The Challenge In The Use Of New Technologies Integrated To Health In The Treatment Of Covid-19: A Brief Critical Analysis In Brazil

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RESUME

Viral diseases continue to emerge and annually bring challenges to the Brazilian public health system, such as COVID-19 with easy respiratory infection. This study aims to analyze the importance of new technologies in the treatment of COVID-19 and, thus, promote the information of technological data in the Brazilian territory. Therefore, methodological techniques were used in systematic reviews in the selection of included studies to be used in the construction of this short and critical systematic review. And 08 articles were included for inclusion in this critical analysis.

Keywords: Security mechanism, health monitoring, security, COVID-19.

INTRODUCTION

In recent years, telemedicine is an emerging technology that has benefited health care areas worldwide and especially patients [35]. For this reason, it is considered an application in the health area through the use of information technology that allows the patient to have control of his/her data outside the hospitalization system and uses this technology [23], for example, through the use of video conferencing or scanned image and the frequent use of this technology has generated a change in Brazilian society and due to the constant change in Brazilian society[12, 24], this technological invasion brings transformations in the treatment and care of patients with viral diseases such as COVID-19 [25]. The SUS brings the Brazilian population access for equity, quality and especially the cost-benefit ratio, the main indicator used in developing countries like Brazil [04, 05]. New technologies, for example, computers, the internet and mobile devices through the use of communication and the search for information have a potential to help solve public health [04] problems such as infectious and viral processes [23,29], using these technologies

means being able to develop a network of treatment and care worldwide and thus have a sustainable solution worldwide [01-09]. One of the great allies of technological advances applied to treatment and care in public health are mobile devices [10-19]. Most individuals on the planet have a personal device for communication, entertainment, mobility and/or information [13, 32]. Access to these means has become increasingly easier, as well as its ability to perform complex functionality [23-31].

The collaborative use of mobile technologies makes it possible to integrate health care techniques in search of better care, prevention, diagnosis and treatment of diseases, such as diabetes, obesity or some other specific pathology [28-33].

According to the WHO (World Health Organization), disability is part of the human condition and imposes numerous challenges in every day life [04, 23]. Most of the people who have some type of disability are affected by psychomotor problems or cerebral palsy, which trigger complications that can cause definitive injuries in speech, locomotion, vision, manipulation or cognitive ability to develop actions [31-35].

However, for this advancement in new technologies to occur, interdisciplinary advancement is necessary, specifically in the use of technologies that use telecommunications [04, 23, 24], and the use of an instrument for the purpose of exchange and administration of health data [27-29]. The use of sensors in viral diseases such as COVID-19 for the purpose of monitoring patients has attracted attention in research due to the possibility of developing the use of new technologies applied specifically in public health [02, 03, 05].

This new technology is known as "Wireless body with network area" and allows for the safe transmission of data to continuously and in real time monitor the patient in order to favor multidisciplinary assistance in the Brazilian public health system [23-31]. COVID-19 allowed the use of new health technologies as a proficient tool that allows us to coordinate efforts among health professionals and thus [12], it is possible to improve care and responses in real time. In the last few months, the COVID-19 pandemic brought technological opportunities to the Brazilian population [13], but it required Brazilian health professionals to train health staff, diagnose and conduct checks or monitor the patient in a preventive or post-curative manner in therapeutic procedures [04-09, 24, 29].

Or in the prescription of medicines and in the provision of public health services, mainly in the SUS network [32]. COVID-19 has its transmission similar to other viral forms of influenza in the world, in short [23, 24, 25], it occurs through human-to-human transmission and the aggravation occurs usually according to the patient's previous clinical and immunological conditions, which induces the main worsening such as severe viral pneumonia [24,25].

And in Brazil, as in other countries, severe pneumonia leads to death and its frequency increases in patients over the age of 60 years after the initial infection period [24], however, death is largely related to the underlying health of patients and that is why we have highlighted the need for continuous monitoring of patients with COVID-19 mainly as historical as chronic diseases [23, 24, 29, 31].

