

Telemedicine and telehealth services and their sustainability

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Abstract

Increased access to information and communication technologies, the development of artificial intelligence, machine learning, robotics, biotechnology, the internet of things, the internet of services and a variety of innovations arising from emerging ecosystem of start ups opportunizes the expansion of the offer of telemedicine and telehealth services in different forms and specialties. In this scenario, this variety of technology should be used as best as possible to promote best practices, the safest and the best reach of the target population, through structured teleassistance, telediagnostic and teleducation services, avoiding unnecessary referrals, increasing agility in the delivery of test results, scheduling and consultations with specialists, diluting the hospitalization rate, among others. All this technology can assume expressive values from a financial standpoint, which can impact both positively and negatively. The expectation of those who invest is also to generate savings of resources with the use of such tools in order to achieve sustainability of the service. This article aims to raise and analyze the literature produced in the last five years, on the sustainability of telemedicine and telehealth services in the context of care, assuming the perspective of the service provider.

Keywords: Telemedicine; Evaluation; Sustainability; Telehealth.

Resumen

Servicios de telemedicina y telesalud y su sostenibilidad.

El aumento del acceso a las tecnologías de la información y comunicación, el desarrollo de la inteligencia artificial, el aprendizaje de máquinas, la robótica, la biotecnología, la internet de las cosas, la internet de los servicios y una variedad de innovaciones derivadas de el ecosistema emergente de start ups ofrece una oportunidad de expansión de la oferta de servicios de telemedicina y telesalud en diferentes formas y especialidades. En este escenario, esta variedad de tecnología debe utilizarse lo mejor posible para promover las mejores prácticas, el alcance más seguro y óptimo de la población objetivo, a través de servicios de teleasistencia estructurado, telediagnóstico y teleducación, evitando referencias innecesarias, aumentando la agilidad en la entrega de los resultados de los exámenes, programación y consultas con especialistas, diluyendo la tasa de hospitalización, entre otros. Toda esta tecnología puede asumir valores expresivos desde el punto de vista financiero, lo que puede impactar tanto positiva como negativamente. La expectativa de quien invierte es también generar ahorros de recursos con el uso de tales herramientas para lograr la sostenibilidad del servicio. Este artículo pretende plantear y analizar la literatura producida en los últimos cinco años, sobre la sostenibilidad de los servicios de telemedicina y telesalud en el contexto de la atención, asumiendo la perspectiva del proveedor de servicios.

Palabras-clave: Telemedicina; Evaluación; Sostenibilidad; Telesalud.

Resumo

Serviços de telemedicina e telessaúde e sua sustentabilidade.

O aumento do acesso às tecnologias de informação e comunicação, o desenvolvimento da inteligência artificial, do aprendizado de máquina, da robótica, da biotecnologia, da internet das coisas, da internet dos serviços e uma variedade de inovações advindas do emergente ecossistema de start ups oportuniza a ampliação da oferta de serviços de telemedicina e telessaúde, em diferentes formas e especialidades. Neste cenário, há que se utilizar, da melhor forma possível, essa variedade de tecnologia para promover as melhores práticas, as mais seguras e as de melhor alcance à população alvo, por meio de serviços estruturados de teleassistência, telediagnóstico e teleducação, evitando-se encaminhamentos desnecessários, aumentando agilidade na entrega de resultados de exames, no agendamento e nas consultas com especialistas, diluindo-se a taxa de hospitalização, dentre outras. Toda essa tecnologia pode assumir valores expressivos do ponto de vista financeiro, o que pode impactar tanto positiva quanto negativamente. A expectativa de quem investe é também gerar economia de recursos com a utilização de tais ferramentas, a fim de alcançar sustentabilidade do serviço. Este artigo tem o objetivo de levantar e analisar a literatura produzida nos últimos cinco anos, sobre a sustentabilidade de serviços de telemedicina e telessaúde no contexto da assistência, assumindo a perspectiva do provedor de serviços.

Palavras-chave: Telemedicina; Avaliação; Sustentabilidade; Telessaúde.

