

Adherence to growth hormone therapy in children with growth hormone deficiency: Experience at a public sector tertiary care hospital

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Author's Contribution

¹ Conception of study

¹ Experimentation/Study conduction

^{2,3,5,6} Analysis/Interpretation/Discussion

¹ Manuscript Writing

^{2,3,4,6} Critical Review

^{4,5} Facilitation and Material analysis

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Abstract

Objective: To determine the adherence rate of recombinant human Growth Hormone therapy (rhGH) in children suffering from growth hormone deficiency and parent's perspectives regarding reasons for non-compliance

Materials and Methods: This study was conducted at District Headquarters Hospital, Rawalpindi from January 2020 to June 2021. All children already diagnosed with Growth hormone deficiency were included in the study. Children with less than one-year duration of treatment were excluded. Demographic details were recorded on a predesigned proforma. Adherence to treatment was assessed using a combination of methods based on previous studies. The proportion of days covered >80% was taken as good adherence. Data was entered and analyzed in SPSS 25. Qualitative variables such as gender, socioeconomic status, source of growth hormone injections, and adherence were presented as frequency and percentages. Self-reported reasons for non-adherence were presented as frequency and percentage.

Results: A total of 38 patients meeting the inclusion criteria were included in the study. Both genders were equal in number. The mean age at diagnosis was 8.2 ± 3.6 years. Socioeconomic status was the middle (upper or lower) in 55% of the cases while 45% belonged to the lower socioeconomic group. Adherence was good in 44% of the patients while suboptimal in 56%. The cost of treatment was the main reason for non-adherence in all the cases.

Conclusion: Non-adherence to rhGH therapy is common in our setup. Clinicians should be aware of different factors affecting adherence and all efforts should be made to ensure good adherence so that optimal targets may be achieved.

Keywords: Adherence, Growth hormone therapy, socioeconomic status.

Introduction

Growth hormone (GH) has been the standard therapy for the treatment of children with growth disorders for over 60 years.¹ Short stature is a common presentation for pediatric endocrine evaluation though growth hormone deficiency is relatively rare in the population, with an estimated prevalence of 1:3500 children.² Recombinant human growth hormone (rhGH, somatropin) has proven to be an effective and safe therapy since 1985.³ Apart from the treatment of GH deficiency (GHD), it is approved in many countries for the treatment of children with idiopathic short stature (ISS), Turner syndrome (TS), Prader-Willi syndrome (PWS), chronic renal failure (CRF), small for gestational age (SGA), and Noonan's Syndrome.⁴ Evidence suggests that the success of growth hormone therapy depends on various factors like age at initiation of treatment⁵, adherence⁶, underlying diagnosis, and gender.⁷

Recombinant human growth hormone (rhGH) treatment is administered via a daily subcutaneous injection, given by the parent/caregiver or self-administered within the home environment.⁸ Though this condition is not life-threatening, it adversely affects the quality of life. Treatment needs to be continued for several years, till early adulthood or attainment of optimum height.

Treatment adherence is defined as "the extent to which a patient's behavior matches agreed recommendations from their health professional."⁹ A recent systematic review found that up to 71% of children with growth hormone deficiency and their families are non-adherent to treatment as prescribed.⁶ Non-adherence to treatment results in poor outcomes and suboptimal growth.¹⁰

Commonly reported factors affecting rhGH compliance are the duration of treatment, socioeconomic status, gender, mother's education, doubt on treatment benefit, problems with device usage, and degree of growth retardation at diagnosis.^{10,11,12}

There is a scarcity of data from developing countries on adherence patterns of growth hormone deficiency. This study was done to determine the adherence rate of rhGH therapy in children suffering from growth hormone deficiency and parents' perspectives regarding reasons for non-compliance.

Materials and Methods

This study was conducted at District Headquarters Hospital, Rawalpindi from January 2020 to June 2021. All children already diagnosed with Growth hormone deficiency based on auxiological criteria and growth hormone provocation test (insulin stress test) were included in the study. Children with less than one-year duration of treatment were excluded. Demographic details were recorded on a predesigned proforma. Socioeconomic status was assessed by Kuppuswamy socioeconomic status scale with income group modification.¹³

Data was collected by non-probability consecutive sampling. Adherence to treatment was assessed using a combination of methods based on previous studies.⁶ Patient record was reviewed to check issued, renewed, or encashed rhGH prescriptions. A questionnaire completed by patients and/or parents was also employed to check concordance with the measures using prescription records. The proportion of days covered >80% was taken as good adherence.

Data was entered and analyzed in SPSS 25. Qualitative variables such as gender, socioeconomic status, source of growth hormone injections, and adherence were presented as frequency and percentages. Quantitative variables like age at the start of treatment, monthly cost, and duration of treatment were presented as mean and standard deviation. Duration of treatment, gender, source of growth hormone, and socioeconomic status were compared with adherence pattern applying ANOVA. A P-value less than 0.05 was considered significant. Self-reported reasons for non-adherence were presented as frequency and percentage.

Results

A total of 38 patients meeting the inclusion criteria were included in the study. Both genders were equal in number in our study; the mean age at diagnosis was 8.2 ± 3.6 years while the mean age at initiation of treatment was 8.9 ± 3.8 years. Socioeconomic status was the middle (upper or lower) in 55% of the cases while 45% belonged to the lower socioeconomic group. The mean duration of treatment was 2.3 years. Adherence was good in 44% of the patients while suboptimal in 56%. Among patients with upper or lower middle socioeconomic status, 70% had good adherence as compared to 12.5% of lower socioeconomic class.

