

DEVELOPMENT OF A MOBILE APPLICATION TO SUPPORT HEALTH PROFESSIONALS IN THE DIAGNOSIS OF AIDS USING RAPID TESTS

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Resume: Rapid tests (RT) also known as point-of-care testing (POCT) remote laboratory tests (TLR) are designed to be performed close to the patient, providing results in up to 30 minutes. With the publication of Ordinance No. 29 of December 17, 2013, the use of RTs was standardized so that the diagnosis could be performed with their exclusive use, that is, without the need for confirmation through other methodologies. Thus, RTs have become key tools for the diagnosis and prevention of AIDS/AIDS (Acquired Immunodeficiency Syndrome). However, for its use, health professionals must undergo training. TELELAB is the online training platform made available by the Ministry of Health (MS) and is considered a national reference for this purpose. Mobile applications (apps) are examples, whose use is recognized by the WHO as a complementary health care strategy. Due to the low supply of apps that address AIDS testing in Brazil, this study aimed to develop an application for professional qualification focused on the execution and interpretation of rapid AIDS tests. This is a study of the technological production of software for smartphones, with content based on TELELAB. The graphic engine for creating games and applications called Unity was used, developing a platform composed of 6 modules with relevant information about TRs. The result of this study was the creation of the AIDS_TESTE RAPID app for download on Android and iOS devices for free and with operation without the need for internet (offline mode). Due to the diversity of professionals who can carry out the test and the difficulties encountered in primary care, it is concluded that the application developed is very useful as it will provide greater safety in practice and update current determinations that address the diagnosis of the disease.

Keywords: AIDS diagnosis, continuing education, mobile devices, rapid tests.

INTRODUCTION

Rapid tests (RT) are portable and easy-to-handle immunoassays (IE), which provide results in up to 30 minutes (BRASIL, 2018). The high cost and delay in results with the use of other methodologies boosted its development. In Brazil, its regulation occurred through Ordinance n°. 34/2005, which authorized the use of RT for the diagnosis of human immunodeficiency virus (AIDS) infection in special situations, such as, for example, in areas of difficult access (BRASIL, 2005).

In 2013, the Technical Manual for the Diagnosis of AIDS Infection in Adults and Children was approved (Ordinance SVS/MS No. 29/2013), which provided flowcharts for laboratory and non-laboratory diagnosis (BRASIL, 2018).

The RT have become key tools for the diagnosis and prevention of AIDS/AIDS (Acquired Immunodeficiency Syndrome), however, for their execution, health professionals must undergo training (BRASIL, 2018).

TELELAB is a free training platform from the federal government, with a proposal for permanent education in the area of health. The first courses were offered about 25 years ago. In 2011, the platform for *online training* was created, considerably expanding the certification of professionals (TELELAB, 2022).

The use of educational technologies, fast and dynamic, help in the dissemination of information. Mobile applications (apps) are examples whose use is recognized by the World Health Organization (WHO) as a complementary health care strategy (WHO, 2015). Apps are instruments that facilitate the teaching and learning process (OLIVEIRA; ALENCAR, 2017).

In a mapping carried out in 2017, of the apps available in Portuguese, 15 apps produced in Brazil were identified in virtual stores, related

to the term “AIDS”, whose central content was about AIDS/AIDS infection, with a focus on transmission and prevention (BARBOSA, 2019).

In 2019, a study, based on the terms “AIDS” and “AIDS”, identified only 7 apps aimed at health professionals and none with

an approach to AIDS diagnosis through rapid tests (**Figure1**). Of these, 4 apps (“PCDT Adult”, “PCDT TV”, “TV-SP” and “PCDT prep.”) were available on Google play and Apple Store, 2 apps (“PEP-Tec” and “EoAIDS”) on Apple Store and 1 app (“App AIDS”) in the Play Store (FERMO et al, 2021).


