

## LeishCare<sup>®</sup>: A Software Designed for the Management of Individuals with Leishmaniasis

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**Abstract.** The aims of this study were to describe a smartphone app aimed at healthcare professionals who work in areas endemic for visceral and tegumentary leishmaniasis, and to report the user's perception of the app in these areas. The software, called LeishCare<sup>®</sup>, has the following features: data registration, image filter to record the evolution of skin lesions using photos, calculation of a score set to identify the risk of death from visceral leishmaniasis, and guides to the diseases. LeishCare<sup>®</sup> was made available to healthcare professionals in endemic municipalities in Brazil, and the perception of potential users was evaluated at baseline and after 6 and 12 months. In the first meeting, 96 (94.1%) of the 102 professionals who knew the app reported positive expectations for its use. The installation of LeishCare<sup>®</sup> on the individual device and the evaluation of user perception were completed at 6 months with 16 users and at 12 months with 20 users. More than 90% of the professionals evaluated in both assessments found the information of the app useful. The features related to the calculation of visceral leishmaniasis severity score, and the guides to leishmaniasis were the most frequently accessed. Users reported competence gain attributed to the app for all items evaluated. In conclusion, LeishCare<sup>®</sup> was found to be a promising tool to help healthcare professionals in endemic areas with leishmaniasis management.

### INTRODUCTION

Classified as neglected tropical diseases, visceral and tegumentary leishmaniasis are important public health problems. The estimated number of new cases worldwide ranges from 600,000 to 1 million for tegumentary leishmaniasis and from 50,000 to 90,000 for visceral leishmaniasis, with a mortality rate of 7%.<sup>1,2</sup> Most cases of visceral leishmaniasis occur in East Africa, Southeast Asia, and Brazil, which account for more than 95% of the new cases reported.<sup>1</sup> These diseases are associated with direct and indirect costs for health services. Carvalho et al.<sup>3</sup> evaluated the total cost of visceral leishmaniasis care in Brazil in 2014, which was US\$14 million, with total medical costs of approximately US\$1.9 million.<sup>3,4</sup> Factors that reduce morbidity and mortality and consequently the impact of the two clinical presentations of the disease are an early diagnosis and the initiation of appropriate specific treatment.<sup>5–8</sup>

In this scenario, the introduction of new information and communication technologies (ICTs) that can help health professionals with the early diagnosis and appropriate treatment, even in remote endemic areas, is necessary. It is estimated that 2.71 billion people in the world use smartphones, and approximately 3.9 billion own mobile devices with Internet connection.<sup>9</sup> Brazil has 242 million active customers of mobile network operators, which has become a global communication platform with varied possibilities for interaction.<sup>10,11</sup> In the healthcare area, this technology permits to establish professional connections among specialists to share opinions and to collaborate with screening, diagnosis, and patient management.<sup>12</sup> Within this context, applications designed for a specific purpose can facilitate decision-making and can have a positive impact during consultation because they are

easy to use considering the mobility of the professional.<sup>13–15</sup> In addition to the exchange of information and connection with people around the world, these tools are able to reduce patient waiting times and can integrate multi-professional teams by permitting long- and short-range communication.<sup>16</sup>

The aim of this study was to describe LeishCare<sup>®</sup>, an app designed for the management of individuals with a suspicion of leishmaniasis that can be used by health professional in endemic areas. We describe the software development process and the main features of the app, as well as the results regarding user perception and satisfaction with LeishCare<sup>®</sup> over one year of availability and use in endemic areas located in the state of Minas Gerais, Brazil.

### MATERIAL AND METHODS

**Development and distribution of the app.** For the definition of software content and programming, a technical committee was formed that consisted of an engineer, an information technology analyst, doctors, and a biologist. The app was developed for smartphones running Android as the operating system. The main reason for choosing Android was that it is currently the top-selling system in the world and is used on the simplest to the most sophisticated devices,<sup>17</sup> thus providing a widely available app free of charge.

