The "Doctor Apollo" chatbot: a digital health tool to improve engagement of people living with HIV

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BACKGROUND

Integration of mobile phone technology into HIV care has been proposed not only to increase ART adherence bur also to facilitate the long term follow-up of people living with HIV.

AIMS

Aim of the project is to design, develop and evaluate a digital health personnel-patient interface.

STUDY DESIGN AND METHODS

The project phases (analysis of needs and expectations, development; enrollments of study population and evaluation) have been conducted with a user centered approach. More specifically, focus groups, design thinking and lean programming methodologies, and agile project management have been employed.

Inclusion criteria were:
- own a smartphone,
- age>18 y.o,
- to be under ART for at least 6 months.

A semi-structured questionnaire before and after Doctor Apollo use to evaluate the current interaction modalities with the clinical center and the degree of satisfaction was administered.

Table 1. Characteristics of the study population

Sex	17F, 17M
Age median (min-max)	46 (21-65)
Heterosexual, num. (%)	15(44%)
MSM°, num. (%)	19 (56%)
CD4 mm^3, median (min-max)	527 (170-1207)
HIV-RNA copies/ml	<40

°MSM men who have sex with man

RESULTS

The needs of HIV people identified were: a diversified level of required privacy, the possibility to receive the results of blood test in real time, have a contact with the center even when it is closed, and a leaner appointment management. The instant messaging platform chosen to develop and deliver Doctor Apollo has been Telegram. See Figure 1 for bot scheme usage and its functions. 34 pts have been enrolled into the study (4 declined to sign informed consent for privacy reason). Characteristics of the study population are listed in table 1. In five month period 3422 messages between patients and Doctor Apollo were exchanged, many of those outside working hours. The most used function was "Book appointment" (24.6%), "Results" (22%), followed by Therapy (20%), "Upcoming event" (10.2%) and "Follow up" (9.6%), (Fig. 2). Unexpectedly, the "Medication reminder" function has been used in less then 10% of days.
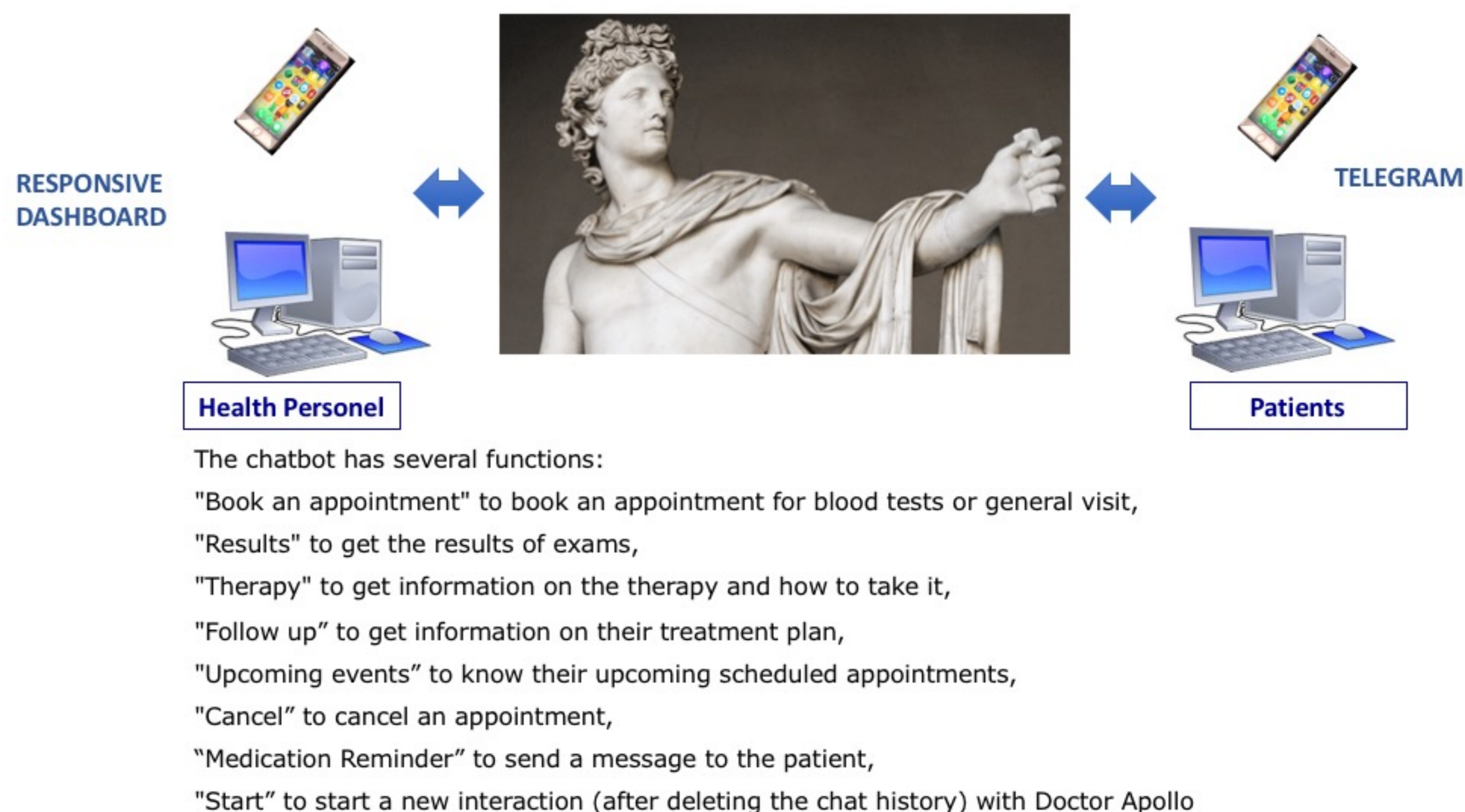

