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Teleconsultations in the Brazilian Market

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ABSTRACT

Title: Teleconsultations in the Brazilian Market

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The Brazilian healthcare industry is currently experiencing a digital transformation. Accelerated by the COVID-19 pandemic, the implementation of teleconsultation is becoming closer to being a reality. Due to the quarantine scenario, the government was obliged to temporarily officialize the practice of teleconsultation for all doctors and healthcare practitioners.

Accordingly, accessibility between doctors and patients and efficiency in time and monetary conditions will be improved by this innovative care and treatment concept. Teleconsultation enables a time and location-independent treatment of patients using the digital world. However, this kind of digital medical treatment is currently not properly available in Brazil outside the pandemic period. This could be the time that shows the potential and need for implementation of this innovation. Therefore, this study assesses the current status and potential of teleconsultation in the Brazilian market, observing its great potential due to the vast physical territory that lacks quality healthcare assistance and the number of people paying for private insurance plans. Also, the findings of the study in terms of the main roadblocks for implementation shows that key barriers are created by stakeholders such as the government, insurance companies, doctors themselves and the technology providers. All of these play a decision-making role for implementing this healthcare method. Moreover, the Brazilian sample interviewed showed great acceptance of the innovation and the data collected together with the expert interviews indicated having this technology fully implemented within 5 years, at least in the main regions of the country.

Key words: Teleconsultation, Telemedicine, e-Health, Online consultations.

ABSTRACTO

Título: Teleconsultas no Mercado Brasileiro

Autor: Pedro Castro

O setor de saúde brasileiro está passando por uma transformação digital. Acelerada pela pandemia COVID-19, a implementação da teleconsulta está cada vez mais perto de ser uma realidade. Devido ao cenário de quarentena, o governo foi obrigado a oficializar temporariamente a prática da teleconsulta para todos os médicos e profissionais de saúde. Consequentemente, tanto a acessibilidade entre médicos e pacientes como a eficiência em termos de tempo e dinheiro devem ser trazidas a novos patamares por esse conceito inovador de saúde e tratamentos. A teleconsulta permite um tratamento de pacientes independente de horário e local através de meios digitais. No entanto, esse tipo de tratamento atualmente não está disponível de forma regularizada no Brasil fora do período pandêmico. Este pode ser o momento que mostra o potencial e a necessidade de implementação dessa inovação. Portanto, este estudo avalia a situação atual e o potencial da teleconsulta no mercado brasileiro, vendo grande potencial devido ao seu vasto território físico, sem assistência médica de qualidade e à quantidade de pessoas que pagam por planos privados. Além disso, as conclusões do estudo em termos dos principais obstáculos de implementação mostram que as principais barreiras são criadas por stakeholders, como o governo, seguradoras, os próprios médicos e os fornecedores de tecnologia. Todos eles desempenham um papel crítico na tomada de decisão para a implementação deste método de saúde. Além disso, a amostra brasileira entrevistada mostrou grande aceitação em relação à inovação e os dados coletados em conjunto com as entrevistas com especialistas apontaram para uma estimativa de ter essa tecnologia totalmente implementada em 5 anos pelo menos nas principais regiões do país.

Palavras-Chave: Teleconsulta, Telemedicina, e-Health, consultas online.

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1. Introduction

At a quickly growing pace, the world is becoming more digital with the increase of technology. IoT (Internet of Things), social media, artificial intelligence, and many others have essentially changed society's lifestyle.

In the course of digital transformation, people's expectations and communication habits are constantly changing, forcing industry and its companies to adjust existing activities and replace them with more efficient, digital, and technological processes. In 2020, a pandemic year, these digital developments are being felt all over the world in almost every industry. Nevertheless, some industries have been digitally transforming themselves for a longer time, whereas the healthcare sector it has only recently come into focus. The COVID-19 pandemic forced the temporary implementation of teleconsultation in Brazil, speeding up the regulatory process of this innovation, by bringing its benefits as a whole to society, patients, doctors and other stakeholders involved.

There is a new generation of patients that consults on Dr. Google and relies on smart watches, healthcare apps and the arrangement of online appointments at clinics, part of the digital healthcare system.

However, the question still remains as to what the key roadblocks for the full implementation of teleconsultation across the country are, and what benefits this digital transformation would bring. At the moment eHealth, telemedicine and especially teleconsultation are important instruments in a patient's journey and in the physician's activities and procedures. Until now, the doctor´s capabilities were bound to the doctor's location. Teleconsultation changes this scenario as doctors are no longer tied to any location through the usage of information and communication technologies, which helps them to manage, medicate and treat their patients at any distance or time.

Nevertheless, other countries like Switzerland have already implemented well-developed approaches of teleconsultation and proved that this is an optimal working, realistic approach for a doctor's appointment in the future.

Brazil is a country of unique opportunities for telemedicine development and its fields of applications, especially teleconsultation. Its broad territory, with thousands of isolated places and high difficulty of access, the uneven distribution of quality medical

resources, among other aspects that put universal, fair healthcare services at risk, point out a huge potential for the expansion of teleconsultation in the country.

Hence, this thesis has the purpose of identifying, from the current conditions that the country faces for the full implementation of teleconsultation in Brazil, what the main challenges to its full dissemination are.

2. Literature Review

2.1 Introduction to the world healthcare panorama

Over the past 72 years, the main goal of the World Health Organization (WHO) has been to achieve the highest possible standard of health for all people, all over the world. But health systems are constantly evolving, as are health trends. No health system is perfect, and all countries have people who are left out, which is why it is important to keep making progress and exposing areas of vulnerability that need to be changed (WHO, 2019).

In 2015, it was estimated that from 2.3 to 3.5 billion people had full coverage of essential services. This illustrates that at least 50% of the world's population were not receiving the essential health services they needed. It was estimated, in 2010, that 808 million people (11.7% of the world's population) were spending 10% of their household budgets paying for healthcare services; for 179 million of those people, these payments were over 25% of their household budgets. An estimated 97 million people (1.4% of the world's population) fell below the poverty line as a result of out of-pocket healthcare spending in 2010, as illustrated in figure 1. The proportion of the population that suffers catastrophic health expenditures (>10% or >25% of total household expenditures or income) is higher in middle-income countries than in lower high-income countries (WHO, 2019).

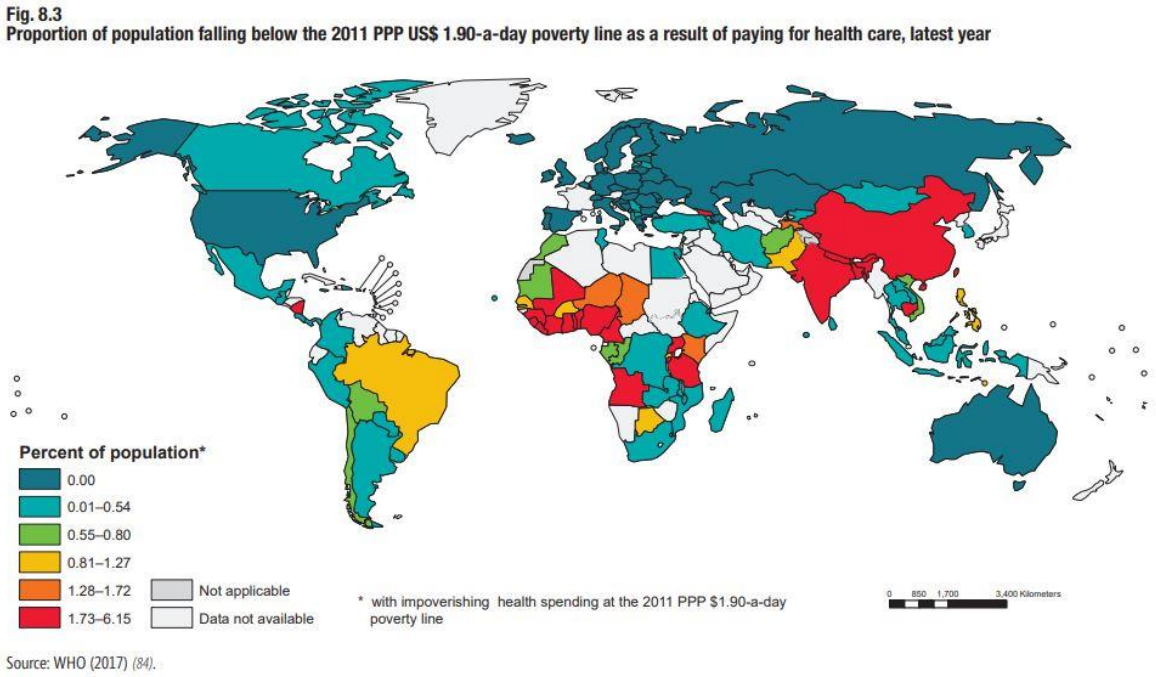

Figure 1. Proportion of population falling below the poverty line as a result of paying for healthcare in 2010 (WHO, 2017).

2.2 Introduction to Brazil´s healthcare panorama

In 2019, 59.7 million people, which corresponds to 28.5% of the country's population, were paying to have access to private health insurance coverage, medical or dental, out of their own pockets. The Southeast, South and Midwest regions represent the highest proportions (37.5%, 32.8% and 28.9%, respectively), and the North and Northeast regions, the lowest (14.7% and 16.6%, respectively). Figure 2 illustrates the dependency of Brazil's population on public health services, as 71.5% of the population does not have access to supplementary health care (IBGE, 2019).

