

Economic Burden of Secondary Hyperparathyroidism in Germany: A Matched Comparison Using Administrative Claims Data

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INTRODUCTION

- Chronic Kidney Disease (CKD) is a global health burden associated with increased risk of morbidity, mortality, and a substantial economic cost burden to health systems worldwide.¹
- A common complication among CKD patients is secondary hyperparathyroidism (SHPT), a complex alteration in bone and mineral metabolism characterized by excessive parathyroid hormone (PTH) production and parathyroid gland hyperplasia.^{2, 3}
- SHPT occurs in 40% to 80% of CKD patients in stages 3 and 4, respectively.⁴
- This study's aim was to assess the economic burden of patients with incident SHPT in CKD3 and CKD4, using administrative claims data from the Statutory Health Insurance (SHI) in Germany.**

METHODS

STUDY DESIGN

- This study was a retrospective, matched cohort analysis using administrative claims data from the SHI in Germany.

DATA SOURCE

- The Institute for Applied Health Research Berlin (InGef) research database includes anonymized claims data of approximately 4 million individuals. The research sample is adjusted in terms of age and gender to represent the German population and has been proven to be in good accordance with respect to morbidity, mortality as well as drug usage compared to the general population in Germany.⁵

STUDY POPULATION

- Data from 2014-2018 were used to identify CKD stage 3 and 4 patients via International Statistical Classification of Diseases, 10th Revision, German Modification (ICD-10-GM) codes. Patients were stratified by the occurrence of incident SHPT using diagnosis code N25.8 and Anatomical Therapeutic Chemical (ATC) prescription codes for paricalcitol, alfacalcidol or calcitriol.
- SHPT patients were matched 1:1 to non-SHPT patients having the same CKD stage using propensity scores. Matching parameters included age, gender, updated Charlson Comorbidity Index (CCI) score in the year before index, index quarter, New York Heart Association (NYHA) class in the year before index, and whether the index CKD stage was determined in the hospital.
- Index date was the first SHPT diagnosis quarter/prescription indicating SHPT in the SHPT cohorts, and a randomly chosen quarter of a CKD diagnosis within the non-SHPT cohorts. Patients with evidence of dialysis or kidney transplant prior to the index quarter were excluded.
- Matched groups were compared with respect to the healthcare resource utilization in terms of outpatient visits and hospitalizations as well as healthcare costs in a two-year follow-up period.

RESULTS

PATIENT SELECTION & DEMOGRAPHICS

- Overall, 1,156 incident SHPT patients in CKD3 and 517 incident SHPT patients in CKD4 and their respective matches were identified. Matching fit was assessed via standardized differences (SD) and showed a good balance of the matched cohorts (see **Table 1**).
- The mean age of the CKD3 groups was 74.43 years in the SHPT and 74.75 years in the non-SHPT cohort. The CKD4 groups were slightly older, with a mean age of 76.87 years in the SHPT and 77.85 years in the non-SHPT cohort (see **Table 1**).
- Mortality was significantly higher among non-SHPT patients in CKD3 (20.59% vs. 16.18%, p<0.01) and CKD4 (43.33% vs. 35.40%, p<0.01). This led to a 5.87% increase in follow-up time among SHPT CKD3, and 17.88% increased follow-up time among SHPT CKD4 patients.

RESULTS (CONTINUED)

