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Development of a Basal Insulin Titration System to Support Healthcare Providers in Treatment of People with Type 2 Diabetes: Preliminary Results

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Abstract. The study aims to develop a system for insulin titration in type 2 diabetes to assist primary healthcare providers. Usability testing with end-users is ongoing.

Keywords. Basal insulin titration, type 2 diabetes, decision support system

1. Introduction

Titration of insulin in people with type 2 diabetes (T2D) is a complex and challenging process for many primary healthcare providers affected by clinical inertia [1]. Thus, 30-50% of people treated with insulin remain in suboptimal glycemic control six months after initiating basal insulin. This emphasizes the necessity for simpler and more accessible methods for insulin titration in primary care to facilitate better treatment outcomes [2,3]. The present study, therefore, aims to develop a decision support system for primary healthcare providers in insulin titration of people with T2D.

2. Methods

System development followed two phases utilizing usability engineering principles. In phase one, initial requirements were established in a workshop with three domain experts possessing clinical guideline knowledge, leading to creation of a prototype. This prototype featured a retrospective graph of insulin doses and fasting glucose levels, and a test environment to simulate glycemic effects of dose changes before prescribing. Users could also prescribe doses and consult clinical guidelines. The prototype underwent heuristic evaluation [4] by technical experts, informing improvements for a second version. Phase two involved usability testing with healthcare providers, monitored by an eye tracker, to assess effectiveness, efficiency, satisfaction, and workflow disruptions.

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3. Results

Heuristic evaluation of the first iteration of the prototype was carried out by eleven usability experts, identifying a total of 57 distinct violations, mainly focusing on the understandability of the insulin dose slider and graph together with a general observation of data overload on the main interface. In Figure 1 the first and second iteration of the prototype is seen. At the time of writing, the second iteration of the prototype is undergoing usability testing with healthcare providers.

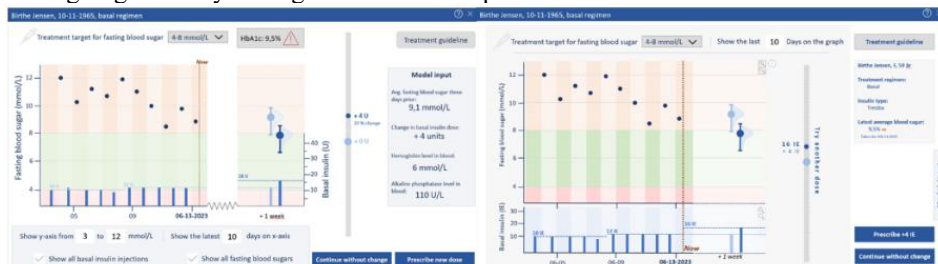


Figure 1. Comparison of the initial prototype (left) and the refined version after heuristic feedback (right).

4. Discussion

The development of a system must prioritize usability to enhance the likelihood of user acceptance; thus, an iterative approach involving both technical experts and potential end-users is essential. However, it is crucial to carefully consider the number of participants providing input in each iteration to ensure findings are generalizable, as such input can be highly influenced by inter-person variability [5].

5. Conclusions

The study will identify key requirements for a decision support system amid at helping primary healthcare providers titrate basal insulin for people with T2D, potentially streamlining the process, empowering providers, and improving treatment outcomes.

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