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Utilization of drugs with reports on potential efficacy or harm on COVID-19 before, during, and after the first pandemic wave

Salka Enners[1], Gabriele Gradl[1], Marita Kieble[1], Michael Böhm[2], Ulrich Laufs[3], Martin Schulz[1]

[1]German Institute for Drug Use Evaluation, Berlin, Germany
[2]Saarland University Medical Center, Homburg, Germany
[3]University Hospital Leipzig, Leipzig, Germany

Background: Conflicting information and speculation on potential benefits of drugs as well as reports on hypothetical harm of commonly used drugs in coronavirus disease 2019 (COVID-19) treatment have challenged clinicians, pharmacists and healthcare systems. It was hypothesized that certain drugs, such as hydroxychloroquine, azithromycin and statins have been used off-label and consequently, a number of patients may have been exposed to hazardous effects of these drugs without a proven benefit. For other drugs such as renin-angiotensin-aldosterone system inhibitors (RAASi) or ibuprofen, an increased risk for a critical outcome of COVID-19 was suspected.

The aim of this drug utilization study was to analyze the change in ambulatory drug utilization before, during, and after the first wave of the pandemic in 2020 and to discuss potential influencing factors.

Materials and Methods: We explored the database of the German Institute for Drug Use Evaluation (DAPI), which contains dispensing data at the expense of the statutory health insurance (SHI) funds from a representative sample of more than 80% (until June 2019) and more than 95% (from July 2019 onwards) of community pharmacies in Germany. The data was extrapolated by regional factors to 100% of the SHI-insured population.

Drug utilizations were analyzed as number of packages dispensed per week from January to June 2020 and as percentage change compared to 2019. The observation period was divided into three periods. The first period runs from January 2020 until March 22; on which nationwide restrictions on public and social life were implemented. The second period goes from March 23 until April 19, 2020, during nationwide restrictions and the third period from April 20 until the end of June, 2020; the period after first relaxation of restrictions until the end of observation. For ibuprofen and paracetamol, monthly dispensing data from privately insured patients and self-medication utilization from the INSIGHT Health database were included. The INSIGHT Health database includes extrapolated data from a representative sample of over 4,500 community pharmacies. The distribution of the package sizes per analyzed drug from January to June 2020 compared to January to June 2019 was determined to rule out possible bias due to different amount of drugs per package in both evaluation periods.

Results: There were no relevant differences in the distribution of package sizes in the analyzed drugs in 2020 compared to 2019. Utilization of hydroxychloroquine increased by up to +110% in March 2020 to 10,700 weekly dispensed packages compared to the previous year and then slightly decreased until week April 13–19 to 4,700 packages. Renin angiotensin aldosterone system inhibitors (RAASi) as well as simvastatin and atorvastatin increased to 1.9 million (+78%) and 623,000 weekly dispensed packages (+74%), respectively, and subsequently decreased below 2019 levels (RAASi: 1.2 million/–17%, simvastatin and atorvastatin: 405,500 (–15%) weekly dispensed packages). After an initial slight increase, utilization of azithromycin and all systemic antibiotics decreased continuously from March 2–8 until June to levels considerably lower compared to 2019 (June 22–28: azithromycin: 14,800 (–55%), all systemic antibiotics: 402,300 (–27%) weekly dispensed packages). After recommendation of the Federal Minister of Health on March 09, 2020 for people over 60 years to get vaccinated against pneumococci to prevent a “superinfection”, pneumococcal vaccines utilization initially increased by +373% to 302,700 weekly dispensed doses, followed by a sharp decrease. Subsequently, utilization increased again to 306,100 dispensed doses (+294% compared to 2019). Paracetamol utilization showed an initial increase of +111% in March 2020 to 8.0 million packages, mainly caused by an increase of over-the-counter dispensings. Ibuprofen dispensings also increased in March, though less significant (+19% in March 2020 to 7.5 million packages). From April onwards, a decrease in utilization for ibuprofen and paracetamol was witnessed.

Conclusion: The increase in the course of utilizations at the beginning of the pandemic indicates stockpiling. After implementation of nationwide restrictions and the likely resulting decline in visits of physicians and, subsequently, pharmacies, there was a decrease in utilization. After first easings of those restrictions, utilization increased again. The decrease in (all) systemic antibiotics indicates a corresponding decrease in the occurrence of respiratory tract infections. Fluctuations in utilizations may indicate drug shortages, as reported by the Federal Institute for Drugs and Medical Devices for hydroxychloroquine, paracetamol, and pneumococcal vaccines.

It is a great challenge for the healthcare system to counteract sudden, unexpected rises in demands of drugs. For pneumococcal vaccines, which have a long manufacturing time, Germany obtained deliveries from Japan and England.

Ultimately, the data suggest that, apart from the pandemic itself, dissemination of misinformation and unsound speculations as well as supply shortages influenced drug prescribing, utilization, and purchasing behaviour. The findings can inform post-pandemic policy to prevent unfounded over- and underprescribing and off-label use as well as drug shortages during a public health crisis.

References

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Corresponding Author:
Salka Enners, Deutsches Arzneiprüfungsinstitut e.V., Heidestraße 7, 10557 Berlin, Germany, s.enners@dapi.de

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