Editorial Commentary

Telemedicine in COVID-19 pandemic: a truly exceptional development?

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Received: 18 March 2021; Accepted: 23 July 2021; Published: 25 September 2021.
doi: 10.21037/jphe-21-20
View this article at: https://dx.doi.org/10.21037/jphe-21-20

The term telemedicine has had great echo in connection with the COVID-19 pandemic. A simple Google search with the keywords (Telemedicine) and (COVID-19) brings back more than 40,000,000 results that grow further if the search is expanded with the term telehealth.

Mass media, internet and newspapers have continually bombarded us, as if it were a novelty of recent years and as if telemedicine had never existed before. In the early days of the telemedicine applications, (when to make a connection in telemedicine it was necessary to have tools comparable to a commercial private commercial television network), time has passed. Today with very low costs it is possible to transmit important parameters such as oxygen saturation, heart rate, respiratory rate in COVID-19 times, using the simple home smartphone connected to wearable devices.

But why is there so much talk about it and what really happened?

This commentary aims to answer this question of what has happened, through a brief objective analysis that considers both the success factors as well as some critical issues encountered without forgetting the main obstacle of this sector: the digital divide (DD).

The telemedicine boom during the pandemic

We have witnessed an exponential development in telemedicine (1,2) in the past year.

Surely the COVID-19 pandemic has played an important role in this pandemic period. Furthermore, technologies, especially mobile technologies, compared to previous pandemics have undergone an incredible evolution that has allowed us to have valid support.

The smartphones were not available in the previous pandemic, the SARS-CoV; therefore, wearable technologies for the digital health, needed specialized solutions (3). Thanks to the smartphone, it is today possible to integrate wearable technologies together, in a device, as large as a pocket, capable of (I) measuring physiological parameters through microsensors, often also directly present in the device (II) allowing connection with health systems; (III) allow simple, effective and user-friendly communication through social networks and messaging systems; (IV) allow new remote monitoring and tracing functions essential for epidemic control. These health care developments and opportunities have affected almost all applications from mental health to ophthalmology (4-7). Systems such as WhatsApp and/or Wechat for sending message and/or Videoconferencing with meet and/or teams and/Zoom (just to name a few) have made it possible to maintain social distance on the one hand, and on the other, to avoid loneliness and isolation and the related psychological impact (8-10).

In essence, the key role of mobile technology (mTech) has unfolded in three polarities (2).

The first polarity consists on the traditional one, i.e., the remote healthcare delivery through mHealth using self-monitoring systems, self-therapy tools, client-server connectivity with digital health delivery systems of health services. In this period there has been a streamlining of mHealth practices thanks also to a revision and/or simplification of the rules of use also through specific exceptions and a push towards the normalization of the disbursement rules also providing clear reimbursement methods (1).

The second polarity consists on tools to allow the productive/communication activities of daily life. Think of

the opportunities of smartworking in connecting to work environments. Think of the usefulness of mTech in distance learning. Think of the role these technologies play in social communication between relatives and friends. Think of the increase in remote electronic activities, such as e-banking, e-commerce, just to name a few.

The third polarity concerned the innovative applications of contact tracing in the digital environment which has shown great potential in some cases for controlling the epidemic through digital systems that had their fulcrum in the App installed on the citizen's smartphones. These Apps have been developed around the globe and used by various governments with different technologies (global positioning system, Bluetooth), different approaches to privacy, use and data management (11,12). With these Apps we observed different approaches:

(I) A governmental and centralized development, as in Italy (www.immuni.it);
(II) A not-centralized development as in the USA;
(III) An integration with consolidated systems in the use of the population, such as in China where applications were integrated with WeChat and AliPay through the system that included the famous healthcode function.

Surely one wonders if this great development that has involved the three polarities mentioned will vanish once the pandemic is over.

Basic questions are as follows,

Will exceptions to the purchase of psychoactive medications remotely in tele-psychiatry be maintained even afterwards?

Will there not be an unjustified detriment of the health service towards the citizen with an exaggerated recourse to remote health care even when not required?

The basic consideration is whether this development has been uniform. The approach between the different governments towards these innovations has often not been the same, but patchy. Just to mention some differences, just think of the difference in approach that has existed between the US and Europe in relation to basic issues such as reimbursement and remote employment systems. In the USA there has been a rapid updating of the legislation (even with exceptions) on these points. While in Europe this was less evident (13), at least at the beginning of the pandemic and we have seen running in at different speeds.

The Italian reflections on the telemedicine boom

There is no doubt that every nation has had its breakthrough in telemedicine with its own peculiarities. Here we report the example of Italy which, after a first natural moment of disorientation then started successfully.

In Italy, the boom was not immediate, for example during the first period of the lock down two wide range criticalities were experienced:

(I) A lost opportunity to spread telemedicine widely for long term patients as highlighted by Omboni (13), The author found that in the first phase the running in of the telemedicine showed serious problems caused by limits in the connectivity of the telemedicine; the limits of the laws regarding aspects such as the privacy, the delivery of the service and the not multidisciplinary approach.
(II) Other authors, such as Viganò *et al.* (14) highlighted that:
    (i) In the first phase there was a strong decrease in the access to the hospital of some frail patients, such as subjects with heart/neurological/liver/gastrointestinal diseases.
    (ii) Forecasted serious consequences in the near feature for this.
    (iii) The need of telemedicine to avoid/limit these consequences

In June 2020, at the end of the first lock down, important signals started in Italy on the opportunity of the Telemedicine (15) that helped the development. The first signal was that telemedicine could be a strong defence for the frail subjects. Both Omboni and Viganò *et al.* (13,14) have indirectly highlighted that these subjects in the first Italian lockdown period (March–May 2020) were without a true health care defence without a deep and extensive use of the telemedicine (16).

