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ORIGINAL ARTICLE

TELEMEDICINE AND ITS CURRENT PERSPECTIVES AND APPLICATIONS IN BRAZIL, 2017-2021

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ABSTRACT

Evidence on telemedicine in Brazil is scarce. Telemedicine was evidenced by its application in the Covid-19 pandemic. Some telemedicine applications are for the country's economy. Objective: this research aims to investigate preliminary data from DATASUS on its current proposals and possible applications in the field of Medicine. Methods: The design of this study is descriptive epidemiological and was carried out with a retrospective survey as perspectives of the application of telemedicine in Brazil. The research consisted of consulting SINAM data from 2017 to 2022, available on DATASUS. Results: The role of the State of Santa Catarina in diagnostic imaging as an applicability of health services

KEYWORDS: STATE OF SANTA CATARINA. DIAGNOSTIC IMAGING. ULTRASOUND. SUS. DATASUS

INTRODUCTION

The impacts of Covid-19 had repercussions across the globe. Face-to-face medical care requires a request for the occupation of rooms and specialized personal care with structural and organizational health assistance. Given the facts associated with the condition of Covid-19, restrictive measures for contact between people and isolation measures were required, being the reasons for expanding the use of Telemedicine [1].

Telemedicine is shown as increasing evidence of its participation in developing countries as a government and partnership strategy in Covid-19 and has been associated with the ability to deliver quality care remotely as well as reduce costs as the Covid-19 epidemic strengthened the dissemination of telemedicine[2].

With the literary scarcity of telemedicine performance in the Brazilian system, the Unified Health System (SUS) completed 23 years of existence in 2021 and is a health milestone in Brazil. Based on Brazilian public health data, this research aims to investigate preliminary data from DATASUS on its current perspectives and possible applications in the field of Medicine.

METHODS

2.1. Search strategy

A retrospective descriptive epidemiological study was carried out with the aim of examining the prospects for the application of telemedicine in Brazil. The research consisted of consulting SINAM data from 2017 to 2022, available in DATASUS. The analyzed data were analyzed from the beginning of 2017 until the month of July 2022, which showed up as the last accounting of data available on the network, as complete data.

2.2. Study selection

Two independent investigations (prevalence in Brazilian macro-regions and main medical applications) were chosen for the screening investigation in TabNet Win32 3.0. The protocol established in this research for both investigations was in line, column, content and period selections available (Available at http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sinannet/cnv/).

All options available on the platform were investigated, with the final filter, telemedicine. Among around 40 selection criteria in Row and around 20 selection criteria in Column, 2 criteria in content and variation of 21 years. A total of 33,600 data options were made available on DATA SUS, specifically on TabNet.

Following an exhaustive investigation with the recruitment for data related to Telemedicine, 38 selection criteria in Line, 18 selection criteria in Column and 1 criterion in content were excluded, obtaining the macro-region variables, which were funneled by the system into regions: South, North and Northeast Plateau, Midwest and Serra Catarinense, Grande Oeste, Grande Florianópolis, Foz do Rio Itajaí and Alto do Vale do Itajaí and their relationships with services provided by the medical network. Evidence found for services provided by the medical network, which corroborates the applicability of telemedicine.

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2.3. Data extraction

The years 2017 to 2022 were selected, where data from 2001 to 2022 are originally available in the DATASUS system, in order to reflect the current situation in 5 years of retrospection, since there are limited data on telemedicine in order to avoid any trends and important implications, some selection criteria were established for data extraction, based on DATASUS.

The selection criteria consisted of data between 2017 and 2022, data from the health network, by region/federation unit, by complexity and approved quantity. Scientific papers considered gold standard within the scope of the research were also included, as well as articles involving telemedicine and health in Brazil.

The exclusion criteria were all that did not fit the profile of the selection criteria and articles used for this research that were dated before 2001, excluding those that did not have an unclear methodology or other approaches that did not fit within the research objective.

2.4.Data analysis method

In order to identify published studies on telemedicine and current perspective and applicability, a bibliographic survey of scientific articles published in ScienceDirect, PubMed, Medline, Web of Science, EMBASE, LILACS, Scielo and Google Scholar databases was carried out in the study. between the years 2001 to 2022. For the research, the descriptors were used: "Telemedicina", "Telemedicina no Brasil", "Aplicabilidade da Telemedicina", and their corresponding words in English: "Telemedicine", "Telemedicine in Brazil"," Applicability of Telemedicine". The search took place between the months of July and September 2022, totaling 4 works used in media such as discussion.

