

## Development of material for guidance on the use of growth hormone directed to children and their caregivers



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### ABSTRACT

Growth hormone (GH) deficiency is a syndrome caused by impaired GH secretion which may have

congenital, less common, or acquired causes. To treat the deficiency, daily subcutaneous injections of GH are used. The treatment is effective and safe, but as it requires daily injections for many years, adherence can be affected. The pharmacist can provide guidance on the use of GH, identifying and solving problems that may compromise adherence to treatment. The objective of this work was to develop material to guide children using GH and their caregivers. In the first stage, interns and pharmacists exchanged their experiences about the consultations. Subsequently, there was a search for information in the literature about the main adherence problems found in the studies. Finally, we developed a Welcome Letter for the child and a Guidance Manual for caregivers.

**Keywords:** Treatment Adherence and Compliance, Growth Hormone, Health Education.

## 1 INTRODUCTION

GH (*Growth Hormone*) is a hormone produced and secreted by the anterior pituitary gland whose main function is to promote growth and body development through its action on protein formation, multiplication and cell differentiation. GH deficiency, although rare, is the most common pituitary deficiency in children<sup>1</sup>.

Growth hormone deficiency is a syndrome caused by impaired GH secretion that may have congenital, less common, or acquired causes. Acquired causes include tumors and infiltrative diseases of the hypothalamic-pituitary region, trauma, pituitary infections and infarction or cranial radiotherapy, as well as surgical treatment of pituitary lesions. In children, the persistence of this deficiency causes growth problems and, in the most severe cases, difficulty in maintaining blood glucose<sup>2</sup>.

Since 1987, GH has been administered subcutaneously to treat the deficiency, and the drug is discontinued at or near skeletal maturity. In addition to its impact on growth, GH treatment can have



positive effects on lipid profile, cardiac performance, body composition (muscle mass and adiposity) and bone mineral density<sup>3</sup>.

In Brazil, treatment for growth hormone deficiency is provided by the Unified Health System (SUS) and is made available through the Specialized Component of Pharmaceutical Services (CEAF). To have access to treatment, patients must meet the inclusion criteria and not have any exclusion criteria according to the Clinical Protocol and Therapeutic Guidelines for Growth Hormone Deficiency - Hypopituitarism.

In Joinville, CEAF medicines are dispensed at the SUS/SMS/Univille School Pharmacy (FAE). FAE was created 20 years ago through a partnership between the Municipal Health Department of Joinville and the University of the Region of Joinville (Univille). Currently, FAE serves 157 patients with GH deficiency, 30 of whom started treatment in 2023. Of these new processes, 73% (n=22) are intended for the treatment of children aged 1 to 9 years.

GH treatment is considered effective and safe, but because it requires daily injections for many years, it can affect adherence. The causes of poor adherence are complex and include factors related to the disease, the patient, the physician, and the treatment (Savage). If adherence is less than optimal, treatment effectiveness is compromised, resulting in reduced growth velocity and minimized final adult height. Since the cost of GH treatment is considerable, there is a need to improve effectiveness by increasing adherence and reducing waste<sup>4</sup>.

Pharmaceutical care allows for improved treatment adherence, as the pharmacist, when acting in direct patient care, can provide guidance on the disease and its treatment. Such guidelines make it possible to sensitize patients and caregivers about the importance of complying with treatment, in addition to allowing the identification of barriers that hinder adherence<sup>5,6</sup>.

As a strategy to improve adherence to GH treatment, the present study aimed to develop material for guidance of caregivers and children using the drug.

## 2 METHODOLOGY

Initially, there was a discussion between teachers, pharmacists and trainees about the care provided to caregivers and growth hormone users. The objective of this discussion was to identify fears, difficulties and the greatest doubts presented by these individuals during the dispensing of the medication.

Subsequently, a literature search was conducted for studies that evaluated factors that compromise patients' adherence to growth hormone treatment. For the search, we used the PUBMED and SCIELO databases using the terms "growth hormone" and adherence. The terms were used in Portuguese and English. For inclusion, we used studies with no limits of language or type of



publication, published in the last five years. Only studies that could be accessed in full without the need for payment were selected.

With the result of the two previous stages, we determined modifiable factors that could compromise the adherence of patients assisted by the FAE and established strategies to improve care, including the preparation of materials to be delivered during the first dispensation of the medication.