RESPONSIVE DASHBOARD — TELEGRAM — Health Personel — Patients

The chatbot has several functions:
"Book an appointment" to book an appointment for blood tests or general visit,
"Results" to get the results of exams,
"Therapy" to get information on the therapy and how to take it,
"Follow up" to get information on their treatment plan,
"Upcoming events" to know their upcoming scheduled appointments,
"Cancel" to cancel an appointment,
"Medication Reminder" to send a message to the patient,
"Start" to start a new interaction (after deleting the chat history) with Doctor Apollo

Figure 1. Representation of bot scheme usage and its functions

- 24.6% Book Appointment
- 22% Results
- 20% Therapy
- 9.6% Follow up
- 10.2% Upcoming events
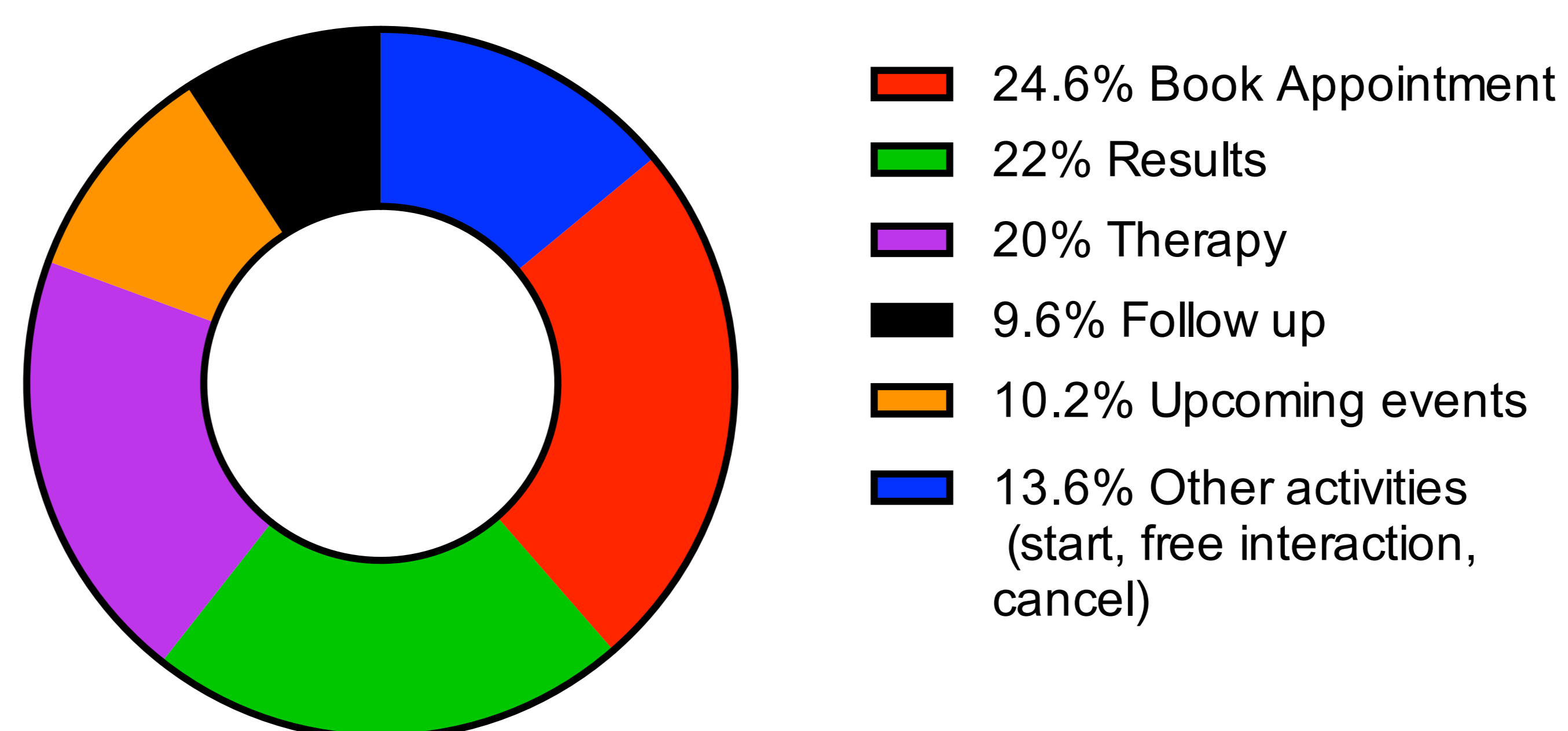- 13.6% Other activities (start, free interaction, cancel)

Figure 2. Representation of the most widely used functions by patients in five month period

CONCLUSIONS

A chatbot interface between patient and clinical center seems to be an effective tool for its flexibility. The need to be in continuous close contact with the clinical center was a major issue for enrolled patients. Apparently, drug reminder is not a need for patients and it is being perceived as invasive. A larger use of Doctor Apollo in different settings is necessary to better understand the role of chatbots in the long term management of HIV infection in everyday life.