

Male mortality and the German response: lessons from COVID-19

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The current COVID-19 outbreak has raised many questions, amongst them the higher mortality rates in men and the low overall mortality rates in Germany compared to other European countries. Here the authors explore some of the reasons behind both these phenomena and outline what we can learn from them for the future.

On average, men die younger and are at higher risk of life-threatening ailments, including heart disease and many forms of cancer.

The Sars-CoV-2 coronavirus appears to be following suit. In all six of the countries that, up to 20th March, had sex-specific records of deaths from COVID-19, the proportion of men was higher than women. Over time this was confirmed by data collected by Global Health 50/50 (May 6th) in countries that had a high COVID-19 caseload; with death rates of 62% men and 38% women in Italy, 58% and 42% (respectively) in Spain, and 80% and 20% (respectively) in Greece.¹

In a very recent (29th April) preliminary study published in *Frontiers in Public Health*,² Beijing researchers explored the role of gender in morbidity and mortality of a small sample of 43 patients with a COVID-19 diagnosis. They concluded that while men and women have the same prevalence of infection, men with COVID-19 are at higher risk for worse outcomes and death, independent of their age.

| No. | Country | Confirmed cases | Number of deaths | Death rate (%) |
|-----|----------------|-----------------|------------------|----------------|
| 1. | Belgium | 53,081 | 8656 | 16.31 |
| 2. | France | 175,181 | 26,354 | 15.04 |
| 3. | United Kingdom | 219,183 | 31,855 | 14.53 |
| 4. | Italy | 219,070 | 30,560 | 13.95 |
| 5. | Hungary | 3,284 | 421 | 12.82 |
| 37. | Germany | 178,879 | 7569 | 4.40 |

Figure 1. Coronavirus (COVID-19) death rate in countries with confirmed deaths and over 1000 reported cases as of May 11, 2020, by country. ©Statista 2020⁴

The authors further investigated the data of 37 patients who had died of COVID-19 from the Chinese Public Health Science Data Centre and found that the number of men who died was 2.4 times that of women. Given the small sample sizes, no generalisation of the results is possible at this stage; however, the widely noted tendency that men are more severely affected by COVID-19 and have a higher mortality rate than women holds.² UK data collected and analysed from 1st February–25th April 2020 confirmed (amongst other factors) a male hazard ratio of 1.99 in COVID-19 related deaths when compared to females.³

There are possible biological and behavioural explanations for this trend, as discussed in this issue's 'Journal watch', which include: hormones, the immune system, genetics and the fact that older men have more (severe) comorbidities than their female counterparts. Male lifestyle factors, such as a higher ratio of smoking and alcohol intake, lower compliance with handwashing advice, and delays in presentation, may play a role in explaining the above findings.

Evidently, poor hand hygiene in men could expose them more frequently to the virus, and to a higher viral load, which in turn can affect severity of the infection. A UK survey of >2000 adults from March 2020 found that both men and women had taken steps to protect themselves from the virus by improving their personal hygiene such as hand washing; however, fewer men (67%) than women (74%) had up-scaled their hand washing routine.⁴

More research is required in order to fully explore why men are more vulnerable to COVID-19. A greater in-depth understanding of the underlying biological and behavioural processes will help to inform targeted measures – a form of precision medicine where the goal is to better understand sex and gender differences in disease and drug response in order to tailor preventive measures and treatment. However, it must be remembered that COVID-19 affects all of us significantly, regardless of sex and gender.

In the next section, we will move to discuss how governmental and public

health strategies, using the successful example of Germany, are pivotal in optimising pandemic outcomes.

COVID-19 in Germany

There has been much debate about why Germany has one of the lowest fatality rates in Europe. As per the 11th May 2020, 171 879 cases of COVID-19 have been identified and 7569 deaths registered, giving a fatality rate of 4.4%. As shown in Figure 1, this compares with, for example, fatality rates of the UK (14.53%) and France (15.04%).⁵

As it happens, one of the authors (PS) of this article was in the small town of Landsberg for a meeting on the day when Germany's first COVID-19 case was recorded there: the patient was a male who worked for a company that has two car plants in Wuhan in China.

The author spent the following days in Munich and was particularly struck by the speed at which the local health department and federal authorities acted. Within a couple of days of the first case being recorded, contacts had been identified and quarantined, and the company closed its Bavarian plant in addition to the ones based in China in order to contain the outbreak. The public was informed locally and nationally about the case and measures were taken without any delay.

This early action is an example of the coordinated and rapid response that defines how the German authorities have dealt with the current COVID-19 situation.

