

Effect of the COVID-19 Lockdown on Patients Valuation of Usability of Telemedicine

Lucila BRUCHANSKI^{a,1}, Ana Clara TORRE^b, Nuria BIBILONI^b, Janine SOMMER^a, Bruno BOIETTI^d, María Florencia GRANDE RATTI^c, Romina RAPISARDA^a, Daniel LUNA^a, Luis MAZZUOCCOLO^b and Fernando PLAZZOTTA^a

^aDepartment of Health Informatics, Hospital Italiano de Buenos Aires, Argentina

^bDepartment of Dermatology, Hospital Italiano de Buenos Aires, Argentina

^cDepartment of Family Medicine and Community, Hospital Italiano de Buenos Aires, Argentina

^dUniversity of Hospital Italiano de Buenos Aires, Argentina.

ORCID ID: Lucila Bruchanski <https://orcid.org/0000-0001-6690-1803>

Abstract. The aim of this paper was to report patient valuation of usability with our telemedicine system and to explore the effect of pandemic in its behavior. We conducted a cross-sectional study based on the prospective recollection of the results of the Spanish abbreviated version of the Telehealth Usability Questionnaire (TUQ), from October 2019 to July 2020. We observed an inflection point of growth of answers during the pandemic era and a trend of decrease in usability valuations coinciding with the massive and forced implementation of the system after lockdown. This effect was transitory, evidencing an improvement over time. These results might be explained with a sociotechnical approach that includes considering the learning curve and suggest the importance of a telemedicine usability tool to guide decision-making. In conclusion, tools to assess telemedicine services may identify facilitators and barriers to its use in a highly changing social and technological context.

Keywords. Telemedicine, surveys and questionnaires, patients

1. Introduction

When COVID-19 was declared as an outbreak by the World Health Organization on March 11, 2020 and many countries went to a lockdown, telemedicine services were widely adopted as an alternative to deliver health care reducing exposure to the virus both for clinicians and patients [1]. Even before pandemic, the potential benefits of telemedicine were recognized. In spite of this, its use was restricted in many cases to

¹ Corresponding Author: Lucila Bruchanski, Health Informatics Department, Hospital Italiano de Buenos Aires, Tte. Gral. Juan D. Perón 4190, C1199ABB Buenos Aires, Argentina; email: lucila.bruchanski@hospitalitaliano.org.ar.

pilot projects due to several challenges such as high costs, low acceptance, unavailability of proper infrastructure and regulatory concerns, especially in developing countries [2].

Usability measures effectiveness, efficiency, and satisfaction of a system or service for a specific goal in a specified context of use [3]. In the context of a rapid adoption of telemedicine services and considering its mentioned challenges, it was crucial to measure its usability as a screening tool to detect ongoing problems, evaluate and improve the effectiveness of the technology and service delivery. The aim of this paper was to report patients valuation of usability with our telemedicine system, to explore the effect of pandemic in its behavior, and to describe the potential value of these results as a decision making tool in this adaptive and complex context.

2. Methods

2.1. Setting

Our study took place at Hospital Italiano de Buenos Aires, from Argentina. It has an in-house developed health information system [4,5]. The organization has a web-based, problem-oriented and patient centered EHR, with terminology server referenced to SNOMED-CT; and an integrated PHR available since 2007 [6]. The teleconsultation service implemented was also designed in-house and embedded in the EHR and the PHR. Its development was based on the premise of not needing the installation of any software, besides Google Chrome.

Since its implementation, teleconsultations were adopted by selected services such as dermatology, cardiology and urgent care and were only available for affiliates of the hospital's own medical insurance service. After lockdown (March 2020 in Argentina), to ensure the continuity of care, the telemedicine system was generalized to all patients as the only attention modality. This change in processes bring changes in the system mainly in order to face the abrupt increase in the volume of teleconsultations (infrastructure, connectivity)

2.2. Design, participants and data collection

We conducted a cross-sectional study based on the prospective recollection of the results of the Spanish abbreviated version of the Telehealth Usability Questionnaire (TUQ), from October 2019 to July 2020.

The original TUQ is a 21-item questionnaire, developed and validated in English by Parmanto and col. [7]. We used a validated version tool in Spanish (after translation and transcultural adaptation) with only 12 items [8], [9]. The endpoints were the reply date and the answer of these questions using a numeric likert scale from 1 to 7 (1 being the worst and 7 the best result). The questionnaire was sent by email automatically to all patients right after the end of every teleconsultation.

2.3. Statistical Analysis

We used descriptive analysis of the usability over time, within the study period: pre-pandemic era (October 2019 to March 2020) and pandemic era (April-July 2020). Each

question and domain of the questionnaire was summarized using the median with its interquartile range (IQR) or mean and standard deviation (SD).

Data was stored in an Access database and processed with the STATA 14 software. This project was approved by Institutional Review Board (CEPI#5782).

3. Results

We collected a total of 43,056 answers. During the pre-pandemic era, the frequency of questionnaires remained stable. Meanwhile, we observed an inflection point of growth during the pandemic era: from 46 complete surveys in February 2020 to a maximum value of 13,339 in July 2020, as seen in Table 1.

