Physical Therapy in Patients with Pulmonary Arterial Hypertension (PAH): Results from a German Claims Data Analysis

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Objectives

- Pulmonary arterial hypertension (PAH) is a rare, life-threatening, and progressive disease characterized by remodeling and progressive narrowing of the pulmonary vessels.¹
- Medical guidelines recommend supervised physical therapy (PT) for clinically stable patients on PAH-specific treatment.²
- To date, data on the utilization of PT in PAH patients in Germany are not available. By conducting a claims data analysis, we aimed at closing this gap.

Table 2 Age and gender distribution of PAH patients treated with PAH-related agents in 2021*

Treated PAH patients									
Demographics	Male (n=146)		Female (n=257)		Total (n=403)				
	n, summary statistic	%	n, summary statistic	%	n, summary statistic	%			
Age distribution									
Mean	70.1		71.6		71.0				
SD	15.3		14.4		14.8				
Min	1		4		1				
Q1	63		63		63				
Median	74		76		75				
Q3	80		82		81				
Max	95		93		95				
Age groups									
0-17 years	<5	-	<5	-	5	1.2%			
18-29 years	0	0.0%	<5	-	<5	-			
30-39 years	<5	-	11	4.3%	13	3.2%			
40-49 years	<5	-	9	3.5%	10	2.5%			
50-59 years	18	12.3%	23	8.9%	41	10.2%			
60-69 years	31	21.2%	43	16.7%	74	18.4%			
70-79 years	45	30.8%	71	27.6%	116	28.8%			
≥80 years	45	30.8%	98	38.1%	143	35.5%			
Total	146	36.2%	257	63.8%	403	100.0%			

Study design

Methods

- A retrospective claims database analysis using anonymized German Statutory Health Insurance (SHI) data was conducted.
- The study covered a time period from 2016 to 2021 to include the most recent available years in the database at the time of study initiation.

Data source

- Data from the Institute for Applied Health Research Berlin GmbH (InGef) research database was used.
- The database contains information on insured individuals from more than half of the German SHIs and is representative for the German population with respect to age, gender and region.³

Study population

- The study population comprised PAH patients identified by ≥ 1 inpatient (primary or secondary discharge diagnosis) and/or \geq 2 outpatient (verified) diagnosis codes for PAH (ICD-10-GM I27.0) in 2021.
- Thereof, patients with a prescription of pre-defined PAH-specific treatment in 2021 were assessed.⁴
- To determine patients on PT, a list of all aids and remedies according to the Medical Aids⁵ and Remedies⁶ Directive of Federal Joint Committee (G-BA) (identified by aids position numbers on a ten-digit level and by remedies position number on five-digit level) recorded between 2016-2021 was generated.
- Thereafter, PAH-related aids and remedies (incl. supervised PT such as breathing exercises) were selected.

* Due to data protection restrictions, the number of patients <5 cannot be reported

- Valid aids and remedies data from 2016 to 2021 were available for 383 patients (extrapolated to the German population: \sim 9,500 patients) (see Figure 2).
- Thereof, 45.4% (n=174; extrapolated to the German population: ~4,300 patients) had a prescription for PAH-related aids and remedies in 2021 (see Figure 2A) and 67.4% (n=258; extrapolated to German population: ~6,400 patients) between 2016-2021 (see Figure 2B).
- PT was prescribed to 25.6% (n=98; extrapolated to the German population: ~2,450 patients) of patients with valid aids and remedies data in 2021 (see Figure 2A) and 47.8% (n=183; extrapolated to the German population: ~4,560 patients) of patients between 2016-2021 (see Figure 2B).

Figure 2: Number of patients with physical therapy



- Specific inhalation and respiratory devices were defined as PAH-related aids.
- Patients with PT were identified by the remedy codes shown in **Table 1**.

Table 1: PAH-related remedies

Remedies position number	Description "Service provider" (digit 1)	Description "Service type" (digits 2-3)	Description "Service" (digits 2-5)
20501	Physiotherapist	Physiotherapy, normal, individual treatment	Physiotherapy, including respiratory gymnastics, also on a neurophysiological basis
20702	Physiotherapist	Physiotherapy, special, individual treatment	Physiotherapy, also respiratory therapy for mucoviscidosis and severe bronchial diseases, 60 min
33103	Speech therapist/breathing, speech and voice teacher	Individual treatment (price incl. preparation and follow-up)	45 minutes (therapy time with the patient)

• Number of identified PAH patients was extrapolated to the German population based on data extracted from the Federal Office of Statistics (DESTATIS)⁷ for the year 2021.

Results

• Among approximately 3.3 million individuals continuously observable in the InGef research database from 2016 to 2021, our study identified 3,270 patients (97.9 per 100,000 individuals) with at least one inpatient or two outpatient diagnoses for PAH in 2021 (see Figure 1). This corresponds to approximately 81,500 PAH patients in

Discussion

- As there is no specific diagnosis code for PAH, ICD-10-GM code I27.0 "Primary" pulmonary hypertension" was used in the analysis. This code might be not specific enough and could have caused an overestimation of the number of PAH patients, especially compared to prevalences reported in published literature^{8,9}.
- Claims data may contain coding errors, including the treating physician's coding behavior (e.g., due to lack of precise diagnosis codes) leading to overestimation of patient counts.
- Data on a highly supervised rehabilitation program in expert centers which is available for PAH patients in Germany, is not included in the database. This may have caused an underestimation of the proportion of patients with PT.
- Nevertheless, to the best of our knowledge this is the first study to investigate the prescription of PT in PAH patients in Germany. The results contribute to closing the knowledge gap and providing initial figures which are a considerable basis for further analyses.

Conclusion

- We found that one in four of the diagnosed PAH patients treated with PAH-specific treatment received PT as part of their aids and remedies prescription in 2021. When considering a more extended timeframe from 2016-2021, nearly half of the identified patients had a PT prescription.
- Further research is needed to evaluate the patterns of PT prescriptions in PAH patients in Germany.

Germany.

• Thereof, 403 patients (12.1 per 100,000 individuals) received PAH-specific treatment in 2021 (see Figure 1). Extrapolated to the German population, this corresponds to approximately 10,030 patients with PAH-specific treatment.

Figure 1: Patient selection steps

Step 1	Individuals in the InGef research database continiously observable between 2016-2021				
		InGef: 3,340,340 Germany: 83,129,285			
↓ ,					
Step 2	Patients with at least one inpatient or two outpatient diagnoses for PAH (ICD-10-GM I27.0) in 2021				
		InGef: 3,270 Germany: 81,379			
↓ _					
Step 3	Patients with at least one prescription of PAH-related agents in 2021				
L		InGef: 403 Germany: 10,029			

• The average age was 71.0 years (SD: 14.8 years), 63.8% were female (see Table 2).

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