THE IMPACT OF COVID-19 PANDEMIC ON THE HEALTHCARE SYSTEM IN LOMBARDY

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ABSTRACT

This chapter aims to provide suggestive evidence on how the Lombardy region dealt with the COVID-19 pandemic in 2020 and discuss future challenges for the Lombardy healthcare system. After an introduction to the wide spread of the virus inside the region, we describe the Lombardy health system so the reader may understand the context in which the virus has taken hold so quickly. The pandemic has heavily stressed the system, mainly because Lombardy experienced an excess of hospital admissions. We have considered the increased mortality rate as a proxy of the proper managing of the COVID-19 pandemic. In addition, we describe the process of treating non-COVID patients, such as those affected by acute myocardial infarction (AMI), stroke and oncological diseases. Despite the pandemic, hospitals have been able to guarantee a high level of performance. A discussion of the future evolution of the healthcare system concludes this chapter.

Keywords: Excess of mortality; non-COVID patients; healthcare system; quality of care; impact evaluation; Lombardy region

1. INTRODUCTION

COVID-19 made its first appearance in China in December 2019. Although the perception of risk was mainly limited to people and goods related to China, the Italian prime minister declared a national emergency on 31st January 2020 that lasted for six months. At that time, people screened and tested for COVID-19 were only those arriving from China.

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The news of the first Italian case occurred on 21st February 2020 in Codogno, a small district in the province of Lodi, on the west side of the Lombardy region. A 38-year-old healthy man was admitted to the public hospital of Codogno with mild pneumonia resistant to therapy. Although he had no relevant travel history and no apparent exposure to diseased contacts, he tested positive for COVID-19 (Cereda et al., 2020). In a few days, the cases increased exponentially, foretelling the possibility of what would later be defined as a pandemic.

At the very beginning, the situation seemed to be limited to Codogno and some neighbouring municipalities. However, it quickly became clear that the spread of the virus would affect the whole of Lombardy. In fact, on 8th March 2020, all of Lombardy was locked down into red zones. A few days later, on 11th March 2020, the whole country was locked down. After months of lockdown, a de-escalation of containment measures started at the beginning of May. This happened as the contagion index R_t dropped below 1 across most of Italy, marking the end of the first wave of the COVID-19 pandemic in Italy. Despite the national lockdown, the evolution of the epidemic in Italy entailed variations in spread and impact depending on the region. Lombardy was by far the most affected Italian region and one of the most affected in the world during the first wave. In general, Northern Italy experienced the highest rates of COVID-19 infection compared to both the centre and south, where the spread of the new coronavirus did not follow similar exponential growth (Angelici, Berta, Costa-Font, & Turati, 2021).

The two months of restrictions and, probably the lower summer virulence, reduced infection rates between June and September. But this relaxing of containment measures led to a new epidemic peak. The second wave started at the end of September just after the beginning of the new school year. This second outbreak hit the entire Italian territory in a uniform manner (Bontempi, 2021). Despite this, Lombardy continued to top the rankings of contagion and deaths.

This chapter aims to provide suggestive evidence on how the Lombardy region dealt with the COVID-19 pandemic in 2020 and discuss future challenges for the Lombardy healthcare system. Section 2 describes the Lombardy healthcare system, and Section 3 provides a general picture of the impact of the COVID-19 pandemic on the healthcare system. In addition, Section 4 considers how mortality rates could be used as a measure to evaluate the strategies of managing the impact of COVID-19. Section 5 considers the handling of non-COVID patients, and Section 6 discusses future challenges for the Lombardy healthcare system. The chapter is concluded in Section 7.

2. LOMBARD HEALTHCARE SYSTEM

The Italian National Healthcare System, founded in 1978, provides universal healthcare coverage financed with taxes mostly collected at the central level. During the 1990s, several policy reforms transferred administrative and organisational responsibilities from the central government to the regional administrations, which means Italian regions have significant autonomy in organising their healthcare systems (Turati, 2013). This autonomy was enjoyed also during

the pandemic, and it explains the different policy patterns followed by Lombardy and the other regions.

