



Comparative Study on Quality of Life of Hypertensive Patients with and Without Diuretics

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KEYWORDS

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ABSTRACT:

Introduction: Hypertension is a chronic health condition that significantly impairs quality of life (QoL) and increases the risk of cardiovascular morbidity. Diuretics, a primary antihypertensive class, are extensively used for managing fluid overload and hypertension. However, the influence of diuretics on patient-reported QoL outcomes compared to other antihypertensives remains insufficiently explored.

Objectives: This study aims to compare the quality of life of hypertensive patients with and without diuretics.

Methods: A prospective observational study was conducted in a 450 bedded tertiary care hospital. The study included hypertensive patients categorized into two groups: those receiving diuretics and those not. HRQoL was assessed using the EQ-5D-5L instrument and EQVAS. Symptom burden was evaluated using HSS, and sleep quality was assessed via the PSQI. Data were analyzed and compared using an appropriate statistical tool.

Results: The majority of patients were aged 65–75 years. The diuretic group showed a significantly higher incidence of pain/discomfort ($p=0.037$) and poorer sleep outcomes, including significantly higher global PSQI scores ($p=0.005$), worse subjective sleep quality ($p=0.026$), and shorter sleep duration ($p=0.009$). Mean EQVAS scores were slightly lower in the diuretic group (75.07 ± 7.20) than the non-diuretic group (77.15 ± 8.77). While the HSS indicated a slightly better symptom profile for diuretic users (6.47 ± 2.78 vs. 6.76 ± 2.72), this difference was not statistically significant. A significant moderate positive correlation was found between HSS and PSQI scores across both groups ($p<0.001$).

Conclusions: Although the use of diuretics results in only slight alleviation of symptoms associated with hypertension, it causes a substantial disturbance in sleep patterns and an increase in physical discomfort. The results show that disturbances in sleep (presumably due to nocturia) are the main contributing factors to the slight reduction in HRQoL in the diuretic group. Although these side effects can be tolerated, diuretics can still be considered a useful treatment choice due to their relative tolerability.

1. Introduction

Hypertension (HTN) continues to be one of the most prominent global health issues, as it affects over 1.2 billion adults worldwide and is a major contributing factor to cardiovascular disease, stroke, and renal failure. However, aside from the morbidity, the chronicity of hypertension and the need for lifelong pharmacologic

management have been found to greatly affect the Health-Related Quality of Life (HRQoL) of a patient. HRQoL has become an increasingly important consideration in clinical practice, as it encompasses a patient's physical, mental, and social well-being.

Among the different classes of antihypertensive drugs, diuretics, including thiazide-like, loop, and potassium-



sparing diuretics, are commonly used as first-line or add-on therapies for the treatment of fluid overload and peripheral resistance. Although diuretics are effective drugs, they are commonly linked with special side effects, including polyuria, electrolyte disturbances, and nocturia. These issues can affect daily activities and sleep patterns, potentially contributing to a perceived deterioration in the patient's well-being compared to other classes of antihypertensive drugs, including Angiotensin Receptor Blockers (ARBs) and Calcium Channel Blockers (CCBs).

However, there is a lack of comparative information available regarding the impact of diuretic-based regimens on patient-reported outcomes such as sleep quality and symptom experience compared to non-diuretic regimens. The majority of clinical outcomes are measured in terms of blood pressure "numbers" rather than the "lived experience" of the patient. This study was intended to fill this void by employing standardized instruments—the EQ-5D-5L, Hypertension Symptom Score (HSS), and the Pittsburgh Sleep Quality Index (PSQI)—to provide a comprehensive comparison of HRQoL between these two patient groups. By appreciating these subtleties, clinicians can more effectively individualize antihypertensive therapy to maximize both physiological outcomes and the patient's quality of life.

2. Objectives

1. To compare the QOL of patients with or without diuretics by using EQ-5D Questionnaire and EQ-VAS.
2. To study the drug utilization pattern of antihypertensives.
3. To assess the sleep quality of patients on diuretics and compare it with other antihypertensives by using PSQI.
4. To study the effectiveness of the drug by the hypertension symptom score.