The minimum specifications of the devices for running the software are a camera with at least 2 megapixels, Android 4.4 or higher, an 800-MHz processor, a 3.5-inch screen, and an accelerometer. The recommended extra resources for better utilization are Bluetooth and Internet access for data-sharing.<sup>18</sup>

Before the distribution of LeishCare<sup>®</sup> in endemic areas, a pilot study was conducted with the prototype of the app in endemic areas located in the northern region of Minas Gerais, Brazil. The adjustments resulting from this study were configuration for agility and increasing the range of use on different devices.<sup>19</sup>

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Finally, the software received the name LeishCare<sup>®</sup> and has the following features: 1) to catalog signs observed in patients with a suspicion of leishmaniasis and to record the evolution of skin lesions using photo filters, with subsequent creation of a chart. This feature allows us to visualize, insert, or edit data of the patients in the chart using a speech recognition tool or the keyboard of the device. After each consultation is filed in the medical records, a list of the consultations performed is generated, and each consultation can be selected within the folder; 2) to enter the data into the chart and to potentially share these records with other professionals who have the app installed to help with diagnosis and treatment. These data can be shared via Bluetooth, e-mail, or applications that allow file sharing between devices on which the LeishCare<sup>®</sup> software is installed; 3) to calculate a score set to identify the risk of death from visceral leishmaniasis based on the health risk assessment adopted by the Brazilian Ministry of Health.<sup>20,21</sup> Based on the clinical and laboratory data of the patients, the severity parameters are marked on this tab. Once these data have been entered, clicking on the “calculate” button estimates the risk of evolution to death; and 4) to provide texts with informative and reference guides on leishmaniasis (Figure 1).

LeishCare<sup>®</sup> is the intellectual property of the Federal University of Triângulo Mineiro (UFTM), registration number 512019000045-5. Since August 2019, after data collection for the present study ended, the app was available free of charge on Play Store through the following link: <https://play.google.com/store/apps/details?id=com.uftm.gerson.healsis>.

#### **Evaluation procedures of LeishCare<sup>®</sup> in endemic areas.**

*Endemic areas where the app was made available.* The LeishCare<sup>®</sup> care app was made available in three Brazilian municipalities with different endemicity profiles: area of intense and old transmission of visceral and tegumentary leishmaniasis (Montes Claros), area of moderate and more recent transmission of visceral and tegumentary leishmaniasis (Paracatu), and area recently established as endemic for visceral and tegumentary leishmaniasis, with report of the first autochthonous case in 2017 (Lavras).

*Distribution of LeishCare<sup>®</sup> to health professionals in endemic areas.* In each area, the local technical bodies were responsible for identifying the health professionals who could participate in the study. These professionals were invited to the first face-to-face meeting for the purpose of 1) leishmaniasis training provided by an expert on the topic, and 2) presenting LeishCare<sup>®</sup> and details of its features.

After this first meeting that occurred between April and May 2018, a semi-structured questionnaire was applied to evaluate the health professionals' expectations about the possible future use of LeishCare<sup>®</sup>. At the end of the meeting, professionals who were interested in participating in the prospective phase of the study provided their individual mobile phone number through which the link for installation of the app was made available. Virtual support to answer users' questions was maintained throughout the study period. The prospective phase consisted of another two face-to-face meetings held 6 and 12 months after the first meeting, in which the perception of the professionals on using LeishCare<sup>®</sup> was evaluated (Figure 2).

*Assessment tools to measure the perception of health professionals on LeishCare<sup>®</sup>.* Evaluation of expectations. A self-administered semi-structured questionnaire containing

the following fields was used: 1) previous use of an app for professional support (if yes, how did the professional evaluate its performance), 2) expectations regarding the use of an app aimed at facilitating the diagnosis and management of leishmaniasis (Likert scale responses: very positive, positive, negative, very negative, and indifferent), 3) whether the professional believes that information technologies are helpful in the health professions (Likert scale responses: strongly disagree, disagree, agree, and strongly agree), 4) prediction of difficulties arising from the use of the app (no/yes—text entry field), and 5) prediction of gains resulting from the use of the app (no/yes—text entry field).

Evaluation of user perception. Two instruments were used for this evaluation, which were applied at 6 and 12 months after distribution of the app. These instruments were only applied to those professionals who, at the time of assessment, had reported the installation of LeishCare<sup>®</sup> and were, therefore, considered users of the app.