Among the 21 regions, Lombardy is one of the top-ranked for sociodemographic indicators (Del Vecchio, Fenech, & Prenestini, 2015). Lombardy has a population of 10 million residents, and it ranks among the most competitive areas in Europe for its economic indicators. Public expenditure for healthcare services reached 19 billion euro in the last year. The healthcare system comprises approximately 150 hospitals generating 1.5 million discharges annually (Berta, Seghieri, & Vittadini, 2013). Regional reform in 1997 radically transformed the healthcare system in Lombardy into a quasi-market in which citizens are free to choose their provider regardless of ownership (private or public). Differently from all the other Italian regions, the healthcare system in Lombardy is entirely built on a clear separation between insurers (i.e. the local health authorities) and providers, a prospective payment system based on DRGs, and reimbursement for all the providers within the regional accreditation system (Brenna, 2011).

The public has rated the Lombardy healthcare system as excellent (Del Vecchio et al., 2015) and the region as one of the most capable Italian regions to deal with a traumatic event, such as an epidemic (De Luca, Zacchetti, Vizio, & Misculin, 2020). However, the progression of the COVID-19 pandemic has raised doubts about the ability of the Lombardy healthcare system to manage this event. For instance, the Lombardy healthcare system responded to the COVID-19 epidemic by hospitalising most of the patients, which allowed the virus to spread into the hospitals and create excessive stress on the system. This higher stress to the hospital system caused by the surge in patient flow saturated hospital resources and resulted in worse performance and patient outcomes. Accordingly, a strong association between the higher prevalence of COVID-19 in the community and increased in-hospital mortality was seen (Asch et al., 2021; Soria, Lapadula, & Bonfanti, 2021). The rapidly growing number of citizens who needed to be hospitalised forced hospitals to dedicate entire wards to COVID-19, increase bed capacity in the intensive care units (ICU) and move physicians and nurses from their usual activity to care for patients affected by the coronavirus (Grasselli, Pesenti, & Cecconi, 2020). This policy of increasing ICU bed capacity was later adopted across the country (Angelici, Berta, Costa-Font, & Turati, 2021).

Emergency management initially took place while maintaining the patient-centred approach: physicians, ambulatory clinics and emergency rooms were used on the front line. Many patients were sent to the hospital without specific services. The result was an overload of human resources and hospital beds, which detracted from the quality of care. Consequently, ordinary and monitoring care ceased for a long time after the onset of the pandemic (Binkin, Salmaso, Michieletto, & Russo, 2020; Cereda et al., 2020; Pisano, Sadun, & Zanini, 2020).

In the public debate, the hospital-centred Lombardy healthcare system, the share of private providers, the limited relationship between primary care and hospitals, and an unfit government caused the overwhelm of the healthcare system and mismanagement of the COVID-19 emergency. However, evidence from

a counterfactual analysis of this debacle is lacking. For this reason, we consider that additional studies are needed to better understand what has not worked and whether this perceived debacle is supported by quantitative evidence.

3. IMPACT OF COVID-19 PANDEMIC ON HEALTHCARE SYSTEM IN LOMBARDY

Impacts on the healthcare systems are among the most severe consequences of the COVID-19 pandemic. In Lombardy, the healthcare system reacted to this pandemic mainly in three ways: First, planned admissions were stopped and a large proportion of bed capacity was dedicated to COVID patients. Second, the number of ICU beds grew in three weeks from 800 to 1,500, and finally, in some cases, the emergency departments arranged two pathways – one dedicated to the admissions for suspected COVID patients and the second one for other citizens.