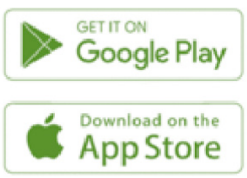






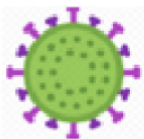

Apps	Application Approach	Available at stores
Adult PCDT 	Provides the Clinical Protocol and Therapeutic Guidelines (PCDT), produced by the MS, in full and via the platform, which establishes recommendations for the management and care of PLAIDS	
PCDT TV 	Provides the Vertical Transmission PCDT, produced by MS, in a practical, simple and easy-to-consult platform.	
TV-SP 	Aimed at Primary Health Care (PHC) professionals and maternity hospitals in São Paulo, it aims to provide technical information on vertical transmission of AIDS, syphilis and viral hepatitis to support decision-making from prenatal care to the postpartum period.	
PCDT prep. 	Provides document produced by MS that establishes recommendations regarding the use of pre-exposure prophylaxis (PREP).	
PEP- tec 	Assists health service professionals in caring for people who have gone through situations with a potential risk of AIDS infection	
And the AIDS (Occupational exposure to AIDS) 	Assists in the treatment of occupational exposure to AIDS. Its target audience is health professionals and aims to provide information for workers to expand their self-care capacity and improve adherence to antiretrovirals during post-exposure prophylaxis (PEP)	
App AIDS 	Developed based on the PCDT for the management of AIDS infection in adults, with the purpose of assisting physicians in the care of patients diagnosed with AIDS	

Figure 1. Applications aimed at health professionals with the theme AIDS/AIDS

Source: Based on Fermo et al. 2021. Own authorship.

Due to the shortage of technological solutions in the country, an application is relevant mainly for accessing information easily and quickly, in addition to contributing to health education.

OBJECTIVE

To describe the development of an application to support health professionals in the execution and interpretation of AIDS RT.

MATERIALS AND METHODS

This is a study of technological production, development of the app named AIDS_TESTERÁPIDO.

The content of the application was based on the didactic material of the classes of the TELELAB courses.

Initially, a sketch was created that was later organized into 6 modules (**Figure 2**).