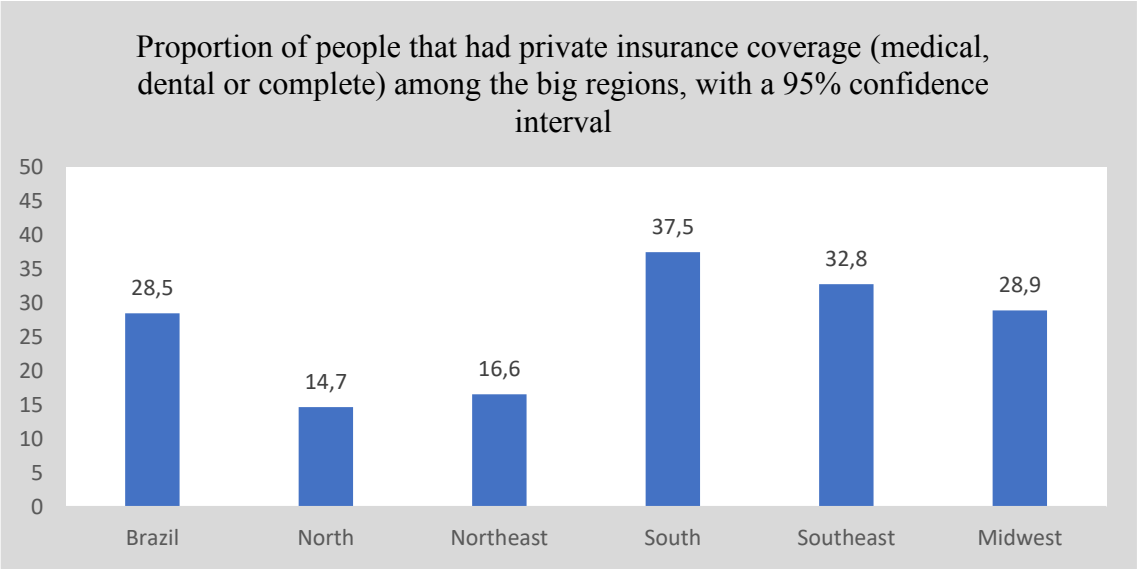

Figure 2. Graph of proportion of people who have private insurance coverage with a 95% confidence interval – Brazil and its regions (Adapted from IBGE, 2019).

Brazil is one of the countries that provides a free universal public health system for its population, which means that taxes cover all types of consultations and treatments offered by the SUS (Unified Health System). Nevertheless, with incomes growing and economic development, once it fits a family's budget, people are opting for private health insurance plans. This is based on perceived deficiencies of the public system – lack of capacity, lower quality, etc., compared to services covered by private insurance (PWC, 2016).

Proof of this incapacity is found in Figure 2, taken from a study of "Brazilian healthcare in the context of austerity: private sector dominant, government sector failing". This illustrated waiting times for specialized consultations, tests and surgery in the SUS public system in the municipality of São Paulo – October, 2012 (Costa, 2017).

Descriptor	**Waiting Time in Days**
Orthopedic and general trauma consultation	35
Ophthalmology consultation	74
Whole abdomen ultrasound	83
Surgery on circulatory system	103
Ear, nose and throat consultation	110
Dermatology consultation	152
Vaginal ultrasound	183
Endoscopy of upper digestive tract	288
Musculoskeletal surgery	451

Surgery on digestive system, connected organs and abdominal wall	510

Figure 2. Waiting time for specialized consultations, tests and surgery in the SUS public system in the municipality of São Paulo – October, 2012 (Folha de São Paulo newspaper, 2013 in Costa, 2017).

Comparing the level of total health expenditure in Brazil with other Latin American countries, public spending is still very low for a universal healthcare system. Private sector expenses are much higher than public expenditures by the government, specifically when considering the amount of the population that uses each system. For example, the Union, states and municipalities, in 2009, assigned around R$79 billion ($39 billion) to the SUS (Unified Health System), Brazil's public health system. At the same time, the private market provided approximately R$91 billion ($45 billion) (Massuda et al.,2018; PWC, 2016).

In fact, Brazil has one of the lowest proportions of public health spending in Latin America and the Caribbean, with 46.0% of national budgets being spent while the average for the other regions is 51.28%. In upper middle-income countries the average is 55.2% and in OECD countries the average is 62.2%. Moreover, even though Brazil has decreased out-of-pocket expenses, there is still almost 50% of private expenses allocated to healthcare representing a considerable financial burden for families (Massuda et al., 2018).

2.2.1 Industry Perspective

The private healthcare market in Brazil is divided between several different individual players. In this market consumers have two options: paying for an individual service (which is much more expensive) or collectively paying through groups or health insurance plans, which are administered by private companies, cooperatives, or medical organizations. The increase in health plans is mainly due to provision of collective contracts. Providing a private health insurance plan, in Brazil, is one of the most valued benefits for employees, and thus a way to get professionals interested in the company. Therefore, 63% of contractors have collective healthcare plans and the terms, including price adjustments, are established by agreement between the operator and the plan's beneficiaries. Medical costs such as diagnoses, treatments, surgery, and hospitalization are not financeable for the majority of Brazilians to pay themselves. In the 1990s, studies showed that in countries of average income like Brazil, between 20% and 30% of families had to take a loan or sell assets to pay for medical expenses. The decision of a

family to go into debt to pay for health treatment creates a tragic pattern for family finances (PWC, 2016; Costa, 2017).

On the other hand, there are the service providers: hospitals, clinics, laboratories, pharmaceutical industry and others, and the regulation of activities is different for each sector agent. The National Health Agency (ANS) supervises and standardizes Administrators and health insurance plans, while the National Agency for Sanitary Surveillance (ANVISA) supervises providers. In the public health domain, NHS management focuses on the Ministry of Health, which allocates income to states, municipalities, university hospitals, and charities, but always supervising the activities. The healthcare sector in Brazil is known for its particularities and for being very complex. Nevertheless, this sector has undergone significant changes and received a new business standard, making this market one of the most promising and attractive in the entire world (PWC, 2016).

2.3 Digital Transformation

Digital Transformation may be categorized by three different components: (1) Technological – established with the usage of new digital technologies such as social media platforms, mobiles, analytics or embedded systems and devices; (2) Organizational – for the transformation to occur, it is essential that a change of organizational processes or the creation of new business models take place; (3) Social – this event is influencing all aspects of human life i.e. enhancing customer's experience. Reis defines Digital Transformation as the use of new digital technologies that enables major business improvements and influences all aspects of the customers' (Reis et al., 2018).

In the public sector, the term digital transformation conveys creating new forms of relationships, working with stakeholders in new ways and building new frameworks of service delivery (Bason et al., 2013). In the internet age, the need to use technologies to maintain competitiveness in a market where products and services are delivered both online and offline continues to increase. Adopted from the private sector, the term digital transformation is mostly associated with this need (Mergel et al., 2019).

Some people define online service transformation as a way to improve customization and automation through standardization. Others define digital transformation as a way to follow customers' needs by using new technologies in order to rebuild business models (Berman,

2012). Digital transformation efforts result in changes not only in the way of delivering services, but also in new ways of direct interactions with customers. One example is social media, where products and services are adapted according to changing customer needs. This can be seen in the rise of platform economies, where creating space for interactions between producers and customers is the core business model. Value in this business model arises from the network effects of connecting people. Another change provided by digital transformation, mainly in the private sector, is that existing channels for delivering services and the players used for such services are being replaced. For example, taxi services are now being delivered by non-professional drivers using the Uber app to connect themselves to clients via a mobile phone.

2.3.1 Digital Transformation in the Healthcare industry

E-health is where the Internet meets health. Inside the concept of e-Health are all the concepts of digital transformation in the healthcare industry, such as telehealth, telemedicine and teleconsultation. It represents many kinds of health services provided through the Internet including e-commerce (Maldonado et al., 2016). The definition of e-health provided by the World Health Organization converges with Maldonado et al. It states that e-health is the use of information and communication technologies in any kind of health service, which entails the concept of telehealth, defined as the delivery of any health services, categorically, where distance is an obstacle to the healthcare, through information and communication technologies (WHO, 2005).

Telehealth has a wider, multidisciplinary characteristic, where it incorporates all other health-related areas, such as nutrition, psychology, odontology, physical therapy, and speech therapy (Marcolino et al., 2013). Within the concept of telehealth are contained the concepts of telemedicine and teleconsultations. The systematic utilization of telehealth is considered an important strategy to promote health in different regions of the world, contemplating diverse areas such as: mental health, neurology, attention to cardiovascular health, rehabilitation, attention and management of chronic diseases and others. Telemedicine has different definitions around the globe; the Brazilian Federal Medicine Council, in federal resolution CFM nº 1.643/2002, article 1, defines telemedicine as “the exercise of medicine through the utilization of interactive audiovisual communication methodologies and data, with the objective of assistance education and research all focused on the health industry” (Federal Medicine Council, 2002). The American Telemedicine Association defines it as “the use of medical

information served from one location to another, through electronic communication, in order to improve the patient's health status" (American Telemedicine Association, 2012).

Telemedicine, by its definitions, is a part of telehealth, being the delivering of medical healthcare services, medical information and distance medical education through information and communication technologies. In more developed countries, telemedicine services covering diagnostics and clinical management are already offered on a daily basis. In addition, biomedical measurement devices are used remotely more frequently being able to follow-up and manage patients with acute and chronic conditions. The most common examples of these devices are heart rate, blood pressure and blood glucose monitors (Maheu et al., 2001; Maldonado et al., 2016).

2.4 Definition and Application of Teleconsultation

Contained within the concept of telemedicine, this concept represents the use of telecommunications and health information systems, used by health professionals in training, analyzing exam results, attending patients, giving prescriptions and providing information to other healthcare providers or patients, where distance is a critical factor. Thus, teleconsulting has a few basic aspects: physical distance between the healthcare services and the patient; technology usage for delivering of care instead of physical presence; availability of the medical or health team and health practitioners to provide the service; availability of IT systems and infrastructure with proper development and maintenance; systematization of the telecare process, and ensuring the security and confidentiality of all data provided through teleconsultation with the development of well-structured medical data protocols (Melo MCB and Silva EMS, 2006; Wen CL, 2016).