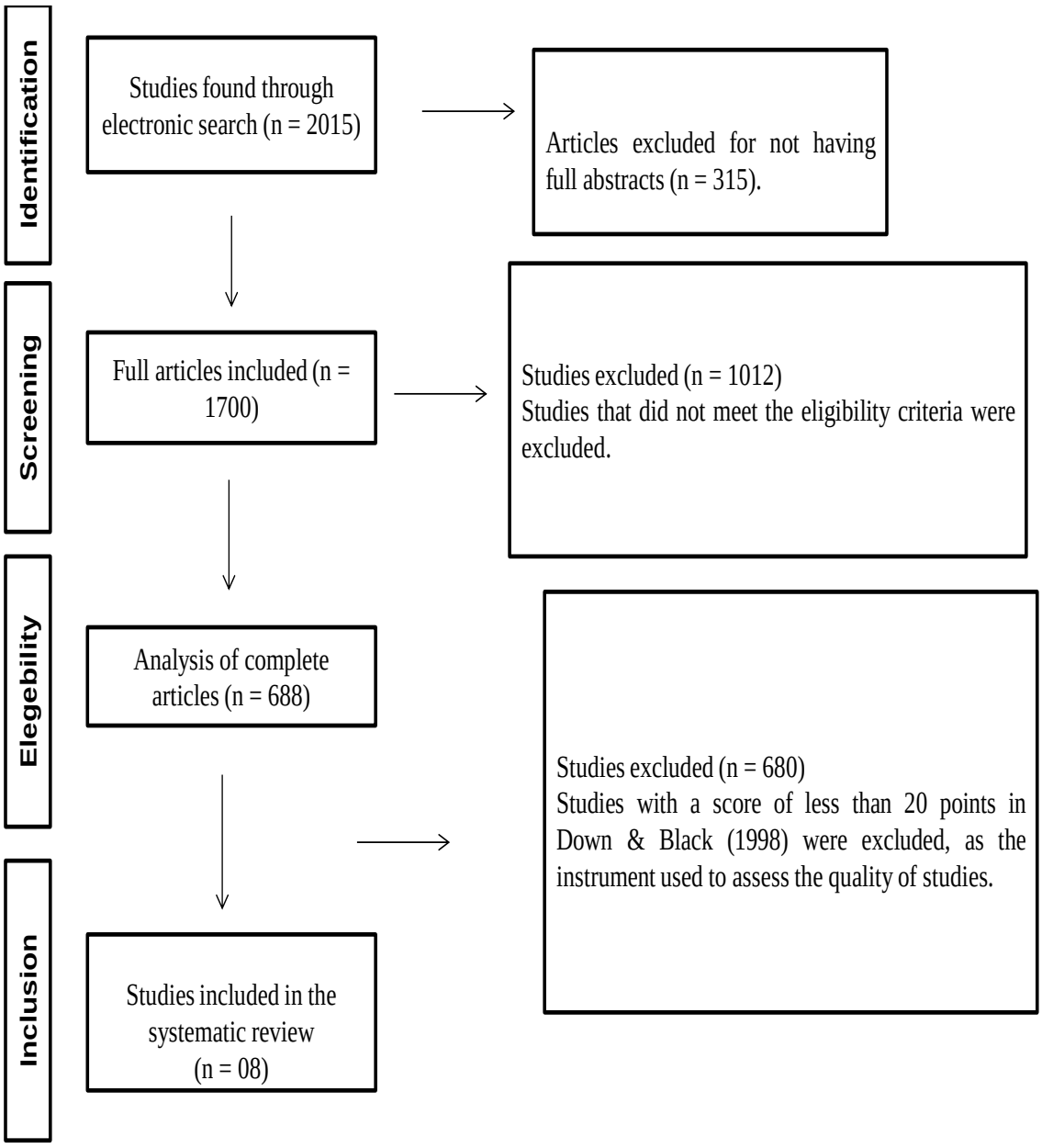
Monitoring is possible because the patient with COVID-19 maintains a constant of symptoms, such as, high fever ($\geq 38.0^{o}$ C), fatigue, non-productive cough, dyspnea and diarrhea [23, 24, 25].

Therefore, the guiding question of this systematic critical analysis of the use of new technologies applied to the Brazilian health system is: How to use new technologies in health in order to monitor patients

with COVID-19 remotely in SUS? Therefore, this study aims to analyze the importance of new technologies in the treatment of COVID-19 and, thus, promote the information of technological data in the Brazilian territory.

METHODOLOGY

Figure 01 - Flowchart of the selection process for studies included in the systematic review (PRISMA).



The studies chosen to be included in this short systematic review on the first level were the studies that used new technologies such as monitoring in the treatment process and caring for patients with viral diseases like COVID-19 on the second level. The authors used the filtering of the studies on the respective platforms. According to its security base, in this case, PubMed, Medline, Cochrane and EMBASE (Elsevier and Lancet) [24]. In order to achieve a meaningful sample, we use combinations of keyword groups. The first research group included "New Technologies", "", "E-health", "telemedicine", "telehealth", "remote

monitoring", "Security mechanism" and "Personalized Health Care" which used the Boolean operators "OR", "AND" and "AND NOT". In the second research group, the terms "Network mechanism", "priority" and "serious" "COVID-19" were included. In the third research group on the platforms mentioned above, only the terms "Profiling mechanism" and "Coronavirus" were included. The selected publications included original articles, pre-proof with acceptance, from 1995 to July 2020 (Figure 01) and without language restrictions. 2015 references were identified in four databases or repositories of scientific evidence. We used the "Rayyan - QCRI" manager for initial screening of titles and abstracts and removal of duplicate articles in the bibliographic survey, carried out by two reviewers to perform the analyzes of the included studies, using "artificial intelligence" using R-Studio [24, 25]. At the end, eight primary studies remained that supported the conclusion of this short review of critical analysis (Figure 01).

