretical concepts relevant to the study were compared, and the variables pertaining to older patients with hypertension were refined. Perceived health status, self-care behavior, and social support were identified as independent variables, as these factors are modifiable and strongly correlate with QoL in this population.

Perceived health status, self-care behavior, and social support are recognized as reliable predictors of QoL, supported by consistent research findings (Ding et al., 2018; Dumitrache et al., 2017; Kakhki Ali et al., 2013). However, studies focusing specifically on the predictors of QoL in the hypertension population in China remain limited. This study was conducted in Wenzhou, a major commercial city on the southeast coast of China, known for its significant older population (Zhang et al., 2020). Previous research has primarily concentrated on adults with hypertension without assessing the overall health status of patients across different age groups (Wu et al., 2023). Furthermore, the impact of nursing care on the QoL of hypertensive patients has not been thoroughly explored. Prior studies indicate that appropriate nursing care can enhance QoL, positively influencing blood pressure and overall well-being (Sadeghi et al., 2022). Recognizing the role of nursing care in managing the QoL of hypertensive patients can guide nursing practices, while inadequate control of hypertension may lead to severe complications such as cardiovascular and kidney diseases, underscoring the need for careful nursing care.

To address this gap, guided by the WHOQOL-BREF framework and literature review, this study aimed to describe QoL and explore its age-specific characteristics among patients with hypertension. Patient-reported status was selected as the key predictor in this study. Additionally, analyzing perceived health status, self-care behavior, and social support could help predict QoL in older patients with hypertension in Wenzhou, China. Understanding QoL and its predictors in this demographic would enhance the professional quality and evidence-based nursing capabilities of healthcare providers. It would also assist healthcare and nursing managers in designing and implementing culturally appropriate care and support, as well as aiding the Wenzhou government in its efforts to develop an age-friendly society and improve the health outcomes and QoL of older patients with hypertension across specific age groups.

Methods

Study Design
A cross-sectional research design was employed in this study.

Samples/Participants
This study was conducted with older adults with hypertension who visited the Cardiovascular Outpatient Department at the Second Affiliated Hospital of Wenzhou Medical University from November to December 2022. Samples were selected based on the following criteria: 1) Patients diagnosed with hypertension by a physician for at least six months, 2) Age ranged from 60 to 69 years, 3) No serious complications of hypertension, such as paralysis or NYHA (New York Heart Association) Stage IV heart failure (Caraballo et al., 2019), 4) Ability to read, write, and understand Chinese, and 5) Willingness to participate in the study.

G*Power 3.1 was used to calculate the sample size before initiating the study. Considering that the focus was on examining three predicting factors for QoL in older patients with hypertension, linear multiple regression was chosen as the statistical test type in the G*Power program, with alpha, power, and medium effect size set at 0.05, 0.95, and 0.15, respectively (Shippee et al., 2017). The essential sample size was determined to be 119 participants. To account for potential incomplete data collection, an additional 10% of the sample size (12 participants) was added (Little & Rubin, 2014). Therefore, a total sample size of 131 was determined.

Instruments
Five instruments were utilized in the study. Except for the demographic questionnaire, all other instruments were authorized by the authors of the original and Chinese versions. Details of the five questionnaires are presented as follows:

1. Demographic Questionnaire: This questionnaire was designed by the researchers. Subjects reported general data, including age, gender, education, marital status, occupation, type of hypertension, and hypertension complications.
2. WHOQOL-OLD: The World Health Organization Quality of Life Instrument—Older Adults Module (WHOQOL-OLD), Chinese version, was developed to measure QoL among older and healthy Chinese populations, as well as those experiencing illness (Liu et al., 2013). The questionnaire includes 24 items across six domains: sensory abilities, social participation, autonomy, past, present, and future activities, death and dying, and intimacy (with four items in each domain). Total scores range from 24 to 120, with higher scores indicating superior QoL. WHOQOL-OLD achieved an internal consistency reliability of 0.892, while

intra-class correlation coefficients were greater than 0.7 between test and retest outcomes for total and subscale scores.

