Usability and Acceptability of a Comprehensive HIV and Other Sexually Transmitted Infections Prevention App

Blanca Rodríguez Vargas [1] · Javier Sánchez-Rubio Ferrández [2] · Jorge Garrido Fuentes [3] · Reyes Velayos [3] ·
Ramón Morillo Verdugo [4] · Ferrán Sala Piñol [5] · Alberto Onteniente González [6] · Miguel Ángel Rodríguez Sagrado [7]

Abstract

The *Preparadxs* app was designed to enhace the prevention of the HIV and other sexually transmitted infections transmission through the empowerment of the user. The purpose of this study is to determine the usability and perception about the app among real users. In this prospective cross-sectional study all app end-users were asked to answer the System Usability Scale and question regarding app capability to reduce sexually transmitted infections in the future. Influence of several variables (gender identity, educational level and digital native condition) was explored. A total of 69 users answered the survey during study period. Most of them were male and had university studies. Final usability score was 80,8 points which means a good, near excellent usability. No differences in usability scores were observed regarding to gender identity, native condition or educational level. Most users were strongly agree (56,5%) or agree (28,9%) with app potential to reduce the incidence of HIV and other STIs in the future.

Keywords Mobile applications · Usability · HIV · Sexually transmitted infections · User acceptance

Introduction

HIV-1 continues to be a major global health problem, with more than 36 million individuals living with HIV infection in 2017. Antiretroviral therapy (ART) has indeed significantly brought improved the quality of life of those infected; however, the incidence of new human immunodeficiency virus (HIV) diagnoses continues to remain high [1].

In order to achieve the target of reducing the number of new HIV infections by 75% by 2030 [2], amplified HIV prevention efforts are necessary. Several effective prevention strategies have been developed, and the market of mHealth

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✉ Javier Sánchez-Rubio Ferrández
javier.sanchez@salud.madrid.org

Blanca Rodríguez Vargas
blanca.rodriguez@salud.madrid.org

Jorge Garrido Fuentes
coordinacion@apoyopositivo.org

Reyes Velayos
presidencia@apoyopositivo.org

Ramón Morillo Verdugo
ramon.morillo.verdugo@gmail.com

Ferrán Sala Piñol
fsala.germanstrias@gmail.com

Alberto Onteniente González
alberto.onteniente@salud.madrid.org

Miguel Ángel Rodríguez Sagrado
mrsagrado@salud.madrid.org

1   Pharmacy Service, Infanta Cristina University Hospital, Parla, Madrid, Spain

2   Pharmacy Service, Getafe University Hospital, Getafe, Madrid, Spain

3   Apoyo Positivo, Madrid, Spain

4   Pharmacy Service, Valme University Hospital, Sevilla, Spain

5   Pharmacy Service, Germans Trias i Pujol University Hospital, Badalona, Spain

6   Pharmacy Service, Getafe University Hospital, Getafe, Madrid, Spain

7   Pharmacy Service, Ramon y Cajal University Hospital, Madrid, Spain

apps has grown exponentially over the last years. The increasing popularity of smartphones and smartphone applications (apps) has greatly expanded the possibilities for phone-based HIV/STD interventions and there is a trend towards the use of this innovations [3]. Our team has recently designed a mobile application called *Preparadxs* in the field of the prevention of HIV and other sexually transmitted infections (STIs).

The purpose of this study is to determine the usability of the app among real users and user perception regarding the app and its capability to reduce STIs.

Methods

Study design

Prospective cross-sectional study.

Participants

All app end-users were invited to fullfill a survey through an app pop up during a period of one month. The app was publicized by a community-based organizations for people living with HIV and through Spanish Society of Hospital Pharmacy website. The study participation was completely voluntary, and the participant could leave the study at any time. At the beginning of the study, a general introduction to the purpose of the study was provided and consent was obtained electronically from all participants.

The project was conducted in accordance with the Declaration of Helsinki and was previously approved by an Ethical Committee.

Technology

The Preparadxs app is a free, anonymous, universal access mobile application. It is written in spanish and its main aim is to enhace the prevention of the HIV and other STIs transmission through the empowerment of the user. The main menu lists the different sections including information about HIV, transmission routes, pre-exposure prophylaxis and other preventive methods, and chemsex (Fig. 1). A "sex and health" quiz with three skill levels, geolocalization of community sexual health centers and a "contact us" link for questions are also available.

The app is currently available in the iOS App Store and in the Google Play Store.

Procedures

Participants completed self-administered questionnaire within the app. Demographic information provided included age, gender identity, and educational level. The study participants were asked to provide responses to the System Usability Scale (SUS) [4] and to an open-ended interview questions regarding their opinion regarding app capability to reduce new infections.