**Semi-structured satisfaction questionnaire.** contains the following variables: 1) opinion about the information provided by the app (Likert-type scale responses: adequate, insufficient, further information needed, excessive, and too much information), 2) utility attributed by the user to the information provided by the app (Likert scale responses: very useful, useful, of little help, and I do not know), 3) estimated frequency of access to the app (Likert scale responses: often, even when not attending suspicious patients; every time when attending a suspicious patient; sometimes; and I did not access), 4) overall user satisfaction with the app (Likert scale responses: very satisfied, satisfied, dissatisfied, and very dissatisfied), 5) performance evaluation of the app for the management of patients with leishmaniasis (Likert scale responses: excellent, good, regular, and none), 6) indication of strengths of the app (text entry field), and 7) indication of aspects that could be improved (text entry field).

**Self-perception of competence gain.** designed to measure the user's perception of competence gains attributed to the use of the app following the method described by Bhanji et al.<sup>22</sup> The self-administered instrument consists of a list of competencies for which the users were asked to rate their self-perception of proficiency “before” and “after” using LeishCare<sup>®</sup> on a Likert scale: 0 = no competence, 1 = little competence, 2 = competent, and 3 = expert. For the “after” field, the professional should consider only potential gains arising from the use of the app. The following competencies were evaluated: 1) ability to use a mobile device for improving professional practice, 2) understanding the different clinical presentations of leishmaniasis in the municipality, 3) ability to extract information for clinical practice by means of a mobile app, 4) ability to communicate virtually with leishmaniasis experts, and 5) motivation of using the virtual environment to solve clinical problems. At the end of this instrument, the user was asked to provide an overall assessment of the app (Likert scale responses: 1) positively exceeded my expectation, 2) fulfilled my expectation, 3) indifferent, and 4) worse than expected. In the last question of the instrument (open ended), the user could write about what he/she liked most about using the app and what could be improved.

**Data analysis.** For the analysis of expectations, only questionnaires that were completely filled out in the first meeting were considered. Regarding the 6- and 12-month assessments, only subjects who had installed LeishCare<sup>®</sup> on