Introduction

The digital transformation scenario, which includes telemedicine and Telehealth makes it increasingly challenging for health service providers to make decisions on incorporating these new technologies in order to promote best practices, the most safe and the best in range for the target population through structured teleassistance, tediagnostic and teleducation services, avoiding unnecessary referrals, increasing agility in the delivery of test results, scheduling and consultations with specialists, diluting the hospitalization rate, among others. The feasibility of this 'digital health' can assume expressive values from a financial standpoint, which

Methods

Active search in the online databases, using a medical metadata system in english, Medical Subject Headings (MeSH), under the following terms descriptors: telemedicine, telehealth, ehealth, mobile health, associated with the terms evaluation and sustainability, through the logical operator "and". The bases used were: EMBASE-MEDLINE, PUBMED, COCHRANE Library, SCOPUS, WEB of Science and BVS-Lilacs. All revisions and articles were considered in the first search.

The articles initially identified were filtered by title, keywords and abstract, based on the terms descriptors and the

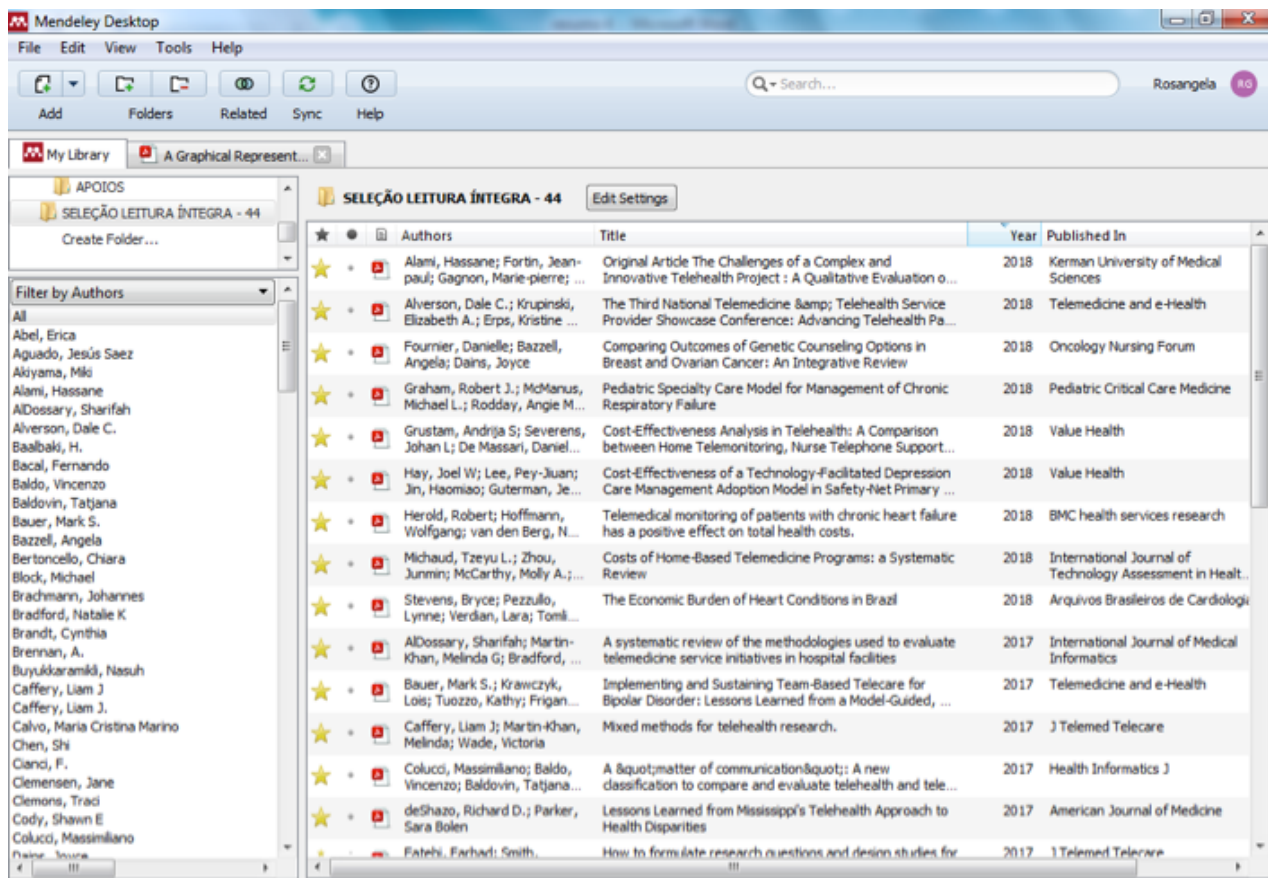


Fig. 01 - Selection for Reading in full: Mendeley.

can impact both positively and negatively. The expectation of those who invest is to promote the expansion of access, improvement in the quality of their care, and also generate savings of resources with the use of such tools in order to achieve sustainability of the service. This article aims to raise and analyze the literature produced in the last five years, on the sustainability of telemedicine and telehealth services in the context of care, assuming the perspective of the service provider.

following selection criteria: full texts, free access, published in books and magazines, whose main subject was Health, in the clipping of January, 2013 to September, 2018.