The case of Lombardy is crucial for the analysis of the health system's management of the COVID-19 pandemic. Indeed, Lombardy was the first western region affected by COVID-19 and was forced to react with limited information on this new disease. In the mainstream discussions it is said that Lombardy performed worse than other national and international realities, in part due to an initial level of contagion that put the system in crisis, but also because of a hospital-centred healthcare system. In this sense, a first hypothesis suggests that Lombardy had poor ability in managing the pandemic during the first emergency phase due to a pre-existing organisation based on delivering patient-centric care compared with more community-focused and less hospital-centred healthcare systems (Pisano et al., 2020). To formulate a judgement that goes beyond opinions, it is necessary to observe and analyse the available data and, in this way, disentangle whether management within the Lombardy region during the pandemic had worse consequences than in other realities.

The official data available are those released daily by the Civil Protection, which mainly concern the number of infections, hospitalised patients, patients in ICUs and deaths due to COVID-19.[1] These data, while valuable, suffer from some biases that affect their quality. During the period of greatest impact of COVID-19, the numbers of infected, hospitalised and deceased concerned only those who attended emergency rooms of the hospitals. The scarce availability of swabs and the excessive pressure on the healthcare system led to an underestimation of the real values of infected, hospitalised and dead citizens (Angelici, Berta, Costa-Font, & Turati, 2021). This data source allows us to form a general idea of the level of infection and is useful above all to study the ability of the health system to react to the epidemic. Exploiting data about ordinary hospitalisation and ICU admission allows us to evaluate the ability of the system to adapt its offer, modify its organisational structure, identify a rapid and adequate response in the treatment of patients, and cooperate.

When the shock of the spread of COVID-19 infections hit Lombardy, it was necessary to suspend the ordinary management of the healthcare system. The cornerstones of the Lombardy healthcare system (i.e. quasi-market in which

public and private providers compete and patients are free to choose where to be hospitalised) have been fundamentally shattered: hospitals (public and private) had to react as quickly as possible to the growing demand for beds for COVID-19 patients and especially to a massive demand for ICU beds. In the most affected regional areas, such as Bergamo, Brescia, Cremona and Lodi, hospitals showed an extraordinary ability to move from a competitive system to cooperation between private and public providers. Fig. 1 shows how, in only a few days, Lombardy doubled their ICU bed availability – a huge effort achieved thanks to the ability of hospital managers (both public and private) and regional government. Without this effort, the healthcare system would have collapsed.

This positive evidence achieved during the first wave of the COVID-19 pandemic is closely linked to the level of initial contagion and, therefore, is not an element that allows us to compare the management of COVID-19 in Lombardy with what has happened in other regions or countries. To have a clearer picture of what happened, we need to focus on two elements: an analysis of overall mortality, which compares Lombardy with other Italian regions, and the ability of the healthcare system to treat non- COVID patients.

4. EXCESS OF MORTALITY

As mentioned above, Lombardy was the first western region severely affected by the COVID-19 pandemic. Based on official data, at the end of 2020, Lombardy accounted for 25,123 deaths of the total 74,159 in Italy. Table 1 shows that Lombardy (highlighted in bold in the table), despite accounting for 16.81% of the

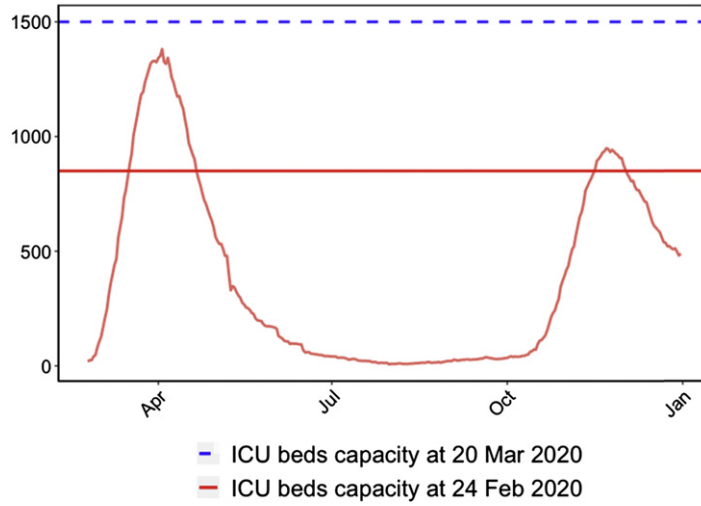

Fig. 1. Trend in ICU Hospitalisations and Beds Availability before the COVID-19 Pandemic and in the Middle of the First Wave.