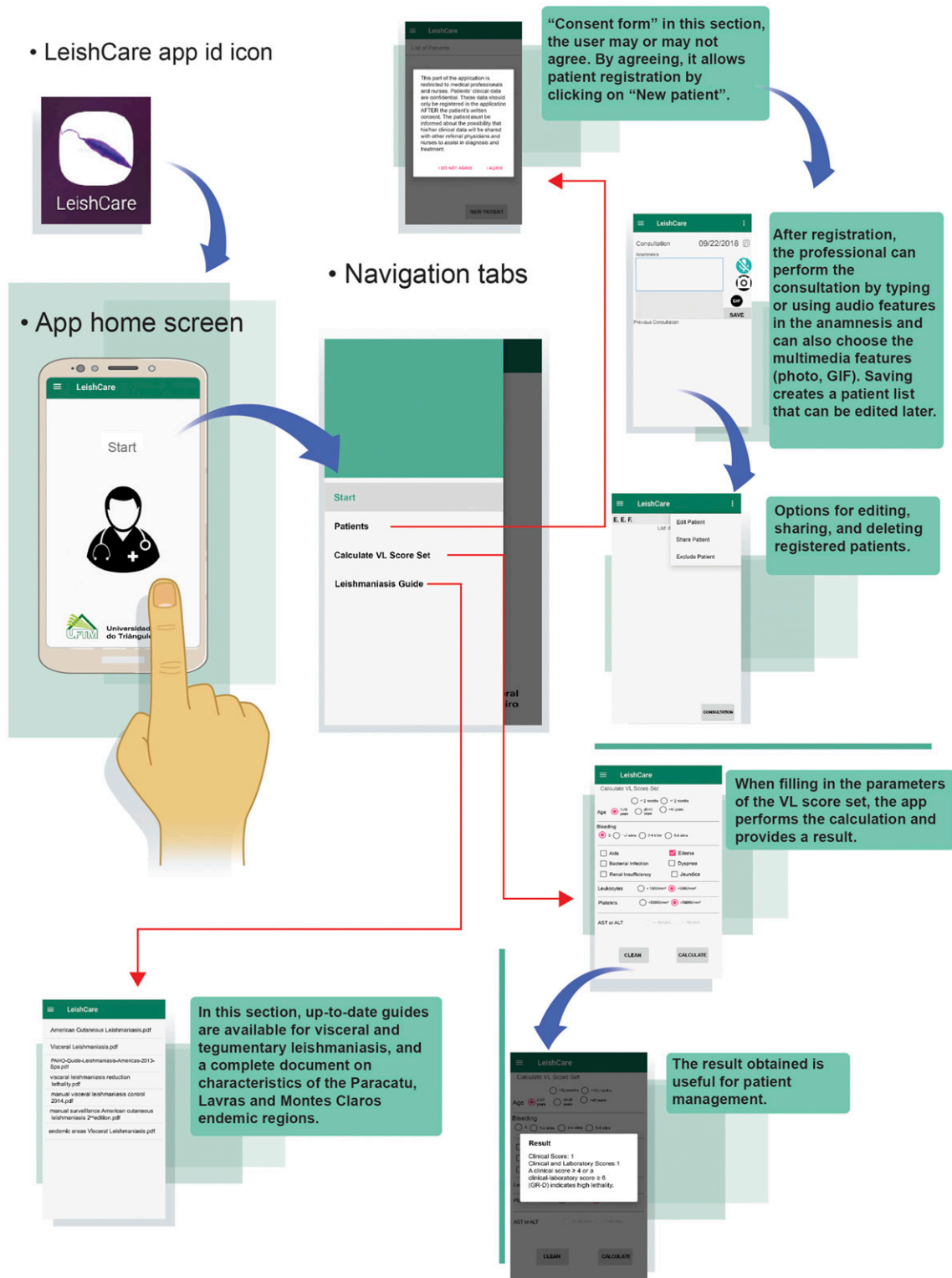


FIGURE 1. Infographic of LeishCare® app navigation. This figure appears in color at [www.ajtmh.org](http://www.ajtmh.org).

their mobile phones and who had properly filled out all fields of the two instruments (satisfaction and self-perception of gains) were included in the analysis.

The results were analyzed descriptively by calculating absolute and relative frequencies and by analysis for content identification. Thematic analysis was performed according to

Bardin.<sup>23</sup> The categories were established after thorough analysis of the answers and content organization. Content analysis resulted in the formation and categorization of recording units and context units.<sup>23–26</sup>

Self-perceived competence gain was assessed based on the difference between how the professionals rated themselves

