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THE EFFECT OF SOCIO-ECONOMIC CONDITIONS ON THE TIME OF DIAGNOSIS AND COMPLIANCE DURING TREATMENT IN GROWTH HORMONE DEFICIENCY

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In 78 patients with idiopathic growth hormone (GH) deficiency the effect of the fathers' educational level on the age and the extent of growth retardation at diagnosis was studied. There was a tendency for an increase of the age and the degree of growth retardation with the decrease of the fathers' completed grades. The occurrence of height SD scores less than -4.5 was conversely related to the number of grades completed by the father ($chi^2=19.2$ $p<0.001$). Eighteen of the 70 patients treated with growth hormone discontinued treatment after 0.3 to 6 years. Compliance was closely related to the grades completed by the father ($chi^2=24.7$ $p<0.001$). Six out of 7 patients with a height SDS less than -4.5 at diagnosis and with a father of low level of education (less than 8 grades) became non compliant.

It is concluded that the degree of growth retardation at diagnosis and compliance at treatment in GH deficiency is related to the educational level of the father.

INTRODUCTION

With the treatment methods employed in the last 20 years the final height of many growth hormone deficient patients remains below the 3rd percentile. Among the factors which determine final height the degree of growth retardation at the beginning of treatment seems to be the most important /1, 2, 4, 7/. Consequently, an earlier diagnosis at less severe growth retardation would result in greater final height. Another factor which in our experience unfavorably affects final height in many patients has been bad compliance during treatment. The factors which determine the time of diagnosis and compliance during treatment have not been studied previously, but the importance of socio-economic status may be supposed.

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The present paper aims at determining to what extent the fathers' educational level affects the degree of growth retardation at diagnosis and compliance during treatment.

PATIENTS AND METHODS

The study concerning the time of diagnosis was carried out in 78 patients with idiopathic growth hormone deficiency. The criteria for the diagnosis of growth hormone deficiency have been published recently /3/. The degree of growth retardation was expressed in SD scores. For comparison local standards were used.

In the study of compliance 70 patients were included who had been treated between 1973 and 1988. Growth hormone was given 2-3 times a week and the patients returned for check-up every 3 months at our clinic to be examined by the same doctor. Medical care including growth hormon was free for all patients. A patient was regarded non compliant if he discontinued treatment completely or interrupted treatment for at least one year.

The data concerning the fathers' occupation could be obtained from the records in all cases, the number of grades completed was asked during check-ups or in a questionnaire sent out to the parents. In the case of 61 out of 62 fathers the occupation was in accord with the educational level so that in the 8 fathers whose educational level was not known it was deduced from the occupation. The information available about mothers' education was not sufficient for analysis. For the statistical analysis Students' t-test and the chi^2 test were used.

RESULTS

There was a tendency for an increase of the age at diagnosis and the degree of growth retardation with decreasing paternal educational level, the difference between the groups, however, was not significant (Table I). The occurrence of patients with severe growth retardation ($<$ -4.5 SDS) at diagnosis was significantly related to the number of grades completed by the father (Table II). Of the 70 patients treated in the given period 18 interrupted treatment for more than 1 year or discontinued it definitely. There were relatively more girls

TABLE I

The relationship of the educational level of the father to the age and extent of growth retardation at diagnosis

		Grades completed			
		< 8	8	11-12	>12
	n	8	31	29	10
Age at diagnosis, years. Mean ± SD		9.9±52	8.6±3.6	7.9±3.4	6.9±3.0
Height at diagnosis SDS Mean ± SD		-6.4±2.4	-4.2±0.9	-3.8±1.0	-3.7±0.7

TABLE II

The occurrence of severe growth retardation at diagnosis in relation to the fathers' educational level

	Grades completed			
Height SDS	< 8	8	11-12	>12
≥4.5	1	15	22	9
<4.5	7	16	7	1

chi^2 = 19.2 $p < 0.001$

than boys in the non compliant group 10:8 vs 18:36 in the compliant group (chi^2=2.5 non significant). The average distance of the clinic from the patients' home was 90 km in the non compliant and 130 km in the compliant patients. In the year preceding the interruption of treatment growth was unsatisfactory (< 4 cm/year) in one patient. There was a significant relationship between the fathers' educational level and compliance (Table III). Six of the seven patients whose height was below -4.5 SDS at diagnosis and whose father completed less than 8 grades became non compliant.

TABLE III

The occurrence of non compliance during treatment in relation to the fathers' educational level

	Grades completed			
	< 8	8	11-12	>12
Non-compliant	8	6	4	-
Compliant	1	15	26	10

chi^2 = 24.7 $p < 0.001$

DISCUSSION

The growth rate of children with growth hormone deficiency before treatment is variable so that the time necessary to accumulate the same degree of growth retardation is different from patient to patient. We have shown that the most important factor which determines the age at diagnosis is the extent of growth retardation /5/.

No relationship has been found between the degree of growth retardation at the time of diagnosis and the sex or the nutritional state of the patient, or the height of the parents. In agreement with Herber et al we have also observed that in the last years growth hormone deficiency has been detected at a less severe growth retardation than previously /5, 6/ suggesting an improved familiarity of the doctors with growth problems. In the present paper we demonstrated that socioeconomic factors are also of importance in early diagnosis, and, in consequence, in the final height of patients.

To our knowledge, the problem of compliance during growth hormone treatment has not been studied previously. Apart from diabetes mellitus, growth hormone deficiency is the only condition in childhood where chronic treatment consists of the regular administration of injections. In diabetes mellitus some of the consequences of irregular treatment become apparent in a short time, while in growth hormone deficiency the results of treatment or non treatment can only be appreciated after at least a year which may unfavorably affect compliance. It has been shown that due to the exaggerated expectations raised by the doctors /8/, some patients and parents are disappointed in the treatment results. In our own experience discontent with treatment seems to be less important since in most of these patients treatment tended to be irregular already in the first year. As shown by our data and our personal impression negligence of the parents associated with low socio-economic status is the most important determinant of non compliance during growth hormone treatment. Although in our material, as well as in that of others, growth hormone deficiency was more

frequent among boys than girls, there were more girls in the non compliant group which may reflect a difference in the attitude of parents to the importance of height in the two sexes.

If a patient failed to turn up for checkup for six months, a letter inquiring about the cause of interruption of treatment was sent to the parents. In some cases this resulted in the resumption of treatment which, however, usually lasted for a short time only. Our results suggest that only an active search for children with pathological growth retardation and new approaches to the improvement of compliance can increase final height in a group of growth hormone deficient patients.

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