Table 1. Comparison between Covid-19 Death Officially Registered and Population.

Region	Death	Population	Death Rate	Pop. Rate
Abruzzo	1,213	1,293,941	1.64%	2.17%
Basilicata	256	553,254	0.35%	0.93%
Calabria	472	1,894,110	0.64%	3.18%
Campania	2,844	5,712,143	3.84%	9.58%
Emilia-Romagna	7,738	4,464,119	10.43%	7.48%
Friuli-Venezia Giulia	1,642	1,206,216	2.21%	2.02%
Lazio	3,769	5,755,700	5.08%	9.65%
Liguria	2,891	1,524,826	3.90%	2.56%
Lombardia	**25,123**	**10,027,602**	**33.88%**	**16.81%**
Marche	1,571	1,512,672	2.12%	2.54%
Molise	191	300,516	0.26%	0.50%
P.A. Bolzano	739	532,644	1.00%	0.89%
P.A. Trento	942	545,425	1.27%	0.91%
Piemonte	7,922	4,311,217	10.68%	7.23%
Puglia	2,472	3,953,305	3.33%	6.63%
Sardegna	747	1,611,621	1.01%	2.70%
Sicilia	2,412	4,875,290	3.25%	8.17%
Toscana	3,673	3,692,555	4.95%	6.19%
Trentino-Alto Adige	1,681	1,078,069	2.27%	1.81%
Umbria	624	870,165	0.84%	1.46%
Valle d'Aosta	379	125,034	0.51%	0.21%
Veneto	6,539	4,879,133	8.82%	8.18%
Total	74,159	59,641,488	100.00%	100.00%

overall Italian population, experienced 33.88% of the total deaths registered for COVID-19 in Italy.

This simple visualisation of the data allows us to understand how severely COVID-19 hit this region. But a pending question is whether regional government and the health system played a role in explaining differences in COVID-19-related regional mortality. For instance, several articles attribute blame to the Lombardy healthcare system, accusing the quasi-market structure or the lack of a strict link between primary and secondary or tertiary care. In particular, Lombardy promoted hospital-based assistance for cases (Binkin et al., 2020), but hospitals were not equipped to deliver the type of care needed during a pandemic (Pisano et al., 2020). On the other hand, although sociodemographic factors are often advocated to explain differences in observed mortality (Blangiardo et al., 2020), these differences can also depend on the ways governments managed the pandemic or the characteristics of their health systems. For this reason, differences in mortality can be considered as a proxy of the governments' ability to address the stress of the health system caused by the COVID-19 pandemic.

Despite this, we need to consider that data on mortality are a controversial measure to evaluate the strategies of managing the impact of COVID-19 for several reasons: First, the quality of coding on the death certificates (particularly in the earlier stages of the pandemic) is disputable because it was strictly linked to testing capacity (Blangiardo et al., 2020). Second, strong differences exist in the recording systems, even in the same country (Baio & Blangiardo, 2020). Hence, estimating excess deaths for all causes based on past-year trends represents an effective way to evaluate the impact of the COVID-19 pandemic (Banerjee et al., 2020), including direct COVID-19-related as well as indirect effects (Woolf et al., 2020).

In this framework, it is worthy to cite Alacevich et al. (2021), who evaluated the role of regional administration in managing the diffusion of the pandemic and the health emergency. Exploiting data provided by National Institute of Statistics (ISTAT), the authors adopted a spatial autoregressive (SAR) model to study excess mortality in Lombardy at the municipality level associated with the presence of care homes during the first wave of the COVID-19 outbreak.[2] Alacevich et al. explained the role of care homes and the policy adopted by the regional government captured the media attention due to their lack of clear rules on containment, testing and contact with visitors. At the same time, the regional decision to use nursing homes as care facilities for hospital patients at the end of the acute phase of the disease was reported as one of the worst strategies adopted by the regional government.[3] It is speculated that this led to a rapid and lethal spread of COVID-19 in nursing homes, exacerbating the pandemic challenge. Overall, Alacevich et al. (2021) provide evidence of significantly higher excess death rates in municipalities where care homes are present. This suggests that nursing homes were a driver of higher mortality and demonstrates that regional government practices on nursing homes likely negatively impacted COVID-19 containment.