In developing countries, telemedicine and teleconsultation have the potential to help solve health challenges, in particular expanding access to specialized health services or consultations to regions that do not have access through physical means. It also improves the quality of the local healthcare system, decreasing the time between diagnosis and treatment, lowering costs, and reinforcing epidemiological observation by helping in the identification and screening of public health problems (WHO, 2009).

Teleconsultation can also be used as a system for second opinions that enables exchanging of information between two or more health professionals with the objective of

discussing a clinical case when a specialist is not locally available. This specific type of teleconsultation can occur in real time, with a live simultaneous interaction or it can be at a store and forward model (on a time independent basis). Low-cost technology and low bandwidth converge to make the store-and-forward teleconsultation model the most frequent form of telehealth used in developing countries (Alkmim et al., 2015).

2.4.1 Teleconsultation Worldwide

Since the 1990s, telehealth has been expanding throughout the world, highlighting attention, and receiving substantial amounts of public and private sector investments. For emergent countries, the most predominant telehealth application is teleconsultation, which includes telediagnostic tools to support health professionals and to be able to deliver specialized services to remote and isolated areas. Today, it is impossible to quantify the number of projects and teleconsultation related services around the world (Alkmim et al., 2015).

Over the past few years, teleconsultation has had the help of extremely favorable conditions in its full development, such as the ageing population especially in developed countries, which has deeply expanded the demand for healthcare services. Estimates indicate that in 2050, the world will have approximately 2 billion people 60 or more years old, which implies that chronic conditions will represent more than 80% of healthcare costs worldwide. In addition, the increase in prevalence of chronic diseases, such as chronic obstructive pulmonary disease (COPD), heart failure, high blood pressure, and diabetes, all associated with the conditions of modern life and population ageing (Remondini and Van Gaal, 2010 in Maldonado et al., 2016)

Another aspect that is also creating appropriate conditions for the use of teleconsultation is the growing pressure for the control of healthcare expenses on a global level. This is a consequence of the rising demand for healthcare services (Maldonado et al, 2016). There are already countries using teleconsultation and telemedicine as a way to reduce costs in their healthcare system, such as the United Kingdom, China and France. In the United States, in 2012, there was an implementation of payment reduction as a penalty for hospitals that readmitted patients that were discharged within 30 days or less. This measure was created by the Medicare & Medicaid Services, and was seen as a great incentive towards adopting teleconsultation (Dolan, 2012 in Maldonado et al., 2016).

Among other aspects that motivate the development of not only teleconsultation but telemedicine as a whole, it is necessary to mention the perspectives of market growth, due to the reshaping of the healthcare system and increasing healthcare expenses, especially in developing countries; the process of incorporating new technological developments, which means new possibilities for healthcare practices in the field of telemedicine; and the growing acceptance of teleconsultation by both practitioners and patients. It should be emphasized that, because of behavioral changes, people who are interested only in monitoring their health status before being diagnosed with any disease constitute a promising market for telemedicine health monitors and teleconsultations to keep track of their health status (Maldonado et al., 2016). Prediction instead of remediation is the new trend in the healthcare market.

2.4.2 Teleconsultation in Brazil

Being the fifth largest country in area and population, with 8.51 million square kilometers and around 196 million inhabitants, Brazil, in 2012, hit the mark of the seventh largest Gross Domestic Product (GDP) on the planet, with US$ 2.2 trillion. It is a country with huge territorial extension where there is precarity and high cost of transportation, isolated small communities (more than 65% of Brazilian municipalities have less than 20,000 habitants), lack of economic resources from local governments and from a large part of the population, and, mainly, extreme inequality in the amount and quality of human resources and public healthcare materials distribution.

According to the Medicine Federal Council, 85% of Brazilian doctors are in only 100 cities, being that the state of São Paulo has almost 50% of the doctors, and more than half of the municipalities do not have local doctors. Therefore, teleconsultation technology is in fact one of the best-known ways to increase the coverage and availability of healthcare services while it also increases quality. With all its successful applications, it can help Brazilian doctors and other health professionals to extend their knowledge and assistance to patients in regions of the country that are difficult to reach physically (PWC, 2016; Maldonado et al, 2016; Sabbatini, 2012).

2.4.2.1 Legal Aspects

In 2014, the Brazilian Ministry of Health presented Ordinances 2.859 and 2.860 with the purpose of encouraging the foundation of new state and intermunicipal Telehealth key centers. The idea was to do this by repaying cities and states that adopt the project for implementation and effective usage, which would be measured by indicators created for this purpose. The Brazilian Ministry of Health, by providing the stimulus of using the telehealth program by primary care teams, is attempting to transform it into the key mechanism to improve the quality of primary care services, specifically for family health teams (Federal Ministry of Health (ordinance nº 2.859), 2014 ; Federal Ministry of Health (ordinance nº 2.860), 2014).

In terms of regulatory action on telemedicine as a whole, the targets regarding services provided and management are: privacy, professional practice, and interface of IT systems. These three dimensions are closely connected, since the information and communication technologies are those that supply the tools needed and the necessary infrastructure to guarantee the privacy of patients as a right and also the means for the professional practice of healthcare agents. As for the required equipment, the regulation basically targets safety and essential performance. Thus, there are different agents involved in the regulation of telemedicine in Brazil. One of the keys is the Brazilian Federal Board of Medicine (CFM), that issued at least two major regulatory measures in 2002 and 2007. The CFM has the mission of ensuring that the storage, sharing, handling and transference of Electronic Health Records (EHR) are secure, and also confirming that their authenticity, confidentiality, and integrity are assured. (Federal Board of Medicine (resolution nº 1.638), 2002; Federal Board of Medicine (resolution nº 1.821), 2007; Maldonado et al., 2016).

3. Methodology

In order to have a complete view of teleconsultation in Brazil, this study conducted a survey sampling a population representing possible future patients; expert interviews, complemented the patient's point of view with the doctor's point of view; and past case studies were the final qualitative element.

Analysis of past case studies focused on drawing a holistic view of teleconsultation, examining implementation and success in other countries and comparing this with the current state of development of teleconsultation in Brazil, in order to map out points of success, key stakeholders, points of struggle and mainly to be used as a benchmark for future perspectives.

Analyzing the insights gained and reshaping them for the Brazilian healthcare scenario, it was possible to generate a list with the main possible roadblocks for teleconsultation in Brazil. To understand how relevant each of these assumed roadblocks is, in the opinion of Brazilians, a survey from Qualtrics was sent by e-mail and social media platforms and answered by 281 different people.

Six different expert, semi-structured interviews were also conducted. Interviewees were selected by relevance in their fields of practice and of different ages and genders, in order to obtain different perspectives. The experts included a hospital director, gynecologist, and clinic owner. The results were obtained through flexible interviews, which provided space for discussion. Some of the questions were similar to questions applied in the survey for the respondents, in order to provide side by side analysis of opinions.

The semi-structured interview guideline was divided into three different parts: Introduction to opinions on teleconsulting – where it was possible to capture personal opinions on teleconsulting, past experiences, what their patients thought about teleconsulting, and obtain a view on where the interview was going.

Stakeholders and challenges of Brazilian teleconsultation – this part was intended to identify the main roadblocks and stakeholders responsible for delaying teleconsulting, in the opinion of the experts.

Future perspectives – an extension of the second part of the interview focused on understanding what experts considered needs to be done, and by whom, to overcome roadblocks and implement this technology and methodology. It also tried to understand a few key questions for implementing teleconsulting in the country.

The interviews were conducted remotely in Brazil due to the COVID-19 pandemic situation. Subsequently, the key insights from the interviews were translated into English for documentation purposes. With the objective of summarizing the interviews in a value-added way, a qualitative content analysis summary was used, aimed at capturing views of the experts to extract interpretations and action orientations (Mayring, 2015).

4. Findings and Analysis

4.1 Acceptance of Teleconsultation

Acceptance by an individual may be defined as a "psychological state with regard to his or her voluntary or intended use of a particular technology" (Hendrick and Brown, 1987).

The success or failure of medical services is determined by patients and physicians. Thus, acceptance by doctors and patients is a critical success factor for establishing healthcare innovations such as teleconsultation (Laber, 2019).

4.1.1 Patient Acceptance

The survey was answered by 281 Brazilians and showed that 44.44% had already experienced teleconsultations, which is a higher number than expected. This may be explained by the pandemic accelerating this technology. Teleconsultation has been well accepted by the 55.56% that had not experienced teleconsultation; 83.87% said they would be willing to do consultations online. And it has been increasing; of the 44.44% that already had teleconsultations, 92.74% said they would do it again based on their previous experience (Table 2).

Question	Yes	No
1. Have you ever used teleconsultations?	44.44%	55.56%
2. **[If No to 1]** You have not used it yet, but if it were offered to you, would you use teleconsultations?	83.87%	16.13%
3. **[If Yes to 1]** Based on your previous experiences, would you continue to use teleconsultations?	92.74%	7.26%
4. Would you use teleconsultations after the pandemic period?	82.44%	17.56%
5. Do you feel as comfortable sharing symptoms, pains, and personal information in a teleconsultation as you would in person?	92.83%	7.17%

Table 2. Percentage of acceptance of teleconsultation among Brazilians.

Even though the pandemic has made teleconsultation more popular, this study suggests that it is not a necessary determinant for teleconsultation acceptance since 82.44% of respondents answered positively when asked whether they would use teleconsultations after the pandemic period if such services were offered by their doctors.

To confirm the data gathered in the survey, the experts were asked if they thought patients would continue using this consultation model after the pandemic. The general answer from doctors who provide teleconsultation was affirmative. Interviewee D stated that patients have realized that the methodology works well in terms of treating health issues. Furthermore, patients have access to online examinations and they increasingly comment that this is becoming a real differential and value that he called the "convenience factor".