### 3 RESULTS AND DISCUSSION

During the discussions with the team, the caregivers' difficulties in understanding the preparation, storage and technique of GH administration were mentioned. Another point raised was the need to involve children in the medication dispensing process as a way to make them aware of the importance of complying with treatment and to listen to their fears and anxieties.

The search for studies resulted in 59 articles, but only five were consulted. The others were excluded because they analyzed the adult population, compared different GH formulations or evaluated adherence to treatment with the use of devices not made available by the FAE, such as Easypod, for example.

By consulting the literature, it was possible to identify insufficient education, awareness and/or family involvement, poor understanding of the condition and the consequences of missed doses, fear of making mistakes when administering the medication, discomfort with the injection, dissatisfaction with the results of growth, and inadequate or problematic contact with health professionals as barriers to treatment adherence. Reluctance, unwillingness and/or refusal on the part of children due to needle nervousness and/or pain associated with the injection, both actual and anticipated, was also mentioned<sup>7,8,9</sup>.

Inaccurate administration technique and the skill of the individual responsible for GH administration have been reported to be associated with lower treatment adherence. It was found that interpersonal aspects influence the levels of adherence to GH treatment, especially those related to the quality of interaction between the health team and the patient. A retrospective study showed that non-adherence was influenced by the type of health team that provided training at the beginning of treatment<sup>10</sup>. The need to convince the child to use the injectable medication and the low level of awareness of the consequences of not following the treatment correctly were also cited as barriers to treatment adherence<sup>11,12</sup>.

According to studies, recommendations to increase adherence include, among others, the use of reminders and increased patient involvement/education<sup>7</sup>.

To decide on the interventions to be developed, the information found in the studies and the impressions obtained by the team during the consultations were taken into account. By analyzing all these data, it was found that in addition to guiding caregivers, it would also be important to involve



children in the care process. This involvement aims to minimize doubts and fears that children may have and that can potentially compromise treatment.

Thus, it was decided to make oral guidance also directed to the child when he is accompanying the caregivers, giving space for him to express his anxieties and expectations regarding the treatment.

Written information has also been developed that is given to caregivers and children during the first dispensing of the drug:

- Welcome letter for the child (attachment 01)
- Guidance manual for caregivers with information on the choice of needles, application sites, preparation of doses, storage and disposal of the medication, stability after preparation. This manual is adapted to each patient according to the prescribed dose to even inform how many days a GH vial will be used (appendix 02)

#### **4 CONCLUSION**

The literature review confirmed the impressions collected by the team during the consultations that there are difficulties in the use of the medication due to the greater complexity in the preparation and administration of the doses, storage and transportation of the medication. Considering that low adherence compromises the outcome of treatment and that part of the causes of non-adherence are avoidable, the development of educational strategies is an efficient and low-cost alternative.



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## ANNEX I

### Welcome Letter

Joinville, XX of XX of 2023

### Well-vind\_, XX

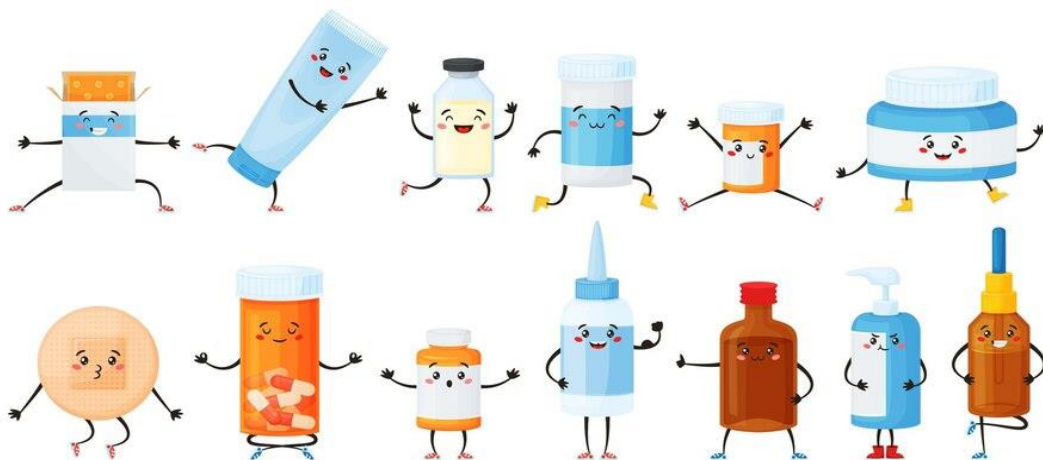
We are very happy to know that you will start your treatment. We hope that this medication will help you get better and that you will feel great while you are using it. If you have any questions about your treatment or if you feel anything different when using the medication, know that here at Farmácia Escola we have several pharmacists who can help you. You can come here whenever you want and ask anything you consider important.