After data collection, analysis and interpretation, the Microsoft® Excel 2020 program was used to tabulate data and expose the situation of telemedicine in Brazil in representation of the incidence of telemedicine in health services through tables.

Due to the fact that it is a public domain database, it was not necessary to submit it to the Research Ethics Committee.

RESULTS

3.1. The diagnostic imaging/ultrasound service using telemedicine stands out in the State of Santa Catarina

The main results for the application of telemedicine among the macro-regions associated with the use of the service were represented by Table 1.

In the last 5 years, the Alto Vale do Itajaí, located in the State of Santa Catarina, was presented with the highest proportion in the diagnostic imaging service in ultrasound, accounting for 97.11% of the service (n = 9,407) in a total of n = 9,868. The second highest result was also found in the area of diagnostic imaging in computed tomography, also in the region of Santa Catarina (Foz do Rio Itajaí n=145), followed by the Grande Oeste (n=133), the diagnosis by imaging in interventional radiology (n = 196 – total).

	Diagnostic imaging / telemedicine radiology service	Diagnostic Imaging / Telemedicine Ultrasound Service	Diagnostic Imaging Service / 009 telemedicine computed tomography	Diagnostic Imaging / MRI Telemedicine Service	Diagnostic imaging service / interventional radiology by telemedicine
TOTAL	30	9,686	458	45	196
SOUTH	-	-	6	-	87
NORTH AND NORTHEAST PLATEAU	10	18	60	2	-
MIDWEST AND SERRA CATARINENSE	16	61	98	22	-
GRANDE OESTE		27	133	-	-
GRANDE FLORIANÓPOLIS	3	2	8	5	-
FOZ DO RIO ITAJAÍ		161	145	16	-
ALTO VALE DO ITAJAÍ	1	9,407	8	-	109
Identification code			121007 121		

Source: Ministry of Health/SVS- Diseases Information System – SINAN NET.

*Subtitle:

Macro-regions and services provided – specification in telemedicine.
Period: 2017-2022.
Data made available on TABNET until July / 2022.

3.2. Diagnostic Imaging in Computed Tomography is the type of service most applied in the regions studied.

According to Table 2, the most provided service in telemedicine consists of computed tomography imaging diagnosis among the regions evaluated (n = 697,093), followed by ultrasound imaging diagnosis (n = 467,510) and home care services (n = 697,093). = 45,723). Figure 1 lists the nine major types of services provided by the health network.

	Attention service in neurology / trauma and anomalies neurosurgery	Spine and peripheral nerve neurology	Neurology and nervous system tumors	Vascular neurosurgery	Neurosurgery in pain management
TOTAL	30	9,686	458	45	196
SOUTH	-	-	10	6	87
NORTH AND NORTHEAST PLATEAU	10	18	60	2	-
MIDWEST AND SERRA CATARINENSE	16	61	98	22	-
GRANDE OESTE	4	27	133	-	-
GRANDE FLORIANÓPOLIS	3	2	8	5	-
FOZ DO RIO ITAJAÍ		161	145	16	-
ALTO VALE DO ITAJAÍ	1	9.407	8	-	109

	Neurology research and epilepsy surgery	Neurology endovascular treatment	Stereotactic functional neurology	Polysomnography neurosurgery	Hearing health care service/specialized care for people with hearing impairment
TOTAL	160	1666	135	369	292
SOUTH	82	71	-	-	-
NORTH AND NORTHEAST PLATEAU		455	5	-	-
MIDWEST AND SERRA CATARINENSE	19	171	-	-	-
GRANDE OESTE			-	-	-
GRANDE FLORIANÓPOLIS	58	263	130	369	292
FOZ DO RIO ITAJAÍ		216	-	-	-
ALTO VALE DO ITAJAÍ	1	490	-	-	-

	Home attention service / home care	Home attention service / home hospitalization	Home care service / multidisciplinary home care team – emad	Diagnostic Imaging Service / Unclassified	Diagnostic imaging / radiology service	
TOTAL	29,812	45,723	36	22,695	27,207	
SUL	47	-	-	6	2,858	
NORTH AND NORTHEAST PLATEAU	89	38		134	4,939	
MIDWEST AND SERRA CATARINENSE	1,993	9	25	12	3,053	
GRANDE OESTE	467	-	3	21,595	317	
GRANDE FLORIANÓPOLIS	26,540	45,507	-	131	10,349	
FOZ DO RIO ITAJAÍ	74	168	8	468	1,805	
ALTO VALE DO ITAJAÍ	602	1	-	349	3,886	