3. Perceived Health Status: Participants' health status was evaluated through the question: "Would you say your health, in general, is excellent, good, fair, or poor?" Responses were classified as 1-4, indicating excellent, good, fair, and poor, respectively (Lewis & Riegel, 2010). Total scores ranged from 1 to 4, with higher scores indicating poorer health status. Scoring for perceived health status was categorized as low health status (3.1-4.0), moderate health status (2.1-3.0), and high health status (1.0-2.0).

4. Self-Care of Hypertension Inventory (SC-HI): The Chinese version of the Self-Care of Hypertension Inventory in Older Adults (SC-HI) is a self-rating scale that includes 23 items classified into three subscales: self-care maintenance, self-care confidence, and self-care management (Zhao et al., 2019). The Cronbach's alpha and scale-level content validity average method were 0.858 and 0.986 for the total scale, respectively. The test/retest reliability was determined to be 0.949. Total scores range from 23 to 92, with higher scores indicating better self-care. Self-care scores are divided into three levels: low self-care (23-46), moderate self-care (47-69), and good self-care (70-92).

5. Social Support: Social support was evaluated using the 12-item version of the Multidimensional Scale of Perceived Social Support (MSPSS-C), Chinese version (Chou, 2000). This scale measures perceived social support from three aspects: family, friends, and significant others. The Cronbach's alpha for this scale was 0.89; total scores ranged from 12 to 84, with higher scores reflecting stronger social support. According to the author's suggestion, scores were categorized as low support (12-36), moderate support (37-60), and high support (61-84).

Data Collection

Data were collected at the Cardiovascular Outpatient Department following the Chinese pandemic prevention methods for COVID-19. Nurses at the department searched the registration to find participants who met the eligibility criteria and agreed to participate voluntarily. Outpatient nurses contacted the researchers if a patient expressed interest in the study. Before data collection, the purpose, ethical considerations, and data collection processes were explained to all participants. Written consent was obtained from all participants prior to their involvement in the study. Participants were given ample time to complete the questionnaires in a private room. Information was collected from participants as well as corresponding medical records. Researchers examined the completeness of the questionnaires and ensured that participants could seek medical attention promptly after completing the questionnaires.

Data Analysis

IBM SPSS 26.0 software was used for data analysis in this study. A significance level of $p < 0.05$ was established. Descriptive statistics were used to describe demographic data, including percentage, frequency, mean, and standard deviation. Variable descriptions were analyzed by range, mean, and standard deviation. Stepwise multiple regression analysis was employed to predict QoL among older adults with hypertension. Assumptions of regression analysis were tested, including normality of dependent and independent variables, autocorrelation, multicollinearity, homoscedasticity, and linearity. Normality was assessed using the Kolmogorov-Smirnov test (with a significance value > 0.05) and the Skewness-Kurtosis coefficient (with significance values between -1.96 and +1.96). Autocorrelation, which indicates that the scores of a sample are not independent, was evaluated using the Durbin-Watson statistic. The Durbin-Watson value was 1.991, indicating no autocorrelation. Collinearity statistics showed tolerance values greater than 0.20 and variance inflation factor (VIF) values less than 4, indicating no multicollinearity among predictors. The standard residual value ranged between +3.00 and -3.00, suggesting no multivariate outliers. Linearity was confirmed through statistical tests and scatterplots, all of which indicated linearity. The scatterplot of the regression standardized residual demonstrated a linear pattern, thus proving that the assumptions of linearity and homoscedasticity were met.

Ethical Considerations

The Ethics Committee of Burapha University, Thailand (G-HS062/2565) and the Second Affiliated Hospital of Wenzhou Medical University, China (2022-K-129-01) approved the study protocol. Participants were informed about the study objectives, benefits and risks, their rights, data extraction procedures, confidentiality, and their right to withdraw from the study until data collection was completed without consequences. All participants provided informed consent prior to data collection.

Results

Description of Participant Characteristics

A total of 131 older patients with hypertension participated in this study, consisting of 105 males (80.15%) and 26 females (19.85%). Participants' ages ranged from 60 to 69 years, with an average age of 64.7 years. Among the participants, 60.3% resided in urban areas, while 39.7% lived in rural areas. The majority of participants had completed primary school (52.67%), followed by junior high school (38.17%), and a smaller percentage with senior high school education (8.39%). Most participants (97.7%) were married, and 95.4% reported unemployment. Most participants (97.7%) had primary hypertension, and 94.6% had no hypertension-related complications (**Table 1**).

