**RESEARCH ARTICLE**                                                                 **OPEN ACCESS**

# THE APPLICABILITY AND PERFORMANCE OF THE STATE TELEHEALTH CENTER IN THE STATE OF CEARÁ

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## ARTICLE INFO

## ABSTRACT

Understanding that the role and applicability of Telehealth, while diverse and essential for the analysis, systematization, and documentation of health education initiatives within the DICT, this study aimed to analyze the activities developed by the Telehealth Center of the State Health Secretariat of Ceará, Brazil, from 2015 to 2018. This is a quantitative, descriptive study with 6,596 registered professionals identified in the State of Ceará, highlighting Nursing (35.9%), Medicine (31.3%) and Dentistry (18.9%), with a greater concentration in the Fortaleza macro-region (36.9%). We identified 1,392 teleconsulting requests, 315 (22.6%) in 2015, 860 (61.8%) in 2016, 140 (10.1%) in 2017 and 77 (5.5%) in 2018, with, therefore, a total reduction of 91.1% from 2016 to 2018. Moreover, 382 web lectures were attended by 17,054 professionals. We concluded that the breadth and applicability of Telehealth in Ceará exceeds its diversity and flexibility. However, it is necessary to apprehend the meaning of terms for the conscious application of their tools. Again, in this context, it is essential to break with the paradigm that a professional category is the holder of knowledge and practice, understanding that all those who work in health can contribute to teleconsulting activities.

## INTRODUCTION

The use of communication and information tools is currently shown as a facilitator of care and providing quality in health care. It corroborates essentially with the registration and retrieval of patient historical data, with the skillful and effective communication between health professionals and the broad access to scientific literature, allowing the selection of diagnostic and therapeutic procedures, the rapid and correct interpretation of results of laboratory tests and the encoding of clinical data, also establishing virtual teaching and learning environments in health.The World Health Organization (WHO) states that health informatics allows expanding and improving access to services to most of the world population. In this perspective, the WHO recommends the use of Telemedicine and Telehealth resources as political and strategic instruments for the planning and implementation of health actions (Nunes *et al*., 2016; Melo & Silva, 2006).

Currently, technological resources are part of people's lives and health practices, and it is inconceivablefor us to live without them. However, their development and growth are viscerally linked to the development of research. Thus, in a country with large territorial dimensions such as Brazil, the use of Digital Information and Communication Technologies (DICT) aims to break geographical barriers and expand access to health services, and representing the opportunity to align and qualify service and care in the services.

Due to the diversity of DICT used, many researchers have dedicated themselves to assessing the impact of these technologies on the provision of health services and describing the experience of professionals in their management (Barbosa & Silva, 2017). Silva, Carneiro, and Sindico (2015) affirm that the results of studies organized by the WHO point to incomplete outcomes in the Brazilian Telehealth and also emphasize the need for studies on the services offered by the

telehealth centers disseminated throughout Brazil. DICT emerge as the possibility of narrowing geographic distances and expanding access to health services. However, they require an intricate process that involves innovation, digital inclusion, and social and political interest. In this sense, the need to analyze the historical normative process, and the actions that consider this scenario is justified. We should recognize existing telehealth initiatives, since a gap in evaluations that addressed the analysis of current experiences has been identified, mainly in public health (Silva, 2014). Developed with a robust and flexible data structure, the National Telehealth Platform allows including new modules, actors and processes, and is compatible with SUS national registries, mainly the National Registry of Health Facilities (SCNES). The State Telehealth Center of Ceará was conceived by the Rio Grande do Sul Telehealth Center (TelessaúdeRS-UFRGS) and institutionalized by the Ministry of Health in 2015, which occurred with all centers without own operational facility accessible to PHC professionals of the entire national health care network.The platform has simplified data entry, which facilitates access to services, combined with a complex data output, consisting of flat tables of structure and process, which accumulate the variables of request, remote teleregulation, response, and evaluation of teleconsulting services. Based on this data structure, this study aimed to analyze the teleconsulting offerings and use by telehealth centers and users registered on the National Telehealth Platform, Ceará version.In this perspective of understanding the role and applicability of Telehealth, which evidences traits of diversity, it is necessary to understand the importance of analyzing, systematizing, and documenting such initiatives. To this end, this study brings the following guiding question: what are the activities developed by the State Telehealth Center of Ceará from 2015 to 2018.