	Diagnostic imaging / ultrasound	Diagnostic imaging / CT scan	Diagnostic imaging / MRI	Diagnostic imaging/interventional radiology service	Diagnostic imaging / telemedicine radiology service	Diagnostic imaging / telemedicine radiology service
TOTAL	467,510	697,093	59,902	21	30	
SOUTH	57,808	116,327	13,808	-	-	
NORTH AND NORTHEAST PLATEAU	142,157	124,529	15,781	6	10	
MIDWEST AND SERRA CATARINENSE	43,942	121,616	8,884	4	16	
GRANDE OESTE	46,361	54,298	6,481	-	-	
GRANDE FLORIANÓPOLIS	96,583	103,589	7,780	6	3	
FOZ DO RIO ITAJAÍ	31,609	61,650	2,768	-	-	
ALTO VALE DO ITAJAÍ	49,050	115,084	4,400	5	1	

	Diagnostic imaging service/tele medicine ultrasound	Diagnostic imaging service / telemedicine computed tomography	Diagnostic Imaging / MRI Telemedicine Service	Diagnostic imaging service / interventional radiology by telemedicine	Diagnostic service by dynamic / unclassified graphic methods	Diagnostic service by dynamic graphic methods / electrocardiographic examination
TOTAL	9,686	458	45	2	2	4,636
SOUTH	10	6	-	-	-	816
NORTH AND NORTHEAST PLATEAU	18	60	2	-	-	1,659
MIDWEST AND SERRA CATARINENSE	61	98	22	-	-	103
GRANDE OESTE	27	133	-	-	-	199
GRANDE FLORIANÓPOLIS	2	8	5	-	-	1,145
FOZ DO RIO ITAJAÍ	161	145	16	2	2	562
ALTO VALE DO ITAJAÍ	9,407	8	-	-	-	152

Table 2. Services provided by the Health Network in the regions evaluated. Source: Ministry of Health/SVS- Diseases Information System – SINAN NET

*Subtitle:

Macro-regions and services provided - General

Period: 2017-2022.

Data made available on TABNET until July / 2022.

Figure 1. Representativeness of the services in greater number presented by the Medicine network. Source: DATASUS, prepared by the Author.

DISCUSSION

Current perspectives on telemedicine and its applicability in Brazil were listed mainly in the State of Santa Catarina and the main service available within the telemedicine service was diagnostic imaging/ultrasound (Table 1). Within that refers to the services provided by the health area, which was found in our research, which aimed to associate telemedicine in this context, the service by diagnostic imaging/computed tomography (Table 2). In the public health sector, the use of asynchronous care telemedicine on a large scale was evidenced in Santa Catarina by the implementation of the Santa Catarina Telemedicine Network, which began in 2005 and this evidenced the attention of the Ministry of Health in 2006 and encouraged the creation of the Telehealth Brazil Program. According to Savaris et al. (2008) the Telehealth nucleus was present in 145 municipalities in SC with evidence of sending 78 exam points of different modalities. Andrade et al. (2016) reports a prototype integrated to the Santa Catarina Telemedicine and Telehealth System in order to improve support for Electroencephalogram exams, which corroborates the evidence in diagnostic imaging found in our research [3]. Historically, telemedicine was implemented in Brazil by the National Telehealth Program by the Ministry of Health and expanded in 2011 to the National Telehealth Brasil Redes Program, which can be related to the strong evidence presented by the region of the State of Santa Catarina. The electrocardiogram (ECG) evaluation is relevant in the literature in the context of imaging exams and has been applied as a low-cost procedure with the potential to save lives, and this system has served a portion of the Santa Catarina population, especially the elderly [4]. Telemedicine is a beneficial technology that can provide preventive treatments and assist in long-term treatments, however, this application is still applied in early stages of health management and is expanding, as its application has already been reported worldwide [2]. Some limitations of this study were evident due to the low evidence of telemedicine performance in Brazil, which significantly delimited the selection criteria and the regions presented. Nevertheless, it shows up as a significant point of little-known regions and/or that show up with relevance for the distribution of this system in detailed regions, improving the availability of quality in health services.

CONCLUSION

This work highlights the role of the State of Santa Catarina and the dissemination of the diagnostic imaging service as an applicability of health services in Brazil, however, more studies are needed to account for a significance of data and presentations on relevant points about Brazilian telemedicine.

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