Table 01 - Identification and classification of the methodological quality risk of the included studies according to Down and Black (1998).

Article Identification	Reporting (0 – 10)	External validity (0-03)	Internal validity – bias (0 – 07)	Confusion - bias of selection (0-06)	Power (0 – 5)	Total score
Fengou et al. (2013)	10	02	04	04	00	20
Burckel et al. (1999)	10	03	04	03	00	20
Ali et al. (2019)	10	03	05	03	00	21
Júnior et al. (2017)	10	03	05	04	00	22
Cantarino et al (2016)	09	03	04	05	00	21
Lee et al. (2020)	10	03	04	03	00	20
Lima et al. (2016)	09	03	04	05	00	21
Rosen et al. (2016)	10	02	04	04	00	20

SOURCE: SARA, H. D.; BLACK, N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. J Epidemiol Community Health. v.52. p.377–384. 1998.

RESULTS

Database used in Brazilian public health in the care of patients with viral diseases such as COVID-19

Health knowledge through the use of e-health technology mainly in the interdisciplinary area has been influenced by several scientific actions in the field of technology and engineering [01-09].

With the pandemic of COVID-19 it was possible to verify the possibility of health services anywhere at any time, new technologies with personalized services and mobility of services and context awareness have been adopted by the practice in the treatment and care in modern Brazilian public health [12-17].

Coronavirus required personalized treatment at low cost and efficient patient monitoring. The Brazilian public health system has an ubiquitous action and has been changed with the actions in the pandemic of COVID-19 [13-23], paradigms have been broken in the provision of health care and treatment mainly in the use of platforms with the use of e-Health in the prevention of diseases serious viruses like COVID-19 [07, 19, 21, 25].

The Brazilian Unified Health System stores and manages databases with information from the general population. These platforms serve as a database which can be classified as follows: epidemiological (Disease Information and Notification System - SINAN, Mortality Information System - SIM) and are generally used for surveillance and evaluation in research for the purpose of approach the public on health issues as well, as in the administrative profile through the outpatient system [04-09], the SIA-SUS and the hospital information systems (SIH-SUS) with the use of new technologies and capable of accounting for production control in the services provided in the SUS network and currently clinical platforms such as the FIOCRUZ network that are used to store clinical data on patients for future reference in clinical research. Some government platforms can manage, as well as, demographic and socioeconomic characterization of the Brazilian population [03-08]. The Brazilian public health system works with the Social Ministry to manage the database through the maintenance and development of electronic databases, the well-known CadUnico or unique registry for the purpose of rendering accounts in the Brazilian social service [03-23].

In Brazil, these databases are used in combinations of others for the purpose of studying social determinants and in order to evaluate public health policies applied in Brazil. Since 1947 [21-26], the World Health Organization has been monitoring the activity of influenza viruses and other viral diseases such as SARS-Cov or Coronavirus through a network of viral identification laboratories known as the “Influenza Surveillance Network (GISN) [23-32].

However, in 2011 the activity of this virus, either influenza or Coronavirus, was changed to a global influenza surveillance and response system (GISRS) [22-32]. This international data network aims to monitor the evolution of viruses such as influenzas or coronavirus and provide information that supports the recommendations of the World Health Organization for the main laboratory diagnostics, vaccine development, antiviral susceptibility and risk assessment and thus establishes a global alert mechanism for the emergence of viruses with pandemic potential [24-30].

Brazil has been a part of GISRS in recent years, through three NIC laboratories accredited by WHO, in this case, Virology Laboratory of the Evandro Chagas Institute of Pará (IEC/PA) [04], the Respiratory Virus Laboratory of the Instituto Adolfo Lutz de São Paulo (IAL/SP) and the Laboratory of Respiratory Virus and Measles of the Oswaldo Cruz Foundation of Rio de Janeiro (Fiocruz/RJ) [04-06]. And so, the first two laboratories are recognized by the National Public Health Laboratories System (Sislab) as regional references, while the last is considered a national reference for influenza in Brazil [24, 25].

These new data technologies used by the Brazilian Unified Health System SUS through virology surveillance is able to identify viral circulation in relation to type and subtype, its correlation with regional

and global standard as well as describe antigenic and genetic characteristics to monitor antiviral sensitivity in Brazilian territory [04-06, 21, 26]. And with the help of "Artificial Intelligence" it is possible to develop proactive actions, with improvement in the quality of life of the Brazilian citizen in concrete circumstances in the control of pandemics or epidemics, delivering a personalized treatment and care service at the right time, place and right time, without time or location limitation [04-08, 21-28].