## MATERIALS AND METHODS

This is a documentary, retrospective study, conducted through the analysis of quantitative data regarding participation in activities and the use of the services offered, extracted from reports issued by the State Telehealth Center of Ceará. Documentary research used data contained in the internal documents of the investigated organization as a source. This search provides the ability to meet the specific objectives of the research (Gil, 2010).This study was performed at the State Telehealth Center of Ceará, located at the State Health Secretariat of Ceará (SESA), consisting of a manager, four field monitors, a computer technician, and eleven teleregulation medical specialists. The participants in this research were professionals from the center, the teleconsulting service requesting professionals, speakers, and participants in the web lectures.The research used data from teleconsultants registered from January 2015 to February 2018, totaling 30 teleconsultants in the following areas: psychology, nursing (family health, diabetes, intensive care), physiotherapy, physical education, dentistry and medicine, and 6,314 Primary Health Care (PHC) professionals in Ceará registered on the telehealth platform for the request of teleconsulting services.Data was organized in tables with absolute and relative frequencies. Spatial distribution was established from the health regionalization adopted by the State of Ceará. We calculated the mean measures and the standard deviation of the time elapsed between the date of the request and the date of the service provided by teleconsultants.The identification of the number of web lectures per period and the most accessed

topics were assessed through reports issued by the researched group. The satisfaction with the service of teleconsultants was evaluated as per the Likert scale, which consists of a type of psychometric response commonly used in questionnaires. When answering a questionnaire based on this scale, teleconsulting applicants specify their level of agreement or acceptance of the response received.

**According to the telehealth platform, satisfaction is measured using two scales:**

- Overall satisfaction: the applicant can leave his assessment blank or select the "very satisfied"; "satisfied"; "neither satisfied nor dissatisfied"; "dissatisfied"; and "very dissatisfied" options.
- Answering the central question: the requester can leave his assessment blank or select the "fully met the needs"; "partially met the needs"; "did not meet the needs" options.

The data were processed using SPSS 20.0, license number 10101131007. The scales of general satisfaction and the answer to the main question were presented by professional category. The study was submitted to the Research Ethics Committee (CEP), via the National Platform "*Plataforma Brasil*", in order to meet ethical requirements, under Resolution N° 466, of the National Health Council/Ministry of Health, of December 12, 2012. Data collection started after the authorization by the CEP, under positive opinion N° 3.261.429.

## RESULTSAND DISCUSSION

The National Platform showed 6,596 registered professionals in Ceará. Of these, 68.2% were females. Most professionalswere trainedinNursing (35.87%), followed by Medicine (31.32%) and Dentistry (18.86%). It is worth mentioning that the activities of the State Telehealth Center of Ceará mainly target PHC professionals. Thus, this information confirms that the minimum team in the Family Health Strategy has a higher education level.The Family Health Team (ESF) is linked to the PHC Unit (UBS) in the territory, composed of a multi-professional team, with at least one general practitioner or family health or in family and community specialist, a generalist or family health specialist nurse, a nursing assistant or technician, and community health workers (ACS). They are joined by an oral health team, consisting of general or family health specialist dental surgeon, an oral health assistant, or technician (Brazil, 2000). The number of physiotherapy (234), psychology (124) and social service (119) professionals is included in the Family Health Support Centers (NASF). NASFs were created in 2008 by the Ministry of Health to support the consolidation of PHC, expanding the offer of health services, and the resolution, scope, and target of actions. They were regulated by Ordinance N° 2.488, dated October 21, 2011. Its composition was defined by municipal managers, following the priority criteria identified from epidemiological data and local needs and supported health teams (Brasil, 2008).Health regionalization is presented as a SUS guideline for the processes of decentralization of health actions and services and the negotiation and agreement between managers. Regulated by Decree N° 7.508 of June 28, 2011, it was a norm in the federal health agenda during the first 10 years of SUS implementation, and the State of Ceará has a tradition of pioneering this action.

**Table 1. Category of professionals registered on the Ceará Telehealth Platform. Fortaleza, Ceará, Brazil, 2019**

| PROFESSIONAL CATEGORY | N | % |
|---|---|---|
| NURSING | 2,366 | 35.87 |
| MEDICINE | 2,066 | 31.32 |
| DENTISTRY | 1,244 | 18.86 |
| PHYSIOTHERAPY | 234 | 3.55 |
| PSYCHOLOGY | 124 | 1.88 |
| SOCIAL SERVICE | 119 | 1.80 |
| PHYSICAL EDUCATION | 97 | 1.47 |
| NUTRITION | 90 | 1.36 |
| OCCUPATIONAL THERAPY | 80 | 1.21 |
| MANAGEMENT | 63 | 0.96 |
| SPEECH-LANGUAGE THERAPY | 62 | 0.95 |
| PHARMACY | 33 | 0.50 |
| INFORMATION SCIENCES | 9 | 0.14 |
| VETERINARY MEDICINE | 5 | 0.08 |
| BIOMEDICINE | 2 | 0.03 |
| BIOLOGY | 1 | 0.01 |
| BIOCHEMISTRY | 1 | 0.01 |
| TOTAL | 6,596 | 100.00 |