The convenience factor is that the patient does not have to park or spend money on parking lots, does not have to move from one place to another and face São Paulo traffic, does not have to stop his/her routine at home (and given the current situation), and does not have to spend time waiting in a doctor's office. Interviewee E said that patients who had already tried teleconsultation and who had good experience with it will continue to use this method after the pandemic, if offered by their doctors.

In the digital era, where people share data and information online, privacy and security could be a problem. 92.83% of respondents answered that they feel completely safe in sharing their symptoms and medical information in a teleconsultation.

When considering genders, there are no large differences in terms of adoption and acceptance of the methodology. It is worth mentioning that female users are a bit ahead in terms of using the technology, with 16% more positive answers about using teleconsultation (Table 3). This can be explained by the fact that women tend to take better care of their health, trying harder to prevent possible future problems and tending to seek out doctors more often (OMS, 2019).

Question	Yes	No
1. Have you ever used teleconsultations?	Male	
	31.48%	68.52%
	Female	
	47.16%	52.84%
2. **[If No to 1]** You have not used it yet, but if it were offered to you, would you use teleconsultations?	Male	
	78.38%	21.62%
	Female	
	85.12%	14.88%
3. **[If Yes to 1]** Based on your previous experiences, would you continue to use teleconsultations?	Male	
	100%	0.0%
	Female	
	91.67%	8.33%
4. Would you use teleconsultations after the pandemic period?	Male	
	81.48%	18.52%
	Female	
	82.10%	17.90%
5. Do you feel as comfortable sharing symptoms, pains, and personal information in a teleconsultation as you would feel in person?	Male	
	87.04%	12.96%
	Female	
	94.32%	5.68%

Table 3. Percentage of acceptance of teleconsultation among Brazilians – difference between genders.

From the 44.44% who already used teleconsultation, only 16.7% are people between 18 – 24 years old, which is to be expected due to the lower frequency at which people from this age group go to the doctor. A German study of acceptance of video consultation with doctors (applying the same concept of teleconsultation as this study), found higher acceptance (39%)

from the 35 – 54 bracket. In Brazil, a similar result was obtained for this age interval with a 52.26% acceptance (Table 4).

Question	Yes	No
1. Have you ever used teleconsultations?	18 – 24	
	16.67%	83.33%
	25 – 34	
	44%	56%
	35 – 44	
	53.85%	46.15%
	45 – 54	
	50.67%	49.33%
	55 – 64	
	46.67%	53.33%
	65+	
	36.36%	63.64%
2. **[If No to 1]** You have not used it yet, but if it were offered to you, would you use teleconsultations?	18 – 24	
	80%	20%
	25 – 34	
	85.71%	14.29%
	35 – 44	
	83.33%	16.67%
	45 – 54	
	78.38%	21.62%
	55 – 64	
	95%	5%
	65+	
	71.43%	28.57%
3. **[If Yes to 1]** Based on your previous experiences, would you continue to use teleconsultations?	18 – 24	
	100%	0%
	25 – 34	
	90.91%	9.09%
	35 – 44	
	92.86%	7.14%
	45 – 54	
	92.11%	7.89%
	55 – 64	
	94.29%	5.71%
	65+	
	91.67%	8.33%
4. Would you use teleconsultations after the pandemic period?	18 – 24	
	75%	25%
	25 – 34	
	88%	12%
	35 – 44	
	80.77%	19.23%
	45 – 54	
	81.33%	18.67%
	55 – 64	
	85.33%	14.67%
	65+	
	72.73%	27.27%
	18 – 24	

5. Do you feel as comfortable sharing symptoms, pains, and personal information in a teleconsultation as you would feel in person?	87.50%	12.50%
	25 – 34	
	88%	12%
	35 – 44	
	96.15%	3.85%
	45 – 54	
	93.33%	6.67%
	55 – 64	
	96%	4%
	65+	
	93.94%	6.06%

Table 4. Percentage of acceptance of teleconsultation among Brazilians – difference between age groups

Although in overall numbers there is positive acceptance and adoption of teleconsultation, the number of positive responses from those who have already tried this method are higher than from people who have not. This leads to the conclusion that the first experience for a person leads to approval of teleconsultation.

Patient acceptance looks promising with data that shows that 93.62% would use teleconsultation as a first meeting with the doctor to ask questions and check symptoms and see if an in-person consultation is necessary (Figure 1).

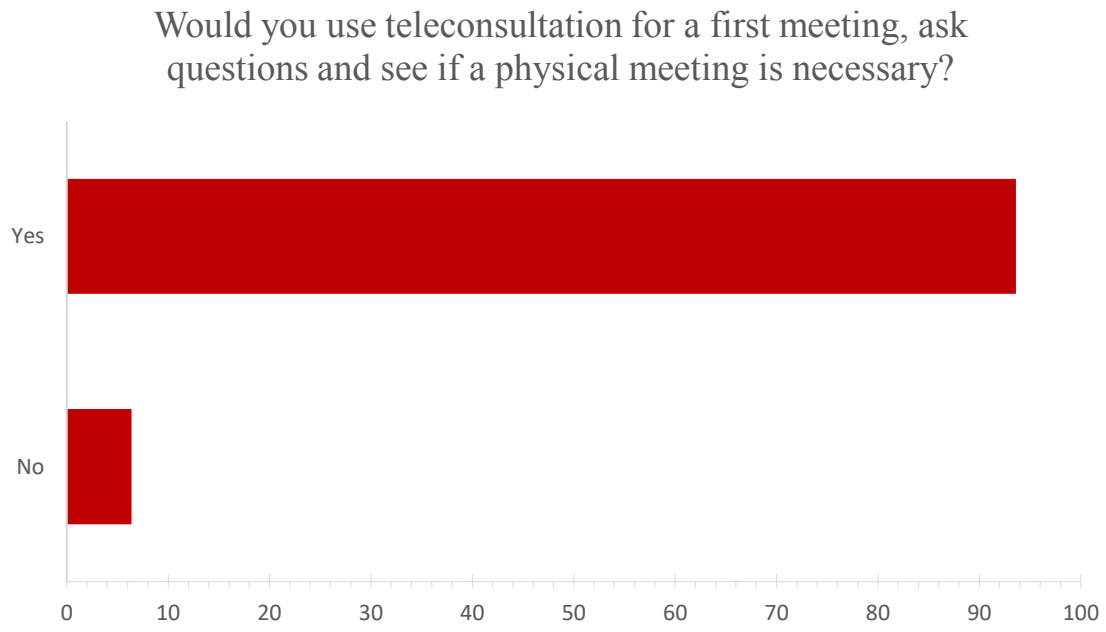

Figure 1. Graph of percentage of people who would use teleconsultation for a first meeting with the doctor.

Using teleconsultation as a first meeting can have promising results as exemplified in a conversation with Interviewee C:

"[…] Yes, I really think first talks can be very efficient. For example, the other day a patient of mine called me and said she was feeling strong pains in her leg and was afraid it was a thrombosis. So, I asked her that we first do a teleconsultation before she went to the emergency room in the middle of a pandemic. And by the symptoms that she gave me, I could ensure her that it was not a thrombosis and she could easily stay home and avoid risking getting infected by the virus" (Interviewee C).

From those who answered yes for a first online meeting to check symptoms, ask questions, and see if the doctor felt it necessary to meet in person, 85.61% answered that if the doctor stated that no physical touch was necessary, they would use teleconsultation (Figure 2).

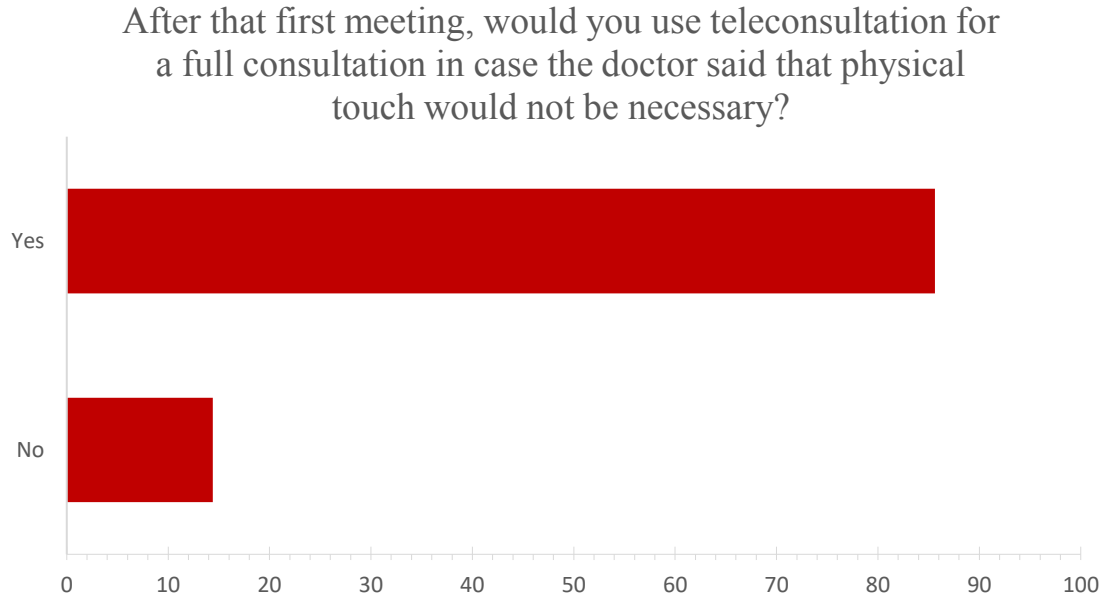

Figure 2. Graph of percentage of people who would use teleconsultation for a full consultation in case the doctor said physical examination would not be necessary.

Although teleconsulting acceptance looks promising, there is still a certain reluctance with online diagnosis. 35.46% of respondents think that even in a scenario where physical touch is not needed for examination, the chances of a bad diagnosis are higher for teleconsultation. On the contrary, experts agree that the quality of diagnostics is the same and that a good diagnosis relies on the quality of the doctor. Interviewee C explained a precept of medicine that can be used to argue against patient reluctance:

"[…] 100%...100%...Being a diagnosis that involves laboratory exam analysis, x-ray, ultrasonography, anything like that or even clearer symptoms…without a doubt" (Interviewee D).