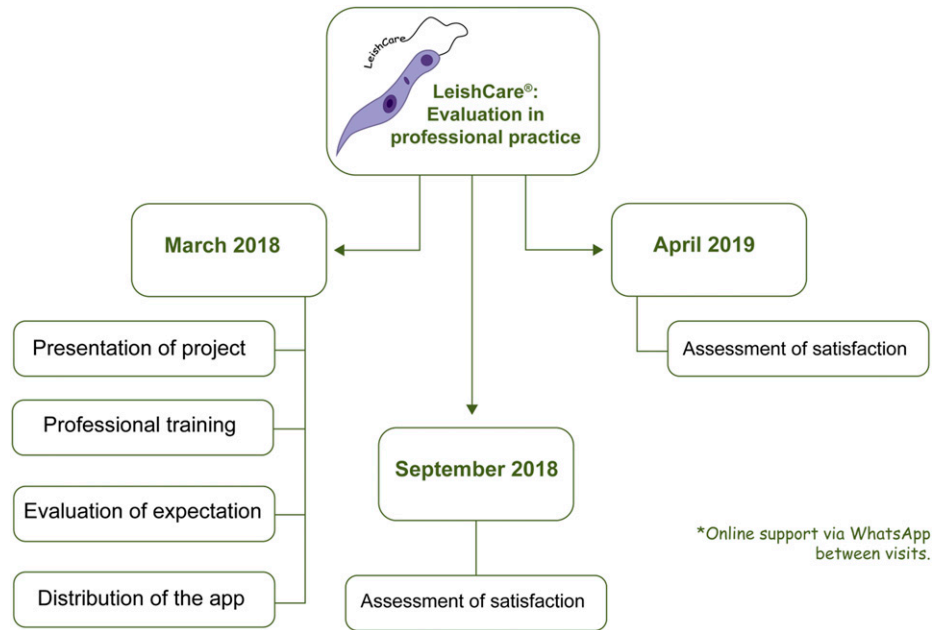


FIGURE 2. Flow diagram of the study approach. This figure appears in color at [www.ajtmh.org](http://www.ajtmh.org).

before and after using the app for each item. A competence gain in each item was defined when the health professional added one point or higher to the score of the competence scale described earlier.

**Ethical considerations.** This study was approved by the Ethics Committee on Research Involving Humans of UFTM (Approval number 1.667.477) in accordance with the requirements of Resolution 466/12 (Brasil, 2012).<sup>27</sup> All professionals were informed about the objectives of the study and agreed to participate by signing the free informed consent form.

## RESULTS

**Evaluation of expectations.** One hundred two professionals participated in the evaluation of expectations. Of these, 62 (60.8%) reported not having previously used any application/information technology and 96 (94.1%) responded to have very positive ( $n = 57$ ) or positive ( $n = 39$ ) expectations regarding the use of LeishCare<sup>®</sup>. Among the 40 (39.2%) professionals who had already used application suites, the most common softwares were Whitebook (39%) and GestaTools (16%), followed by other applications designed for the calculation of doses and scores such as SafeDose, the Framingham Risk Score, and body mass index. Fifty-three (52%) professionals agreed that information technology is important for the health professions and 49 (48%) agreed strongly with this statement. Eighty-seven (85.3%) professionals did not predict difficulties arising from the use of LeishCare<sup>®</sup>. Fifteen (14.7%) professionals reported that they might have difficulties with its use. The difficulties predicted for the use of LeishCare<sup>®</sup> were concerns about Internet access, restrictions regarding the use of the iOS operating system, potential installation problems, insufficient computer skills, and difficulties in the handling and adaptation of the app. Regarding the prediction of gains arising from the use of the app, 93 (92.1%) professionals believed that there would be gains from its use and 8 (7.9%) did not predict any gains.

### Evaluation of satisfaction and self-perception of gains.

The first evaluation of satisfaction and self-perception of gains occurred 6 months after the distribution of LeishCare<sup>®</sup>. On that occasion, 16 users responded adequately to both assessment instruments. After 12 months, complete results were obtained for 20 users, and nine of them had already been evaluated at 6 months.

**Satisfaction.** Most subjects in the two assessments considered the information provided by the app to be adequate and useful and reported to be satisfied with LeishCare<sup>®</sup>. There were varied responses to the item's frequency of access, performance in case management, strengths, and aspects to be improved (Table 1).

Comparing the results of satisfaction evaluation at 6 and 12 months, small changes in perception were identified for the nine users who participated in the two assessments, with an increase in the frequency of access and a more positive evaluation of the app. In the free text question of the satisfaction instrument, the professionals were asked what they liked most about LeishCare<sup>®</sup>. Content analysis evaluating all open responses (6 and 12 months) identified 23 recording units divided into nine topics that gave origin to three categories. The first category "usability and functionality" refers to the features available in the app such as calculation of the visceral leishmaniasis score, reference guides, and capturing photographs; it also portrays the user's perception regarding the utility of LeishCare<sup>®</sup> in health services, as expressed in the following statements: User 1: "Work has really improved a lot. The app is very useful because it is very easy, accessible, and it has a very quick feedback for some questions we ask, so it is very useful for us, especially in our region that has a high prevalence of the disease." User 2: "I used LeishCare<sup>®</sup> more to consult the guides and it was also very useful for calculating the score. I was unable to register the patient; I see it as a feature that may require more daily practice; I find it interesting though but I did not use it." User 3: "Regarding the app, I think that it was useful; however, here, due to the perception of our

