ABSTRACT
Objective: to evaluate the implementation of the Telehealth Program in the primary care of the second macro-region of Alagoas. Method: this is a descriptive, cross-sectional study with a quantitative approach using secondary data. The structure and process indicators were used to describe the program and its level of implementation. Results: the results showed the level of implementation of the Telehealth Program and the actions being developed in the second macro-region of Alagoas. Conclusion: the Telehealth Program is under development in Alagoas (AL), Brazil, given the relatively short time of implementation, with distribution and unequal access in the second macro-region. This study enabled a systematic analysis of the program, allowing greater efforts to strengthen the initiative by highlighting the critical points and difficulties in the implementation process of telehealth. Descriptors: Telehealth; Health Management; Programs and Health Projects.

RESUMO
Objetivo: avaliar a implantação do Programa Telessaúde na atenção básica da segunda macrorregião de Alagoas. Método: estudo descritivo, transversal, de abordagem quantitativa, com a utilização de dados secundários. Os indicadores de estrutura e processo foram utilizados para descrever o programa e seu nível de implantação. Resultados: os resultados evidenciaram o nível de implantação do Programa Telessaúde e as ações que vem sendo desenvolvidas nesta macrorregião. Conclusão: o Programa Telessaúde está em desenvolvimento em Alagoas (AL), Brasil, dado o relativo pouco tempo de implantação, com distribuição e acesso desigual na segunda macrorregião. Este estudo possibilitou uma análise sistematizada do programa, o que possibilitou maiores esforços para fortalecer a iniciativa ao evidenciar os pontos críticos e dificuldades no processo de implantação/implementação do telessaúde. Descriptores: Telessaúde; Gestão Em Saúde; Programas e Projetos de Saúde.

RESUMEN
Objetivo: evaluar la implantación del Programa Telesalud en la atención básica de la segunda macroregión de Alagoas. Método: estudio descriptivo, transversal, de enfoque cuantitativo, con la utilización de datos secundarios. Los indicadores de estructura y proceso fueron utilizados para describir el programa y su nivel de implantación. Resultados: los resultados mostraron el nivel de implantación del Programa Telesalud y las acciones que vienen siendo desarrolladas en la segunda macroregión de Alagoas. Conclusión: el Programa Telesalud está en desarrollo en Alagoas (AL), Brasil, dado el relativo poco tiempo de la implantación, con distribución y acceso desigual en la segunda macroregión; este estudio posibilitó un análisis sistematisado del programa, lo que posibilita mayores esfuerzos para fortalecer la iniciativa al mostrar los puntos críticos y dificultades en el proceso de implantación/implementación del telesalud. Descriptores: Telesalud; Gestión En Salud; Los Programas Y Proyectos De Salud.

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The development of Information Technology (IT) has provided changes and advances in professional practices and education, providing changes in organizational and academic proposals through the “digital language” allowing to inform, communicate, interact and learn.¹

Telehealth is the use of modern information and communication technologies for distance-related health activities at their various levels (primary, secondary and tertiary). It allows the interaction between health professionals or between them and their patients, as well as the accessibility to diagnostic or even therapeutic support resources, also acting as a point of support and logistics for the health system.²³

The use of telehealth as a tool to support the development of health planning, assistance, research, and education actions bringing innovative character with the use of IT in improving health conditions.³

In 2007, the Ministry of Health of Brazil launched the National Pilot Project for Telehealth with the objectives: to improve the quality of health service with the continuous qualification of the professionals of the Family Health teams; to increase accessibility to specialized services; to promote the digital inclusion of the Primary Care/Family Health teams; to form an integrated network to monitor health problems through primary care; to reduce health care costs by reducing unnecessary travel; to reduce the feeling of isolation of Family health professionals and to assist in the establishment of professionals in remote areas.⁴

Also, in the Basic Health Units Rehabilitation Program (UBS), the component “Computerization and Telehealth Brazil Networks in Primary Care” aims to carry out the computerization of Basic Health Units and develop actions to support health care and education for the work improving the quality of care, expanding the scope of actions offered by these teams, changing care practices and organizing means of teleconsulting provision, second training opinion and telediagnostic.⁵

The Telehealth program enables the creation of a network connecting health education institutions and services, in a cooperative and permanent work process, identifying problems and solutions that reduce costs and bureaucracy of processes, contributing to the resolution and quality of services.⁶

Thus, considering the role of the Telehealth Program in the qualification of health work teams and processes in primary health care, this study is justified by the relevance of information technologies in the health area, enabling the gradual construction of the health evaluation in the axis of the program, as a tool of public management, to provide subsidies and strategies for improvements in the process of implementation of services, evidencing articulation and needs of the system, which will enable the reorganization of health management processes.