"The experts of my hospital never missed. The quality of the diagnosis relies only on the quality of the doctor" (Interviewee A).

"A precept of medicine is that your anamnesis is 80% of your diagnosis. Anamnesis is the conversation with the patient. So, if you have a good conversation, a good analysis with the patient, you are able to access the majority of it. Of course, there are things that you can only figure out with an examination, but you can analyze, request the exams, check the results, and prescribe medications, all online" (Interviewee C).

There is still some resistance on the part of patients, especially those waiting for doctors to get back to attending them in a presential manner. This was much lower than the aversion from a few doctors that will be discussed in section 4.1.2, but is still worth analyzing. This aversion comes from the fact that the patient is paying for a consultation and the doctor is not present in person, measuring blood pressure, taking pulses and temperature, etc. A good solution that has been found for this is scheduling an in-person follow-up after the first meeting that 93.62% of the population accepted to take (Interviewee C).

"How do I do it? I schedule the teleconsultation. If I think my patient has to be examined immediately, I schedule a presential consultation for the following week and I do not charge, it counts as the return consultation. And if it is a totally clinical diagnosis, I do it online. It has worked well so far, and it conquers the reluctant patients" (Interviewee C).

4.1.2 Doctor Acceptance

According to Eduardo Cordioli, responsible for telemedicine at Hospital Israelita Albert Einstein, teleconsulting has existed for a long time. People sending letters to their doctors asking about a certain diagnosis was, in a certain way, a teleconsultation. With the rise of WhatsApp, text messages and even photos and videos that doctors respond to with recommendations are also, in a certain way, teleconsulting (Interviewee C).

Interviewee B affirmed that the methodology is well adopted and accepted by all his patients and colleagues, but he said that adoption really counts and matters when it is well organized, meaning in his words: "It's no use for you to send me a WhatsApp message, call me or even send photos… it has to be formal, with an agenda, waiting room… like an office, but online". Interviewee B uses Zoom to do the teleconsultation with his patients and his secretary always sends the link to the patients a week before with the time and day for them to connect.

Doctor acceptance is a delicate topic. Although all the experts interviewed were in favor of the concept, when asked if they would be willing to do a teleconsultation with their doctors, being patients themselves, a few doctors expressed resistance. On the accepting side, Interviewee C talked about her own experience being pregnant during the quarantine and the pandemic, and affirmed that she had very positive results:

"[...] I started with a positive attitude and a consultation with my nutritionist. Then I liked it, so I put my dermatologist on the list too, and then the list kept growing and I learned a few new tricks to apply to my personal workplace" (Interviewee C).

Interviewee E argued that he, and many other doctors use teleconsultation to check with professional colleagues' patient cases. So, if the confidence is there for the patients it should be for themselves too. In addition, all of the experts were asked if they had ever used teleconsultation to obtain a second opinion on a patient case with a colleague, all of them responded positively.

Interviewee C talked about her experience with teleconsultation. Since her internship at a hospital in Miami, her contact with this method has made her comfortable with this consulting method. As a gynecologist and mother, she follows up with her pregnant patients every 24 hours using WhatsApp as she understands the importance of a pregnancy and that this technology helps facilitate more consultations. For these patients, the doctor knows their entire background, and they occasionally meet in person for a check-up exam, measure blood pressure and conduct follow up procedures. But besides that, everything is done online for the patient's own comfort.

Because of teleconsultation and investing in her Instagram, as a way to provide free medical tips for those who do not have access to a consultation with her, Interviewee C's practice has continued growing and she now consults with patients from the entire country. In the interview, she said that most of her income comes from São Paulo, where she lives, and from Porto Alegre, which is 1300km away from São Paulo. One day per week she attends to return consultations, which are all teleconsultations, so she can also have a home office day.

However, there is still a large portion of doctors who are resistant. In their minds, with the arrival of teleconsultation, they will lose patients and the number of appointments will decrease. This is not necessarily resistance to teleconsultation or even telemedicine; it comes from opposition to change because, whether they want to or not, they would have to understand a new technology system and apply new techniques instead of simply waiting for patients to come and go from their office (Interviewee C).

This particular doctor´s resistance to teleconsultation frames a potential roadblock for implementation.

"[...]The main thing that needs to change is the doctor's way of thinking, because the patient is only going to accept it if you really believe in it. And we see a lot of colleagues that still do not believe in it" (Interviewee C).

Culturally, in Brazil, doctors are known for being traditional and late adopters of innovation, which can be seen as a cultural explanation of this particular resistance (Interviewee C).

> *"[...]I know a lot of doctors that still attend on paper, they don't have an electronic medical record…it's 2020 already" (Interviewee C).*

Correspondingly, Interviewee A affirmed that if teleconsultation is not yet totally accepted on the part of doctors, it is due to the lack of familiarity with the technology and online consulting systems. This can be seen as a form of laziness, in the eyes of Interviewee A.

One benefit that has been clearly perceived and acknowledged by the experts is access to better healthcare in more rural regions and new patients consulting with particular doctors coming from places where normally contact would not be possible if in-person consultations were the only possibility (Interviewee C, D).

Hospital Israelita Albert Einstein has practiced teleconsultation for several years, in order to deliver quality healthcare to places where access is difficult. For example, the hospital formed an oncology group that receives cases from the whole country. This group, through teleconsultation, discusses cases with doctors from different regions who send cases for analysis and discussion. The teleconsultation group based in São Paulo gives recommendations on how to proceed with each case (Interviewee A).

Teleconsulting has proven itself to be very beneficial, if used properly. The problem is that people think of teleconsulting as a substitute for physical consultation, and it is not. Physical examinations are essential in many cases. But examinations can be postponed, emergencies guided, orientations given, thus avoiding leaving the house when not necessary, e.g. for giving feedback on laboratory exam results (Interviewees A, C, E).

> *"[...]The challenge for teleconsultation in my specialty is the clinical examination; besides that, I don't think I can find any. As a mastologist, I can't touch and feel the women's breasts or the armpits online…" (Interviewee D).*

4.1.3 Key Roadblocks for Implementation

Investing in technology does not necessarily mean developing a new product or new system. “The word technology comes from two different Greek words, transliterated techne and logos. Techne means art, skill, or the way, manner, or means by which a thing is gained or done. Logos means word, the observation by which inward thought is expressed, a saying, or an expression. So literally, technology means a discourse about the way things are done” (Oregon State University, definition of technology). Technology is a knowledge process.

One of the critical roadblocks identified for implementation of teleconsultation in Brazil is the lack of investment in technology, with 88.65% of respondents saying that this seriously compromises or in some way affects implementation of teleconsultation in the country as shown in figure 4. It is worth noting that 59.93% of the respondents answered at the higher level of the scale.

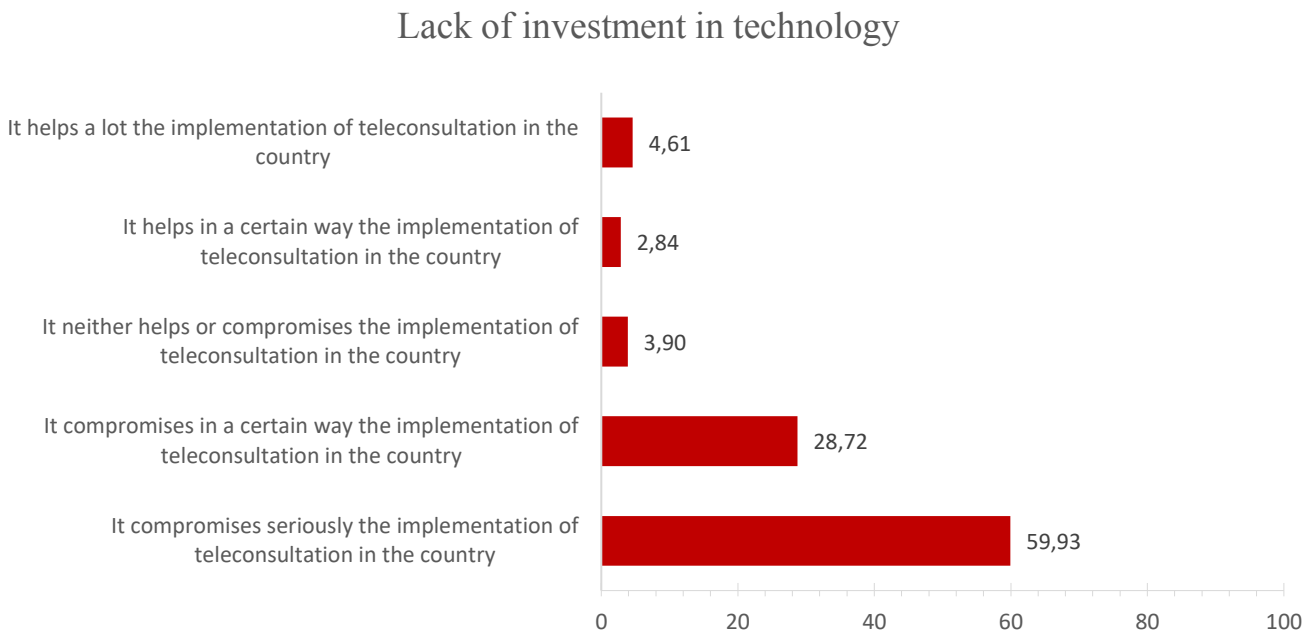

Figure 4. Assessment of the relevance of the lack of technology as a roadblock for the implementation of teleconsultation in Brazil.

Considering the definition of technology given, and the concerns shared from interviewees in section 4.1.2 about doctors being reluctant to adopt teleconsultation due to non-familiarity with technology, investing in the technology to gain familiarity with it would remove a key roadblock for implementation.