Possible explanations for this phenomenon

A strong healthcare system

The German healthcare system has been persistently modernised over the last 20 years, which certainly put Germany in a good position to deal with the COVID-19 pandemic. The result of this was more hospital beds, more ventilators, more intensive care unit (ICU) beds and more hospital

doctors per capita than any other comparable country in Europe.^{6,7,8}

In addition, community specialist practices and a dense network of primary care physicians provided a strong backbone to support hospital care during the outbreak.

Swift action after early COVID-19 cases emerged

Germany was one of the first countries to initiate so-called social distancing measures. This allowed the early shielding of the elderly population while a meticulous tracing of the chain of infections was undertaken in order to suppress spread. The government made optimal use of the time available after the first cases emerged in southern Germany, upscaling bed capacity, joining the PPE EU procurement scheme, and mobilising the diagnostics industry that was already well established.

Furthermore, the government listened to scientific advisors and drew them in early to the decision-making process.

Testing

As mentioned, in Germany the diagnostics infrastructure was readily in place and scaled up upon the emergence of COVID-19 cases. This allowed Germany to become one of the first countries to develop a reliable COVID-19 test as early as January, and to initiate widespread testing. From early on, for example, Germany tested >20 people per thousand (as compared to the UK, which tested 5.54 per 1000).⁹

In the *BMJ*,¹⁰ Christian Drosten, Virologist at the Berlin University Hospital Charité, highlighted that in Germany testing is done across an array of quality-controlled labs rather than relying on a central lab for all processing and testing. As a result, early widespread testing resulted in up-to-date analysis of current infection trends and timely countermeasures, increased identification of mild cases and, therefore, a lower overall case fatality rate.

Public information and societal factors

In Germany, regular national updates were held where the current situation was summarised, scientific evidence discussed, and the rationale for decisions laid open to the public.^{11,12}

Broader society, possibly as a result of the transparent communication strategy, mostly followed the measures implemented or recommended by the government. However, there is admittedly no reliable source of data to suggest that this was adhered to more (or less) in Germany as compared to other European countries.

Technology and digital health

An additional reason for the robust management of the COVID-19 crisis by the German healthcare system up to this point is the digitalisation that has taken place, particularly over the past two years and more rapidly over the past weeks and months. This has started to move Germany to a partially digitalised system.

At the end of last year, the German government passed the Digital Care Act (DCA).¹³ This enables, amongst others, an expansion of telemedicine to all medical specialties and affiliated healthcare professionals - offered free of charge in the COVID-19 related context.

The German government developed strategies to encourage production and widespread usage of CE-certified COVID-19 chatbots and triage Apps by established authorities (for example, the Robert-Koch-Institut), all of which happened within days and weeks. Digital prescribing is following suit. In light of the DCA and COVID-19, a vibrant German digital health ecosystem has emerged rapidly, covering anything from screening, prevention and diagnosis to treatment and rehabilitation. And many of these companies have switched to a free service in COVID-19 times.¹³

The German National Health Innovation Hub that was formed a couple of years ago by the Ministry of

Health has incorporated an up-to-date COVID-19 section on their website that summarises, signposts and evaluates digital applications relating specifically to COVID-19 and distributes this in a daily newsletter.¹⁴

Furthermore, in search for COVID-19 solutions, the German government organised a COVID-19-related hackathon (an event where people collaborate to try and initiate solutions to technical problems within a certain time frame, in this case within 48 hours) in March. This led to the selection of 20 out of 1500 projects aiming, for example, to optimise National PPE distribution, the delivery of food and medicines, communication relating to infection control, and local business support, to name but a few.¹⁵

Over the last months, Germany has been catching up fast with other countries, such as the UK, where digital healthcare solutions such as telemedicine and digital prescribing were already well embedded prior to COVID-19. In addition to developing digital health interventions and system optimisations, researchers and developers in the UK and across Europe have been working to determine whether existing technologies can be given new applications to assist with the pandemic. Examples of such innovation include: mobile phone location data to predict disease spread and the impact of interventions such as social distancing; robots designed to clean hospitals; drones to deliver food to patients; health tracker apps to monitor for potential COVID-19 symptoms; new equipment designs, such as the Ventilator Challenge UK consortium to provide more than 10 000 ventilators; the involvement of private industry experts from Formula One, Dyson, and 3D printer companies to develop new devices in record time; and the use of AI algorithms for speedy drug development.^{16,17,18}

Conclusion

The successful management of COVID-19 is clearly multifactorial and

will change as more deaths across Europe are unfortunately inevitable. Nevertheless, we can conclude that up to this point, Germany's COVID-19 management has been exemplary and there is a lot to learn from the country's healthcare, communication and policy strategies.

Across the world, once the pandemic starts to subside, further comparative and collaborative analysis of strategies and policies is required in order to better prepare us globally for future pandemics. What is evident from the current situation is that an effective future response requires the sharing of information and collaboration across nations.

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