Search results: 3,570 articles were found. Using Mendeley, a free software, which among other functions, allows the management of scientific articles, was performed the first examination of records, for withdrawal of repetitions, reports of pilot projects, or lasting less than 12 months, with a number of patients attended less than 100; demonstration

reports, descriptive models, letters, event reports, implementation projects or feasibility test. From this stage 411 documents were left, which were sent for a second review, for refinement by title and abstracts available. 281 records were left for verification and identification of the free and full text available records, which contained the perspective of the service provider in the context of the teleassistance, as defined for this publication. 44 articles were eligible for full reading. Fig. 01.

Consolidation of the selected articles

Of the 44 articles selected, after reading in full, resulted 31, being 20 Original Articles, 10 Systematic Reviews, 01 Report, plus 08 others* that were incorporated by cross reference and collection personal. These 39 documents are very different from each other, but they constituted the basis for the construction of this article, which is recommended later reading. Tab. 1.

Table 1 - Consolidated of the publications analyzed:

Year of Publication	Country of origin	Qt Systematic Review	Original Articles	Others*
2018	Germany (1), Brazil (1), Canada (1), Germany with United Kingdom and the Netherlands (2), USA (5), Switzerland (2)	2	6	4
2017	Australia (3), Italy (1), Finland (1), Brazil (1), Denmark (1), USA (6), Ireland (1), China (1), Switzerland (1)	5	10	1
2016	Japan (1)	1	-	-
2015	USA (1), Netherlands (1), Spain (1), South Korea (1)	1	2	1
2014	Australia, Israel and Germany (1), USA (1)	-	1	1
2013	United Kingdom (2), Brazil (1)	1	1	1
2011	Brazil (1)	-	-	1

* Others: Workshop reports of Practice Community (1), Conference (1), and Consultancy (1), Publication of guideline (3), article of Doctoral Thesis (1). Systematic Review (1), Article Latin Am. J telehealth, 2017 (1)

Discussion

It was repeatedly found in systematic reviews the citation that for various reasons, such as: small sample size, short period of follow-up and evaluation, lack of randomized clinical trials, omission of cost detailing or its incomplete presentation, methodological failures, among others, the level of evidence of cost-effectiveness and sustainability of telemedicine and telehealth services is not yet robust^{1-9, 39}.

Although these arguments are forceful, they should serve as an opportunity and stimulus for further studies and publications, as is the case, for example, of the 13-year experience of the University of Mississippi Medical Center, which developed a successful Teleemergency program, which removed rural hospitals from the lack of critical access and now provides telehealth services throughout the state of Mississippi¹⁰. For this sustainability, the conjunction of the support of the only state academic health center, the active participation of its clinical faculty in the state's medical and nursing organizations and the positioning of health services as a growing industry, in an effort to obtain legislative support were key in the strategy.

DeShazo & Parker still quote in his article, the case of Teladoc, headquartered in Dallas, Texas, and the largest Telehealth corporation in the United States, operating in 46 states, which has gained causes in justice for reimbursement for services rendered, because the telehealth, each time more, has changed the health system in that country. Not that the future is guaranteed, there are many barriers^{10,11} for the telehealth to reach the status quo of 'normality'¹² or mainstream: legal is-

sues, implementation costs and equipment, reimbursement process, lack of high quality assessments and cost of quality; acceptance of society itself, lack of practice patterns, state licensing requirements and unforeseen consequences, scope of practical disputes between medical professionals, among others.

Graham and Colleagues¹³, in turn, evaluated a four year period of a program in Pediatric Critical Care, and concluded that “innovative models, such as the extension of intensive care services, for high-risk and high-cost patients may result in immediate cost savings. The evaluation of the financial implications of comprehensive care for high-risk patients is necessary to complement clinical and patient centered outcomes for alternative care models. When year-to-year cost variability is high and cost persistence is low, these savings can be estimated from the documentation within the care coordination management tools. Means of financial sustainability, scalability and equal access of such care models need to be established.”