**OBJECTIVE**

- To evaluate the implementation of the Telehealth program in the basic care of the second macro-region of Alagoas.

**METHOD**

This is a descriptive, cross-sectional study with a quantitative approach using secondary data. The data collection procedures involved the reading and analysis of the management reports of the Telehealth Program developed in the second macro-region of Alagoas, available at the coordinating information system of the Macro-regional Telehealth Program.

The variables studied were regarding the structure and process, from November 2012 to October 2013, minimum indicators for monitoring and evaluation of the telehealth centers” (Figure 1).
The implementation of the telehealth...

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Description</th>
<th>Numerator</th>
<th>Denominator</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCTURE</td>
<td>Connectivity</td>
<td>Presence of computer equipment (computer, webcam, etc.) and internet connection.</td>
<td>-</td>
<td>-</td>
<td>Yes/No</td>
</tr>
<tr>
<td></td>
<td>Telehealth centers</td>
<td>Number of health units assisted by Telehealth in each city.</td>
<td>Number of centers</td>
<td>-</td>
<td>Centers</td>
</tr>
<tr>
<td></td>
<td>Teams</td>
<td>Number of health teams assisted by Telehealth in each municipality.</td>
<td>Number of teams</td>
<td>-</td>
<td>Teams</td>
</tr>
<tr>
<td></td>
<td>Teams/centers centers</td>
<td>Number of teams per telehealth centers.</td>
<td>Number of teams</td>
<td>Number of centers</td>
<td>Teams/centers</td>
</tr>
<tr>
<td></td>
<td>Professionals</td>
<td>Number of professionals participating in the program.</td>
<td>Number of professionals</td>
<td>-</td>
<td>Professionals</td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td>Percentage of teams and centers trained in the macroregion.</td>
<td>-</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Request by city</td>
<td>Average of the last 12 months of requests per city.</td>
<td>Total requests</td>
<td>-</td>
<td>Requests/city</td>
</tr>
<tr>
<td></td>
<td>Request by team</td>
<td>Average of the last 12 months of requests by health team.</td>
<td>Total requests from the city in the last 12 months</td>
<td>Number of teams in the city</td>
<td>Requests/team</td>
</tr>
<tr>
<td></td>
<td>Team request per month</td>
<td>Average requests per team per month</td>
<td>Total requests from the city in the last 12 months</td>
<td>Number of teams in the city/12 months</td>
<td>Requests/team/month</td>
</tr>
<tr>
<td></td>
<td>Request by center</td>
<td>Average of the last 12 months of requests per center.</td>
<td>Total requests in the city in the last 12 months</td>
<td>Number of telehealth centers</td>
<td>Requests/centers</td>
</tr>
<tr>
<td></td>
<td>Request by professional</td>
<td>Average of the last 12 months of requests per professional.</td>
<td>Requests by professional category in the city</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Web made</td>
<td>Proportion of web conferences made.</td>
<td>Web made</td>
<td>Web appointments</td>
<td>%</td>
</tr>
</tbody>
</table>

The data were tabulated and processed in the Microsoft Office Excel 2010 Program, with the construction of a database about the cities part of the second macro-region of Alagoas assisted by the Telehealth Program.

Because it is research with secondary data related to variables that do not involve human beings directly or indirectly, according to the previous provisions, the research did not need to be ethical committee of research, according to Resolution 466/2012.

### RESULTS

#### Characterization of the Telehealth Program in the Second Macroregion

The state of Alagoas has a population of 3,300,935 inhabitants, distributed according to the Regionalization Master Plan (PDR) in 102 cities, ordered and allocated for the operationalization of SUS in two macro-regions of health.

The first macroregion has 2,093,801 inhabitants, with a municipality located in Maceió, comprising 56 municipalities. The second macroregion, with 1,026,692 inhabitants in 46 municipalities, with a municipality located in Arapiraca. The telehealth program was decentralized to the two macro-regions, with the objective of...
The implementation of the telehealth... offering the actions closer as possible to the municipalities.