Description of QoL in Older Patients with Hypertension

According to **Table 2**, the average QoL score among the participants was moderate (M = 75.52, SD = 5.86; Min = 60, Max = 93). The mean scores for the six dimensions were as follows: sensory abilities (M = 10.54, SD = 2.60), autonomy (M = 13.50, SD = 2.58), past, present, and future activities (M = 12.53, SD = 2.76), social participation (M = 15.13, SD = 1.73), death and dying (M = 11.85, SD = 2.05), and intimacy (M = 11.97, SD = 2.73).

Table 1 Participant Characteristics (*N* = 131)

Characteristics	*n*	%
Age *(M = 64.69, SD = 2.68, Min = 60, Max = 69)*		
60-64	60	45.80
65-69	71	54.20
Gender		
Male	105	80.15
Female	26	19.85
Residence		
City	79	60.30
Rural area	52	39.70
Educational background		
Illiterate	1	0.77
Primary school	69	52.67
Junior high school	50	38.17
Senior high school	11	8.39
Marital status		
Married	128	97.70
Divorced	1	0.77
Widowed	2	1.53
Occupation		
Employed	6	4.60
No occupation	125	95.40
Type of hypertension		
Primary hypertension	128	97.70
Secondary hypertension	3	2.30
Hypertension complications		
None	124	94.60
Myocardial infarction	2	1.53
Coronary revascularization	5	3.81

Table 2 Description of QoL in older patients with hypertension (*N* = 131)

Variables	Possible score	Actual score	Mean	SD	Level
Overall Quality of life (QoL)	24-120	60-93	75.52	5.86	Moderate
Sensory abilities	4-20	5-19	10.54	2.597	
Autonomy	4-20	7-20	13.50	2.579	
Past, present, and future activities	4-20	7-19	12.53	2.761	
Social participation	4-20	9-19	15.13	1.734	
Death and dying	4-20	6-16	11.85	2.047	
Intimacy	4-20	7-18	11.97	2.731	

Examination of the Predictive Power of Selected Factors for QoL in Older Patients with Hypertension

Table 3 shows the results of stepwise multiple regression analysis, indicating that self-care behavior (β = 0.421, *p* <0.001), social support (β = 0.416, *p* <0.001), and perceived health status (β = -0.170, *p* <0.001) significantly predicted QoL among older patients with hypertension. These factors accounted for 82.7% of the variance in QoL among the participants (R^2 = 0.827, *Adjusted* R^2 = 0.823, $F_{(3, 127)}$ = 202.04, *p* <0.001). The prediction equation based on raw scores is as follows: QoL = 37.52 + 0.39(self-care behavior) + 0.36(social support) - 1.56(perceived health status).

Table 3 The final stepwise multiple regression analysis model for predicting QoL in older patients with hypertension (*N* = 131)

Independent variables	*B*	*SE(B)*	*Beta (β)*	*t*	*p-value*
Self-care behavior	0.39	7.41	0.42	5.76	<0.001
Social support	0.36	0.06	0.41	6.02	<0.001
Perceived health status	-1.56	0.41	-0.17	-3.80	<0.001
Constant	37.52	3.25		1156	<0.001
R² = 0.827, *Adjusted R²* = 0.823, *F*(3, 127) = 202.04, <0.001					

Discussion

Summary of the Findings

The study's results showed that many participants reported a moderate QoL level, aligning with previous studies conducted in China (Chen et al., 2021; Li et al., 2018). In this study, the QoL scores for social participation and autonomy were higher, while those for sensory abilities and death and dying were lower. Several factors may explain the higher scores in social participation and autonomy. One key reason is the positive attributes of the Wenzhou spirit, including the idea of practice and the willingness to work hard (Yang, 2020). This suggests that older patients with hypertension in Wenzhou seek more social involvement and recognition opportunities. Additionally,

residents of Wenzhou often place great importance on their independence and ability to manage tasks on their own (Zhang et al., 2020). Research has shown that regular social activities positively impact the physical and social functioning of patients with hypertension (Haraldstad et al., 2019).

