English

An updated view of the process of incorporating technologies into Brazil's Primary Health Care network

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Abstract

Introduction: *An updated view of the process of incorporation of technologies in the primary health care network in Brazil. Introduction: The process of incorporation of information technologies in Brazil in general is still short of developed countries. In the health area, several institutional initiatives are underway.* Method*: Descriptive study, which analyzed data on the incorporation of information technologies in 37,894 Primary Care Teams and 28,939 health units in 5,320 Brazilian municipalities that provided primary care services in 2017. Variables related to connectivity were analyzed. , electronic medical records and telehealth, and systematize the reasons why these resources are not used.* Result and discussion: *It was observed that 74% of health units have internet and 10.7% of units do not have computers. In units that have a computer, an average of 5.52 computers was observed. It was found that 38.1% of family health teams have electronic medical records and 53.8% use telehealth resources. As for non-use issues, infrastructure, connectivity and lack of time or opportunity to use were mentioned, corresponding to 20.7%, 26% and 11.2% respectively. There is still a long way to go for the process of incorporation of information technologies in PHC in Brazil.* Conclusion*: In Primary Care, it was observed that there is still a significant number of health facilities that have not yet incorporated information technology resources. However, the process is advancing with nearly forty percent of teams already using electronic medical records and telehealth resources.*
Keywords: *Primary Health Care, Electronic Health Records, Internet access, Telehealth.*

Resumen

Una visión actualizada del proceso de incorporación de tecnologías en la red Primaria de atención de salud en el Brazil. Introducción: Una vista actualizada del proceso de incorporación de tecnologías en la red de atención primaria de salud en Brasil. Introducción: el proceso de incorporación de las tecnologías de la información en Brasil en general aún es corto en los países desarrollados. En el área de la salud, varias iniciativas institucionales están en marcha. Metodo: *Estudio descriptivo, que analizó datos sobre la incorporación de tecnologías de la información en 37.894 equipos de atención primaria y 28.939 unidades de salud en 5.320 municipios brasileños que proporcionaron servicios de atención primaria en 2017. Se analizaron las variables relacionadas con la conectividad. , registros médicos electrónicos y telesalud, y sistematizar las razones por las cuales estos recursos no se utilizan.* Resultado y discusión: *Se observó que el 74% de las unidades de salud tienen internet y el 10.7% de las unidades no tienen computadoras. En las unidades que tienen una computadora, se observó un promedio de 5.52 computadoras. Se encontró que el 38.1% de los equipos de salud familiar tienen registros médicos electrónicos y el 53.8% usa recursos de telesalud. En cuanto a los problemas de no uso, se mencionaron la infraestructura, la conectividad y la falta de tiempo u oportunidad de uso, que corresponden al 20.7%, 26% y 11.2% respectivamente. Todavía hay un largo camino por recorrer para el proceso de incorporación de tecnologías de la información en APS en Brasil.* Conclusión: *En Atención Primaria, se observó que todavía hay un número significativo de establecimientos de salud que aún no han incorporado recursos de tecnología de la información. Sin embargo, el proceso avanza con casi el cuarenta por ciento de los equipos que ya utilizan registros médicos electrónicos y recursos de telesalud.*

Palabras-clave: *Atención Primaria de Salud, Registros Electrónicos de Salud, Aceso a internet, Telesalud.*

Resumo

Uma visão atualizada do processo de incorporação de tecnologias na rede primária de atenção á saúde no Brasil. Introdução: O processo de incorporação de tecnologias de informação no Brasil em geral ainda está aquém dos países desenvolvidos. Na área de saúde, várias iniciativas institucionais estão em curso. Método: Estudo descritivo, no qual foram analisados os dados referentes a incorporação de tecnologias de informação em 37.894 Equipes de atenção primária e 28.939 unidades de saúde em 5.320 municípios brasileiros que prestaram serviços na atenção básica no ano de 2017. Foram analisadas variáveis relativas à conectividade, prontuário eletrônico e telessaúde, além de sistematizar os motivos pelos quais estes recursos não são utilizados. Resultado e discussão: Observou-se que 74% das unidades de saúde possuem internet e 10,7% das unidades não possuem computadores. Nas unidades que possuem computador, observou-se uma média de 5,52 computadores. Cosntatou-se que 38,1% das Equipes de saúde da família possuem prontuário eletrônico e 53,8% utilizam os recursos de telessaúde. Quanto aos problemas para não utilização, foram mencionados problemas relativos à infraestrutura, conectividade e falta de tempo ou oportunidade para utilizar, correspondendo a 20,7%, 26% e 11,2% respectivamente. Ainda há um longo caminho a ser percorrido para o processo de incorporação de tecnologias de informação na APS no Brasil. Conclusão: Na Atenção primária, observou-se que ainda existe um número significativo de unidades de saúde que ainda não incorporaram recursos de tecnologias de informação. No entanto, o processo está avançando com quase quarenta por cento das equipes já utilizando prontuário eletrônico e recursos de telessaúde.
Palavras-chave: *Atenção Básica de Saúde, Registro Eletrônico de Saúde, Conectividade, Telessaúde.*