TABLE 1  
User satisfaction with LeishCare® after 6 and 12 months of use

	6 months (n = 16), n (%)	12 months (n = 20), n (%)
Information provided		
Adequate	13 (81.3)	19 (95)
Insufficient	0 (0.0)	0 (0.0)
Excessive	3 (18.8)	0 (0.0)
Others	0 (0.0)	1 (5)
Usefulness of information		
Very useful	6 (37.5)	7 (35)
Useful	9 (56.3)	11 (55)
Of little help	1 (6.3)	2 (10)
I don't know	0 (0.0)	0 (0.0)
Frequency of access		
Often	0 (0.0)	1 (5)
Every time when attending a suspicious patient	1 (6.3)	7 (35)
Sometimes	10 (62.5)	10 (50)
I did not access	5 (31.3)	2 (10)
Satisfaction		
Very satisfied	2 (12.5)	6 (30)
Satisfied	12 (75)	13 (65)
Dissatisfied	2 (12.5)	0 (0.0)
Very dissatisfied	0 (0.0)	1 (5)
Performance in case management		
Excellent	3 (18.8)	8 (40)
Good	6 (37.5)	7 (35)
Regular	0 (0.0)	0 (0.0)
None	7 (43.8)	5 (25)
Strengths		
Visual	3 (18.8)	5 (25)
Content quality	9 (56.3)	10 (50)
Possibility of interaction	3 (18.8)	4 (20)
Others	1 (6.3)	1 (5)
Aspects to be improved		
Visual	5 (31.3)	4 (20)
Content quality	0 (0.0)	3 (15)
Possibility of interaction	6 (37.5)	9 (45)
Others	5 (31.3)	4 (20)

Source: The authors, 2019.

health system, I think it was more useful in the hospital environment (. . .). Today I see that the primary care team has to be more qualified and I think that the public health structure itself has to provide more resources because today, for example, if I suspect a case of leishmaniasis, I can only refer this patient to a hospital since our health services do not provide a rapid test; the serology for leishmaniasis is often not that reliable and the result takes a while; access to the test is difficult. Regarding the myelogram, too, I cannot get this myelogram if it is not in a hospital environment, which is bad, right (. . .), but I think we have to try to change this reality, we have to try together with the health service directors to create a flow that is more accessible to the patient and family doctor.”

The second category “applicability” refers to the possibility of interactions with other professionals to clarify doubts about the disease, culminating in the acquisition of knowledge and facilitating the diagnosis. The following statements portray this reality: User 1: “The app raises our awareness to investigate and think about leishmaniasis as a differential diagnosis of anemia and fever conditions.” User 2: “It is a way to mobilize, encourage, and unite professionals to improve learning and knowledge about patients with leishmaniasis.” User 3: “Better understanding of the disease, interaction with other professionals, more knowledge of the digital information exchange format.”

The third category “available platform” refers to the possibilities of access and operating systems desired by professionals who use iOS devices or who have a more diverse academic background. This category is portrayed by the following statements: User 1: “As pointed out, the app should include veterinary professionals; one way to do this is to add content about dogs with zoonotic potential. Adding information about the main clinical signs, treatment, types of diagnosis, and interactions with other veterinary professionals. It would also be interesting to disseminate the app in veterinary clinics in endemic regions of the disease.” User 2: “Used on iOS.”

*Self-perception of gain.* With respect to competence gains related to the use of LeishCare®, the users reported gains attributed to the app for all items investigated. At 6 months after distribution of the app, the highest frequency of self-perceived competence gains was observed for the items: “ability to communicate virtually with leishmaniasis experts”; “ability to use a mobile device for improving professional practice,” and “motivation for using the virtual environment to solve clinical problems.” After 12 months of use, the highest frequency of self-perceived competence gain was found for the items “ability to extract information for clinical practice by means of a mobile app” and “motivation of using the virtual environment to solve clinical problems” (Table 2).

Analysis of the self-perceived acquisition of competencies and skills arising from the use of LeishCare® among the nine users who participated in the two assessments showed gain in all items investigated. These gains were more expressive after 12 months.