Fear not, we know several children who are using the same medication that you are going to start using and who are very happy with the result of the treatment.

We hope you'll come visit us and tell us how you're feeling. Also, don't forget to tell us how much you're growing.

A big hug,

School Pharmacy Team



Source: Freepik.com



**ANNEX II**

**GUIDELINES – GROWTH HORMONE**

**PATIENT:** \_\_\_\_\_

**WHAT TO DO WHEN YOU GET HOME WITH THE MEDICATION?**

- Remove the medication from the Styrofoam and place it on the middle shelf of the refrigerator.





Source: <https://www1.folha.uol.com.br/seminariosfolha/2018/02/folha-segure-rotina-de-paciente-que-toma-remedio-sensivel-a-temperatura.shtml>

- Remove the reusable ice from the Styrofoam and place it in the freezer

**HOW TO PREPARE THE DRUG?**

**MATERIAL TO BE USED:**

Syringe for drug application	Syringe Suggestion for Drug Preparation
Insulin syringe: 50 or 100 units	Syringe 3 ml Needle 25 X 5 or 25 X 7
	



<ul style="list-style-type: none"> <li>Remove the medicine from the refrigerator 30 minutes before applying</li> <li>Wash one's hands of</li> </ul>	
<ol style="list-style-type: none"> <li>Remove the cap from the vial</li> <li>Open the ampoule of thinner.</li> </ol>	
<ol style="list-style-type: none"> <li>Attach the syringe to the needle and aspirate the contents of the diluent ampoule</li> <li>Vacuum the entire contents of the ampoule.</li> </ol>	
<ol style="list-style-type: none"> <li>Inject the diluent into the vial</li> <li>Dilute by making light, circular movements. Do not shake vigorously.</li> <li>With an insulin syringe, aspirate <b>XX</b> units of the hormone as prescribed by the doctor.</li> </ol>	
<p style="text-align: center;"><b>Stability after dilution</b></p> <ul style="list-style-type: none"> <li>Hormotrop® 4 IU: 14 days under refrigeration (in refrigerator, middle shelf, 2 to 8 C)</li> <li>Hormotrop® 12 IU: 14 days under refrigeration (in refrigerator, middle shelf, 2 to 8 C)</li> <li>Biomatrop® 4 IU: 7 days under refrigeration (in refrigerator, middle shelf, 2 to 8 C)</li> </ul>	

## HOW TO ADMINISTER OR MEDICATION?

<p style="text-align: center;"><b>Cleaning of the application site</b></p> <p style="text-align: center;">Clean the application site with cotton wool and 70% alcohol, let it dry</p>	
<p style="text-align: center;"><b>Areas of application (SC)</b></p> <ul style="list-style-type: none"> <li>Thighs, abdomen, back of arms.</li> <li>Do not apply to areas where the skin is damaged, red, painful or sensitive.</li> </ul>	
<p style="text-align: center;"><b>Administration</b></p> <p style="text-align: center;">With 4 mm and 5 mm needles</p> <ol style="list-style-type: none"> <li>Pinch a portion of the skin to make a fold in children under six years of age.</li> <li>With the other hand, hold the syringe at a 90° angle to the skin.</li> </ol> <p>With 6 mm and 8 mm needles</p> <ol style="list-style-type: none"> <li>Pinch a portion of the skin to make a fold in children under six years of age.</li> <li>With the other hand, hold the syringe at a 45° angle to the skin.</li> </ol> <p>For all needle types</p> <ol style="list-style-type: none"> <li>Insert the needle with a short, quick motion and inject the solution from the syringe</li> <li>Wait 10 seconds after the syringe has been completely emptied.</li> <li>Remove the syringe at the same angle as the application.</li> </ol>	
<ul style="list-style-type: none"> <li>Store the remaining contents of the jar in the refrigerator</li> <li>Use the same bottle for <b>XX</b> days. On <b>the XX day, use what is left in that vial (XX units)</b>, prepare a new vial and use <b>XX units of the new vial, totaling the XX units prescribed.</b></li> </ul>	

## DISCARD

Place the vials, syringes and needles in a rigid container (fabric softener bottle, pet bottle) and bring to the school pharmacy for proper disposal.