Blangiardo et al. (2020) also used data from ISTAT to study spatio-temporal excess mortality in all Italian regions. The authors compared the first four months of each year between 2016 and 2019, adjusting for age, temporal trends and the effect of temperature. Predicted mortality was then compared with the mortality rates at the municipality level for the same period in 2020. In this chapter, Lombardy showed higher mortality rates than expected with 23,946 (23,013–24,786) total excess deaths.

Also exploiting the same data on mortality, Gilbertoni et al. (2021) described the spatial and demographic distribution of excess mortality in Lombardy, Veneto and Emilia-Romagna – the three most affected Italian regions. Excess mortality was estimated in subgroups defined by gender and age classes. Their findings show that, generally, Lombardy experienced the highest burden of mortality and Veneto the lowest. Despite this, excess mortality affected a larger proportion of municipalities in Emilia-Romagna (45.6%) than in Lombardy (41.5%) and Veneto (27.9%); however, in Lombardy, a higher number of municipalities suffered excess mortality rates higher than 50%. A key finding in this chapter is that nearby municipalities showed highly different mortality levels despite being under common regional policies. Possible explanations for

differences in excess mortality between close municipalities could be the presence of public venues, such as sports facilities, cinemas, senior citizens centres and nursing homes, or events that may have taken place before the lockdown (e.g. sports games or public events). Results in this chapter demonstrate that it is important to contrast epidemic data at the smallest possible level and in the most accurate way.

For similar aims, a different approach was proposed in a recent working paper (Berta, Bratti, Fiorio, Pisoni, & Verzillo, 2021). The authors sought to isolate the role of regional administration by implementing a geographic regression-discontinuity design at the municipality level. This method allows analysts to control for differences in observable and unobservable municipality characteristics by comparing municipalities that are geographically proximate but pertain to different regions with specific policies (e.g. level of COVID-19 testing and home vs. hospital care).

Fig. 2 explicates why a geographic regression-discontinuity design is useful for comparing regional administrations in managing the COVID-19 pandemic by exploiting overall mortality. The red spot within Lombardy expresses higher (excess) mortality in comparison to the greenest areas in the other regions. Observing the focus on the 10 km border (right panel) where a similar COVID-19 diffusion would be expected and factors influencing mortality should be comparable, the color differences decrease.

The results provide evidence of existing differences in mortality in areas at the border, which should be broadly subject to the same COVID-19 intensity. Hence, particularly in the first wave, the impact of the regional pandemic management system adopted in Lombardy is shown to be affected by an increase in mortality with respect to the neighbouring regions and the previous years. The application of the same empirical strategy to the second wave evidence shows Lombardy was able to fill the gap with other regions.

The greater initial number of cases in Lombardy may have played a role in the observed differences in outcomes. Nevertheless, Lombardy had a worse

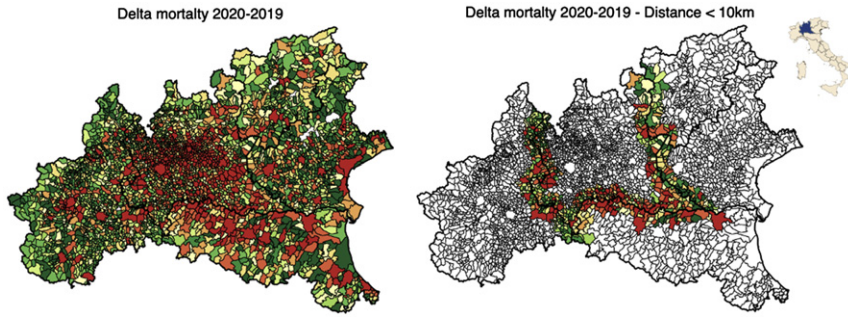

Fig. 2. Excess of Mortality between 2020 and 2019, by Municipality in North of Italy. Right Side Panel Restricts the Area to the 10 kms from the Lombardy Boundary. A Small Map of Italy Shows Lombardy Region in Blue.