Table 1. Demographic characteristics after matching

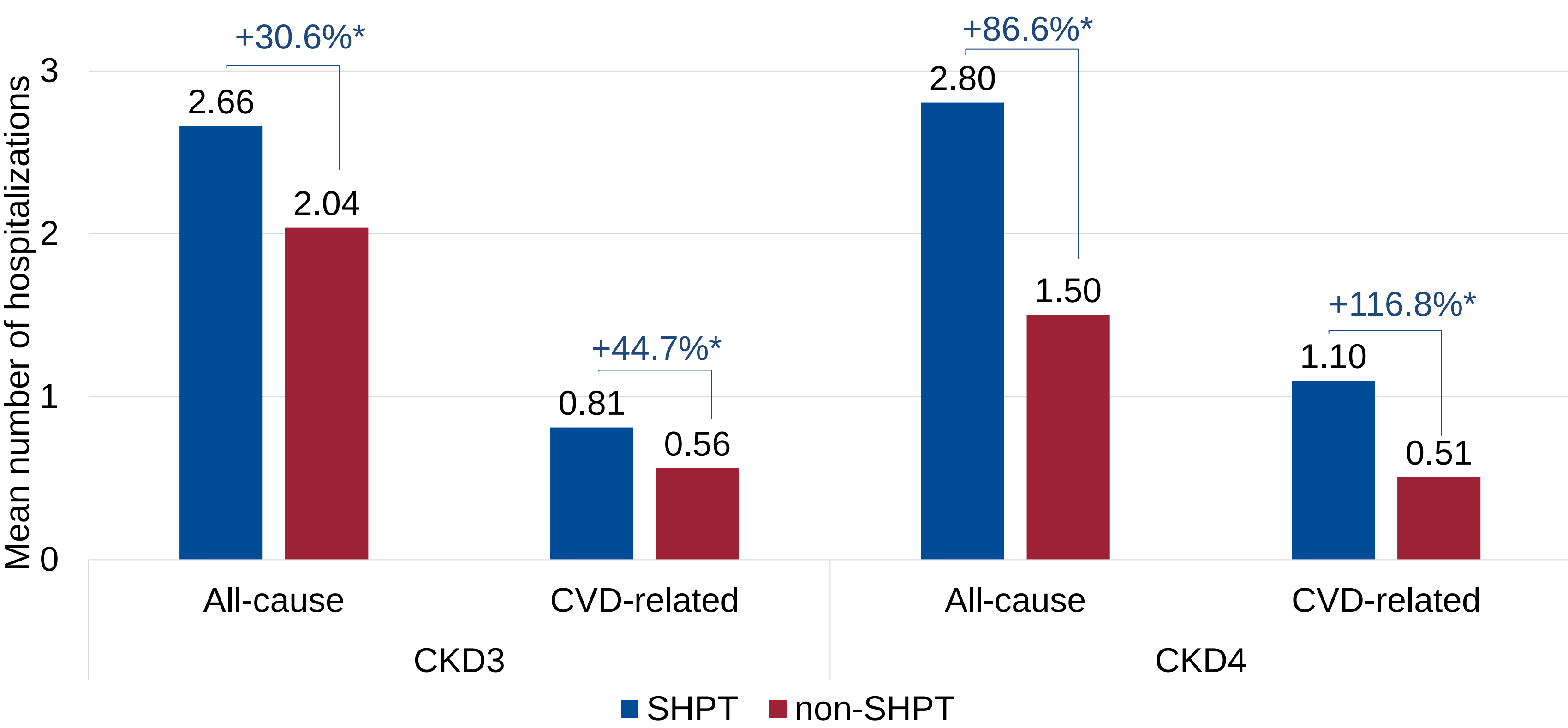
Covariates for propensity score matching		CKD3 SHPT		CKD 3 no SHPT		SD	CKD4 SHPT		CKD 4 no SHPT		SD
		n/mean	%	n/mean	%		n/mean	%	n/mean	%	
Number of patients (n)		1,156	100.00	1,156	100.00		517	100.00	517	100.00	
Age (years)	Mean	74.43		74.75		-0.03	76.87		77.85		-0.09
Gender (n, %)	Male	654	56.57	663	57.35	-0.02	243	47.00	231	44.68	0.05
	Female	502	43.43	493	42.65	0.02	274	53.00	286	55.32	-0.05
CCI	Mean	3.56		3.57		0.00	3.81		3.84		-0.01
CKD hosp. in index quarter	No	855	73.96	847	73.27	0.02	301	58.22	320	61.90	-0.08
	Yes	301	26.04	309	26.73	-0.02	216	41.78	197	38.10	0.08
NYHA Class	No NYHA	724	62.63	750	64.88	-0.05	308	59.57	308	59.57	0.00
	NYHA 1	16	1.38	11	0.95	0.04	9	1.74	13	2.51	-0.05
	NYHA 2	69	5.97	68	5.88	0.00	24	4.64	17	3.29	0.07
	NYHA 3	114	9.86	105	9.08	0.03	41	7.93	41	7.93	0.00
	NYHA 4	59	5.10	54	4.67	0.02	45	8.70	45	8.70	0.00
	NYHA unknown	174	15.05	168	14.53	0.01	90	17.41	93	17.99	-0.02

SD=Standardized differences, CCI=Charlson Comorbidity Index, NYHA=New York Heart Association class for heart failure

HEALTHCARE RESOURCE UTILIZATION

- Mean rates of all-cause and CVD-related hospitalizations were significantly (p<0.01) higher among the SHPT cohorts (see **figure 1**).