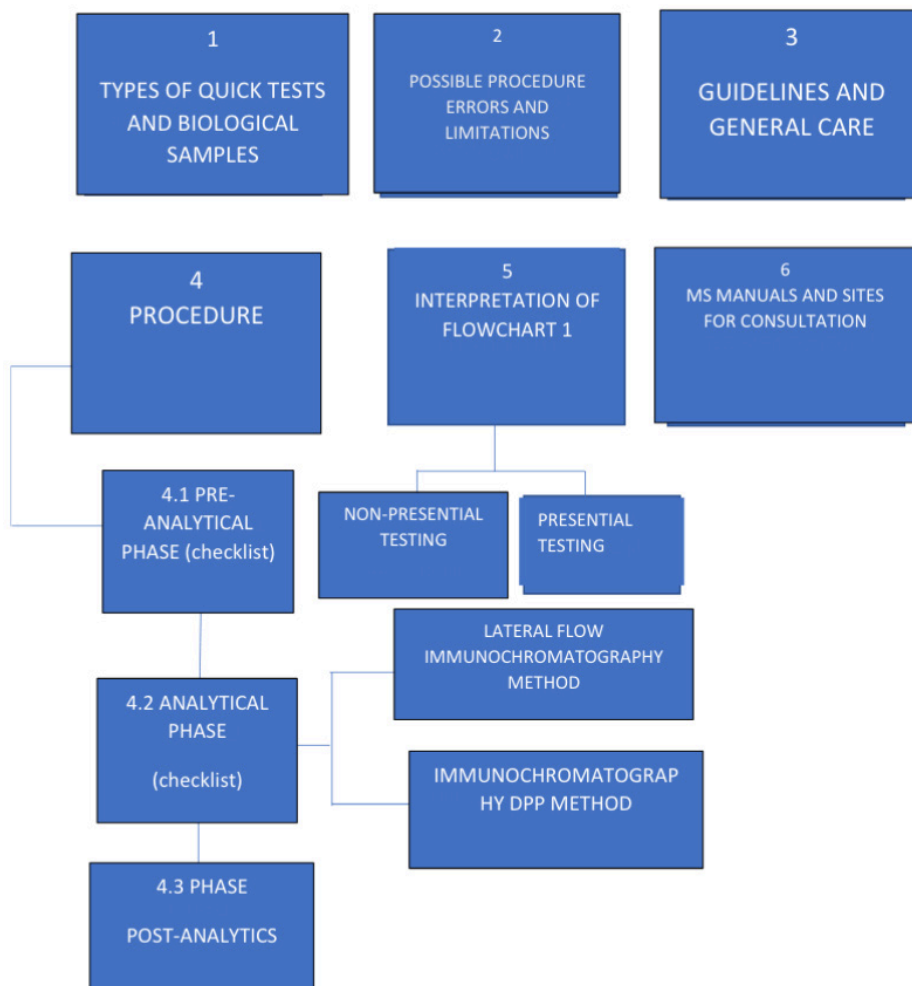


Figure 2. App project flowchart

Source: Own authorship.

Data were extracted from flowchart 1 of the MS and its developments, to create 2 flowcharts with the necessary information for the correct conclusion of the diagnosis

Application code programming was carried out by a specialized service provider. The Unity® framework was adopted. The programming language used was C# (C Sharp).

RESULTS

The result of this study was the construction of a free application installable on Android and iOS smartphones, running without the need for internet(*off-line*).

The application consists of a main screen where 6 modules are displayed (**Figure 3**). On the upper left side of the screen, there is a menu, with additional information about AIDS, privacy policy, bibliographical references, and others. On the upper right side, there is an information field about the app.



Figure 3. Main screen of the AIDS_ TESTERÁPIDO application.

Source: Own authorship.

Module 4 “Procedure” presents information about the pre-analytical, analytical and post-analytical steps, which will help the professional to correctly perform the test, as illustrated in **figure 4**.

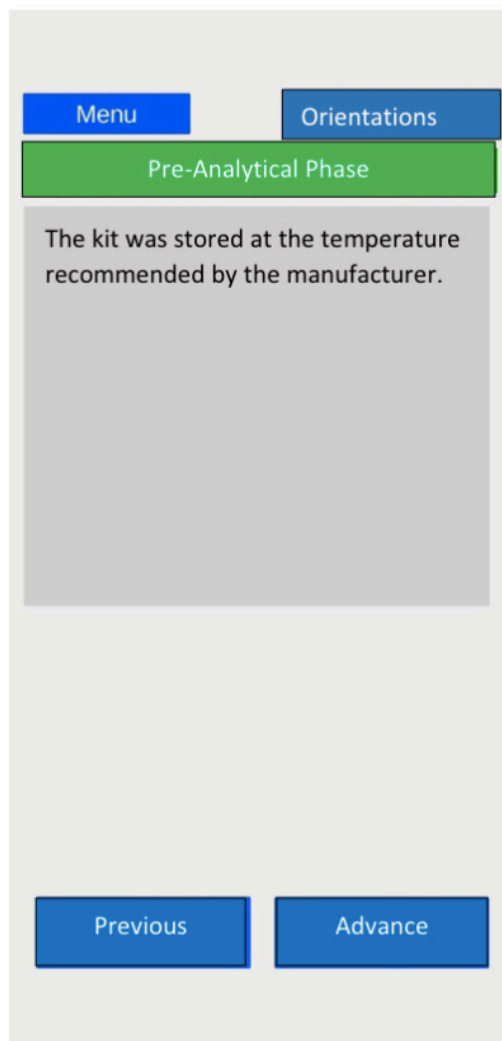


Figure 4. Example of a screen from the pre-analytical phase

Source: Based on Telelab, 2014. Own authorship.