From Canada, Quebec, Alami and colleagues¹⁴ bring the results of a qualitative evaluation based on a case study on Telepathology Project, which is a Service Network of 22 localities (rural and urban), implemented in 2011 and active until the present moment and, therefore sustainable. Its strategy was not like that of Ontario, where the University (tertiary level) provides the service as the main hub, but telepathology was developed among the existing services of the health system. Another strategy consisted in segmenting and limiting itself to services that respond to urgent needs of an extemporaneous nature and second opinion, especially in oncology. This strategy was seen as beneficial to the population and sensitive to the issue of cancer and adapted to the payment conditions of the financiers. According to its authors, telehealth is basically a challenge of transforming the health system: the importance of a vision and strategy to improve the organization, coordination, financing and integration of services and health care using the technologies as leverage. It is also important that organizations develop a culture of learning and become sufficiently flexible to benefit from the experience on the ground of practice¹⁴.

Stevens and colleagues¹⁵ recently published a study on the economic burden of cardiac conditions in Brazil, using as a reference Pandor et al⁶, and the Markov model, built in TreeAge Pro © 2015, with a 30 year horizon to evaluate the cost-effectiveness of Structured Telephone Support and Telemedicine compared to the standard treatment for a hypothetical cohort of patients with cardiac insufficiency. They concluded that both interventions evaluated are cost-effective to achieve improvements in the management of heart failure. They add that its analysis demonstrates that these conditions can have a great impact of productivity and well-being beyond the costs of the health system, which is an important discovery from the standpoint of society. They warn that “if policymakers focus solely on the health costs of a condition, or the relative cost of care per person, they may

lose the broader impact that these conditions have on the economy and the real cost, since other tax impacts should be taken into account.”

Pertinent weighting, since the variables and developments that a certain (less costly) condition can generate if not treated, will affect the future economy with a more costly condition for the health system as a whole.

Another publication that used the Markov Model, the one with 20 years of horizon, corroborates that the home telemonitoring (HTM) and the nurse’s telephone support (NTS) compared to the usual care (UC) are viable and cost-effective solutions to support patients with chronic heart failure from the perspective of society. They also stated that, “from the point of view of the third-party payer, the patients assigned to HTM and NTS incurred higher costs than those treated in UC, but also produced more QALYs¹⁶”.

Herold et al¹⁷, from Germany, also corroborate these findings. In its quasi-experimental study, in a regression analysis of the quarterly health costs processed in the first year after baseline, N = 5463, based on routine data, collected for reimbursement purposes, and N = 2059 for 24 months, reached the conclusion that “it was demonstrated that the total health costs for intervention patients (telemonitoring) after one year were lower compared with a control group (presential) that was combined for a large set of variables. “In addition to age, class and basic health costs, the place of residence of participating patients (urban or rural) was an important determinant for the development of health costs over time (usually with better development for cancer patients than a rural place of residence). A possible cause may be the greater availability of health services in urban areas that tend to be more cost-intensive to the same time¹⁷”.

As mentioned in Michaud¹ chronic diseases seem to be the ones that can most be cared for by telehealth, not Only because patients in these conditions are those who need prolonged care, those who will gain greater benefit, as well, because long-term teleservices are those that are more likely to be cost-effective and sustainable.

To quote another example with chronic disease, this conducted in the United Kingdom by Nymark and colleagues¹⁸, in the cohort study design, based on the concept that telehealth interventions, involving the remote provision of health care, are used in many scenarios to facilitate the management of long-term diseases, because they demonstrated that these interventions can benefit the patient’s health, with potential cost savings can also be important for modern health services, considering the many demands of restricted health budgets. The program was offered to patients with conditions such as diabetes, heart disease and chronic obstructive pulmonary disease. His data demonstrated that this program, called Birmingham OwnHealth, was an effective way to reduce the number of secondary care periods per person and per year, experienced by many of the patients with long-term conditions enrolled in the program and that could result insignificant reductions in the cost of care.