There are a few issues to consider. First, likely respondents considered technology to be a system or a product. This shows lack of information on the part of the respondents as today there are systems operating in Brazil that can attend to all the needs of doctors and patients for a teleconsultation. For example, the Iclinic platform used by Interviewee C. She affirmed that 100% of her patients are on the platform, consultations all occur on the platform and she sends

prescriptions to patients' e-mails. Of course, there is much to be improved, which will be discussed in section 4.1.4 concerning future perspectives and successful cases from other countries.

Another issue to be considered is that investment in technology is not only an investment in equipment, new software or developing new and better products, although these are still lacking. Providers of technology, platforms, software or even insurance companies must provide free training to familiarize doctors with the technology, showing the benefits of the platform and partnerships offered by them, and making them user-friendly for late adopters.

Some experts complained about problems with Iclin and Iclinic causing patients to be assigned to the wrong meeting rooms or the electronic medical record screen blacking out. This kind of failure needs to be rectified by the technology providers.

Due to the pandemic, the Federal Government and the Brazilian Health Ministry issued a temporary order for all health professionals to practice teleconsultation. The continuation of this practice depends upon whether regulatory authorities maintain this authorization or suspend it (Interviewees C, D, E). There is also debate about implementing a new regulatory agency to oversee professional regulations, like a Regional Teleconsulting Council or even a Regional Telemedicine Council (Interviewees A, B, D).

> *"[...] Teleconsultation is a reality, but because of the pandemic! When this is over, and we have a vaccine, then we will see what this is all about. I have to see if I will be able to practice teleconsultation as I do today in the post pandemic period" (Interviewee D).*
> *"[...] They tried to implement it a few years ago and it was completely rejected. Now, with the pandemic, they had no other alternative and the resistance broke down. Now the only thing that we need is a regulatory system so there are no excesses, but teleconsultation is a reality" (Interviewee E).*

Supporting the assertion that weak government support is a roadblock for implementation of teleconsultation in Brazil, 76.95% of survey respondents consider that the lack of government support compromises implementation of teleconsultation in Brazil, characterizing it as a roadblock, as illustrated in figure 5.

Another interesting result is that people who have used teleconsultation would use it again, and the people who have not used it as yet said they would if it were offered to them. For this group, 41.05% think lack of government support is seriously blocking implementation (figure 6). This data, along with the experts' opinions, suggests that government support is critical if teleconsultation is to spread throughout the country.

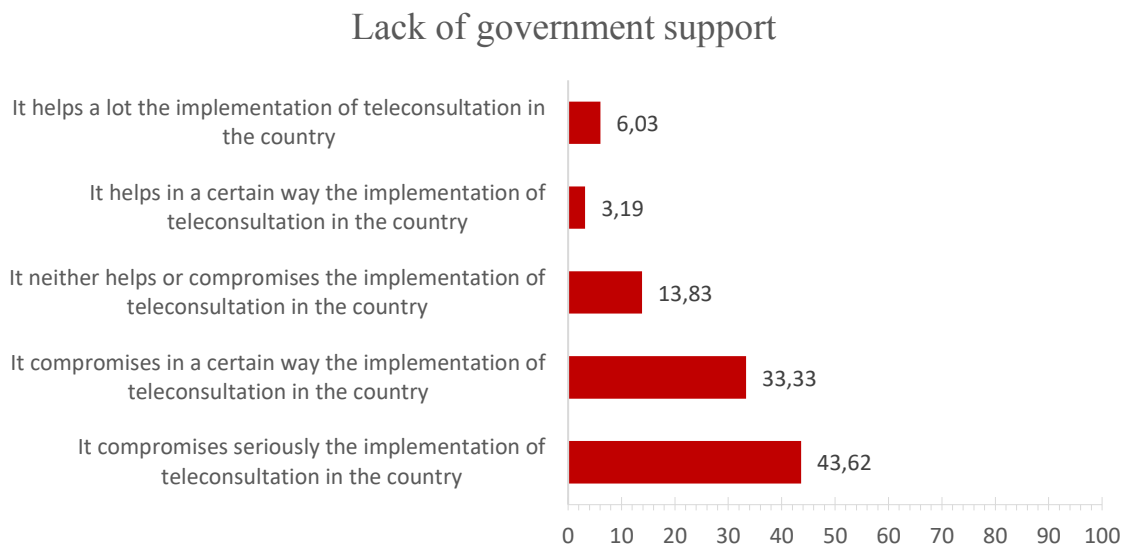

Figure 5. Assessment of the relevance of the lack of government support as a roadblock to the implementation of teleconsultation in Brazil.

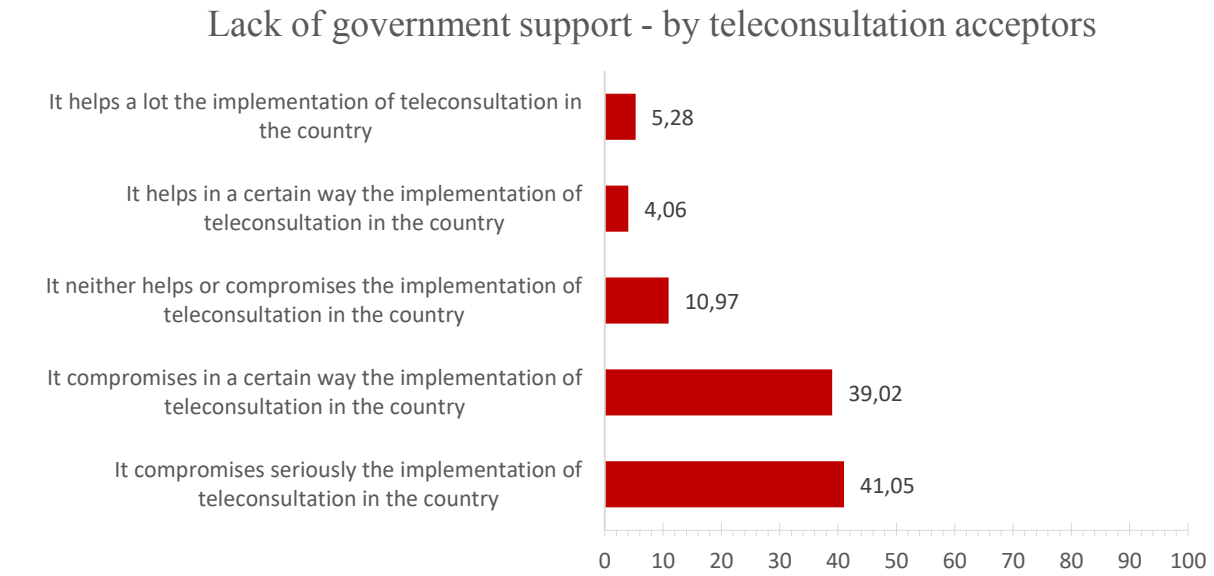

Figure 6. Assessment of the relevance of the lack of government support as a roadblock to the implementation of teleconsultation in Brazil as seen by Brazilian teleconsultation acceptors.

Another concern for the doctors is insurance companies. They worry that health operators will leverage teleconsultation as only an economy of scale and not as a way to deliver better treatment and higher quality healthcare to those without access. Some experts interviewed stated that doctor reimbursements will be a problem. Health operators may reduce the number of doctors or pay them less. Doctors treating all patients only by teleconsultation could end up earning more due to the higher number of consultations per day.

The experts interviewed do not work with insurance reimbursements but they pointed out that insurance companies such as Bradesco Insurances, Porto Seguro, Unimed, Sulamerica

etc. are not going to want to reimburse doctors in the same way for a teleconsultation as for a presential consultation.

> *"[...] If the patient did not use your air conditioning, your secretary, your waiting room, did not drink your coffee, didn't use paper... Let us assume that Bradesco reimburses BRL$90 for a consultation, and I don't know the value because I don't work with insurance companies, but let's assume that. If they reimburse that for a presential consultation, they will reimburse something between BRL$30 and BRL$55 for the teleconsultation, I can guarantee you. Their business is reducing costs and earning money, not people's health and good doctors" (Interviewee D).*

Eduardo Cordioli said that it is not the fault of insurance companies but has to do with the reimbursement system. In a presential consultation, doctors like gynecologists can perform a series of exams in their offices, such as a Pap test, ultrasonography, colposcopy etc. and all of those are reimbursed by the insurance companies. Sometimes that value is higher than the consultation itself, depending on the company. If the patient is not there to perform the exams, the doctors end up receiving reimbursement for the consultation alone (Interviewee C).

> *"[...] For instance, I had a pregnant patient that spent the pandemic at her mother's house in the countryside. Many did that actually. Then, they went to the nearest laboratory and performed the exams there, for example ultrasonography. And then I received the exams and performed the prenatal at a distance; but then I do not get paid for the ultrasonography. Those are financial resistances that are going to arise in a few different specialties, ok?" (Interviewee C).*

4.1.4 Future Perspectives

In Switzerland, teleconsultation has been used by doctors for over ten years, alongside remote treatments and diagnosis. This has led insurance companies to develop completely new insurance models (Jahns, 2017 in Laber, 2019). Additionally, professional regulations have been adapted to support doctor teleconsultation (Riedler, 2016 in Laber, 2019). In Switzerland, there are two different types of telemedical concepts, public and private. The problem is that in the public sector for telemedical assistance in Switzerland, although people can ask questions about specific health problems, no prescriptions or diagnoses are made. Private telemedical providers are authorized to provide a full scope of services paid for by insurance (Fares and Bernstein, 2016 in Laber, 2019).