Table 1:

Variable	Range (Mean ± SD)
Age in years	4 -17 (10.5 ± 3.8)
Duration of treatment in years	(1 – 6.5) 2.3
Monthly cost of treatment in PKR	14,000 – 38,000 (25,263 ± 7,452)

Table 2:

Source of Growth Hormone	Percentage (number of patients)
Self	36% (13)
Bait-ul-Maal	53% (19)
Employer/ pannel	11% (4)

Table 3:

Variable		Adherence Category		P-Value
		Good	Sub-optimal	
Duration of treatment	< 2 year	8	8	0.073
	>2 year and <4 year	10	4	
	> 4 year	0	8	
Gender	Male	8	12	0.498
	Female	10	8	
Source of growth hormone	Self	12	4	0.009
	Employer organization	4	0	
	Bait-ul-Maal	2	8	
Socio-economic status	Upper	2	0	0.049
	Upper middle	8	0	
	Lower middle	6	6	
	Upper lower	2	12	
	Lower	0	2	

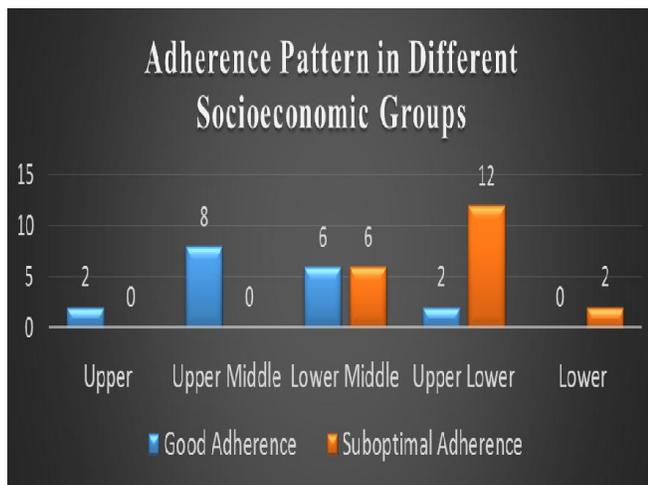


Figure 1:

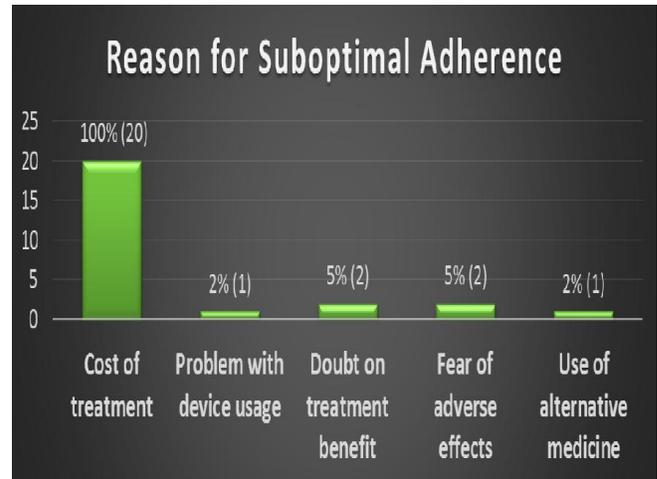


Figure 2:

Discussion

With previous studies highlighting that there is variability in adherence to growth hormone therapy, we conducted this study to find out adherence patterns in our setup and to identify common factors affecting adherence. It is reported that the prevalence of non-adherence to pediatric GH therapy varies from 5 to 82%, depending on the methods and definitions used.⁶ We considered adherence to be optimal if more than 80% of the days were covered. The same cut-off was used in a study done by Hunter et al. in Scotland where 33% of the children were found to be non-adherent as compared to 56% in our study.¹⁴ Cutfield et al. considered more than 1 missed dose per week as non-adherence in a study done in New Zealand and their rate of non-adherence was as high as 66%.¹⁵ Literature states a male predominance in prepubertal children treated with Growth hormone therapy in USA, UK, and Japan but in our study, both genders were equal in number.¹⁶ Mean age of initiation of Growth Hormone was 8.9 years in our study which is comparable to studies done in other parts of the world.^{4,16}

Several studies have reported some factors related to patients' adherence, including an initial inadequate understanding of the treatment goals, frequent subcutaneous injections, long-term treatment, dissatisfaction with treatment results, and socio-economic status.^{6,17,18} In our study, parents of the patients in the non-adherence group were studied for self-reported reasons for non-adherence. The cost of treatment was the reason for non-adherence in all of these cases. Problems with device usage, doubt about

treatment benefits, fear of adverse effects, and use of alternative medicine were additional reported reasons in a small percentage of patients. Duration of treatment and gender had an insignificant association with adherence pattern in our study, unlike other studies that show prolong the duration of treatment adversely affects adherence.¹⁸ Source of growth hormone injections and socioeconomic status were significantly associated with treatment adherence in our study. Patients belonging to the upper socioeconomic class and those who were receiving injections through health coverage by employer organizations had the best treatment adherence. Available international literature debates about coverage of growth hormone therapy under children's health insurance in the USA but doesn't give statistics on patients benefiting from such facilities.¹⁹

Conclusion

Non-adherence to rhGH therapy is common in our setup. Clinicians should be aware of different factors affecting adherence and all efforts should be made to ensure good adherence so that optimal targets may be achieved.

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