According to Wittenborn J. and colleagues¹⁹, in the United States, motivated by the recent approval of Medicare for home telemonitoring coverage for early detection of incident choroidal neovascularization among patients with macular degeneration related to age, and the lack of economic evaluation on its cost-benefit ratio and budgetary impact, carried out a microsimulation model to evaluate the effects of monitoring the ForeseeHome program on epidemiological results, long-term economic and budgetary (10 years), and the conclusion to which they arrived is that this simulation model suggests that the supplementation of usual care with home telemonitoring for patients at high risk of developing macular degeneration related to neovascular age not only reduces the risk of vision loss, but is also cost-effective, although incurring net costs for Medicare.

Whereas the United Nations 2030 agenda, adopted in September of 2015, establishes in its Objective of Sustainable Development (ODS) nº 3 the commitment of the international community to ensure a healthy life and promote the welfare of all in all ages. Telehealth establishes itself as a strategic tool for achieving the objective of improving the effectiveness and coverage of basic healthcare services in a sustainable and economical manner, with a greater preventive, formative and inclusive character²⁰.

It appears that the fight against health inequalities and not profit should be one of the main objectives of the United Nations member countries.

Despite the controversy regarding the robust evidence on the cost-effectiveness of telehealth, we have seen some examples of evaluation based on established models of evaluation that have reached favorable conclusions for the use of digital healthcare as an alternative to the usual care.

In addition, there are some articles that introduce other methods of evaluation, postulating a new mental posture in relation to the metrics for a scenario of innovation such as telehealth.

Hay et al²¹, for example, who developed a cost-effectiveness study using translational research method*.

**Translational research is understood as the research that goes from basic science to the practical application of that knowledge. Typically, research groups are divided into basic research groups and clinical research groups, leaving a gap between these two types of research, and therefore, sometimes the knowledge produced by basic research is not well-harnessed. Hence the emergence of this modality in medicine, in the United States, in the decade of 90, and since the beginning of the years 2000 has advanced both in its development as science, as well as spreading throughout the world, and being adopted in different areas²².*

They adopted the payer's perspective and concluded that: "The depression care facilitated by ICTs are both economical and effective to improve depression and quality of life outcomes in a predominantly hispanic / latin population of low income with type 2 diabetes."

Lilly et al²³, using a cohort case study method published

results from the perspective of the provider/financier, of a TeleICU program that, despite its limitations, concluded that the implementation of an ICU telemedicine program in an academic medical center had favorable clinical results, such as reduced bed occupancy time, as well as mortality, and financial benefits that substantially exceeded the operational and capital costs of the program.

Finally, as innovation in this area of activity is a constant, whether related to aspects: technological, human, organizational, or forms of work and responsibilities, generates a complex scenario and suggests that the conventional metrics, way of evaluating and report maybe they, also, need to go through an innovation. In this sense, we see proposals for new evaluation paradigms, especially with regard to services that use the internet ecosystem, such as telemedicine and telehealth, which demonstrated that there are services evaluated in a non-traditional way, considered effective and sustainable^{10,14,18,19,24,25}, considering that the specific context in which projects occur, which means different patients and pathologies, environments, technologies and health systems, should be taken into consideration when selecting impact indicators, effectiveness and its relation to the cost of the service.

Authors from different countries have made proposals for methods of evaluation and production of indicators. Among others, Gundim²⁵ here in Brazil, in 2009 proposed a multidimensional evaluation methodology, based on the Balanced Score Card. In 2012 Kidholm and colleagues²⁶ of Denmark, they published "A model for assessment of telemedicine applications: MAST", proposing the use of a multidisciplinary, multidimensional evaluation model, including previous considerations and transferability assessment. Hyejung Chang³⁰, in South Korea, in 2015, adopted the fish diagram as an approach to its evaluation model. The Pan-American Health Organization presented in 2016, a report, resulting from a workshop of practice that brought together 52 researchers and professionals from the area, from 13 countries, titled *Definición de indicadores para proyectos de telemedicina como herramienta para la reducción de las inequidades en salud*²⁷ (Definition of indicators for telemedicine projects as a tool for the reduction of health inequities). This document presents 11 primary indicators in telemedicine programs that, although susceptible to modification, improvement and expansion, deem it to be a first step towards an adequate evaluation.

Fatehi and colleagues²⁸, Australia, in 2016, proposed two perspectives of evaluation, a formative one, as a prospective, process-oriented and continuous study to identify areas for improvement in an intervention. And somative evaluation, as a final study, solution-oriented or for the product, generally measuring the overall achievements of a project.