On the other hand, the dimension of sensory abilities received the lowest score. This may be attributed to the age range of the participants (60-69 years), as many may not experience significant sensory impairments, which minimally affects their daily lives and QoL (Wu et al., 2023). Surprisingly, the score for the death and dying dimension was not high. This may be explained by the fact that all participants in this study were older. Studies suggest a predominantly positive correlation between frequent encounters with death and dying, leading to higher acceptance of death as life experience increases (Zhao et al., 2019).

The regression model assessed that all three variables—self-care behavior, social support, and perceived health status—constituted the explanatory variables for 82.7% of QoL in older patients with hypertension in Wenzhou, China, as demonstrated by empirical and theoretical evidence. Based on the conceptual framework of the WHOQOL-BREF, these factors theoretically serve as motivational mechanisms for QoL acquisition and maintenance, influencing patients' engagement in such behaviors (WHOQOL Group, 1998).

The study found a moderate mean self-care behavior score. Self-care behavior was identified as a significant predictor of QoL. Self-care refers to any actions taken to maintain health and prevent disease, including factors such as health, nutrition, lifestyle, environmental conditions, income, socio-economic status, and self-treatment. Effective self-care for patients with hypertension has been recognized as crucial for reducing the prevalence of the condition (Korzh et al., 2019). Some studies have deemed self-care behaviors as the primary determinant of blood pressure control, highlighting practices like proper medication use, exercise, healthy nutrition, and weight management as essential components. Our research results indicated that self-care behavior significantly and positively predicted QoL in older patients with hypertension.

According to the WHOQOL-BREF framework, self-care is vital for improving QoL, with self-care behavior being integral to maintaining one's health through preventative and health-promoting actions (WHOQOL Group, 1998). Self-care practices play a crucial role in reducing complications from hypertension, such as renal and cardiovascular diseases, and in controlling blood pressure (Maciejewski et al., 2014). Most participants had completed primary school education, indicating a low education level, which may contribute to a lack of recognition regarding the importance of self-care behaviors in managing their hypertension, including blood pressure monitoring, physical exercise, and medication adherence. Many older participants showed poor adherence to low-fat, low-salt diets, with a preference for traditional foods such as lard, pickled vegetables, and pickled seafood (Wang et al., 2016). This study aligns with previous research suggesting that education and age are related factors in hypertension, with QoL positively associated with self-care capabilities (Ademe et al., 2019; Chang & Lee, 2015).

Social support also emerged as a significant predictor of QoL. Patients who receive social support from friends, family members, or medical institutions are more likely to demonstrate strong medication adherence, maintain a positive attitude toward treatment, and be motivated to follow their treatment plans (Jin et al., 2008). A meta-analysis involving hypertension patients (N = 33 studies) revealed that functional social support—defined as emotional, instrumental, and informational support from personal social networks—was significantly associated with treatment adherence (Magrin et al., 2015). Consequently, community-clinical connections can enhance the social support system, boost trust in treatment, improve medication adherence, and facilitate support for clinical and hypertension management beyond the hospital setting. According to our research results, social support positively predicted QoL in older patients with hypertension.

In a meta-analysis, older patients with strong social integration may benefit from social control that facilitates adherence to healthy behaviors, thus enhancing their QoL (Magrin et al., 2015). Previous studies have indicated that the social support status of older patients with hypertension is poor, with scores lower than the national standard level in China (Zhang et al., 2020). In Wenzhou, an increasing number of individuals are relocating for employment, leaving their older parents at home and potentially reducing the social support available to them (Zhang et al., 2020). However, many older participants in this study lived with spouses, providing them greater assistance. Marriage has a protective effect on health, contributing significantly to social support, and the quality of the couple's relationship is positively related to health outcomes and longevity (Ermer & Proulx, 2020). Our findings also indicated that men received less social support than women, possibly because women tend to express their needs and seek help more readily than men (Austin et al., 2012).