After the pre-analytical phase, the analytical phase is started in sequence and finally the post-analytical phase (**Figure 5**).

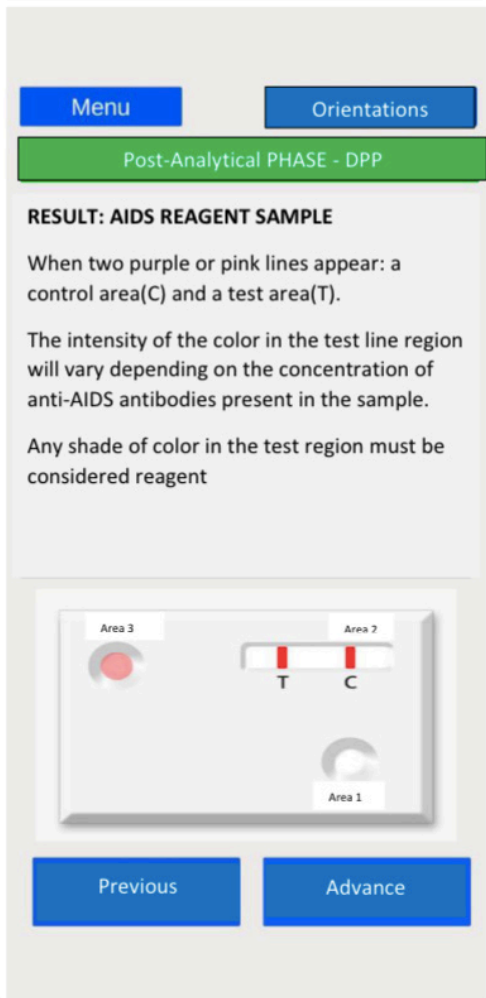


Figure 5. Example of a screen from the post-analytical phase.

Source: Based on Telelab, 2014. Own authorship.

In module 5 “Interpretation of flowchart 1”, two flowcharts were created based on flowchart 1 of the MS and its developments, for consultation according to the type of sample collection (face-to-face or non-face-to-face).

Finally, module 6 “Documents and websites for consultation” provides access links to the main documents that address rapid AIDS testing.

The intention is to ask the National Institute of Industrial Property (INPI) to register the software, and offer it to MS collaborating in

the continuing education of professionals who take TELELAB courses.

DISCUSSION

Over the last few years, public policies to contain the epidemic have made great advances. The expansion of diagnosis with the offer of RT, antiretroviral therapy (ART) and the improvement of assistance to people with AIDS, were essential in reducing the mortality of people infected by the virus⁸. (PEREIRA. *et al*, 2022)

The consequences of errors in diagnosis are serious, requiring a parallel effort to improve quality during existing procedures, thus avoiding the appearance of failures (World Health Organization, 2015).

Despite the technological evolution and popularization of smartphones, there has been no significant increase in apps aimed at training professionals in Brazil in recent years (BARBOSA *et al*, 2019; FERMO *et al*, 2021).

The non-centralization and targeted dissemination of the support materials offered by TELELAB, boosted this study, since in addition to the “AIDS Diagnosis” course, the digital platform offers other important courses in rapid testing.

Continuing education for health professionals through the use of applications needs more incentives due to their potential reach and more research is needed in the practical application of applications for this purpose.

The limitations of this study was the non-validation of the application by a committee of professionals specializing in digital technologies, and in the health area, but as a future perspective, it is intended to evaluate it, in terms of functionality and technical quality.

CONCLUSION

The AIDS_TESTERÁPIDO app contributes to the quality of the service provided to

society, as it provides the main information and determinations of the MS that involve rapid testing, centralized in a single location, and which can be accessed quickly by the professional on their smartphone, ensuring greater safety to the practice and collaborating with the prevention of errors and qualification of people who work in the diagnosis of the disease.

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