3. Methods

A prospective observational study was conducted to compare health-related quality of life (HRQoL), symptom burden, and sleep quality between hypertensive patients on diuretics and other antihypertensives.

It was carried out in the general medicine and cardiology department of a 450-bed tertiary hospital.

3.1 Study Duration

The study was conducted over six months, following institutional approval and the finalization of the research protocol.

3.2 Study Population

A total of 161 patients were enrolled in the study through a convenient sampling method during the study period, comprising 68 patients in the diuretic group and 93 in the non-diuretic group.

As this was an observational study, no clinical interventions were performed. Patients were followed during their hospital visit or stay to complete the standardized questionnaires. Patient demographics, details of past medical and medication history, laboratory values, other investigation, symptoms, diagnosis and drugs prescribed, discharge medications were documented in a specially designed data entry form.

3.3 Diagnostic Tools

The primary outcomes were:

- HR-QoL: Measured using the EQ-5D-5L (five dimensions) and the EQ-VAS (0–100 scale).
- Symptom Burden: Assessed using the Hypertension Symptom Score (HSS), evaluating 10 common hypertensive symptoms.
- Sleep Quality: Evaluated via the Pittsburgh Sleep Quality Index (PSQI), assessing seven components of sleep.

3.4 Statistical Analysis

Data were analyzed using appropriate statistical tools (SPSS/Excel). Descriptive statistics (mean \pm SD) were used for demographic data. The independent t-test and Spearman's correlation were used. Statistical significance was set at $p < 0.05$.

4. Results

Patients were categorized into five age groups for comparative analysis between diuretic-treated and non-diuretic-treated hypertensive patients (Table 1). The majority of patients in both groups were aged 65–75 years, accounting for 42.6% ($n=29$) in the diuretic group and 36.6% ($n=34$) in the non-diuretic group. This was followed by the 55–65 years age group (27.9% vs. 23.7%) and the 75–85 years age group (23.5% vs. 22.6%)



in the diuretic and non-diuretic groups, respectively. Smaller proportions were observed in the 45–55 years (4.4% vs. 12.9%) and 35–45 years (1.5% vs. 4.3%) age categories. Gender distribution (Table 1) revealed an equal number of male patients in both groups ($n=42$ each), while the non-diuretic group included a higher number of female patients ($n=51$) compared to the diuretic group ($n=26$).

	With Diuretics ($n = 68$)	Without Diuretics ($n = 93$)
Demographic Characteristics		
Age		
35-45, n (%)	1 (1.5)	4 (4.3)
45-55, n (%)	3 (4.4)	12 (12.9)
55-65, n (%)	19 (27.9)	22 (23.7)
65-75, n (%)	29 (42.6)	34 (36.6)
75-85, n (%)	16 (23.5)	21 (22.6)
Gender		
Females, n (%)	26 (38.2)	51 (54.8)
Males, n (%)	42 (61.8)	42 (45.2)

Table 1: Demographic characteristics of study population

4.1 Comparison of EQ-5D-5L among patients with diuretics and without diuretics

Across all five EQ-5D-5L domains, scores were comparable between diuretic and non-diuretic users, with the sole exception of the pain/discomfort dimension. Patients receiving diuretics reported a higher mean pain score (mean = 2.21) than those not on diuretics (mean = 1.97), a difference that reached statistical significance ($p = 0.037$). This finding raises the possibility that diuretic therapy may be associated with increased perceived pain or discomfort, plausibly mediated by known adverse effects such as muscle cramps or diuretic-induced electrolyte disturbances. Importantly, no significant group differences were observed for mobility, self-care, usual activities, or anxiety/depression, suggesting that overall health-related quality of life is largely preserved

between the two groups. These results warrant targeted monitoring of pain and metabolic parameters in patients prescribed diuretics and further investigation to clarify causality and underlying mechanisms.

4.2 Comparison of EQ-VAS score

The mean EQ-VAS score was modestly lower among patients receiving diuretics (75.07) compared to those treated with other antihypertensive agents (77.15), suggesting a slightly reduced self-perceived overall health status in the diuretic group. Although the magnitude of difference is relatively small, this trend may reflect the influence of diuretic-associated adverse effects—such as polyuria, muscle cramps, and electrolyte imbalances—on patients' subjective health perception. These findings underscore the importance of balancing therapeutic efficacy with tolerability when selecting antihypertensive regimens, particularly in the context of long-term quality-of-life outcomes.