Introduction

Latin America's reality regarding the incorporation of information technology is still precarious. According to the International T elecommunication Union[1] in 2017, only 52,6% of people used the internet, demonstration the huge disparity that exists among developed countries where 81% of the people already use these resources. There is a very significant disparity in Latin America, ranging from countries such as Haiti where 12,3% of the people have access to the internet, and Chile that has the standard of developed countries: 82,3%. In Brazil, 67,5% of people use the internet. Also, in relation to the ICTs Development Index, in which the countries are categorized in low, average, high and very high, Brazil is situated between 7,12 to 8,17.

OMS, in its 2015 E-health report[2], in a analysis involving 14 countries of the region, affirms that more than 90% of the countries have a policy of national system of health information; however, only about 42% of these have a national policy of e-health and telehealth. In this study, the factors that difficult the implementation of telehealth projects are also enumerated: the absence of infrastructure, of funding and of regulations; competition among the priorities in the health field and proofs that telehealth works.

Brazil has a national telehealth project since 2017, involving the execution of teleconsultations, telediagnosis, tele-education and second formative opinion (SFO, from the Portuguese "SOF"). In Brazil, there is a more and more significant use of incorporation of telehealth resources in the Brazilian public network. In 2016, it was found[3] that the telehealth program in the Brazilian public network was present in 23 states with a total of 8.097 points, serving 3.417 municipalities. There are a lot of specificities: Minas Gerais has expertise in electrocardiogram service from a distance; in Rio de Janeiro, the experience refers to tele-radiology; Rio Grande do Sul has experience in telediagnosis in the spirometry area; Santa Catarina develops wide network of exams transmission, among them, ECG, computed tomography, ultrasound and magnetic resonance. São Paulo and Minas Gerais, in turn, have been standing out in tele-education with initiatives such as the Virtual Men Project, Classroom Projects using interactive resources, development of simulation laboratories and of installation of recording studios, distance-learning courses with 3D modeling and stereoscopy, among others.

In 2017[4], the national coordination of the telehealth project affirms that the national telehealth program was implanted in 47 telehealth centers. Of these, 46 offer the teleconsulting service, while 15 offer the SFO's activity and only 11 offer the telediagnosis service. Twenty-four centers offer the tele-education activity. There are still 08 centers in implementation phase.

In 2019, an availability report of the national telehealth program in Brazil, drawn by the German Hospital[5], determined that in the years 2016, 2017 and 2018, 2.150.084 telehealth actions were carried out, involving teleconsultings, telediagnosis and tele-education activities. The biggest number refers to the telediagnosis 1.877.392, followed by teleconsultings 269.857. This study also showed that in this period a total of $7.314.057,65 were spend, denoting that each telehealth action cost about 3,40 dollars.

Many studies[6,7,8,9,10,11,12,13,14,15,16] confirm the presence of the national project in distinct areas. Also the studies that were carried out about the satisfaction of the costumers demonstrated that the family health doctors are satisfied with the carried out teleconsultings: studied from Santa Catarina[17] refer satisfaction and studies from Minas Gerais[18] concluded that 95% of the professionals said to be satisfied with the teleconsultings.

A study from Rio Grande do Sul[19] points out that telemedicine is potentially useful to improve the quality of care and to speed up the flow between the different levels of care, aspects which were also reaffirmed by studies carried out in Pernambuco[20] and Bahia[21].