The municipality of Arapiraca launched its project to implement the Nucleus of Telehealth in the second macro-region of Alagoas, and in December 2011 it was approved, with the aim of structuring the Macro-regional Nucleus of Telehealth and implanting 163 Telehealth sites in the Basic Health Units of the 47 municipalities of the Second macroregion, making up the 296 Family Health/Basic Care teams.

Initially, priority was given to implementing the Telehealth sites in the cities that joined the Program for the Appreciation of Basic Care (PROVAB), in a proposed distribution of centers and municipalities planned until 2016, as shown in Figure 1.

![Figure 2. Implementation of the Telehealth Program in the Second Macroregion, compared to the proposal in the initial project, Alagoas, from November 2012 to October 2013. Source: Management Reports, Second Macroregion, Alagoas.](image)

**Figure 2.** Implementation of the Telehealth Program in the Second Macroregion, compared to the proposal in the initial project, Alagoas, from November 2012 to October 2013. Source: Management Reports, Second Macroregion, Alagoas.

**Structure indicators**

As for the NT, the structure includes physical infrastructure, computer equipment (computers and webcam), access to software for connectivity (Skype, etc.), and three generalist teleconsulting professionals in the categories of Medicine, Nursing, and Dentistry. Other professionals involved in the NT are a general coordinator, field monitor, administrative assistant, computer technician, driver and general service assistant.

![Figure 3. Computerization and connectivity* of the municipalities of the Second Macroregion of Alagoas, from November 2012 to October 2013.*In %. Source: Management Reports, Second Macroregion, Alagoas.](image)

**Figure 3.** Computerization and connectivity* of the municipalities of the Second Macroregion of Alagoas, from November 2012 to October 2013.*In %.

Source: Management Reports, Second Macroregion, Alagoas.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>N</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centers</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Teams</td>
<td>202</td>
<td></td>
</tr>
<tr>
<td>Professionals</td>
<td>1257</td>
<td>1.88</td>
</tr>
<tr>
<td>Teams/centers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>

Source: Management Reports, Second Macroregion, Alagoas.

**Process Indicators**

The process indicators evidenced that only three (13.6%) of the 22 municipalities with connectivity were responsible for teleconsulting applications, which is the Telehealth modality offered by the NT from November 2012 to October 2013. Professional categories 56% of requests were Community agents, followed by nurses (22%), doctors
Oliveira TC, SalesMLH.

(18%), dentists (2%) and social workers (2%).

Table 2. Distribution of teleconsultories by requesting municipality, in the second macro-region of Alagoas, from November 2012 to October 2013. Maceió (AL), Brasil.

<table>
<thead>
<tr>
<th>City</th>
<th>N</th>
<th>%</th>
<th>Req/center</th>
<th>Req/Team</th>
<th>Req/Team/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arapiraca</td>
<td>33</td>
<td>66</td>
<td>2.75</td>
<td>0.66</td>
<td>0.05</td>
</tr>
<tr>
<td>Olho</td>
<td>14</td>
<td>28</td>
<td>1.16</td>
<td>2</td>
<td>0.16</td>
</tr>
<tr>
<td>D’água das Flores</td>
<td>3</td>
<td>6</td>
<td>0.25</td>
<td>0.13</td>
<td>0.01</td>
</tr>
<tr>
<td>Palmeira dos Indios</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100</td>
<td>4.16</td>
<td>0.63</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Source: Management Reports, Second Macroregion, Alagoas.

The second macro-region of health as a territorial basis for planning health care, which groups health regions, considering socioeconomic, geographical variables, road access, service provision and the need to implement ambulatory and hospital services of medium complexity and high complexity, ensuring access to citizens at the macro-regional level of these levels of care.¹⁰

Thus, within the Telehealth program, it is a scenario of management and monitoring of the implementation of the program, enabling the development of processes and activities to contemplate and combine local characteristics and needs with the objectives and offer of program activities.⁷

The implementation of the Telehealth Program is given in three sequential stages, defined and organized in the implementation project. The first stage consists of the structuring of the Telehealth Center headquarters and/or viability of the teleconsulting and computerization/connectivity offerings, of at least 70% of the Primary Care/Family Health teams, with the beginning of teleconsulting requests, criteria for each core city.⁷

