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Preliminary Evaluation of a mHealth Coaching Conversational Artificial Intelligence for the Self-Care Management of People with Sickle-Cell Disease

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Abstract. Adherence to the complex set of recommended self-care practices among people with Sickle-Cell Disease (SCD) positively impacts health outcomes. However, few patients possess the required skills (i.e. disease-specific knowledge, adequate levels of self-efficacy). Consequently, adherence rates remain low and only 1% of patients are empowered enough to master the self-care practices. Health coaching and therapeutic patient education have emerged as new approaches to enhance patients' self-management and support health behavior changes. This preliminary feasibility study examined patients' perceived usefulness of the information provided by a chatbot we developed following patient-important requirements collected during our preliminary studies. Participants tested the chatbot and completed a post-test survey. A total of 19 patients were enrolled and 2 withdrew. 15 respondents (15/17, 88%) gave a score of at least 3/4 to the question "The chatbot contains all the information I need". Results suggest that mHealth coaching apps could be used to promote the knowledge acquisition of recommended health behaviors related to the prevention of SCD main symptoms.
Keywords. Sickle-Cell Disease, Chatbots, mHealth, Patient Empowerment.

1. Introduction

Sickle-Cell Disease (SCD) is the most prevalent monogenic disorder worldwide [1,2]. The major clinical manifestations are hemolytic anemia and vaso-occlusive pain crises (VOC) [3]. Triggers of VOCs are numerous and include inadequate eating behaviors, stress, infections, dehydration, fatigue [4]. To prevent them, patients require high cognitive capabilities, good disease-specific knowledge and high self-efficacy levels [5]. Yet, literature suggests that only 1% of SCD patients are empowered enough to fully self-manage [6]. Mobile health (mHealth) apps, because of their relatively low cost and scalability, can offer a potential route to support SCD self-management. Studies have shown that Conversational Artificial Intelligence (AI) such as chatbots to encourage people with Diabetes' behavior changes, had a high acceptability and high user engagement [7]. To our knowledge, no work has been done to design such tools for the specific needs of people with SCD. This preliminary study aims at evaluating patients' perceived usefulness of the information provided by a fully automated coaching app designed to empower patients through the learning of recommended self-care practices.

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2. Methods

To be part of the study, applicants had to be diagnosed with SCD. Patients had to be at least 16 years old and be able to understand French. People who had been cured (e.g., bone marrow transplantation) were excluded. Finally participants had to possess a smartphone. Patients have been recruited through patient associations in Guadeloupe during the World Sickle-Cell Awareness Day. All participants gave informed consent before the evaluation and all responses were anonymous. The instrument has been developed following patient-important requirements collected during our previous work [8,9]. Participants tested the chatbot and completed a post-test, the 9-items usefulness scale for patient information material (USE) survey.

3. Results

19 patients participated to the test (9 females and 8 males). 17 completed the evaluation. 2 females withdrew because of problems with their smartphones. Patients were aged between 19 and 59 years old. 15 respondents (15/17, 88%) gave a score of at least 3/4 to the question “The chatbot contains all the information I need” for a total score of 54/68. 10 participants (10/17, 58%) gave a score of at least 3/4 to the question “The chatbot encouraged me to be more active in order to improve my condition”, for a total of 51/68.

4. Discussion

Results suggest that chatbots for health coaching can be used to promote the knowledge acquisition of recommended self-care practices related to the prevention of VOCs.

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