In the overall evaluation of LeishCare® after 6 months, 7 (43.8%) users reported that the app exceeded their expectations in a positive manner, 7 (43.8%) reported that the app fulfilled their expectations, and for 2 users (12.5%), the app was indifferent. In the 12-month assessment, 9 (45%) users reported that the app exceeded their expectations in a positive manner, 10 (50%) reported that the app fulfilled their expectations, and for one user (5%), the app was indifferent (Figure 3).

TABLE 2  
User self-perception of the acquisition of competencies/skills attributed to the use of LeishCare®

Competence	Comparison before/after with gain > 1	
	6 months (n = 16), n (%)	12 months (n = 20), n (%)
Ability to use a mobile device for improving professional practice	10 (62.5)	11 (55)
Understanding the different clinical presentations of leishmaniasis in the municipality	7 (43.8)	9 (45)
Ability to extract information for clinical practice by means of a mobile app	9 (56.3)	14 (70)
Ability to communicate virtually with leishmaniasis experts	11 (68.8)	11 (55)
Motivation of using the virtual environment to solve clinical problems	10 (62.5)	13 (65)

Source: The authors, 2019.

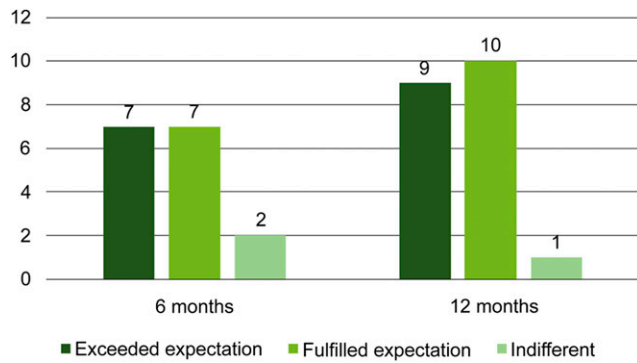


FIGURE 3. Overall user perception of LeishCare® in clinical practice in endemic areas at 6 and 12 months. This figure appears in color at [www.ajtmh.org](http://www.ajtmh.org).

The acceptance of LeishCare® differed between the three municipalities despite their similar health service structure. In Paracatu, there was interest to unite health professionals from different categories and care levels. In Lavras, the app was targeted mainly at health professionals working in primary care. Finally, in Montes Claros, the app was restricted to professionals commonly attending cases with a suspicion of leishmaniasis. This profile may have interfered with adherence to the project and with the impact of the app in different scenarios.

## DISCUSSION AND CONCLUSION

The present study reports the results of a multidisciplinary approach to develop an innovative, free-of-charge product designed to help with the management of a neglected disease. LeishCare® was developed to meet important demands of leishmaniasis-endemic areas such as secure information sharing, prognostic assessment of severe visceral leishmaniasis, and follow-up of tegumentary leishmaniasis lesions.

Delivering an application for professional practice requires the evaluation of the software by its potential users. Thus, in addition to the distribution of LeishCare®, the expectations, satisfaction, and self-perception of competence gains resulting from the use of the app were evaluated. In this regard, the first aspect to be considered is the distinction between the positive expectation for using an app and its effective use. Analysis of user expectation showed that several professionals were receptive to the use of the app; however, evaluation of its application in practice after 6 and 12 months revealed that most of them had not even installed the app. It should be noted that most professionals with positive expectations had never used any application in their professional practice. Within this context, the user results observed may not be representative of most health professionals in endemic areas. On the other hand, it is possible that there is space and support for the introduction of new ICTs in remote areas.

The lack of full use of LeishCare® might be associated with the natural resistance to using ICTs in human health care. In a study conducted in Belgium, Mutebi and Devroey<sup>28</sup> reinforce this inference by showing that less than half of the surveyed physicians were familiar with healthcare softwares, although most of them considered the Internet and apps to be sources of information. On the other hand, using apps on mobile devices can have a major impact on health care. Because of their widespread popularity, these devices facilitate access to

information and keep users connected and, at the same time, up to date.<sup>15,29,30</sup> Within this context, creating virtual tools and disseminating them among health professionals seem to be an interesting approach to change the scenarios of endemic diseases. It is important to take advantage of the potential of mobile telephony for improving public health; however, there is no substitution of the contact between professionals and their patients.<sup>13</sup> Apps are increasingly being used to facilitate rapid communication within teams through private group conversations, improving multi-professional involvement.<sup>31-33</sup> Despite the low frequency of LeishCare® use for this purpose, this feature will probably be more accessed over time, considering the relatively short interval between distribution of the app and the random occurrence of leishmaniasis.