In the second and third stages, telehealth modalities are developed, such as the second formative opinion, tele-education and telediagnosis, depending on the agreement in the bipartite inter-manager committee and the specification in the project.⁷

Regarding the structure of the Telehealth Program, the results showed an adequate infrastructure for the first phase of implementation of the project, contemplating the beginning of teleconsulting, since the minimum recommended structure includes support and monitoring rooms, as well as physical space for administration/coordination, with minimal technological equipment superior to the health units, which allows superior connectivity, in relation to the centers.⁷

With regard to human resources, a minimum staff of NT professionals is recommended to respond to the first phase of implementation, corresponding to 150-300 teleconsultories/month; the presence of general coordinator, administrative assistant and professional for computer support², included in the Arapiraca NT, offering support to the regulatory, field and teleconsultants teams.

The regulatory team is formed by a regulatory monitor and a medical regulator, responsible for regulating and ordering the flow of teleconsultants², and not yet available in the NT of the second macro-region. In the field team, responsible for the support and remote monitoring of the centers, there is a need for coordinator and field monitor², with the availability of only the monitor in the analyzed NT.

The team of teleconsultants correspond to health professionals in charge of responding to teleconsulting requests, with three professional categories involved - Medicine, Nursing and Dentistry, corresponding to the categories of primary care/family health teams in most of the Brazilian territory¹¹, demonstrating a relationship between greater possibility of teleconsulting demand by the professionals of the ESF teams and presence of teleconsultants in the macro-regional NT. There may also be occasional teleconsulting, depending on the needs of the region.⁷

The municipalities of the second macro-region registered in the project were prioritized in the implementation of the program, to the detriment of others, for the development of PROVAB, a strategy that, together with telehealth, aims to strengthen basic care in regions that are difficult to
access, by valuing and qualifying professionals and improved access to services.\textsuperscript{12}

The computerization of municipalities has proved to be a challenge in the program, which is understood to be the provision of infrastructure and information technology equipment (computers, etc.).\textsuperscript{1} By the end of the first phase of program implementation, computerization/connectivity of at least 70\% of the teams, and so far in the second macroregion, there is 35\% connectivity. Thus, adherence to connectivity was a major obstacle to the development of telehealth actions, since for this there is a need to connect to the internet and transmit information through the web. In this sense, a singularity at the national level is that the dissemination of Information and Communication Technologies (ICT) in Brazil, especially in the Health Sector\textsuperscript{13}, does not correspond to the investment needed to implement telehealth in the SUS. Also, regional characteristics and disparities cannot be dissociated in this assessment; there are also large differences between sites where there is and where there is no prior experience of telemedicine or telematics in health in general. It is still necessary to consider the availability discrepancies of broadband internet infrastructure. This interferes, as well as the preexisting work process, in choices among alternatives such as clinical supervision online or offline.

Another mechanism related to the difficulty of computerization and connectivity for the implementation of the Brazil Network Networks Program is the need to define clear rules on telehealth in the SUS since there are a tension between public, collective and private industry interests. Therefore, as a window of opportunity still little explored in this problem, there is the possibility of building a list of actions integrated into telehealth and interoperability of SUS information systems, within the scope of the System of Innovation in Science and Technology in Health.\textsuperscript{13}

The proportions of teams and municipalities per telehealth center are relevant indicators in the evaluation of the distribution of the centers to provide a picture of the access of municipalities, teams, and units to telehealth,\textsuperscript{7} and the results of this study showed a favorable distribution, but there is a need for an evaluation of effectiveness and applicability of this distribution. Training on the program and its functioning are paramount and are relevant because the implementation of the telehealth program will be considered as an innovative strategy, allaying information technologies and health care, and consequently, there is a need for paradigm change, mainly in vocational training and management of services.\textsuperscript{13}

The results regarding training, as they did not represent 100\% of the teams and centers registered in the project, are also related to the low proportion of teleconsulting carried out in the period, possible to consider the process of gradual development and realization of the capacities as one of the causal agents to the underutilization of the program in the regions/municipalities in which there are computerization and connectivity.

Regarding the process indicators, it was demonstrated that under-utilization by the municipalities, in the available modality, the teleconsultory. The average number of teleconsulting/month/team is an indicator of the monitoring of the program's funding since the funding of Computerization Projects and Telehealth Brazil Networks in Primary Care provides an average of two teleconsultory/month/ESF.\textsuperscript{11} In this research, the results showed lower averages than required by the ordinance.

