

# Adherence to Growth Hormone Treatment: Impact of Height, Age, and Puberty

J Rothermel<sup>1</sup>, K Scheithe<sup>2</sup>, N Nazari<sup>3</sup>, B.P. Hauffa<sup>4</sup>, T Reinehr<sup>1</sup>

<sup>1</sup>Department of Pediatric Endocrinology; Diabetes and Nutrition Medicine, Vestische Hospital for Children and Adolescents Datteln, University of Witten/Herdecke, Germany; <sup>2</sup>GKM Gesellschaft für Therapieforschung mbH Munich, Germany; <sup>3</sup>Merck Serono, Germany; <sup>4</sup>Department of Pediatric Endocrinology and Diabetology, University Childrens Hospital, University Duisburg-Essen, Germany

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## Introduction

- Maintaining adherence to growth hormone treatment is difficult, because the burden of daily drug administration is often more apparent than the long-term benefits of therapy.
- Studies about treatment adherence (TA) to recombinant human growth hormone are rare and the results are controversial.
- The aim of our study was to identify factors that influence TA.

## Methods

- The easypod™ device was developed for the administration of rhGH; it automatically records the date, injected dose (mg) and injection status.
- All patients treated with easypod™ in the Observational Study Saizen-online study (an online prospective, multicentre, open-label, non-interventional study) with treatment data over at least 6 months and age, height and pubertal stage data available were included in our study.
- We analysed TA in 6-month periods. TA was evaluated using cut-offs (good adherence: <1 missed dose/week; medium adherence: 1–3 missed doses/week; poor adherence: > 3 missed doses/week). The characteristics of the children are shown in **table 1**.

Table 1. Characteristics of the 168 children treated with rhGH in this study

Indication	<ul style="list-style-type: none"> <li>Growth hormone deficiency: n=119 6-month observation periods: 462</li> <li>Ullrich Turner Syndrome: n=12 6-months observation periods: 44</li> <li>Chronic renal insufficiency: n=3 6-month observation periods: 14</li> <li>SGA: n=34 6-month observation periods: 21</li> </ul>
Actual age (years)	11.6 (IQR 9.9 – 13.9)
Gender	61.9% male
Pubertal Stage	67.1% prepubertal
Actual height - SDS	-2.0 (IQR -2.5 – 1.2)
Delta height-SDS between actual height-SDS and height-SDS at onset of treatment	0.4 (IQR 0.0 – 1.1)
Treatment duration (years)	0.9 (IQR 0.3 – 3.0)

Data as percentage or median and interquartile range (IQR)