As for the tele-education actions[22] the use of telehealth, in addition to fulfilling its part in improving the access to care, treatment and diagnosis for the patients, is also a:

> *"powerful instrument of continued education to the health professionals for the actions of health promotion and disease prevention to the individuals and their communities, specially, the communities located in remote or rural areas with few personal and health services".*

In order to improve the access and quality of the attention offered in primary care, the Health Ministry launched in 2011, the PMAQ – Program of Improvement of Access and Quality (from the Portuguese Programa de Melhoria de Acesso e Qualidade), through which the basic health teams and the basic health units welcome researchers – that verify through documents and through interviews and observations – how the distinct practices related to primary care are. The primary health teams are certified and the municipalities receive financial resources according to the quality levels that were reached by their teams. In this program, many variables relative to the process of incorporation of information technology were collected. The PMAQ has already collected data relative in three cycles, involving the years of 2012, 2014, and now in 2017 and 2018.

This intends to launch a current view of the process of incorporation of information technology, particularly telehealth, in Brazil's primary care network.

Method

A descriptive study was carried out, with data from the database that was structured by the Health Ministry related

to the III PMAQ's cycle, carried out in the years 2017 and 2018, involving data from all over Brazil, about the basic health teams and basic health units that joined the PMAQ on those years.

It was researched, through in loco visits, 37.894 primary health teams and 28.939 health units involving more than 5.000 Brazilian municipalities that do service in primary care.

For this study, the following variables were analyzed regarding the 28939 health units: access to the internet and the quality of this connection and telephones; number of computers, chambers, sound box and printers by unit.

For the teams the following variables related to the process of incorporation of information technology were collected: using the electronic health record and telehealth resources; participation in telehealth actions in the last year and reasons to not participate – Problems in the infrastructure (ex: computer, inadequate room); Connectivity problem (ex: lack of internet, slow internet); Lack of time or opportunity for using the Program; Difficulties in accessing the system/platform; Little exposure of the Program; The team doesn't have the need to access and low qualification of the answers.

Simple frequencies were carried out in order to allow the analysis of the country regarding the number of computers, they were grouped in five levels – none, 1, 2-4 and five or more. The mean and standard deviation related to the number of computers, cameras, sound box, and printers in conditions of use in the primary care units were also calculated. After that, an analysis about the incorporation process of information resources in the country's primary care, was carried out.

Results

It can be observed in Table 1, that in the 28.939 researched primary care units, 74% have access to the internet, with 85,7% of the primary care units affirming that the internet works in a regular basis. Only 0,3% doesn't work. However, regarding the operation of the telephone, 49,1% of the researched units affirm that there are no working telephones in the units.

Table 1 – Access to telephone, internet and quality of connection in the primary care units – Brazil – 2018

Variables		N	%
Is there access to the internet in this unit?	Yes	21423	74%
	No	7516	26,0%
Is the available internet connection enough to carry out the activities?	It works in a regular basis	18354	85.7%
	It works in an irregular basis	3011	14,1%
	It never works	58	0,3%
Is there a working telephone in the Primary Care Unit?	Yes	14197	49,1%
	No	14742	50,9%

Source: PMAQ – MS Brazil

In the mean analysis of the number of computers in conditions of use that exist in the researched health units, expressed in Table 2, it can be observed that they have an average of 5,52 computers per unit, with a standard deviation of 6,15. Regarding the cameras, sound boxes and printers in conditions of use, it can be observed that the respective means are: 0,63, 1,35 and 1,73, with means and standard deviation that are smaller than the computers' means and standard deviations.

Table 2 – Mean of computers, cameras, sound boxes and printers in conditions of use in the primary care units – Brazil – 2018

Variables	N	Mean	S.D
How many computers in conditions of use are there in the Primary Care Unit?	28939	5,52	6,15
How many cameras (web cam) in conditions of use are there?	28939	0,63	1,81
How many sound boxes in conditions of use are there?	28939	1,35	2,82
How many printers in conditions of use are there?	28939	1,73	2,83

Source: PMAQ – MS Brazil

Regarding the process of the use of the electronic health record by the primary care teams, in table 4, it can be observed that 38,1% of the teams affirm that they are using the electronic health records in primary care.

Table 4 – The use of electronic health record by the primary care teams – Brazil – 2018

Variables	N	N	%
Electronic Health Record	Yes	14455	38,1%
	No	22895	60,4%
	Doesn't apply	544	1,4%
Total		37894	100,0%

Source: PMAQ – MS Brazil

Regarding the participation of the primary care teams in telehealth actions in the last year, it can be observed in table 5, that 54,0% of the teams confirm the participation in telehealth actions. As for the use of telehealth resources by the primary care teams, it can be observed that 53,8% of the teams refer to use it.