The SUS is an industry-standard scale that has been rated as a highly robust and versatile tool to evaluate usability [5]. The questionnaire of the SUS consists of 10 statements (Table 1) on a 5-point Likert scale with 5 positive statements (item 1, 3, 5, 7, and 9) and 5 negative statements (item 2, 4, 6, 8, and 10). The user was asked to rate their level of agreement with these statements concerning the app. The individual scores are calculated as follows: each item's score ranges from 1 to 5. In case of the uneven items, the scale position minus 1 contributes to the total score. In case of the even items, the contribution to the total score is 5 minus the scale position. The participant's scores for each question are converted to a new number, added together and then multiplied by 2.5 to convert the original scores of 0–40 to 0–100, where higher scores indicate better usability.

The SUS has been found as a reliable and valid tool among both experts and service users when assessing the usability of mobile apps. A SUS score over 68 is considered above average in the evaluation of mHealth apps [6].

A qualitative questions was also included to obtain further information about participants' perception about the utility of the app in reducing sexual transmitted infections and two open-ended interview questions where added to evaluate which aspects were most and least valued.

Response rate was calculated as the number of active users that participated in the survey. Number of app active users was obtained throught Google Analytics tool which allows to measure and optimize user acquisition and engagement with mobile apps.

We explored the influence of gender identity, educational level and digital native condition [7] on usability.

Data analysis

Descriptive statistics (mean and standard deviation) were calculated for each item. The Kolmogorov-Smirnov test was used to determine the distribution of the quantitative variables. Depending on normal distribution, the Student t-test or the non-parametric Mann-Whitney U test were used. p-values <0.05 were considered statistically significant. Statistical processing of the data was carried out using IBM SPSS Statistics, version 24.0 (IBM Corporation, Armonk, New York, USA).

Results

A total of 69 users answered the survey. During study period 320 used the app which supposed a response rate of 21.6% of active users during study period. 71% were male. Most

Fig. 1 Interface of *Preparadxs* app
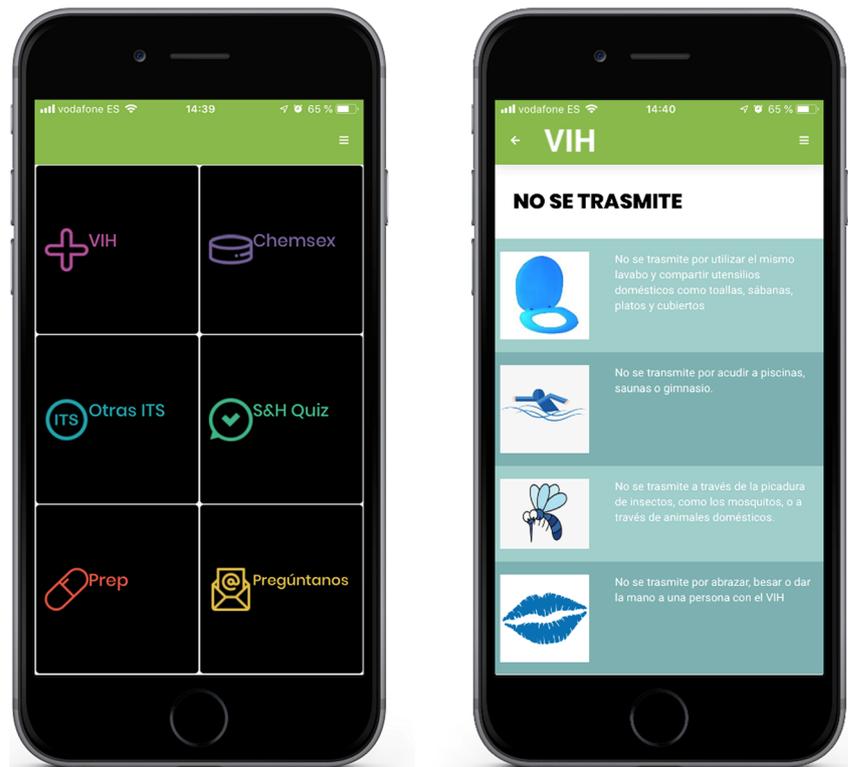
participants (33.8%) ranged from 30 to 40 years old, followed by >40–50 (22.1%) and 25–30 (20.6%). Regarding educational level, 86.8% had tertiary, 10.3% secondary and 1.5% primary levels. 31.9% were considered as digital natives.

Mean and standard deviation values for each statement are shown in Table 1. Final SUS score was 80,83 points which means a good, near excellent usability.

In the univariate analysis no differences in usability scores were observed regarding to gender identity (mean difference − 0.5 IC95% -7.9-6.9; $p = 0.900$), high educational level (mean

difference 2.1 IC95% -4.9-9.2; $p = 0.548$) or digital native condition (mean difference 3.5 IC95% -13.4-6.4; $p = 0.481$) .