In the face of a low utilization of telehealth activities by one or many municipalities, a series of actions can be triggered to clarify the reasons for low utilization (poor quality responses to teleconsulting, verified in the audit process) and interventions for the correction of course (activities of permanent education and qualification of teleconsultants or their replacement).\textsuperscript{7}

Besides to the number of teleconsulting requests, attention should be paid to the quality of these responses and their applicability to the resolution of issues in basic care. A recent study demonstrated that there was a low association between the said teleconsulting requests and causes of hospitalization sensitive to primary care in the region surveyed.\textsuperscript{13}

The professional category of the ESF most active in the request of teleconsultories consisted of the community health agent, a very positive aspect, since these professionals are the link and the integrating axis between the health unit of the family and the community\textsuperscript{12} and through their training, Using telehealth strategies, one can effectively achieve the qualification of care and favorable outcomes in the first level of care.\textsuperscript{14}\textsuperscript{4}

In addition to the challenge of adherence, agreement, and practice of telehealth actions by the municipalities, the program faces the same difficulty and underutilization by the
professionals.\textsuperscript{15-7} About initiative and motivation, Castro Filho et al. in recent work conducted in Rio Grande do Sul, showed that about 30% of the physicians who had access to Telehealth over a long period did not use it (zero use).\textsuperscript{14}

Only the social worker category did not have a specific teleconsultant, which raises the discussion previously proposed in this study, with the need to analyze all categories directly or indirectly involved in basic care, and hiring teleconsultants that represent them, contributing to the establishment response to requests.

In a study of monitoring and evaluation of telehealth in Rio Grande do Sul, there was a lack of time in the professional agenda, work overload and non-forecast/time protection for telehealth use, besides the digital exclusion factor and lack of custom With the use of remote tools as causal factors of the low number of teleconsultory requests, suggesting the constant and continuous training of the team as a valid alternative to reach a greater adhesion of health professionals.\textsuperscript{13,15}

Thus, in view of the evaluation of the structure and process indicators, three major issues are seen in the implementation of the telehealth program in the basic care of the second macro-region of health in Alagoas: the increase of the infrastructure for implementation of telehealth actions; Improving the utilization by the municipalities that have the conditions, and of the professionals who are part of the network, strengthening and expanding the program and ultimately empowering and bringing resolving to basic care. In the experience of Telehealth in Rio Grande do Sul, every two teleconsultories requested by medical professionals, a referral of patients to other levels of care is avoided.\textsuperscript{14}

**CONCLUSION**

The research evidenced a Telehealth Program in progress in the second macro-region of health in Alagoas, and considering the limitations inherent in the Brazilian territory and the difficulty inherent in difficult access regions, the use of technology and communication tools, and the implementation of telehealth as a challenge for health management, the macro-regional NT achieved favorable results in a short time of implantation.

The evaluation of the structure demonstrated the difficulty of implementing the program in all the municipalities of the second macro-region, with only those enrolled in another program - PROVAB. The structure of NT was adequate for the first phase of program implementation.

Computerization and connectivity were the main identified factors that impede the implementation and development of telehealth actions since there is a disproportion between the registered municipalities, those that are computerized and those that have connectivity, a common scenario in several Brazilian regions.

The municipality of Arapiraca was the main responsible for the requests of teleconsultories, because it is a municipality that is home to the NT and the second macro-region. The Community Health Agent was the professional that most used these technologies, a very favorable aspect to the role of telehealth in the quality of basic care assistance.

The underutilization of the program in computerized and connective municipalities shows that there is a gap between the supply of telehealth actions and the effective use by municipalities and professionals. The causes of such underutilization go beyond the objectives of this research, but raise a discussion about the effectiveness of training and the qualitative evaluation of the development of telehealth actions, since it is more relevant to verify the impact of telehealth modalities in the resolution and qualification of basic health care, to the detriment of the analysis of the quantitative indicators of the progress of the program.

The need for further research on the topic of telehealth, especially regarding the difficulties of telehealth implementation and utilization, as well as the evaluation of the results, category of indicators not described in this research, by the implementation process is summarized. A program that is underway in the second macro-region of health in Alagoas, becoming fundamental in the management processes, demonstrating the impact of telehealth actions in improving the quality of primary care, and the health conditions of the population.

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