performance in managing the pandemic compared with regions able to confine the virus. Although it is complicated to disentangle specific explanations of this result, a system organised to provide patient-centric care performed worse when compared with closer regions, which have more community-focused and less hospital-centred systems (Nacoti et al., 2020).

5. QUALITY OF CARES DELIVERED TO NON-COVID PATIENTS

During the COVID-19 emergency, citizens' needs for other healthcare services do not reduce, and limiting hospital capacity for non- COVID services has consequences that must be investigated. In an editorial in the *New England Journal of Medicine*, Rosenmabum (2020) defined this issue as an 'untold toll'. The main question she asked was, *As the coronavirus pandemic focuses medical attention on treating affected patients and protecting others from infection, how do we best care for people with non-Covid-related disease?*

During the first wave of COVID-19, patients reduced their request for hospital admissions, apparently because they were concerned about the risk of in-hospital infection, as well as because of the social limitations adopted by governments and local health authorities to face the pandemic (Abdelaziz et al., 2020; Huet et al., 2020). Abdelaziz found that STEMI volume had a drop of 33%, with a significant delay in symptom-to-FMC. For these reasons, monitoring the effective systematic changes of quality provided to non-COVID patients is crucial for all National Health Systems, as it helps to evaluate the effect from the cited 'untold toll' driven by the COVID-19 pandemic.

A first response to the question of Rosenmabum for the Lombardy region is addressed in a working paper analysing the quality of care provided by Spedali Civili of Brescia (one of the most affected areas in the world) to patients who experienced an acute myocardial infarction (AMI) or stroke episode (Rossi et al., 2021). Rossi et al. focused on a particular subgroup of hospital admissions needing non-deferrable emergency care and selected patients with AMI and stroke. Further, the analysis in Rossi et al. focused on the first wave of the pandemic only to observe the first reactions of the healthcare system to this unexpected event. To this end, the authors adopted a difference-in-regression-discontinuity design, which identifies the effect of the COVID-19 pandemic on in-hospital mortality as the difference between the estimated effects on mortality in a regression-discontinuity design around the lockdown date (March 9) in the year of the COVID-19 outbreak (2020) and the same date in the pooled period 2019–2018 to control for pre-existing (observed or unobserved) differences in mortality determinants around the cut-off point. Data refer to hospitalisations of patients admitted at Spedali Civili, the main hospital in the province of Brescia. As reported by the ISTAT (2020), in March 2020, this province experienced an overall mortality increase of 292% compared with the average of the same month in 2015–2019. Moreover, by the end of April, the province had registered 2,500 confirmed COVID-19 deaths (ISTAT, 2020).

Rossi et al. (2021) shed light on the potential effects of organisational and clinical practice changes to face COVID-19 to ensure the same quality of care for non-deferrable acute admissions provided in previous non-COVID years. During the first wave, Spedali Civili implemented specific protocols to deliver appropriate hospital care for non-COVID-19 emergency patients. In particular, emergency department admissions were structurally modified in a fully dual-track system by introducing a COVID-19-devoted triage and building external emergency tents to admit COVID-19 patients only. Spedali Civili was radically transformed, and, despite the general prioritisation of staff and resources to COVID-19 patients, for time-dependent conditions (e.g. stroke, cardiovascular emergencies, neurosurgical emergencies and trauma), an organisation based on a 'hub-and-spoke' model was adopted. Spedali Civili was selected as the 'hub' for AMI and stroke cases in the eastern part of the Lombardy region (see Casiraghi et al., 2020 for more details).