## Results

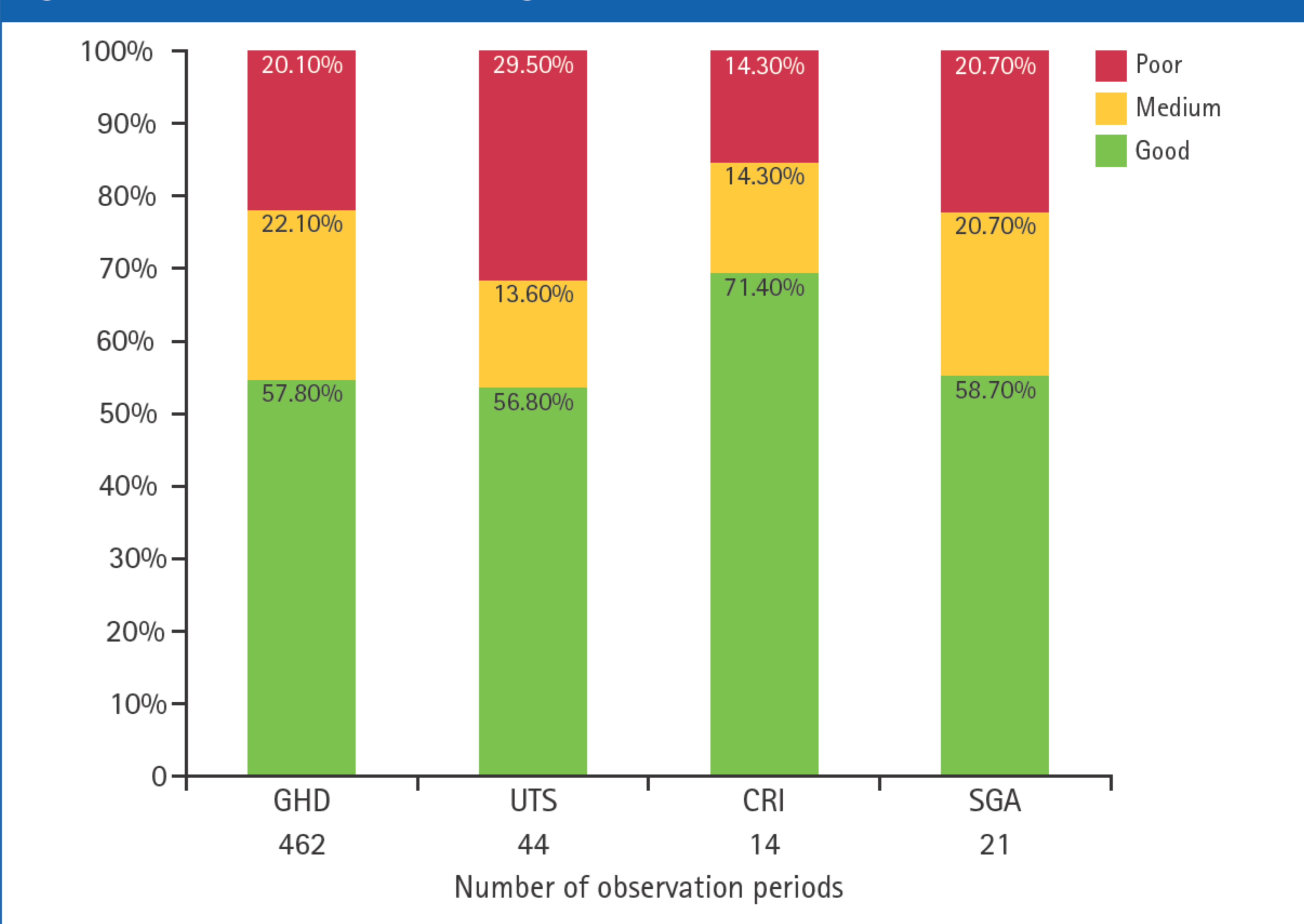
- 168 children treated with rhGH (71% growth hormone deficiency, 7% Turner-Syndrome, 2% chronic renal insufficiency, 20% small-for-gestational age) were included (641 6-month observation periods).
- TA did not differ significantly between treatment indications (p=0.713) or gender (p=0.167).
- Younger age, prepubertal stage, and lower height-SDS were associated with better TA, while better treatment success and longer treatment duration were related to lower TA (**table 2, figures 1,2**).

Table 2. Influence factors on treatment adherence

	Good adherence	Medium adherence	Poor adherence	p-value
Number of 6-month observation periods	373 (58.2%)	135 (21.1%)	133 (20.7%)	
Age [years]	11.6 ±3.2	13.4 ±3.1	12.0 ±3.1	<0.001 <sup>1,2,4</sup>
Actual height-SDS	-1.9 ±1.1	-1.7 ±1.2	-1.3 ±1.3	<0.001 <sup>1,3</sup> ; 0.038 <sup>2</sup> ; 0.017 <sup>4</sup>
Prepubertal	57.3%	32.2%	48.7%	<0.001 <sup>1,2</sup> ; 0.012 <sup>4</sup>
Treatment success (actual height-SDS-height-SDS at onset of treatment with easypod™)	+0.8 (IQR 0.2-1.4)	+0.7 (IQR 0.2-1.3)	+1.0 (IQR 0.5-1.5)	0.004 <sup>1</sup> ; 0.002 <sup>3</sup> ; 0.005 <sup>4</sup>
Treatment duration on easypod™ (years)	1.8 (IQR 0.8-3.6)	3.0 (IQR 1.5-4.5)	2.5 (IQR 1.6-3.6)	<0.001 <sup>1,2,3</sup>