Regarding app capability to prevent new infections most users were strongly agree (56.5%) or agree (28.9%) with the statement that *Preparadxs* could help to reduce the incidence of HIV and other STIs in the future.

The most appreciated aspects were the design, clarity and rigor of contents and the ease of navigation. Conversely the users complained about the excessive number of options of certain menus.

Table 1 SUS scores for each statement

	Global Mean ± SD $n = 69$	Digital native Mean ± SD $n = 24$	Non Digital native Mean ± SD $n = 45$	p
1. I think I would like to use this system frequently.	4,3 ± 0,9	4,3 ± 0,9	4,2 ± 0,8	0.938
2. I found the system unnecessarily complex.	2,0 ± 1,5	2,3 ± 1,1	1,9 ± 1,1	0.189
3. I found the system was easy to use.	4,5 ± 0,8	4,4 ± 0,9	4,5 ± 0,7	0.692
4. I think I would need the support of technical person to be able to use this system.	1,8 ± 1,3	2,0 ± 1,0	1,7 ± 0,9	0.138
5. I found the various functions in this system were well integrated.	4,3 ± 0,7	4,3 ± 0,7	4,3 ± 0,7	0.835
6. I thought there was too much inconsistency in this system.	1,8 ± 1,2	1,9 ± 0,7	1,7 ± 0,9	0.316
7. I would imagine that most people would learn to use this system very quickly.	4,4 ± 0,7	4,3 ± 0,7	4,4 ± 0,7	0.349
8. I found the system very cumbersome to use.	2,2 ± 1,8	2,1 ± 0,4	2,2 ± 1,4	0.849
9. I felt very confident using the system.	4,3 ± 1,0	4,6 ± 0,7	4,1 ± 0,9	0.054
10. I needed to learn a lot of things before I could get going with this system.	1,8 ± 1,3	1,9 ± 0,9	1,7 ± 1,0	0.368

Discussion

This study provided evidence regarding the usability and user's perception about *Preparadxs* app, a smarthphone application designed for people empowerment about sexual transmitted infections and risk practices.

Mobile apps have great potential to improve user's self-management of health related issues. The future of comprehensive sexual health education is moving toward smartphone apps. Use of mobile apps, have been proven to demonstrate positive effects, and can be more effective than other kind of interventions because of privacy and widespread dissemination. [8]

However, overall, the usability of the m-health apps could be suboptimal, demonstrating the gap between the potential and reality of mobile health technology for self-management with regard to the population. [9]

According to a broadly accepted standard assessment of usability, our app was assessed as being above average across all groups of end-users. Using a validated translation to qualitative terms, our app could be classified as being between good and excellent [10]. The usability of the app is vital in order to achieve its objectives [11].

It is known that young adults are at the highest risk of acquiring HIV. Althought daily mobile phone–based contact is acceptable to youth living with HIV [12], in our study most of patients were not digital natives. The preparadxs app included a "Sex and health" quiz in order to target this population, because youth and young adults are the most avid users of games and social media [13], therefore inclusion of gaming elements into mobile phone applications represents a promising health behavior change intervention strategy. One possible explanation for the low rate of users under 30 years-old is that app contents were designed to reach every kind of user and maybe do not deliver tailored content that best meets the specific HIV management challenges faced by young, mainly men who have sex with men.

Digital natives are used to being able to receive information immediately; internet research and apps are their first choice in cases of questions and often the main source of information. However no differences were observed between digital natives and digital immigrants which means that the individual was born before the widespread adoption of digital technology [7].

Our study also found no influence of educational level in SUS scores. These both facts may reflect that the app is accesible to all types of users. Moreover the easy of use was the most valued aspect of the app.

Limitations

Our study had several limitations. First, our participants were subject to selection bias as participants might be those more motivated to use mobile technologies. Moreover, the time of use of the app could be heterogeneous among users.

Conclusions

The usability of the Preparadxs app was reported to be adequated by end-users. Participants perceived that this app would be useful for reducing sexual transmitted infections in the future.

Compliance with Ethical Standards

Conflict of Interest Dr. Sánchez-Rubio has received a speaker honorarium from Gilead, ViiV healthcare, MSD, Celgene and BMS. Dr. Rodriguez Sagrado has received a speaker honorarium from Janssen, Sandoz, Gilead, MerckSerono, Biogen, Novartis, Intercept, Abbvie, ViiV y MSD. Dr. Morillo has received an educational grant from Gilead. Dr. Rodríguez Vargas, Dr. Onteniente, Dr. Sala, Miss Velayos and Mr. Garrido declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent All individual participants consented to participate in the study.

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