Table 5 – Participation and use of telehealth resources by the primary care teams – Brazil – 2018

Variables	N	N	%
The team participates/participated in the telehealth actions in the last year	Yes	20461	54,0%
	No	15807	41,7%
	Doesn't apply	1626	4,3%
Does your team use the Telehealth?	Yes	20390	53,8%
	No	16960	44,8%
	Doesn't apply	544	1,4%

Source: PMAQ – MS Brazil

When the teams that don't use the telehealth identify the reasons why they don't use this resource, it can be observed in table 6, that the connectivity and infrastructure problems constitute as the main problems, with respectively, 26,0% and 20,7%, followed by little exposure of the program 11,7% and lack of time or opportunity for the use of the program – 11,2%. It can be observed that the low qualification of the answers is almost insignificant – 0,6%. The other reasons refer to the difficulties of the computer's use, the absence of qualification and the difficulty to access.

Table 6 – Reasons why the primary care teams don't use the telehealth – Brazil – 2018

Variables	N	%
Problems in the infrastructure (computer, inadequate room)	3513	20,7%
Connectivity problem (lack of internet, slow internet)	4404	26,0%
Lack of time ore opportunity for the use of the Program	1896	11,2%
Difficulties with the use of the computer	496	2,9%
Absence of qualification in the system/platform	1113	6,6%
Difficulty in accessing the system/platform	1077	6,4%
Little exposure of the Program	1990	11,7%
The team doesn't need to access it	398	2,3%
Low qualification of the answers	104	0,6%
Doesn't apply; didn't answer	1969	11,6%
Total	16960	100%

Source: PMAQ – MS Brazil

Discussion

The incorporation of information resources in the Brazilian primary care remains in course, with significant advances in the last periods; however, there is still a precarious situation in many units. This study demonstrated that seventy-four percent of the units already access the internet, advancing in the identification in a previous study that this process reached a little more than 50% of the primary care units in 2014[23]. However, there are still relevant problems, since in almost 25% of the units there is no connectivity and more than 10% of the units work without any computers.

It was also identified that there is still a good connectivity, reaffirming the findings of the previous study. In other words, the existence of an expansion process has also maintained this characteristic.

As for the existence of the computers in the units, it can be observed, in average, among four to five computers, showing that for the process of implementation of the electronic health reports in primary care, the matter of structure and connectivity still constitute a problem, as verified in many Latin-American studies[24,25,26]. Also in the process of incorporation of other equipment that allow interactivity it can also be verified that when it occurs, it has a mean smaller than the computers. An aspect that is highlighted for the infrastructure is that almost 50% of the units don't have a working telephone. As for the process of implementation of the electronic health record in primary care, it can be observed that almost 40% of the teams can already use it, data that exists consistently with the existence of five or more computers in more than 45% of the primary care units. It can be observed that Brazil is starting to be situated near the developed countries such as Canada[27], United States[28] and England[29], that in the last periods walked significant steps regarding the incorporation of electronic health records in their units. As for the process of incorporation of telehealth resources, nowadays more than 50% of the teams report that the use of these resources, advancing in regards to the studies[30,4,3] that were carried out in 2012, 2014 and 2015, whose threshold reached less than 30% of the primary care teams. These findings reinforce the difficulty to incorporate telehealth resources in a health care reality such as the Brazilian one, by its continental dimension and by the problems that come from its socioeconomic situation regarding the connectivity, as verified in many studies[1,2].

Regarding the reasons why the primary care teams don't use the telehealth resources, they are the aspects related to the infrastructure, such as availability of equipment and connectivity that are highlighted. In the Latin-American reality, these aspects are evidenced as problems for the telehealth development also by many institutions[31,32]. It is also identified problems with the absence of qualifications, which causes the teams problems to access the system and use the TICs. It wasn't observed significant problems regarding the quality of the answers of the telehealth program.

In this panoramic view, it was observed that Brazil has been taking important steps towards the incorporation of information resources in the primary care units, although there are still significant situations of absence of these instruments.

Conclusion

Brazil already has a significant process of incorporation of information resources in primary care, with almost 40% of the teams mentioning the use of electronic health reports and more than 50% the use of telehealth resources. However, there are still units that live with precarious situations, since more than 25% of the units still don't have connectivity and more than 10% don't even have a computer. There is still a big road to be travelled.

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