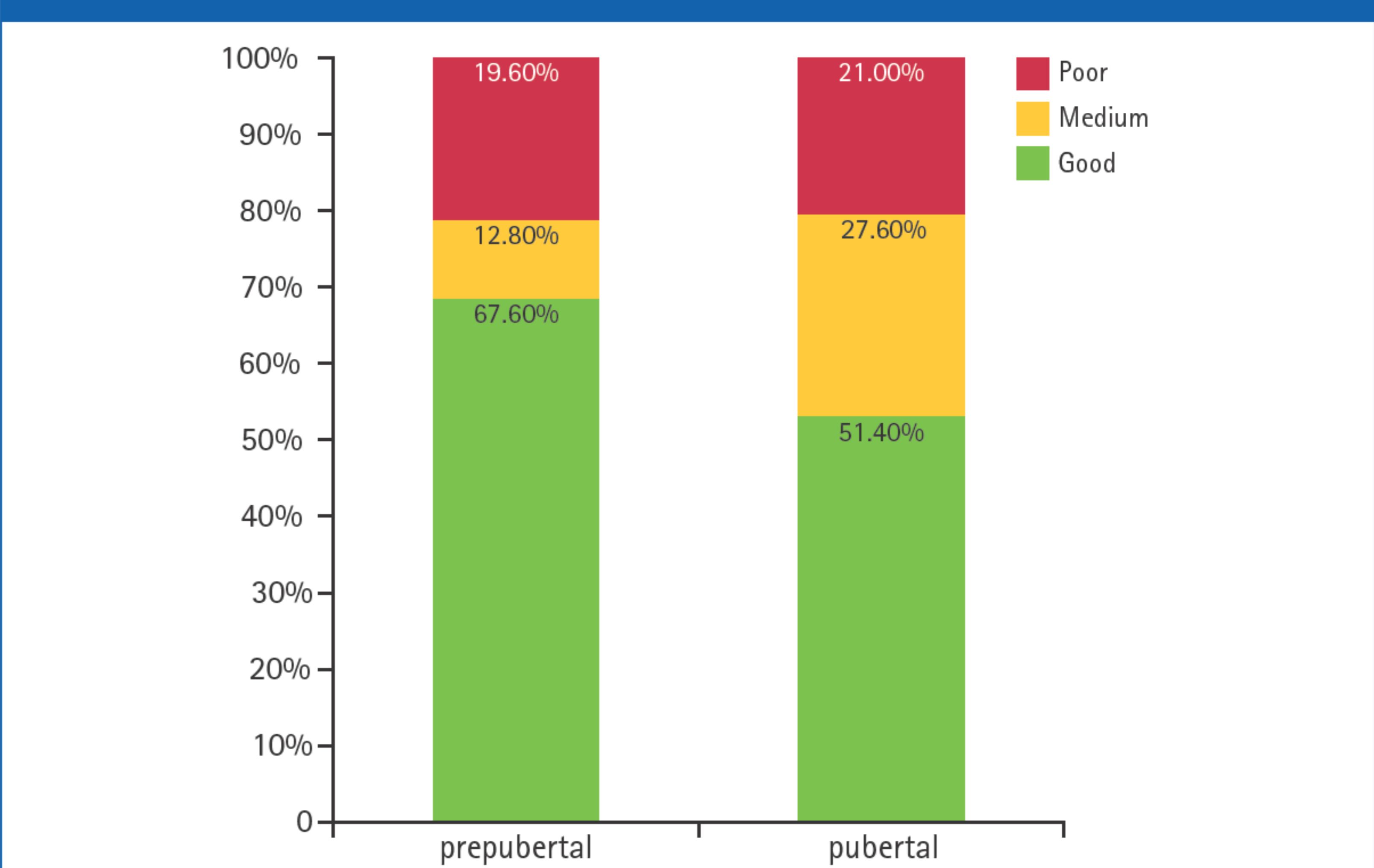
Data as n (%), mean ± 1 standard deviation, or median and interquartile range (IQR); p-values: 1: overall; 2: good versus medium; 3: good versus poor; 4: medium versus poor TA, Fisher's exact, Wilcoxon-Mann-Whitney and Kruskal-Wallis tests were used as appropriate.

Figure 1. Treatment adherence according to indication



(GHD: growth hormone deficiency, UTS: Ullrich Turner Syndrome, CRI: chronic renal insufficiency, SGA: small for gestational age)

Figure 2. Impact of pubertal stage on treatment adherence



## Conclusions

- Good TA was only achieved in approximately half of all 6-month observation periods in children treated with rhGH.
- Prevention and treatment efforts should, therefore, be undertaken to improve TA in GH-treated children.
- Pubertal stage and longer treatment duration seem to be a risk factor for low TA.
- The indication for rhGH treatment and gender were not associated with TA.

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## Disclosures

J Rothermel: support for congress participation  
 K Scheithe: Is a current employee of GKM Gesellschaft für Therapieforschung mbH Munich, Germany which received consultancy fees for performing the study.  
 N Nazari: is a current employee of Merck Serono GmbH\*  
 BP Hauffa, T Reinehr, have received consulting fees from Merck Serono GmbH and are a members of advisory boards and the eAWB group, which is financially supported by Merck Serono GmbH\*.

\* an affiliate of Merck KGaA, Darmstadt, Germany



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