However, in Brazil, the paradigm of the use of new technologies encourages individuals to have a normal life regardless of any viral or other health problems [21, 23]. Therefore, the use of technologies in Brazilian health requires innovative practices that will be in accordance with the need, habits, preference, perspectives of the individual in a real way, the life condition, their needs and habits, preference and perspectives of this related individual it peculiarity. New technologies are not able to direct health practice with omnipresent perspectives in care and treatment centered only on medical practice [30, 32].

Essentially, the use of new health technologies such as e-health is conventional, the presence of consolidated frameworks in the interdisciplinary framework [34]. This knowledge focuses on the creation and delivery of applicable e-health services within the limits of Brazilian public health units [35]. The e-health structures in Brazil must develop patient-centered, that is, the central entity (actor) of the e-health domain and e-health must support health professionals in an interdisciplinary way when accessing any information and means that can help to cope with the patient's illness situation accompanied by a viral disease such as COVID-19 [27-32]. The Brazilian e-health structures have guaranteed fast and secure access to the electronic health records system independent of the doctor and its specific locations [32-35]. However, there is a paradigm in the inclusion of technology that considers the patient to be the central entity of the e-health domain [24-32]. The patient is any individual who needs temporary or continuous assistance from a health professional, be it a nurse, nutritionist, psychologist or physiotherapist and others [34, 35]. A health system with an open domain allows for greater incorporation of different personalized health services [35]. And to realize a structural architecture in reliable, fast and economical platforms with implantation of e-health services in networks based on the IP of notebooks or cell phones is to propose and build network mechanisms for sensors, profiles and security mechanisms in order to improve the quality of data and encourage the adhesion of states that do not yet use the e-health system [33, 34], or at least stimulate the data interface against other systems in order to reduce the workload of the health professionals involved and, thus, reduce iatrogenic actions results [35].

New technologies applied in the Brazilian SUS network - A new option for the use of mobility in data information in the treatment of pandemics

The use of new technologies such as mobile can be a certain option in the continuous use in monitoring the clinical signs of patients sick with flu-like illnesses such as COVID-19 [24, 25]. Currently, there are already several applications and accessories used in weight loss programs such as fitness that can track posture, weight, blood pressure and other signs or body displacement and also calculate calorie expenditure [04-07, 35]. And the public health system can use this technology not only as a telephone, but as an integral part of the life of the modern citizen, which benefits the monitoring of the patient, however, it is worth mentioning that the excessive use brings considerable physiological changes [34, 35]. Therefore,

accompanying and monitoring these patients through health surveillance should be inserted with an interdisciplinary look at the phenomenon of observing the signs of illness through the interpretation of the body, with the position, the frequency for the interpretation with the use of new technologies [35]. The current panorama of Brazilian public health has shown an opening for the use of new technologies and new research and, therefore, these new technologies are emerging through interdisciplinarity [33], therefore, Brazilian public health has invested in applications collectively mainly in populations with diseases like COVID-19 in order to educate a population to deal with the Coronavirus, using new technologies like Whats and SMS in the treatment through interventions to adhere to health programs, can promote health for users of the network SUS through mobile technology and its consequences brings an improvement in the quality of life and economy to the public health system [32-35].

And monitoring these patients outside the hospital system with health security and without the risk of transmitting the disease to other citizens lists possibilities in order to see public health in a holistic manner within 24 hours [23-27].

And so, the monitoring actions for intervention, health promotion can be cheaper, because the patient can use his own cell phone. Well, most Brazilians have cell phones loaded with sensors and able to record metric health activities over a 24-hour period [27-29].

The treatment of patients has become less invasive and even highly complex surgeries have used technology equipment with as little tissue invasion as possible [32].

Monitoring the patient using cell phones, for example, will allow the public health system to take more preventive care [31], as providers are given access to continuous data flows from house to house [32-35]. And when health care is more ubiquitous and mobile it becomes more accessible to rural locations for example [23-29].

However, the federal government and regulatory bodies must institute regulatory protocols in order to reach a percentage greater than 10% of patients who are treated in the Brazilian public health system and thus, a high percentage of the population can benefit from the use of technology [27]. Especially in regions where pressures on public health resources and the very high burden of viral diseases must implement innovative, low-cost solutions [28-31].

CONCLUSION

The use of new data technologies such as blood pressure, temperature or HR or RF in Brazilian public health brings a gain in resolving the monitoring of patients with COVID-19 as it incorporates resolution of more complex cases in the outpatient care itself and brings a rapid response to patient, as well as helping to save costs in the Brazilian health service.

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