Results from Rossi et al. (2021) show that AMI and stroke in-hospital mortality rates were not statistically different from the ones observed in the control group (pre- COVID period) in 2020 compared to previous years (2018 and 2019). This result provides evidence of the hospital's ability to manage by implementing a double-track organisation in the emergency department to simultaneously deliver high-quality care to both COVID and non-COVID patients. This is an important result because it shows how the mitigation strategies realised by Spedali Civili of Brescia, in agreement with the Lombardy government, to deliver both COVID-19 and non-COVID-19 healthcare services were successful.

Another substantial proportion of non-COVID patients are citizens affected by cancer. It is possible to find several studies about the management of these patients in a dedicated centre. Quaquarini et al. (2020) investigated the management of 469 oncological patients with 2,590 occasions of access in ICS Maugeri, a Lombardy hospital located both in Pavia and Milan. Their finding confirms the reduction in access to therapy due to what the authors call 'pandemic fear'. Moreover, they found that few oncological patients treated in their hospitals were exposed to COVID-19 during their hospitalisation. In this way, the authors witnessed the possibility to enable safe cancer treatment and a continuum of care for most patients. Similar results were seen at Fondazione IRCCS – Istituto Nazionale dei Tumori (National Oncological Institute – INT), a high-quality mono-specialised hospital dedicated to oncological patients in Milan. Valenza et al. (2020) investigated the treatment of oncological patients in the INT. The authors described the strategy adopted by INT, which was based on applying filters to and within the hospital, setting up a COVID-19 surveillance area, and developing dedicated triage pathways. INT was able to detect and isolate COVID-19 patients, thus protecting the hospital from the spread of the virus. In this way, they guaranteed continuity of care for patients not affected by COVID-19.

6. DISCUSSION ABOUT FUTURE CHALLENGES FOR LOMBARDY HEALTHCARE SYSTEM

Undoubtedly, when the first case of COVID-19 was diagnosed in Lombardy, the healthcare system suffered from an excessive focus on hospital services and a lack of integration with primary care. This criticality was anticipated by the epidemiological transition (Omron, 1972) of the last decades, which has led to an aging population and an increase in chronicity.

This change in the demographic structure defined a change to the health needs to which the Lombardy health system has tried to respond by promoting general reform in 2015. This law was disclosed in a document drawn by the Lombardy region, which detailed the evolution of the population's needs, the current setup of the healthcare system, and the expected development aimed at improving the quality of services supplied to citizens.[4] In particular, it was pointed out that the re-organisation of the healthcare service network must lead to the definition of an organisational structure able to shift the care axis from the hospital to primary care. However, this expected development does not seem to have been achieved, and the difficulties in responding to the COVID-19 pandemic and the issues affecting the Lombardy healthcare system in previous years point to future challenges that need to be addressed.

In the following, we describe what is lacking in the healthcare system and offer some thoughts on what could be improved to deal with a new epidemic while effectively managing the care of citizens with chronic diseases in the future.

The first point of criticality concerns general practitioners (GP). To improve the managing of chronic patients' needs, the Lombardy region defined a new role in the healthcare system – the so-called 'clinical manager' who could be a GP or a public or private provider. This manager could be freely chosen by the patients in addition to the GP and supports the citizen by scheduling the services to be provided, issuing prescriptions, scheduling appointments, checking reports etc. In brief, this reform aimed to increase the quality of assistance provided to chronic patients. A few years after the reform, the data available suggest that the patients do not know how to do without their GP: when faced with the invitation to choose a clinical manager, more than 90% of citizens with chronic diseases declined the invitation and only 0.45% relied on a public or private provider. On the supply side, on the contrary, some GPs accepted this kind of 'competition' with the hospital clinical managers, as evidenced by the increase of reported associations between the parties. Nevertheless, looking at these numbers, it is evident that the reform of primary care cannot disregard the perceived role of the GPs and their relationship with the patients, as a doctor is perceived to be able to 'take charge' of all the needs of their patients.