Medgate is the largest private telemedicine provider in Switzerland, and treatment procedures work in the following steps:

1. Patients contact Medgate. The contact can be via telephone, Internet or an App;

2. Personal data, symptoms of the illness and the urgency of the treatment are recorded by a medical assistant;
3. For patients who are calling for the first time, a "Patient File" is created where they can upload photos, i.e. picture of the part of the body where they are feeling pain;
4. Within the next 15 minutes the doctors from Medgate call the patient back and proceed with the treatment;
5. If necessary, Medgate doctors are authorized to issue medical prescriptions which have the possibility to be sent online directly to a nearby pharmacy;
6. If the doctors feel that a physical examination is needed, the teledoctor directs the patient to what Medgate calls a “Polyclinic”. All data gathered and diagnosis of the patient is sent to the Polyclinic. In approximately 50% of Medgate's cases, the teledoctor can treat his patient in a way that no further visits to a stationary doctor are necessary (Gossler and Klause, 2017 in Laber, 2019).

The doctors at Medgate must attend specific training to have a telemedical consultation license, which requires several months of study and practice culminating with an examination. Their licenses must be reviewed and renewed annually (Medgate, 2018 in Laber, 2019).

Switzerland is dominated by three different insurance models -- the standard model, the family doctor model, and the telemedicine model. The telemedicine model starts with a teleconsultation to see if a physical examination is necessary or what kind of treatment and prescriptions are needed for that patient. It is important to highlight that the other two insurance models also offer teleconsultation, but patients are free to choose between teleconsultation or presential consultation (Fares and Bernstein, 2016 in Laber, 2019).

Although Switzerland makes it appear easy, Brazil still has a long way to go if it wants to come close to the Swiss reality. But that is not for lack of will as shown by the interviews and surveys. When asked about online prescriptions, 93.97% of survey respondents answered that they would like to receive prescriptions online or through an app. This is something that in part already happens in Brazil, but with the restriction of not being able to send the prescription directly to the pharmacy (figure 7).

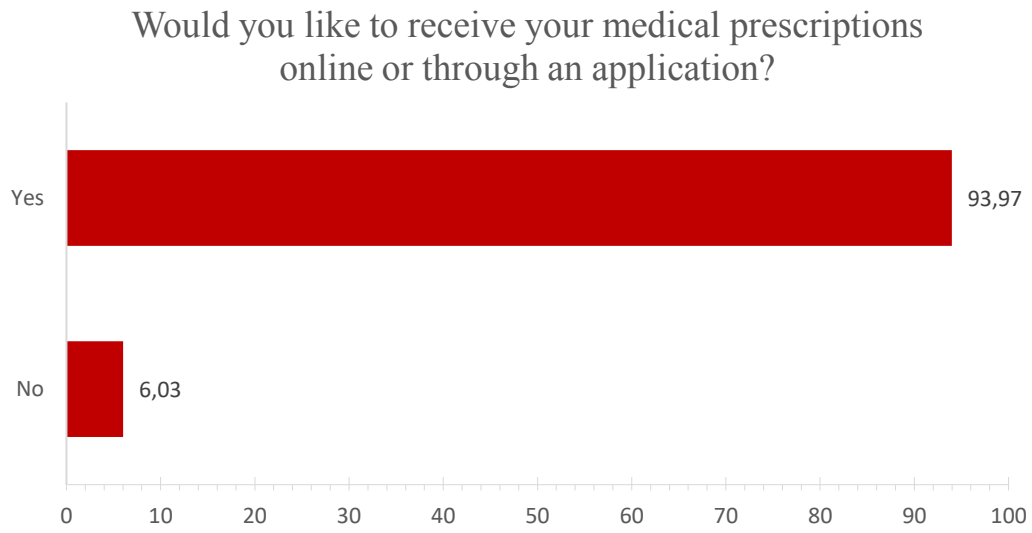

Figure 7. Assessment of respondents' willingness to receive their medical prescriptions online or via app.

Survey respondents were also asked if they would share their medical background online, so that any doctor would have full access to their complete medical records. As shown in figure 8, a majority of 90.43% of respondents answered positively.

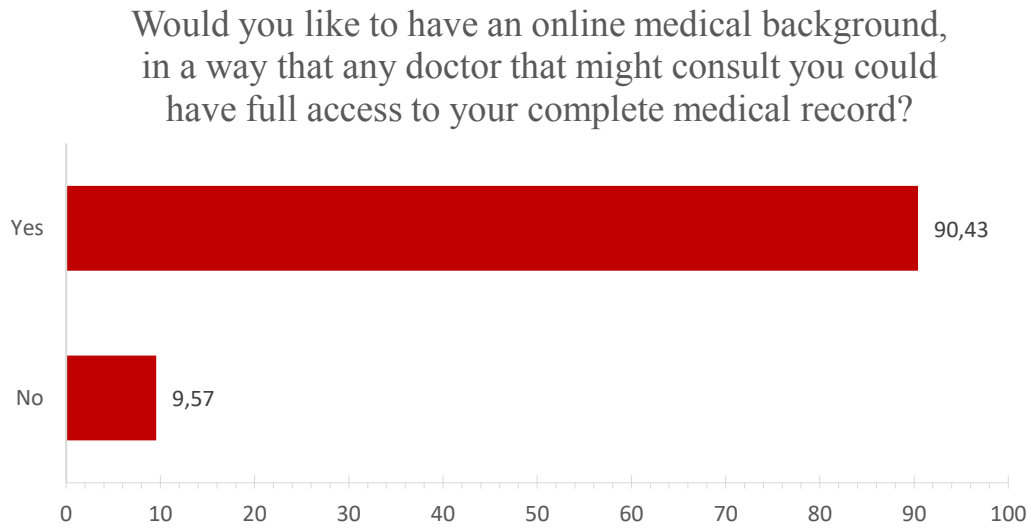

Figure 8. Assessment of respondents' willingness to have an online medical background in order to share their medical record with any doctor.

80.07% of respondents said that the lack of an e-Health center compromises implementation of teleconsultation in the country (figure 9).

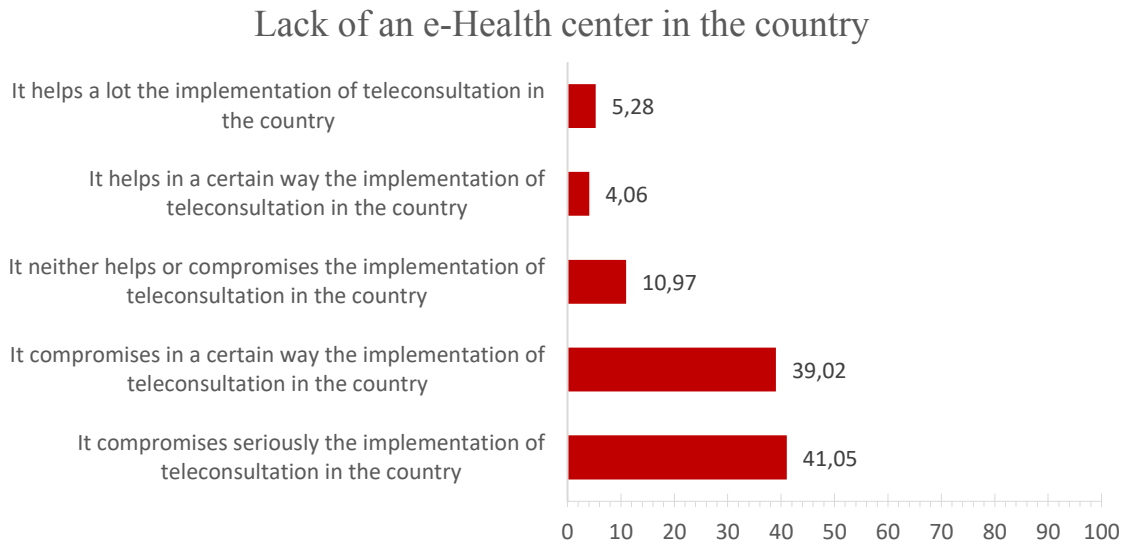

Figure 9. Assessment of the relevance of the lack of an e-Health center in the country as a roadblock for the implementation of teleconsultation in Brazil.

At the end of the interviews, the experts were briefly presented with the Medgate case as a possible benchmark for Brazil. One of the six experts seemed very happy about the current technology and systems available at his office.

> *"[…] My platform does all of this… It generates a QR code for prescriptions, it has an electronic medical record… It just has to get to the doctors" (Interviewee D).*

But the other interviewees were enthusiastic about the case presented and a bit disappointed with the current systems and available technology.

> *"[...]Today I have to use two different platforms, the Iclinic and the Albert Einstein (platform of Hospital Israelita Albert Einstein) and none of them gives me all I need, so I have to use a little of both, which I don't like. The Iclinic I use for issuing the prescription and starting the teleconsultation but I can't send the prescription to the patient or even the digital certificate; and the Einstein I can use for the digital certificate and sending prescriptions but not the rest. So, I guess we're far away from Switzerland" (Interviewee C).*

Estimates of when teleconsultation will be a reality in Brazil diverged. As illustrated in figure 10, 83.69% of survey respondents believe this will happen within the next 5 years. Among the experts interviewed, some stated that within the next 5 years teleconsultation will become a reality, if the necessary regulation is enacted (Interviewees A, D, E), and there are those who believe that within the next 5 years, teleconsultation will be a reality for the richest areas, but that it will take at least 10 years in the furthest and poorest regions due to lack of access to technology. There is also the belief that it will take more time because "bad usage" of

teleconsultation creates iatrogenic effects, and there is fear that teleconsultation will displace the importance of physical examinations (B, C).