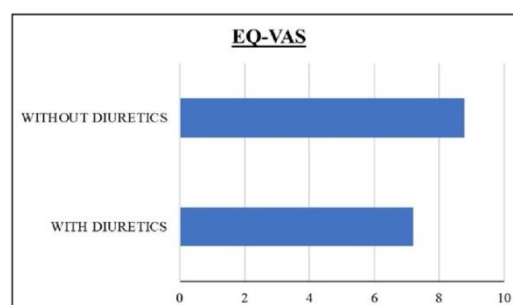


Figure 2: Comparison of EQ-VAS score

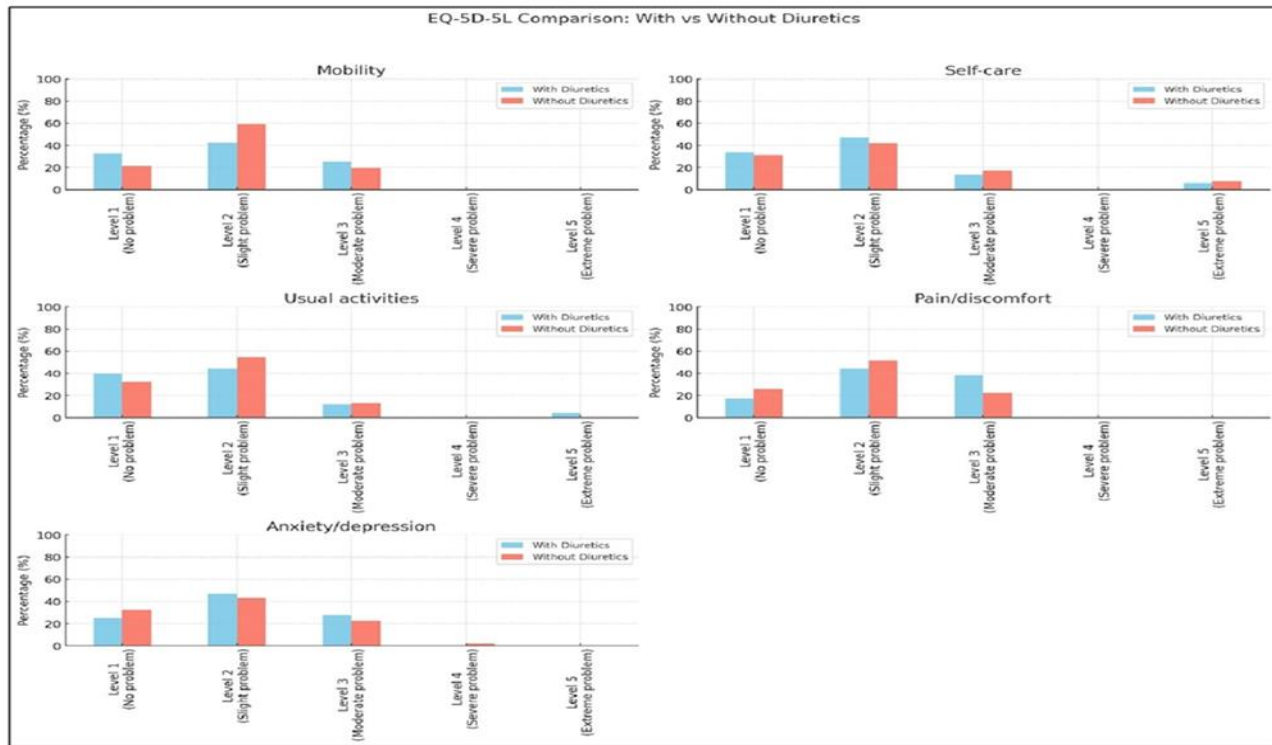
4.3 Comparison based on HSS total score

The total Hypertension Symptom Score (HSS) was marginally lower in the diuretic-treated group (6.47 ± 2.78) than in the non-diuretic group (6.76 ± 2.72). Although the absolute difference is small and its clinical significance cannot be inferred without formal statistical testing, the trend is compatible with a modest reduction in symptom burden among diuretic users. This effect plausibly reflects the pharmacologic action of diuretics in reducing fluid retention and alleviating volume-related symptoms commonly seen in hypertension and heart failure.