Second, the epidemiological evolution in the last decades and the current pandemic force us to reflect deeply on the current network of healthcare services in Lombardy. A system that wants to shift its centrality from the hospital to a profitable integration with primary care must first address the critical aspects of the current hospital organisation. The pandemic emergency has highlighted the need to consider the diverse types of patients (e.g. patients at risk of infection)

along the hospitalisation process. Similarly, the COVID-19 pandemic discouraged hospital organisation based on pathology-specific (or ward-specific) beds, suggesting the need for major flexibility in the allocation of hospital beds. The aim is to cope with the evolving needs of patients to be admitted.

Third, a need exists to increase the supply of sub-intensive and intensive care beds with the corresponding technological and personnel equipment.

Finally, a crucial point relates to the quality evaluation of healthcare services. Quality assessment in healthcare is a key tool that, through various methods, enables the implementation of healthcare services aiming at effectiveness, efficiency, appropriateness, the safety of healthcare professionals and patients, and constant monitoring of the processes and results of healthcare activities. In this way, the quality of the services provided should increasingly become a tool for governing the system, contributing to determining, for example the judgement on the accreditation of the providers or part of their share of funding.

7. CONCLUSION

This chapter focused on the effect of the COVID-19 pandemic in the Lombardy region, which is one of the most heavily affected areas in the world. Among the numerous consequences of the COVID-19 outbreak, it is difficult to assess, in quantitative terms, what determined the magnitude of the COVID-19 impact in Lombardy. It is complicated to disentangle which portion of the effect is due to (1) the unexpected and violent spread of the epidemic, (2) the characteristics of the healthcare system and how these played a role in the poor response of the system and (3) the ability (or inability) of the regional government to manage the pandemic. To explore these questions, evidence on mortality was gathered as a clear indication of the negative effect of COVID-19. At the same time, a comparison between Lombardy and border regions allowed us to quantify the causal effect of living in Lombardy as a driver for observing a higher increase in mortality.

Results on mortality show Lombardy did not effectively manage the pandemic. This was most evident during the first wave when the choice of using nursing homes as facilities for post-hospitalisation proved to be a wrong decision. Even in comparison with other regions hardly hit by COVID-19 in the north of Italy, Lombardy performed worse in the first wave. However, this situation seemed to improve in the second wave when Lombardy had comparable results to neighbouring regions.

An alternative way to observe the impact of COVID-19 has also been considered in this chapter. Examining the evidence on the treatment received by non-COVID patients, the healthcare system in Lombardy was able to guarantee the same quality provided in previous years to non-COVID patients, especially those with pathologies that could not be deferred in time and oncological patients who require strong continuity of care. This positive result was obtained thanks to the work of hospital professionals (managers, physicians, nurses etc.), who were able to reorganise their activities quickly and effectively.

Just the fact that Lombardy was the first western region affected by COVID-19 in Italy could be a reason for the improper management of the pandemic. Lombardy fulfilled this hypothesis because the health system could not react promptly or ensure an adequate and timely reorganisation of the healthcare system at each level. The blame can be mainly attributed to a lack of relationship between primary care and hospitals. Accordingly, we highlight the need to rethink the overall healthcare system. A system that provides for greater integration of all levels of care can ensure better preparation for possible new epidemics. In sum, although the COVID-19 pandemic was the greatest challenge the Lombardy health system has had to face, it could also be a great opportunity for developing a new way of taking care of Lombardy citizens in the future.

NOTES

1. Available at this link: https://github.com/pcm-dpc/COVID-19.
2. Available at this link: https://www.istat.it/storage/dati_mortalita/decessi_comunali_giornalieri_29aprile_2021.zip.
3. DGR XI/2906–8 March 2020 available at https://www.regione.lombardia.it/wps/wcm/connect/5e0deec4-caca-409c-825b-25f781d8756c/DGR+2906+8+marzo+2020.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-5e0deec4-caca-409c-825b-25f781d8756c-n2.vCsc.
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