Source: Telehealth Platform/State Telehealth Center of Ceará

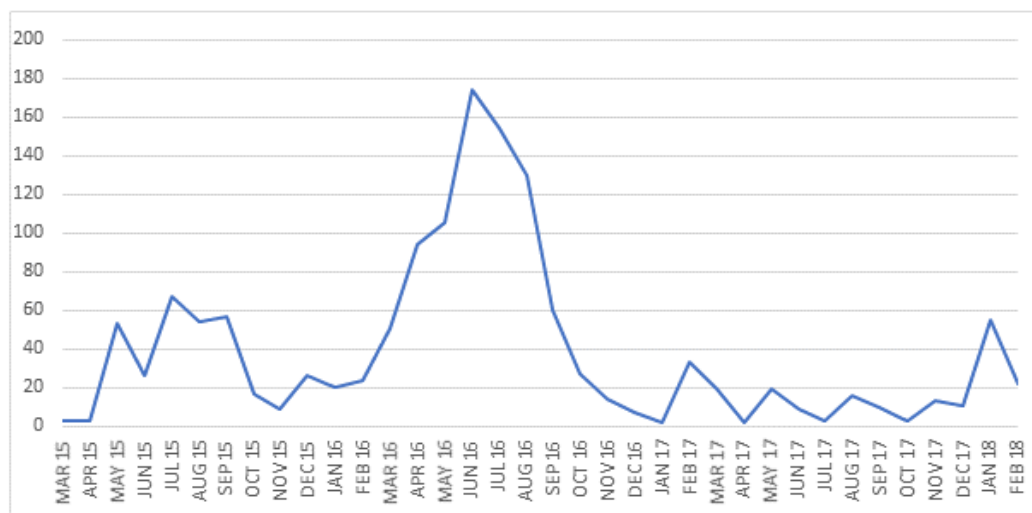**Chart 1. Teleconsulting requests on the Ceará telehealth platform per month and year. Fortaleza, Ceará, Brazil, 2019**



**Table 2. Time elapsed for teleconsulting responses by year. Fortaleza, Ceará, Brazil. 2019**

| | | Year | | | | Total |
|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | 2018 | |
| TIMEELAPSED(days) | Up to 3 | 132 | 322 | 21 | 45 | 520 |
| | | 44.6% | 41.0% | 17.8% | 62.5% | 40.9% |
| | 4-7 | 75 | 211 | 17 | 18 | 321 |
| | | 25.3% | 26.8% | 14.4% | 25.0% | 25.2% |
| | 8-15 | 20 | 115 | 25 | 2 | 162 |
| | | 6.8% | 14.6% | 21.2% | 2.8% | 12.7% |
| | 16-30 | 19 | 55 | 20 | 3 | 97 |
| | | 6.4% | 7.0% | 16.9% | 4.2% | 7.6% |
| | 31-811 | 50 | 83 | 35 | 4 | 172 |
| | | 16.9% | 10.6% | 29.7% | 5.6% | 13.5% |
| Total | | 296 | 786 | 118 | 72 | 1,272 |
| | | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Source: Telehealth Platform/State Telehealth Center of Ceará

**Table 3. Evaluation of the teleconsulting response regarding the main issue. Fortaleza, Ceará, Brazil, 2019**

| ISSUE MET | F | % |
|---|---|---|
| NOTEVALUATED | 1,136 | 74.8 |
| FULLY MET | 272 | 17.9 |
| PARTIALLY MET | 94 | 6.2 |
| NOTMET | 16 | 1.1 |
| Total | 1,518 | 100 |

Source: Telehealth Platform/State Telehealth Center of Ceará

**Table 4. Evaluation of the requesting professional's satisfaction regarding the teleconsulting response Fortaleza, Ceará, Brazil, 2019**

| CLASSIFICATION OF SATISFACTION | F | % |
|---|---|---|
| NOTEVALUATED | 1,132 | 74.6 |
| SATISFIED | 209 | 13.8 |
| VERY SATISFIED | 137 | 9 |
| DISSATISFIED | 23 | 1.5 |
| NEITHER SATISFIED NOR DISSATISFIED | 10 | 0.7 |
| VERY DISSATISFIED | 7 | 0.5 |
| Total | 1,518 | 100 |