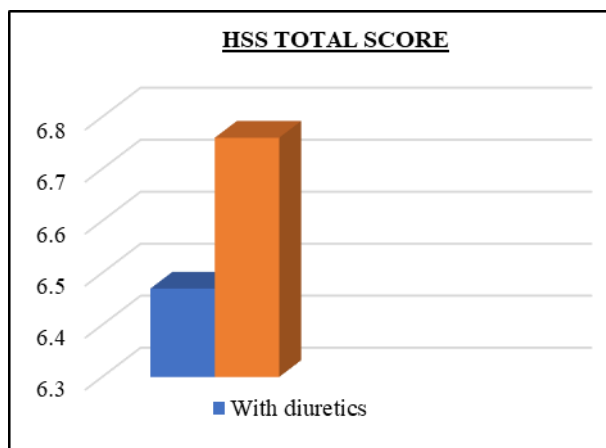


Dimension	With Diuretics			Without Diuretics			t value	p- value
	n (%)	Mean	SD	n (%)	Mean	SD		
Mobility								
No problems	22 (32.4)	1.93	0.76	20 (21.5)	1.98	0.64	0.470	0.639
Slight problems	29 (42.6)			55 (59.1)				
Moderate problems	17 (25.0)			18 (19.4)				
Severe problems								
Unable to walk about								
Self-care								
No problems	23 (33.8)	1.98	1.01	29 (31.2)	2.13	1.12	0.927	0.355
Slight problems	32 (47.1)			39 (41.9)				
Moderate problems	9 (13.2)			16 (17.2)				
Severe problems				2 (2.2)				
Unable to wash/dress	4 (5.9)			7 (7.5)				
Usual activities								
No problems	27 (39.7)	1.85	0.95	30 (32.3)	1.81	0.64	0.369	0.712
Slight problems	30 (44.1)			51 (54.8)				
Moderate problems	8 (11.8)			12 (12.9)				
Severe problems								
Unable to do usual activities	3 (4.4)							
Pain/discomfort								
No pain/discomfort	12 (17.6)	2.21	0.72	24 (25.8)	1.97	0.70	2.104	0.037*
Slight pain/discomfort	30 (44.1)			48 (51.6)				
Moderate pain/discomfort	26 (38.2)			21 (22.6)				
Severe pain/discomfort								
Anxiety/depression								
Not anxious/depressed	17 (25.0)	2.03	0.73	30 (32.3)	1.95	0.80	0.676	0.500
Slightly anxious/depressed	32 (47.1)			40 (43.0)				
Moderately anxious/depressed	19 (27.9)			21 (22.6)				
Severely anxious/depressed				2 (2.2)				

*Significant at 0.05 level

**Table 2:** Comparison of EQ-5D-5L among patients with and without diuretics**Figure 2:** Comparison of EQ-5D-5L among patients with and without diuretics

Confirmation would require hypothesis testing and adjustment for potential confounders (baseline symptom severity, concomitant antihypertensives, comorbidities), but the observed pattern aligns with expected diuretic

**Figure 3:** Comparison based on HSS total score benefits on volume-mediated symptomatology.

4.4 Comparison based on PSQI in patients with Diuretics and without Diuretics

Analysis of the PSQI components indicates that diuretic use is associated with significantly poorer sleep quality compared with non-use. Specifically, diuretic users reported worse subjective sleep quality (mean \pm SD: 1.18 ± 0.52 vs. 1.02 ± 0.53 ; $p = 0.026$) and shorter sleep duration (0.69 ± 0.65 vs. 0.48 ± 0.68 ; $p = 0.009$). These domain-level differences are reflected in the global index: the PSQI global score was higher (worse) among diuretic users (6.34 ± 3.39) than non-users (5.73 ± 2.68 ; $p = 0.005$).