One noteworthy aspect of the LeishCare® app is the possibility to easily calculate a score set to identify the risk of death even without Internet access. This score was developed by Costa et al.<sup>34</sup> based on the data of 883 patients with visceral leishmaniasis evaluated in Teresina, Piauí, Brazil. The authors identified factors associated with progression to severe disease and death. The score was subsequently validated in another 1,031 patients. In 2011, the Brazilian Ministry of Health adopted this score at the national level, which is even used as a criterion for the prescription of high-cost medication such as liposomal amphotericin.<sup>21</sup> In 2016, the Kala-Cal® software was launched, which can be used for calculation of the severity score and is available on the site of the Brazilian Society of Tropical Medicine. The reason for inclusion of this severity score in the features of LeishCare® was to expand the calculation of this score, regardless of Internet access. Because the score has been adopted as a reference by the Brazilian Ministry of Health, its inclusion was considered an additional attraction for using the app. This was confirmed because the possibility of calculating a score set to identify the risk of death was considered a major strength of the app.

The most innovative feature of the app was the development of an image filter system based on the photographs of a tegumentary leishmaniasis lesion. The possibility of taking serial photos that permit their comparison and subsequent availability in graphics interchange format allows us to monitor treatment efficiency. Although this feature has not been widely used in the present study by the health professionals of the endemic areas, it is an interesting tool for researchers to evaluate the therapeutic response in this disease. Zenteno et al.<sup>35</sup> proposed the combination of two control and monitoring models to reduce the incidence of tegumentary leishmaniasis. The first model uses an automated tool designed to streamline laboratory procedures for analysis of the parasites. The second model is a protocol for monitoring the evolution of treatment. This protocol comprises three stages: superficial skin modeling and reconstruction, subcutaneous exploration based on textural characteristics, and volumetric segmentation. This is an elegant model which, however, requires 3D and ultrasonic scanners whose use is unfeasible in endemic areas with few resources.

According to Guidini,<sup>36</sup> the current main challenge in developing and distributing an app is to interpret what users consider important and what motivates them to access the tool with a certain frequency. To use and interpret the data present in an app, the user requires technical competence to understand the content accessed.<sup>31,37,38</sup> Studies involving mobile health applications have gained more visibility in the scientific world, including the identification of knowledge

acquisition, attitudes, and skills in case management.<sup>39–42</sup> In the present study, analysis of the self-perception of gains arising from the use of LeishCare® demonstrated the subjective perception of positive effects of the app. In addition, 75% of the professionals considered the software “excellent/good” for the management of their patients.

The implementation of new technological tools in endemic leishmaniasis scenarios may enable early diagnosis and consequently improve professional performance. However, analysis of the users’ criticisms about the app shows that its use needs to be combined with the appropriate infrastructure to provide support to professionals. Within this context, the performance of an ICT tool in real practice can be affected by the underlying work conditions of a health professional.<sup>43</sup>

In conclusion, LeishCare® was well accepted in endemic areas and may be used by health professionals in their daily practice. The app has benefits for its users even when applied on a small scale. The delivery of a free software stems from the initiative of a Brazilian public university to contribute to the development of technologies for neglected diseases. The release of LeishCare® on Google Play will permit further evaluation of the utility of this tool over time. Despite the positive expectation before the implementation of LeishCare®, our results indicated low adherence of health professional to the installation and routine use of the app. This fact represents a challenge to the creation of digital networks for the management of health problems in Brazil. Many healthcare applications have been made available, but their impact among users is rarely assessed. Hence, it is necessary to address the need of combining the availability of digital technology tools with the assessment of their real acceptance and utility for professionals, especially in areas endemic for infectious and parasitic diseases.

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