Source: Telehealth Platform/State Telehealth Center of Ceará

**Table 5. Number of participants in web lectures, by year. Fortaleza, Ceará, Brazil, 2019**

| Year | Nº of web lectures held | Nº of participants |
|---|---|---|
| 2015 | 63 | 3,697 |
| 2016 | 108 | 5,347 |
| 2017 | 102 | 4,237 |
| 2018 | 109 | 3,773 |
| Total | 382 | 17,054 |

Source: State Telehealth Center of Ceará

**Table 6. Frequency of web lectures by theme. Fortaleza, Ceará, Brazil, 2019**

| THEMES | F | % |
|---|---|---|
| MANAGEMENT | 149 | 39.0 |
| HEALTH PROMOTION | 55 | 14.4 |
| REGULATION | 40 | 10.5 |
| CHRONIC DISEASES | 32 | 8.4 |
| ENDEMICS | 29 | 7.6 |
| TUBERCULOSIS/LEPROSY | 22 | 5.7 |
| ARBOVIRUSES | 20 | 5.2 |
| WORK PROCESS | 18 | 4.7 |
| HEALTH PREVENTION | 17 | 4.5 |
| TOTAL | 382 | 100.0 |

Source: Telehealth Platform/State Telehealth Center of Ceará.

**Chart 2. Number of teleconsulting requests on the Ceará Telehealth platform, by year. Fortaleza, Ceará, Brazil, 2019**
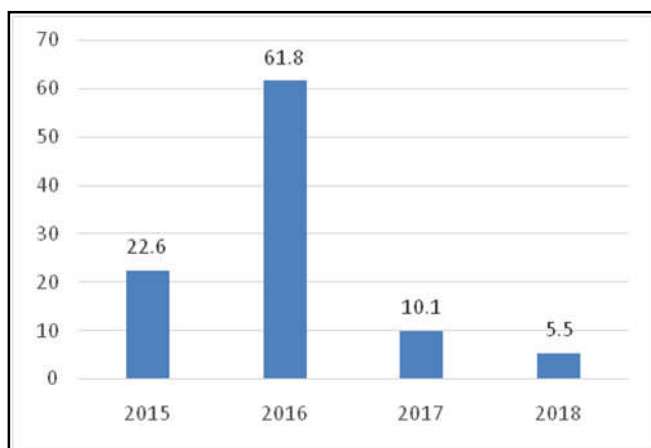


**Source**: Telehealth Platform/State Telehealth Center of Ceará

Currently, the State Health System is structured in five macro-regions: Fortaleza, Sobral, Sertão Central, East Coast/Jaguaribe, and Cariri, plus 22 health regions. It aims to ensure access, resolution, and quality of health actions and services; to ensure comprehensive care, understood as an articulated and continuous set of individual and collective preventive and curative actions and services, at all the complexity levels of the System; to reduce social and territorial inequalities and promote equity; and to strengthen the role of states and municipalities so that they exercise their management functions, aiming to rationalize spending and optimize the use of resources (Brazil, 2011). As per the division by health macro-region, the Macroregion of Fortaleza has the most significant number of professionals registered for teleconsulting (2,362), followed by the Macroregion of Sobral (1,541). Together, they account for more than 50% of registered professionals. Concerning the 22 health regions, the 11th CRES-Sobral has the most significant number of registered professionals (768), followed by the 1[st]CRES-Fortaleza, with 731 professionals registered on the Ceará telehealth platform.We identified in reports of travel carried out to register and train PHC professionals to use the National Telehealth Platform thatsome difficultiesin conducting teleconsulting and other telehealth activities, in general, were identified in some points. The lack of information and communication equipment in some units, the lack of internet access, and professionals' inability to handle equipment were frequently mentioned. The professionals' low personal motivation to use these services in their practice was reported less frequently. The low adherence of medical professionals in the training and use of the tools is noteworthy in these reports. In the teleconsulting activities, 1,518 requests were observed in the analyzed period. Of these, only 1,392 were completed, 315 in 2015, 860 in 2016, 140 in 2017, and 77 in 2018. The remaining 126 had incomplete information. A monthly analysis revealed a peak in the period from March to September 2016, a seasonal period with epidemiological and entomological diseases of Dengue, Chikungunya, and Zika Virus in Ceará. According to an epidemiological bulletin released by the Secretariat of Health of Ceará in June 2016, the State was experiencing an epidemic period of Chikungunya, with more than 31,000 confirmed cases, distributed in 139 municipalities in Ceará (Ceará, 2017).The frequency of teleconsulting requests was organized by the professional category to identify those who use the tool the most. Thus, use by nurses is most frequent (783), followed by clinical doctors (310) and dental surgeons (174). A survey carried out by a telehealth center in the southeastern region also confirmed that nurses are the professionals who most perform teleconsulting, followed by doctors and dentists (Marcolino *et al.*, 2017).Noteworthy is the sharp drop in teleconsulting requests in 2018.

