Much more than fun ticks: the game as a health promoter

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***Abstract*— Brazilian spotted fever, a bacterial disease transmitted by ticks, despite the increasing number of cases, is still little known among young citizens, especially those living in more urbanized areas. To disseminate knowledge about the disease and ways to prevent it, it was developed at the Center of Technological Development in Health (CDTS) of the Oswaldo Cruz Foundation (Fiocruz) a digital game that tackles creatively the ecological cycle of the tick, the main reservoir the disease in Brazil, giving out the three possible epidemiological scenarios: home, wild and rural. This article aims to stimulate the use of a digital game environment as a communication tool in health.**

Keywords: **health promotion; health prevention; tick; brazilian spotted fever; digital games**

I. INTRODUCTION

Transmitted by tick bites, spotted fever is an acute febrile infection caused by bacteria of the genus Rickettsia, and is commonly associated with *Rickettsia rickettsii* infection, which can lead to severe complications - brain inflammation, paralysis, respiratory failure and renal failure - by placing the patient's life [1]. We observed that 10% of the cases are related to children under 10 years old and that the complications resulting from the action of the bacteria in the human body can be avoided if the treatment is initiated in the first days after the onset of symptoms [2]. According to the Ministry of Health, in the last eighteen years 2090 cases of the disease were confirmed in Brazil, of which 681 reached the end of death [3].

Taking these aspects into account, the game addresses in a playful and dynamic way the ecology of ticks, including their life cycle and the possible possibility of transmission of pathogens to humans. The player, through his character, a nice tick, will need to evolve in different stages, seeking the maintenance of life and, ultimately, his own kind. In this way, we try to understand some details of the life of this unusual character, fighting the inadequate idea that ticks are enemies and must be eliminated from nature.

This article aims to stimulate the use of a digital game environment as a communication tool in health, with spotted fever being a model for the development of digital games based on other diseases transmitted by arthropods in Brazil.

II. METHODS

Portraying real facts in a playful manner, with intuitive gameplay and extra challenges in each game scenarios, so that the player could have an individualized gaming experience and thus be seen as a true decision maker, modifying the prevention of tick-borne diseases.

III. RESULTS

The game was developed as a communication resource of the Oswaldo Cruz Foundation between 2017 and 2019, and its demo version is available free of charge through the Play Store app under the title of Pula Carrapato.

Pula Carrapato travels through the ecological processes inherent to the life cycle of ticks, as well as the possible epidemiological scenario in which spotted fever can be observed in Brazil. In a playful way we seek to offer a holistic view, in the molds of the One Health, about the disease, in which the tick, for the maintenance of life and, consequently, of its species, seeks blood repast in domestic or wild animals, eventually infected by the bacterium pointed out as the main agent of spotted fever in the country. The human being would only be a possible host, and could be contaminated during the life cycle of the reservoir or the animal hosts, if he is not prepared for the situations of contact with the ticks [3].

Regarding this aspect, the game works with the logic of prevention in case of contact with animals and natural environments (parks, camping, scouting, visits to the farm, among others) where the use of suitable repellents and clothing could reduce the risk of infection as well as the use of acaricidal collars in companion animals could mitigate the risks in domestic environments, since, in practice, they would avoid maintaining the life cycle of ticks at home [4][5].

We try to impregnate the idea of the need for a timely diagnosis and rapid treatment to avoid major consequences due to the action of bacteria in organs vital to the maintenance of the patient's life. Emulating reality, occurring an infection of a human non-controlled character, a minigame against the clock is started. The player will have to fight the army commanded by the character Rick - in reference to *Rickettsia rickettsii* - before the major organs go bankrupt. The 'weapon' used in this battle is a cannon that shoots tablets of the drug indicated to treat spotted fever in Brazil, in this case doxycycline.

At the end of the game, the player has the opportunity to share their performance, measured by the general score resulting from the gameplay, in their social networks. In addition, we offer a plethora of achievements from the game stages and associated with personal account on Google Play Games. In this way, we believe to encourage replay value in search of a higher score, as well as the curiosity of third parties who share the same virtual networks for the digital game.

IV. DISCUSSION

The disposition of rules of play based on the ecology of ticks, emulating the need to evolve in its various stages for the maintenance of life and consequently of its own species, leads the player to observe spotted fever from a more holistic perspective, common to the One Health movement in which ecology, environment, health and human behavior are intertwined, opposing the traditional meaning of health-disease, still found in textbooks and informational content made available on electronic websites and in medical journals for consumption by non-specialists.

It seemed important to include information, albeit succinctly, on the biology of tick species involved in the transmission of this and other possible diseases to humans, as well as the forms of prevention and control adopted by epidemiological surveillance in Brazil . For this we provide the links for access to electronic sites of the Oswaldo Cruz Foundation (Fiocruz), the Technology Development Center in Health (CDTS) and the Brazilian Ministry of Health in the game's credits.

V. CONCLUSIONS

The game can be adopted as a powerful communication tool aimed at scientific dissemination, in the particular case relating ecology to collective health, mainly for the opportunity to interact with a young and avid consumer of information, in this case fostering self care for the exhibition to the risk factors for Brazilian spotted fever and to increase the knowledge about the ecology of ticks of importance for collective health in Brazil.

We also believe it is timely use as a tool for prevention and health promotion, whether in school settings or in community health facilities, where professionals may be encouraged to play and indicate to their health care teams, patients and community participating students as a mechanism for information dissemination.

It will be necessary to assess whether occurs distinction between merger processes to promote ideas and prevention in health based on non-conventional communication tools, in this particular case the game Pula tick, between players of geographical, social, different economic and cultural, as well of the individual characteristics, such as age, sex or gender, among others.

Assets and other programming sources used are available at https://www.arca.fiocruz.br/handle/icict/35751.

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