Taken together, the pattern suggests that diuretic therapy is linked to both subjective and objective aspects of sleep disturbance—most plausibly through mechanisms such as nocturia from increased diuresis, sleep fragmentation, and secondary effects (e.g., nocturnal cramps, electrolyte shifts). From a clinical standpoint, these findings support routine assessment of sleep complaints in patients prescribed diuretics, consideration of dosing schedules



Component	Diuretics		Without Diuretics		T value	p-value
	Mean	SD	Mean	SD		
1. Subjective sleep quality	1.18	0.52	1.02	0.53	2.681	0.026*
2. Sleep latency	1.18	1.15	1.01	0.96	0.640	0.523
3. Sleep duration	0.69	0.65	0.48	0.68	2.874	0.009*
4. Habitual sleep efficiency	0.19	0.53	0.29	0.62	1.069	0.286
5. Sleep disturbances	1.90	2.83	1.73	0.98	0.525	0.601
6. Use of sleep medication	0.28	0.73	0.25	0.62	0.301	0.764
7. Daytime dysfunction	0.99	0.59	0.95	0.68	0.381	0.704
PSQI Global Score	6.34	3.39	5.73	2.68	3.104	0.005

*Significant at 0.05 level

Table 3: Comparison based on PSQI in patients with Diuretics and without Diuretics

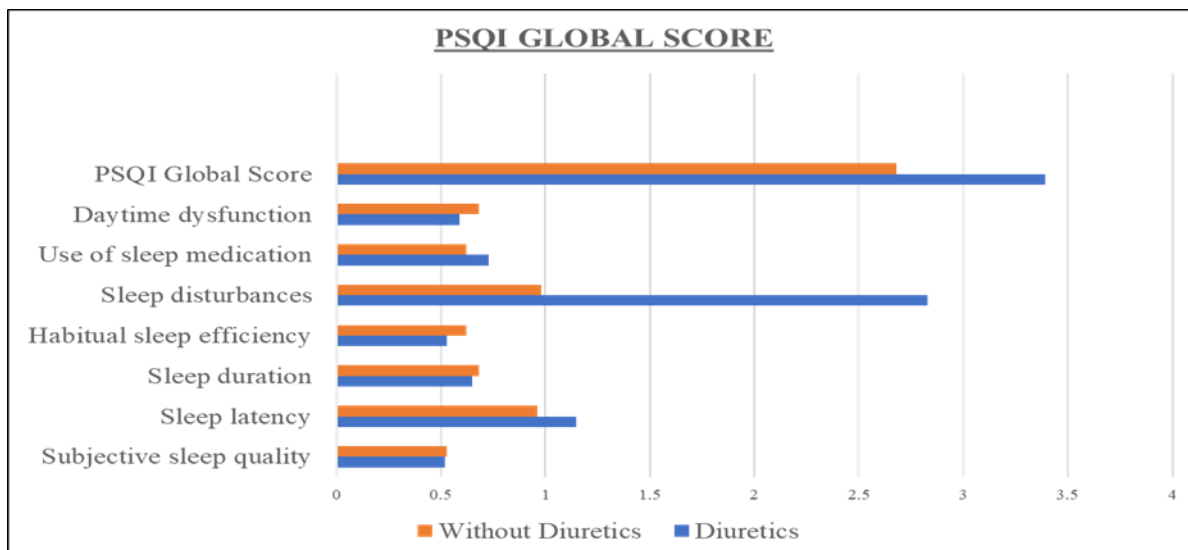


Figure 4: Comparison based on PSQI in patients with Diuretics and without Diuretics

(e.g., morning administration), evaluation for reversible contributors (nocturia, electrolyte abnormalities), and individualized treatment adjustments when sleep impairment is clinically meaningful. Causal inference requires longitudinal or controlled analyses and adjustment for confounders (age, comorbidities, concomitant medications), so further prospective research is recommended to confirm these associations and clarify mechanisms.