However, the monthly analyses of the requests confirm their completion in only two months (January and February), which was due to the termination of the maintenance contract between the Ministry of Health and the Federal University of Rio Grande do Sul (the institution in charge of running the Telehealth platform), which occurred in March 2018. Since then, the Telehealth Center of Ceará was unable to perform teleconsulting activities. Worth highlighting is that the Ministry of Health encouraged the construction of a new platform by the centers, or that those who did not have the infrastructure to do so should join the platform of other centers.We understand that teleconsulting enhances quality communication between points of care in the network and shared management, qualifying for the care of users. As a priority, the State Telehealth Center of Ceará provided asynchronous teleconsulting, when it is answered within up to three days. It is worth mentioning that three actors are involved in its implementation: the requesting professional, from a family health unit in the registered municipalities; the regulator, transmitting the issue to the teleconsultant; and the teleconsultant specialist (e.g., doctor, nurse, dentist, pharmacist, among others). The surveyed group is staffed by 30 teleconsultants registered on the National Platform to

provide teleconsulting services. The activities carried out through this platform started in 2015, and totaled 296 teleconsulting requests, of which 44.6% were answered within three days. In 2016, 786 teleconsulting requests were received, with only 41% answered within three days. A significant drop in the number of requests (118) was recorded in 2017, which, per the center's reports, is due to budget cuts to travel to other municipalities. In the following year, in 2018, only 72 teleconsulting requests were made, until February, a period in which the center was deactivated, but this was the year in which the highest percentage of responses was obtained within three days.After receiving and reading the response to the teleconsulting service performed, the requesting professional should classify it concerning response and satisfaction with the response received. This classification or evaluation is a relevant aspect, as it directs the audit of the responses sent. However, a devaluation or lack of knowledge about the importance of this step by the requesting professional is noted.Regarding the assessment of the response, we identified that 74.8% were not assessed. However, 17.9% of assessed responses fully met the applicant's needs. According to the literature (Brasil, 2012), the assessment of the applicant's satisfaction with the response is categorized based on a 5-level Likert scale: very dissatisfied; dissatisfied; neither satisfied nor dissatisfied; satisfied; and very satisfied.The web lecture is the strategy used for the tele-education modality developed by the State Telehealth Center of Ceará. It can be included in the routine of the work process of health facilities that require only the use of computer and internet equipment. Lectures are organized by health topic of interest to all professionals, at all levels of care, with emphasis on the participation of those who work in PHC and are collective health residents. In total, 382 activities were held within the surveyed period, with emphasis on 2018, with 109 web lectures. A total of 17,054 professional participations were identified in this activity. However, an annual reduction in this number has been noted from 2017.The highest frequency of web lecture themes was related to management (39%), followed by health promotion (14.4%), and health care regulation activities (10.5%).This data shows that the strategy is well employed by state management. However, prevention-related actions obtained the lowest percentage (4.5%).The center's reports evidence that some factors bring about difficulties in the implementation of web lectures, such as the non-release of professionals to attend/participate in the web lectures; the lack of equipment and internet; the inability to operate telecommunication equipment; and, because it is a technological tool, interruptions in transmissions or difficult access due to the lack or inadequate coverage of the internet in some locations.

### Conclusion

The analyses allowed us to understand the process of Telehealth implementation in the State of Ceará systematically. The health services in which the telehealth points were established are a challenging scenario concerning the training of workers, user access to services, humanized care, and comprehensive health care. Given the high number of professionals registered with the National Telehealth Platform and the low number of teleconsulting requests, we identified the need to foster the engagement of PHC professionals to use the services offered by the center. As a result,it is all so urgent to discuss the provision of telediagnosis and teleconsulting services. The importance of encouraging the participation of managers, students, and workers at all levels of care is highlighted, as well as

articulating actions with the *Mais Médicos* (More Doctors) Program, *Médicos pelo Brasil* (Doctors across Brazil) Program, and the Ceará Family Doctors Program.This study revealed the breadth of applicability, diversity, and flexibility of Telehealth. However, it is necessary to apprehend the meaning of terms for the conscious application of their tools. The term "digital health" seems even broader to encompass all strategies, initiatives, and tools that use DCIT for health, although this does not invalidate the term "telehealth", as it addresses specific activities such as tele-education, telediagnosis, and teleconsulting. Again, in this context, it is essential to break with the paradigm in which a professional category owns the knowledge and practice on a given subject, understanding that all health workers can contribute to teleconsulting activities.

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