Another significant predictor of QoL was perceived health status. The perception of health status and improved adherence to medication align with previous research (Huang et al., 2018). This could be attributed to patients having better health and physical function, enabling them to manage their conditions more effectively. Additionally, patients with a better perceived health status may adopt a more positive health attitude, enhancing their compliance with medication (Kang et al., 2015). A previous study supports this explanation, indicating a correlation between better-perceived health status and more positive health attitudes (Xie et al., 2020). Our research results demonstrated that perceived health status negatively predicted QoL in older patients with hypertension.

Over 50% of participants reported moderate health status perceptions, followed by low and high perceptions. The study also revealed that older women generally had worse health status than men, with health status deteriorating significantly with increasing age in Wenzhou. One possible explanation for this sex difference is that women tend to be more attentive to their internal states than men (Tamres et al., 2002). High general health perception ability among older individuals is associated with memory (Wong et al., 2005). Our results indicated that participants had high cognitive ability, allowing them to recognize and remember hypertension and health problems that affect their QoL. Health status is a critical factor that significantly impacts the QoL of the older population; poor health status can increase dependency and vulnerability, leading to a higher risk of hypertension (Cheng et al., 2020; Dumitrache et al., 2017). However, it is confirmed that when

older individuals perceive their health status more positively, they may remain motivated in self-care and achieve higher QoL (Mwanyangala et al., 2010).

Limitations
Although the study aimed to include 131 participants, the sample size remained relatively small, making it impossible to generalize the results to all elderly hypertensive patients in China. Selecting Wenzhou as a specific city meant that the research findings might not fully represent other regions with different socio-economic conditions. Demographic imbalances were also present in this study. The sample was heavily skewed towards men (80.15%), which may have compromised the universality of the survey results. Gender differences in quality of life and health outcomes might not have been fully captured. Additionally, limitations arose from the selection of predictors. This study utilized health perception, self-care behavior, and social support as predictors, while other potentially related factors—such as comorbidity, medication compliance, and lifestyle factors (diet, physical activity)—were not explored. Selection bias also contributed to the study's limitations, as the subjects came from a specific outpatient department, which might not cover all older adults with hypertension, especially those who did not seek routine care.

Implications for Nursing Practice
The findings of this study highlight several important implications for nursing practice when caring for older patients with hypertension in Wenzhou, China. First, nurses should prioritize educating patients about self-care behaviors, focusing on culturally sensitive dietary choices, medication adherence, and the importance of regular physical activity. Additionally, enhancing social support systems is crucial; nurses can assess patients' social networks and facilitate connections to community resources that promote social interaction. Understanding and addressing perceived health status is also vital, as nurses can empower patients through education and supportive counseling to adopt a positive health outlook. Recognizing gender differences in health perceptions and social support needs allows for tailored interventions, especially for older women who may require encouragement to express their needs. Furthermore, fostering interprofessional collaboration can ensure comprehensive care, allowing nurses to work alongside dietitians, social workers, and physical therapists. Continuous monitoring through scheduled follow-ups will help track progress and adapt care plans as needed. Lastly, engaging in research and quality improvement initiatives will enhance understanding and support for older hypertensive patients, ultimately leading to improved quality of life and better health outcomes. These strategies collectively foster a holistic and supportive care environment for this vulnerable population.

Conclusion

The study described a moderate quality of life among older patients with hypertension in Wenzhou, China, highlighting self-care behavior, social support, and perceived health status as key independent predictors. These findings emphasize the vital role of nursing practice in enhancing patient well-being.

Nurses can focus on educating patients, fostering social support systems, and promoting self-care to empower older adults in managing their health. By prioritizing these factors, healthcare providers can significantly improve the quality of life and health outcomes for older patients with hypertension, creating a more supportive environment for this vulnerable group.

Declaration of Conflicting Interest
All authors declared no potential conflict of interest in this study.

Authors' Contributions
All authors contributed substantially to the conception and design, acquisition of data, or analysis and interpretation of data. In addition, all drafted the manuscript or revised it critically for important intellectual content and provided approval of the final version.

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Data Availability
The data sets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing
There is nothing to declare.

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