Proposed by Caffery³¹ and O'Cathain³² is the research of mixed methods. The research of mixed methods studies qualitative and quantitative research in an integrated man-

ner and can provide a broader understanding of complex interventions than a single method study, as in the case of telehealth, which in addition to the medical records, electronic health records and the demand for interoperability of systems, receive a flood of innovations such as monitoring applications, wearable devices, ingerables, biosensors, application of artificial intelligence, learning machines, bigdata analytics, precision medicine, blockchain, even behavioral change and patient empowerment, which when interacting with these technologies, generate new developments that directly or indirectly change, immediately or in the long term, the results and the possible impact of telemedicine or telehealth intervention.

It can be said that, although there are ethical and juridical barriers to be equated, the field of research in telehealth assessment is gradually developing, with the purpose of certifying the effectiveness and fundamentals for its sustainability, as health services.

It is also worth mentioning that it is part of this development the important issue of the taxonomy of telemedicine and telehealth. Several authors when starting their articles from a form, or another, touch that question. The WHO, for example, published in May this year, two documents suggesting that countries adopt the term digital health, in order to simplify and enable comparisons^{33,34}.

In a recent event in the area, organized by the American Telemedicine Association, the result of a survey with na American public was mentioned, in which the term 'connected health' was the most appropriate for the interviewees.

Colucci and colleagues³⁵ approached this problem in order to propose a simplified and comprehensive taxonomy. From a lexical framework, telemedicine or telehealth was conceived as a means of communication and its action as a communication process. As a performance, communication is related to the outcome in health and identified three functions: telemetry, telephysis and telepraxis. Although this is a theoretical attempt to pursue a comprehensive classification that can be used to compare ICT-based programs, it seemed interesting, because it is coherent with health system aimed at delivering value, which has been currently debated. "This new classification - focusing on the final effect of telemedicine and telehealth and the type of interaction between actors involved - walks towards a new and simplified methodology to compare different studies and practices, design future research, classifying new technologies and guiding their development, and finally, addressing health policies and providing healthcare³⁵".

Although many definitions are similar, there are subtle differences that reflect the intent of each organization and the population they serve. These definitions affect how telemedicine has been or is being applied throughout the medical care scenario, reflecting the broad and influential role of the U.S. government in accessing health services and providing services. The evidence base suggests that a common

nomenclature for defining telemedicine can benefit efforts to advance the use of this technology to address the changeable nature of health care and new demands for expected services as a result of the health reform³⁶.

A systematic review conducted in China³⁷, although focused solely on the modality of mobile health, brings recommendations for future investigations that seem coherent not only for mobile health, but for the future of research and sustainability of telehealth: (1) studies should not be carried out as the autonomous technical study assessing its efficacy in the vacuum of the social context, (2) promoting the development of integrated interventions. As a tool to serve the existing health system, (3) concentrate on the development and evaluation of interventions with potential to reduce the disparities in health outcomes in the population and (4) conduct real-world assessment, on a large scale, closely conceived of interventions focused on strengthening the health system.

To increase our discussion, the article by Kimberly and her colleagues¹¹ brings the result of a qualitative research conducted with 36 U.S. hospitals that use or provide telemedicine services to 22 states of the country, on average 5.8 years ago. Ranging from 18 years to just beginning, among those providing services (18 hubs), and an average of 4 years of experience, ranging from 12 years to just beginning, among those who receive the services (550 spokes). The results indicate that a variety of funding sources were used to initiate and increase telemedicine services between hubs and spokes. In this example, it fell on the hospitals hubs to assume responsibility for the identification of sustainable business models. And this can be an interesting lesson learned for benchmarking.

Another aspect worth mentioning about study, which signals the importance of training and the learning curve of users regarding technology and processes: "although the interviewees of the hospitals hubs and spokes have informed that the adherence of the physician is mostly positive, they also believe that the doctor's adherence will improve if physicians have time to adjust to the practice of medicine using telemedicine technology. "

Finally, they ensure that regardless of the barriers, this service network has found paths to its sustainability. They declared that they heard from their interviewees that they have several reasons to continue to develop the reach of telemedicine: 1) helps to cope with the competition, 2) improves access, 3) maintains patients with low acuity closer to home and 4) helps to meet the hospital's mission to provide high-quality care.