We must also consider that during the COVID pandemic fragility had and is having a much broader meaning. A much wider range of pathologies, compared to those that determine a fragility in a non-pandemic period, can determine a fragility towards COVID-19. That's why it's probably much better to talk about "COVID-19 fragile" right now. In the Istituto Superiore di Sanità (ISS), the Italian National Institute of Health (NIH), starting from the first pandemic period, various working groups have been set up to address this aspect. A national working group dealt

with telemedicine and another with rare diseases. What emerged from the activity of these groups was also the need to focus on frail patients with rare diseases who have a wide range of problems and who need a tailored telemedicine in remote care (17,18), which can include, in addition to traditional services, also communication, behavioral and psychocognitive therapy services, adapted and personalized from time to time.

The second signal was that the telemedicine services and application for the remote medical visit consult and diagnosis have also shown to be valuable to minimize the exposure to the COVID-19 and therefore they should remain as a useful tool in the forthcoming periods with a strengthening of regulation and the related formal offer of health systems by means of political and government initiatives, both at regional and central level. In fact, in the second half of the year 2020 some regions such as Lazio (which includes the metropolis of Rome) also included those based on telemedicine among their healthcare offers, also indicating the cost of the services. At a central level, guidelines on the use of telemedicine have been promulgated.

The third reflection was on the boundaries of the telemedicine. We have also considered an expansion of the telemedicine boundaries as for example those ones useful (I) to remotely monitor by means of electronic surveys the successful of a therapy (also based on pets for the mental improvement) (19,20) and (II) the considerations of the subjects of the pulmonary rehabilitation. The problem of monitoring lung parameters and remote treatment of respiratory diseases due to COVID-19 remains a pivotal aspect. However, the need to focus on rehabilitation telemedicine processes in the respiratory rehabilitation sector was also highlighted. In this sector a great support could come from the integration of normal respiratory exercisers with telemedicine as for example shown in (21) in a non-pandemic period, and with remote monitoring systems for walking tests (such as the 6-minute test) commonly used in the rehabilitation of chronic obstructive pulmonary disease subjects (22).

The DD: still an obstacle to the use of the telemedicine

Surely digital technology (23,24) has been and will be of valid support during the pandemic, from daily life activities to telemedical activities. However, access to these technologies does not always occur adequately with easy access and correct distribution due to the phenomenon of the DD. The DD is caused by a multitude of factors ranging from the access to instrumental and network resources, to cultural and social barriers and also to possible forms of communication disability. A research in PubMed with the keys (COVID-19 and DD) returned 47 articles that highlighted that the DD in the COVID-19 era is the main obstacle to combat. It is mainly caused by the following problems (25,26).

Access to resources

This is a problem that may depend on the difficulties in accessing data networks and/or adequate tools due to both technological inadequacy and political problems caused by internal tensions and/or wars, as in the case of conflicts between different ethnic groups.

Social factors

As for example in the case of disadvantaged social groups who, due to poverty, are unable to access resources or training processes.

Cultural factors

The factors may depend on a different way of dealing with technology. Just look around and observe how, for example, the elderly are more reluctant than the young mobile born to use the smartphone (basic tool for mHealth)

Disabilities

Disabilities are an important factor to consider when it comes to the DD. Just think of communication and sensory disabilities, from autism to deafness and blindness and paralysis to understand the importance of this factor in DD.

Conclusions

The commentary highlighted and discussed:

(I) The great development of telemedicine. This development has not always been homogeneous but has sometimes occurred in patches and at different speeds.

(II) The role of mTech in this development in three directions: traditional mhealth; innovative mhealth for example in the digital contact tracing.

in the support in the routine activities such in schools by e-learning, work by smartworking and communication in general.

(III) The Italian example of development through the focus on the fragile and reflections towards new boundaries of explorations in lung telerehabilitation.

(IV) The obstacle that can be represented by the DD caused by: the difficulties in the access to resources, social factors, cultural factors, disabilities.

The commentary is part of a special issue where the developments and perspectives of telemedicine started in the pandemic period are dealt with in detail.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Journal of Public Health and Emergency* for the series "Telemedicine in COVID-19 Pandemic". The article has undergone external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at https://dx.doi.org/10.21037/jphe-21-20). The series "Telemedicine in COVID-19 Pandemic" was commissioned by the editorial office without any funding or sponsorship. Dr. DG served as the unpaid Guest Editor of the series and serves as an unpaid editorial board member of *Journal of Public Health and Emergency*. The author has no other conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/jphe-21-20
Cite this article as: Giansanti D. Telemedicine in COVID-19 Pandemic: a truly exceptional development? J Public Health Emerg 2021;5:21.