Figure 1. All-cause and CVD-related hospitalizations



* Indicates a statistically significant difference at p<0.01

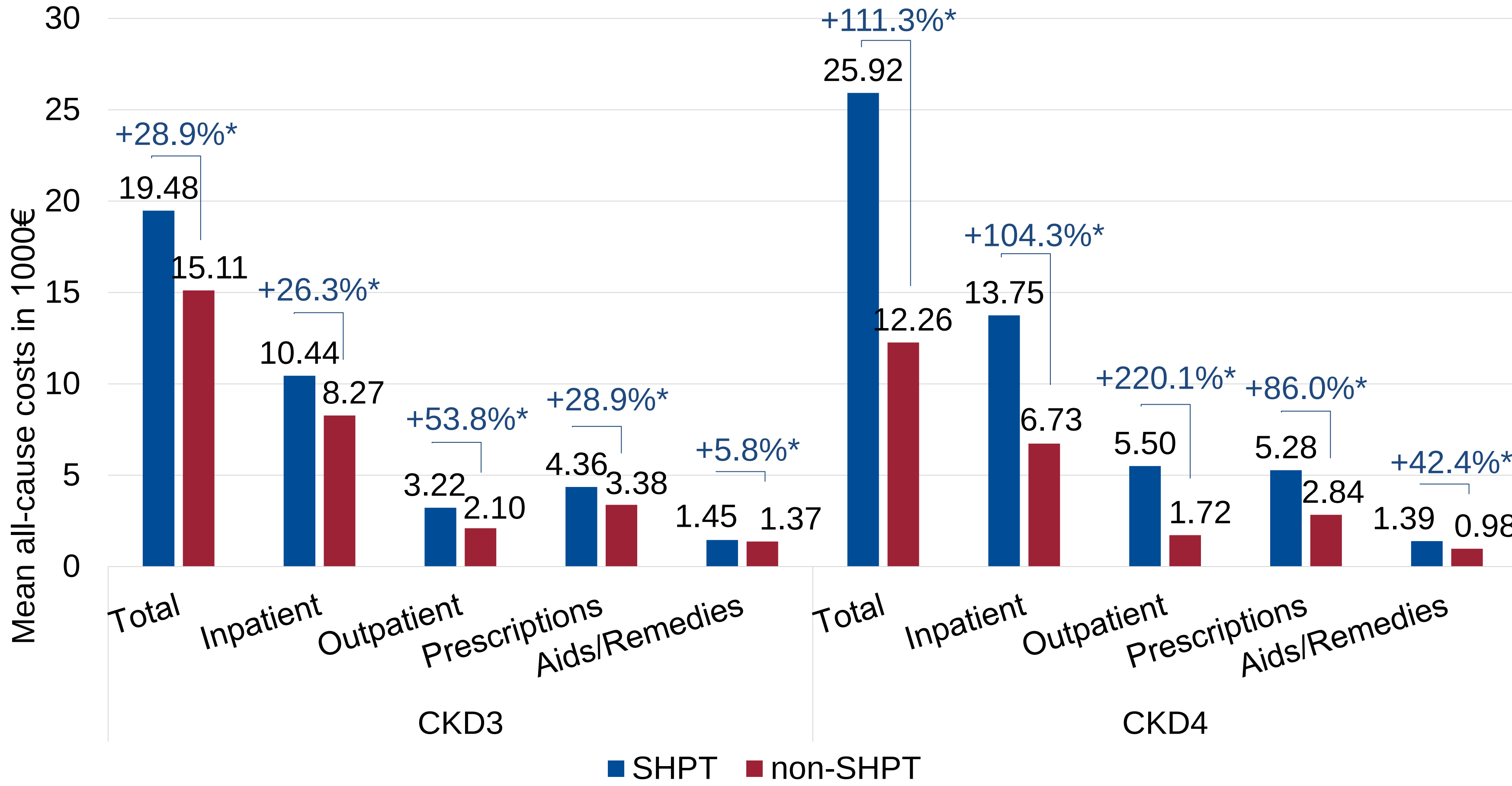
- Similarly, all-cause outpatient visits (CKD3: 94.99 vs. 64.32; CKD4: 101.43 vs. 49.83) and visits at nephrologists (CKD3: 10.49 vs. 1.56; CKD4: 24.71 vs. 1.54) significantly differed between the groups with fewer visits in the non-SHPT group.

RESULTS (CONTINUED)

HEALTHCARE COSTS

- Total healthcare costs after 24 months were statistically significantly higher among CKD3 and CKD4 patients with SHPT in all cost domains, except aids and remedies for CKD3 patients (see **Figure 2**).
- Overall costs were 28.9% (CKD3) and 111.3% (CKD4) higher in SHPT patients. While inpatient costs had the highest absolute cost differences, relative differences were highest in the outpatient setting.

Figure 2. Healthcare costs after 24 months



* Indicates a statistically significant difference at p<0.01

CONCLUSIONS

- Patients with CKD3/CKD4 and incident SHPT presented with a significantly higher healthcare resource utilization and healthcare costs in comparison to CKD3/CKD4 patients without SHPT.
- The findings highlight the need for new treatment options to mitigate the burden of disease for SHPT patients and the economic burden in terms of costs for the German SHI system.

LIMITATIONS

- Due to longer follow-up time (5.87% in CKD3 and 17.88% in CKD4), patients in the SHPT cohorts may have had a higher chance for the occurrence of the reported outcomes potentially resulting in higher resource utilization and costs.

REFERENCES

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