From this report, despite the difference between the Brazilian and North American health market with regard to the barriers imposed by the laws of licensing and medical and hospital accreditation, to provide services both there and here, causes the reflection on the hypothesis that for a network work scenario, such as telemedicine and telehealth, a possibility might be the adoption of a single register of teleservices providers by the Unified Healthcare System,

as well as the possibility of licensing with the Federal Council of Medicine, with validity in national territory, without the need for restriction and without burden to the professional for issuing a state license. Although we know that the two councils (state and Federal) act together, they have autonomy to make decisions and judge cases independently. The main function of the Regional Councils of Medicine is to supervise the actions of physicians and to carry out the judgment of cases that hurt the Code of Medical Ethics, and may suspend or even cancel the record of the professional who commits infringement. It is also up to the organ to register physicians and legal entities, being responsible for assessing the capacity of the applicant according to the requirements to pursue the profession. The FCM has an important political role, because in addition to the interests of physicians, they work with the public authorities to guarantee better health conditions for the population.

Certainly, the suggested hypothesis of integration is a theoretical proposition that needs further deepening, broad discussion and articulation among medical professionals, these entities, besides the higher levels in federal and state health, because it would generate a great impact on the status quo of the organization of the current health service delivery system today.

Retaking, digital health, because of its flexibility and dynamism in the incorporation of new technologies, or of innovative application of existing technologies, the networking of systems and organizations, the complexity of human inter-relationship and the need for the development of new technical competencies of professionals and empowerment of patients in their own care, added to the conditions characteristic of the different pathologies and their developments in relation to the quality of life of the population, and legal restrictions from the point of view of responsibilities, sharing and security of personal data, consent of the patient in addition to the budgetary constraints, the maturation of the possible business models that meet Triple Aim will be gradual and demand still a lot of commitment from all stakeholders.

“Triple Aim”, defined in 2007 by the Institute of Health Improvement³⁸ simultaneously focuses on three objectives to optimize the health performance of the system: improving the health of the defined population; improve patient care experience (including quality, access and reliability); and reduce, or at least control, the per capita care costs. Telehealth encompasses multiple disciplines of primary and specialty care, and enable modalities of remote consultations (synchronous visits), storing and forwarding (asynchronous visits) and remote patient monitoring. These modes of service have a promising potential to reduce costs for all, which meets the three objectives mentioned.

In addition, this concept already expanded to “Quadruple Aim”, includes the experience of the health service provider, as quoted in the report on a conference of health providers, which took place at the end of 2017 in Arizona, EUA²⁴ that telehealth offers tools to address the “quadruple

goal” of improving patient experience, improving population outcomes, lowering costs without sacrificing quality and improving provider experiences.

Final considerations

We have seen articles pointing out effectiveness of services while delivering greater access and better quality, and some including economic effectiveness and sustainability, but still restricted possibly justified by the small volume of services and users reported in the literature consulted. On the other hand, there is an advance in the maturation of this sector, driven by the vectors of the digital transformation through which every society at all levels is passing, the ageing population and its demand for prolonged care, the economic constraints, behavioral change and concept of value delivery, leaving the focus on the disease and the hospital to, ultimately, focus on patient-centered solutions and their needs.

Conclusions

In the field of research, we note the need for investment on new methods of assessing telehealth services, consistent with emerging innovations. Preferably, performed multi-centrally, and in order to evaluate the contribution of telemedicine and telehealth services integrated to the healthcare system as a whole. The isolated evaluation may be useful, but restricted. The collaborative work, in a network of service providers, has greater potential to generate the critical mass needed for sustainability, enabling the achievement of the longing of providers and patients for greater access, better quality, better relationship with costs.

From the perspective of service providers, the pursuit of sustainability is a permanent challenge and will require from the executives and professionals of the hospital of the future to plan an innovative strategy integrating the new services made possible by digital health into the health system, foster investments, retain talents, and manage the high volume of data, and cyber security. There is, therefore, the need for greater integration between professionals and researchers to mutually fulfill the responsibility of extending health services in an inclusive, quality way, cost-effective and generating satisfaction for all stakeholders⁴⁰.

Limitations

This article was based on full articles available free of charge in the online databases. It is a limitation, because several articles that seemed pertinent are in magazines with paid access, which is restrictive for the dissemination of research and the advancement of the area. Among others, for example, quotes a proposal of a theoretical model of evaluation based on the Brazilian Telehealth Program⁴¹, which cannot be studied.

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