Regarding the results of TUQ, the total mean resulted 5.48. The highest valued domain was utility and access to healthcare (5.88) followed by satisfaction/future use (5.49) and usability of the system (5.48). Nevertheless, the lowest average was for interaction quality with physicians (capability to communicate, hear and see the physician as in person) (5.20).

Considering the analysis by periods, the lowest average was seen in March 2020, mainly due to the interaction quality. In the following months there was an increase in these total values and in the different domains (Figure 1).

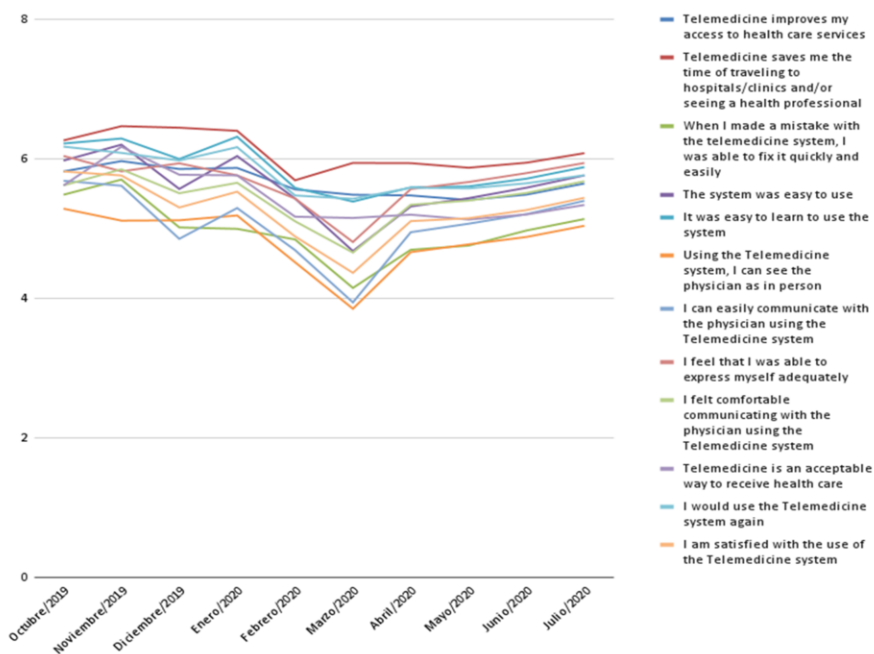


Figure 1. Average values for each of the 12 items of questionnaire, per month.

Table 1. Number of questionnaires. Average monthly values grouped by domains.

Date (m/y)	Number of TUQs	Satisfaction and Future use	Utility and Access to healthcare	Usability of the system	Quality of the interaction with the physician
10-2019	45	5.81	6.04	5.90	5.67
11-2019	34	5.97	6.22	6.06	5.52
12-2019	49	5.64	6.15	5.53	5.31
01-2020	47	5.78	6.14	5.79	5.42
02-2020	46	5.16	5.63	5.29	4.88
03-2020	430	4.90	5.72	4.74	4.20
04-2020	6432	5.31	5.71	5.20	5.06
05-2020	9747	5.32	5.64	5.27	5.17
06-2020	12887	5.41	5.72	5.43	5.30
07-2020	13339	5.56	5.87	5.60	5.46

4. Discussion

In this research, patients reported a total mean of 5.48, using a validated survey on the usability of telemedicine. We also observed a decreased trend, coinciding with the massive and forced implementation after COVID-19 lockdown. This effect was transitory, evidencing an improvement over time.

These results (transitory decrease in satisfaction) might be explained by several factors. From one hand, using a socio-technical approach. Carrying out an organizational change, adapting infrastructure, processes, training and support to the high demand of teleconsultations usually takes time and a planning process that was catalyzed by the context, probably with unintended consequences. Another important factor to mention is the resistance to change. We might assume that at the beginning, teleconsultations were unknown for many patients (and also professionals) that needed training on the process. This learning curve may in part explain the improvement of the values of the TUQ questionnaires during April and its stabilization during May, June and July. The higher values obtained in pre pre-pandemic era could be attributed to different profiles of users, who probably chose teleconsultations. Besides, the system was prepared for a fixed and predictable volume of teleconsultations that suddenly changed.

The results obtained also suggest the importance of having a telemedicine usability tool for continuous monitoring and evaluation of the system and taking its results to guide decision-making in complex adaptive systems such as health systems. Thus, the feedback of the patients was an important element to promote a cycle of continuous improvement. These results were utilized in order to prompt changes and improvements in our system such as redesign processes of the platform.

Finally, this paper has some limitations to consider. First, we had to mention differences in the sample size before and after the lockdown period. However, it was a forced implementation due to the context, and they reflect the real volume of use. Second, it was a single center study and results may not be extrapolated to other contexts and populations. Third, there may be information bias, and we did not calculate the survey response rate. It would have been interesting to have demographic characteristics of respondents, variables that were recently added. As an important strength, we used a valid tool as a measurement instrument.

5. Conclusions

In conclusion, tools to assess telemedicine services allow us to identify facilitators and barriers to its use in a highly changing social and technological context. As future lines of work it would be interesting to evaluate the opinions and expectations of patients as regards the telemedicine system applying a qualitative approach.

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