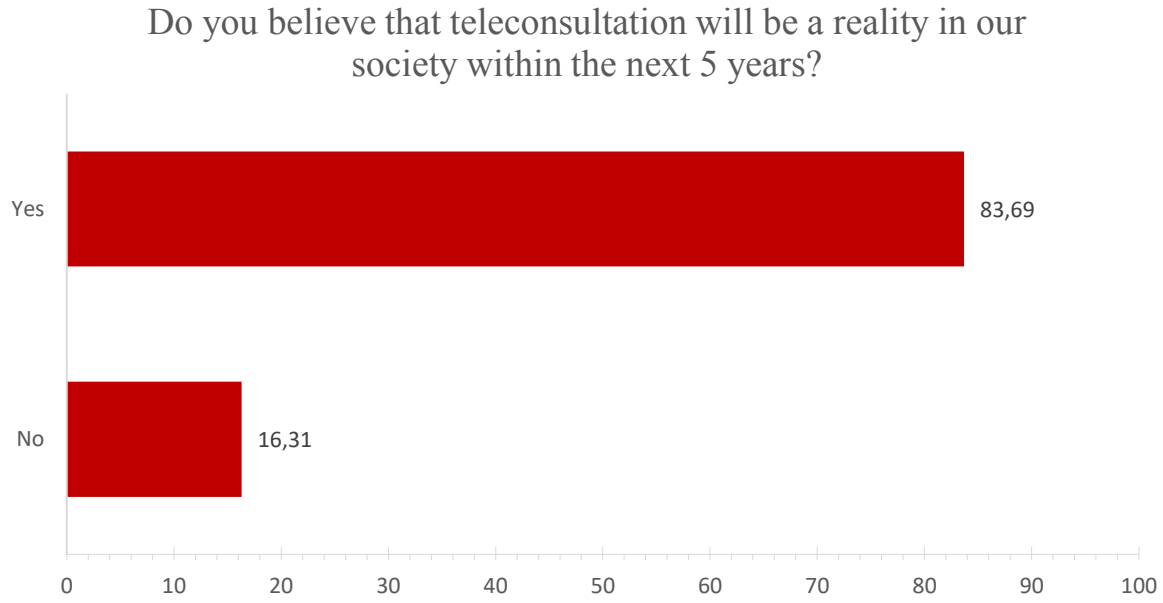

Figure 10. Assessment of respondent's belief that teleconsultation will be a reality in Brazil within the next 5 years.

5. Conclusion and limitations

5.1 Research limitations

This research has limitations that pave the way for future research. Firstly, although the experts' interviews were informative, answers only presented particular points of view which can skew results in a certain direction.

Another major limitation is the lack of representativeness between the interviewees, due to the small sample size of 6 interviewees and the fact that none of them worked with insurance companies. Doctors potentially have more resistance to teleconsultation since their paychecks tend to be reduced for teleconsultations by insurance companies, as explained in section 4.1.4.

The lack of representativeness also relates to the fact that the majority of respondents were female which is not a representative sample of the entire Brazilian population and can bias the results. Also, the vast majority of respondents were from the state of São Paulo, the richest part of Brazil, so it is important to expand this research to other regions, especially those with less access to healthcare treatment and basic technology.

Furthermore, doctors going to conferences on teleconsulting, signing up for the platforms, etc., are acceptors of teleconsultation. Interviews with doctors who are resistant to teleconsultation are necessary to understand counterarguments.

5.2 Final Conclusions

The research demonstrated that the majority of the Brazilian population accepts the use of teleconsultation, as a first consultation with a doctor, to determine if a physical examination is necessary or even as the complete consultation. Teleconsultation may become a reality in Brazil within the next 5 years, at least in the more receptive areas where key stakeholders such as the government, insurance companies, doctors and the technology providers play a decision-making role for implementing this healthcare method. This implies investment in technology, spreading knowledge and educating people about the benefits of teleconsultation as well as having well-established regulations. Finally, further studies are recommended to affirm the results obtained in this work.

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APPENDICES

Appendix 1 – Survey

Dear participant, Welcome and thank you very much for participating in this survey. This study seeks to better understand the Teleconsultation model in the Brazilian market in relation to the intended use, behavior, implementation challenges and expectations about the future. This survey takes about 7 minutes to be completed. Please respond as honestly as possible. All responses are anonymous and confidential, which means that your responses cannot be associated with your identity. Please, answer everything at once, without pauses or distractions, and pay close attention to all questions. If you have any questions related to this study, please contact me: Pedro Henrique de Castro (152119224@alunos.lisboa.ucp.pt).

By continuing, you are agreeing to participate.

Thank you so much!

Have you ever used teleconsultations?

- ○ Yes (1)
- ○ No (2)

Display This Question:
If Have you ever used teleconsultations? = No

You have not used it yet, but if it were offered to you, would you use teleconsultations?

- ○ Yes (1)
- ○ No (2)

Display This Question:
If Have you ever used teleconsultations?= Yes

Based on your previous experiences, would you continue to use teleconsultations?

- ○ Yes (1)
- ○ No (2)

Would you use teleconsultations after the pandemic period?

- ○ Yes (1)
- ○ No (2)

How much do you believe the implementation of teleconsultations on a national level would bring benefits to the country in the fields of:

	0 10 20 30 40 50 60 70 80 90 100
Health	
Economy	

Do you feel as comfortable sharing symptoms, pains, and personal information in a teleconsultation as you would feel in person?

- ○ Yes (1)
- ○ No (2)

Would you use teleconsultation for a first meeting, ask questions and see if a physical meeting is necessary?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Would you use teleconsultation for a first meeting, ask questions and see if a physical meeting is necessary? = Yes

After that first meeting, would you use teleconsultation for a full consultation in case the doctor said that physical touch would not be necessary?

- ○ Yes (1)
- ○ No (2)

Do you believe the implementation of this technology would allow higher quality health access to country regions where the health system is still poor?

- ○ Yes (1)
- ○ Maybe (2)
- ○ No (3)

Do you believe the implementation of this technology would allow for more frequent medical consultations, mainly to those who live in isolated difficult-to-access regions?

- ○ Yes (1)
- ○ Maybe (2)
- ○ No (3)

Do you believe the chances of a bad diagnosis are equal in a teleconsultation and a physical consultation? (Considering a scenario in which the physical touch is not necessary to the examination)

- ○ Yes (1)
- ○ No (2)

Do you believe that teleconsultation will be a reality in our society within the next 5 years?

- ○ Yes (1)
- ○ No (2)

Would you like to receive your medical prescriptions online or through an application?

- ○ Yes (1)
- ○ No (2)

Would you like to have an online medical background, in a way that any doctor that might consult you could have full access to your complete medical record?

- ○ Yes (1)
- ○ No (2)

You're almost done!

Now I need you to rank on a scale from 1 to 5 the sentences that will show up next, the scale being:

1 - It helps a lot the implementation of teleconsultation in the country
2 - It helps in a certain way the implementation of teleconsultation in the country
3 - It neither helps or compromises the implementation of teleconsultation in the country
4 - It compromises in a certain way the implementation of teleconsultation in the country
5 - It compromises seriously the implementation of teleconsultation in the country

Lack of acceptance on the patients' side

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of acceptance on the health professionals' side

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of governement support

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of an electronic system that directly sends medical prescriptions to pharmacies and are stored in a central data base to be retrieved

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of an e-Health center in the country

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of initiative on the insurance companies' side

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of investment in technology

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Lack of information on teleconsultation

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

The fear of the possibility of a bad diagnosis

- ○ It helps a lot the implementation of teleconsultation in the country (1)
- ○ It helps in a certain way the implementation of teleconsultation in the country (2)
- ○ It neither helps or compromises the implementation of teleconsultation in the country (3)
- ○ It compromises in a certain way the implementation of teleconsultation in the country (4)
- ○ It compromises seriously the implementation of teleconsultation in the country (5)

Age:

_____

Gender:

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)

In which State do you live?

_____

In which City do you live?

_____

Appendix 2 – Interview Guideline

Interview Questionnaire:
Depending on the course of the conversation and the given answers, the questions will be adapted.

Introduction to opinions on Teleconsulting

1. Have you ever practiced teleconsultations? Do you still offer them?
2. What do you think is the current acceptance of teleconsulting from the side of doctors and patients?

3. Which problems or challenges can you currently identify in this model of consultation?

4. If you were the patient, would you accept doing a teleconsultation with your doctor?

5. Do you believe your patients would teleconsult with you after the pandemic in case you offered teleconsultation?

6. Do you think you are able to give equally precisive diagnostics in physical and video consultations, considering that this is not a case where the physical touch is needed for the examination?

7. Do you think teleconsultations would bring benefits or disadvantages for the country and population? Which ones?

8. Would you use teleconsultation to contact profession colleagues in order to precisely give a diagnostic with another expert opinion to help you validate your own?

Stakeholder and challenges of Brazilian teleconsultation

9. Who are the main Stakeholders of teleconsultation in Brazil?

10. What is currently stopping the development of teleconsultations? Which challenges must be overcome to successfully implement this technology?

Future perspectives

11. How could we solve such challenges in the future? Who are the main stakeholders to help solving those matters?

12. In your opinion, what effects does the teleconsultation have on the Brazilian healthcare system?

13. Do you think new features such as an integrated platform where you have access to the whole medical historic of the patient and database to send prescriptions directly to them and pharmacies via QR code could be implemented in the future? Would you like to have access to such things as a doctor and as a patient?

14. How long do you think it will take before teleconsultation becomes a reality throughout Brazil?

15. What are the most suitable specialties for the video consultation?

16. How much do you think you can help your patients through teleconsultations?

Appendix 3 - Experts Description

Abbreviation	Interviewee´s name	Position
Interviewee-A	Felipe Martins de Andrade	Hospital Director at one of the top Brazilian hospitals
Interviewee-B	Not-Identifyed	Doctor at one of the top Brazilian hospitals and clinic owner
Interviewee-C	Isis Quaresma	Renown Gynecologist and health social media influencer with more than 33k followers
Interviewee-D	Not-Indentifyed	One of the most renown gynecologists and mastologist in Brazil and Latin America, owner of his own clinic and doctor at the one of the top Brazilian hospitals
Interviewee-E	Not-Identifyed	Doctor and scientist, graduated gynecologist and now works in a laboratory doing medical research