4.5 Correlation between HSS and PSQI Global score

Spearman’s rank correlation was used to assess the association between sleep quality (PSQI global score) and symptom burden (HSS total score) separately in patients with and without diuretic therapy. In the diuretic group there was a moderate, statistically significant positive correlation ($\rho = 0.401, p < 0.001$), indicating that

poorer sleep quality is associated with greater symptom severity. A similar, slightly weaker moderate correlation was observed in the non-diuretic group ($\rho = 0.355, p < 0.001$). Overall, these results demonstrate a consistent relationship between worse

*Significant at 0.01 level

Group	Correlation Coefficient (Spearman’s rho)	P-value	Interpretation
With Diuretics	0.401	<0.001	Moderate positive correlation, Significant at 0.01 level



Without Diuretics	0.355	<0.001	Moderate positive correlation, Significant at 0.01 level
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Table 4: Correlation between HSS and PSQI Global score

sleep and higher symptom burden across both cohorts, with the association being marginally stronger among diuretic users. Clinically, this underscores the value of routinely screening for sleep disturbances when managing symptomatic patients and considering sleep-targeted interventions as part of comprehensive care.

5. Discussion

This study established that the overall quality of life, in terms of quality of life, for hypertensive patients does not vary significantly between diuretic users and those who used non-diuretic antihypertensive medications. Overall, most EQ-5D-5L domains were similar between groups, suggesting that functional status is unaffected by diuretic use. However, there were significant adverse outcomes in terms of pain/discomfort and sleep among diuretic users. The HSS outcomes, which were slightly lower in diuretic users, were not statistically significant. There was a significant positive correlation between hypertension symptoms and sleep quality in both groups, indicating the interrelationship between the two factors.

A major strength of this study is the use of validated patient-reported outcome measures (EQ-5D-5L, EQ-VAS, HSS, and PSQI), allowing a comprehensive assessment of physical, symptomatic, and sleep-related quality of life. The prospective observational design and inclusion of real-world patients with multiple comorbidities enhance the clinical relevance of the findings. However, the study has certain limitations. Being a single-center study with a relatively modest sample size, the findings may not capture regional or population-level variations. The observational design limits causal inference, and potential confounding factors such as duration of hypertension, dose and timing of diuretics, and lifestyle factors were not fully controlled. Additionally, QoL assessments relied on self-reported data, which may be influenced by recall bias.

The findings of the current study have the highest degree of applicability to the elderly hypertensive population commonly encountered in the clinic. From a practical viewpoint, the current findings reinforce the routine use of diuretics as being both effective and QoL-neutral antihypertensive agents to the extent that the elderly hypertensive population is adequately counselled regarding the adverse effects of diuretics on sleep patterns. In the presence of the current findings, a recommendation concerning the use of diuretics as first-line agents for hypertensive patients would be the same as existing policy recommendations, which include diuretics as first-line agents. For future research, multicentric studies could be conducted to formulate individualized dosing regimens, as well as to help reduce the adverse effects of diuretics on the sleep patterns of patients.

6. Conclusion

Hypertension is considered one of the most prevalent chronic conditions around the world with the majority of patients relying on long-term pharmacotherapy to control their blood pressure. The prospective observational study conducted in a tertiary care hospital, was intended to assess the quality of life among hypertensive patients treated with diuretics compared to patients treated with antihypertensive drugs other than diuretics. The findings of the study indicated that although diuretics are the cornerstone of antihypertensive therapy, their administration was related to poor sleep quality which was measured by PSQI Questionnaire. Whilst modest improvement in symptoms were observed in diuretics users as compared to non-diuretic users when evaluated using HSS severity score. The quality of life measured using EQ-5D-5L reported an increased perception of pain. However, the over-all quality of life measured using EQ-5D-5L and EQ-VAS remained within satisfactory ranges for both diuretics and non-diuretic users. Correlation analysis between PSQI global score and HSS revealed a significant relationship between sleep disturbances and symptom scores in diuretic user. Future research should examine individual differences in responses to diuretics. This idea emphasizes the importance of an individualized treatment regimen in hypertension care as well as a multidisciplinary approach that considers many aspects of a patient's well-being to help them achieve a better quality of life.



7. Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

8. Ethical clearance

The study protocol was reviewed and approved by the Institutional Ethics Committee (IEC). Written informed consent was obtained from all participants before data collection, and patient confidentiality was strictly maintained throughout the study.

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