COVID-19 and Post-COVID in health and social workers – a German perspective


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The compensation board for Health and Welfare Workers (BGW) supports the research of CVcare at the University Clinics Hamburg, Eppendorf, Germany.

I am Head of the ‘Occupational Medicine, Toxicology and Health Research’ department of the BGW. We drafted the guideline for the confirmation of COVID-19 as occupational disease in Health and Welfare Workers.

Conflict of interest – we care for those who care
• Epidemiology of COVID-19 in HW
• The dynamic of SARS-CoV-2 infections during the first year of the pandemic for hospital workers in Germany
• Vaccination and severity of COVID-19
• Survey data on Post-COVID in health and welfare workers
Scotland, 1 March to 6 June 2020

Risk of hospital admission because of COVID-19 for Health Workers with patient contact (at the front door)

3-fold

for relatives of these HW

2-fold

Linkage Cohort Study

Hazard Ratio

HW with patient contact: 3.3 (2.13-5.13)
Relatives of these HW: 1.8 (1.10-2.91)
Relative Risk for severe COVID-19 in UK

Baseline UK Biobank data (2006-10) for England combined with results of SARS-CoV-2 testing of Public Health England (March to July 2020).

120,075 participants
271 with severe COVID-19.

<table>
<thead>
<tr>
<th>Relative Risk</th>
<th>RR</th>
<th>(95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW</td>
<td>7.4</td>
<td>(5.5 – 10.0)</td>
</tr>
<tr>
<td>Social worker, teacher</td>
<td>1.8</td>
<td>(1.2 – 2.8)</td>
</tr>
<tr>
<td>Essential worker</td>
<td>1.6</td>
<td>(1.05 – 2.5)</td>
</tr>
</tbody>
</table>

Four occupations with increased risk (significant)

- Geriatric care
- Human medicine and dentistry
- Nursing, emergency services
- Doctors’ assistants

N = 108,960
N = 404 (0.37 %)
with positive PCR after first wave

Childcare

Reuter et al. 2022
Healthcare workers were more than twice as likely to be re-infected than non-healthcare workers (OR of 2.4, p < 0.001).

Two doses or more of vaccination were found to be protective against the risk of reinfection rather than a single dose (mRNA vaccines: OR of 0.06, p < 0.0001, and OR of 0.1, p < 0.0001; vector vaccines: OR of 0.05, p < 0.0001).

Patients with chronic renal failure, cardiovascular disease, bronchopneumopathy, neuropathy and autoimmune diseases were at increased risk of reinfection (OR of 1.38, p = 0.0003; OR of 1.09, p < 0.03; OR of 1.14, p = 0.006; OR of 1.78, p < 0.0001; OR of 1.18, p = 0.02).
Odds Ratios for IgG-Antibodies

Physicians: 2.4 (1.6-3.5)
Nurses: 1.7 (1.1-2.5)
Emergency rooms: 1.5 (1.0-2.3)
COVID-19 wards: 1.7 (1.2-2.4)

2,590 HW tested in April 2020
31.6% IgG positive
Cumulative Incidence of SARS-CoV-2 in Healthcare Workers at a General Hospital in Germany during the Pandemic—A Longitudinal Analysis

Martin Platten 1, Albert Nienhaus 2,3,*, Claudia Peters 2, Rita Cranen 4, Hilmar Wisplinghoff 1,5, Jan Felix Kersten 2, Alexander Daniel Bach 6 and Guido Michels 7
An indoor carnival on 15 February 2020 with 300 participants is assumed to have been the source of the first regional outbreak in Germany, the region is covered by SAH.

All workers of the hospital invited to the study.

Four surveys between April 2020 and April 2021.

Nasal swap for PCR and blood for antibody test.

Questionnaire on infection risks.

Prof. Dr. Guido Michels
Dr. Rita Cranen

Principle Investigators at SAH with team.
Gym became examination parkour at St. Antonius Hospital (SAH)

- reception
- blood draw
- nasal swap
- questionnaire
Results

Positive test results in %

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCR +</td>
<td>0.2</td>
<td>0.8</td>
<td>2.0</td>
</tr>
<tr>
<td>IgG +</td>
<td>0.0</td>
<td>3.0</td>
<td>3.3</td>
</tr>
<tr>
<td>PCR + and/or IgG +</td>
<td>0.0</td>
<td>3.6</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5.2</td>
</tr>
<tr>
<td>Contact with COVID-Patient</td>
<td>Positive PCR or IgG</td>
<td>Negative PCR and IgG</td>
<td>OR (95%CI)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td>n=23</td>
<td>23</td>
<td>391</td>
</tr>
<tr>
<td>No contact known</td>
<td>15</td>
<td>15</td>
<td>657</td>
</tr>
</tbody>
</table>

N=1,086 with complete data
### Results of follow-up Study St. Antonius Hospital (SAH), Germany April 2020 to April 2021 (Survey 1 to 4)

<table>
<thead>
<tr>
<th>Ward</th>
<th>IgG and PCR - N</th>
<th>IgG(M*) or PCR + N</th>
<th>Logistic Regression** OR 95%-KI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>101</td>
<td>24</td>
<td>4.4 [1.7 – 13.6]</td>
</tr>
<tr>
<td>General ward</td>
<td>566</td>
<td>91</td>
<td>2.9 [1.3 – 8.5]</td>
</tr>
<tr>
<td>Workers with no patient contact</td>
<td>108</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

** Logistic Regression with n=895
PCR, IgG or IgM* positive n=120 (13.4%)

* IgM not influenced by vaccination
Potential explanations for low cumulative infection rate during the first 12 months of the pandemic

• We had two more weeks to prepare
• Mandatory COVID-19 specific infection control measures for different workplaces
• Example:
  • Undercover observation of 162 hair parlors in Berlin, Hamburg, Freiburg
  • October – December 2020
  • High compliance with infection control measures (97%)

Infection prevention measures hairdresser
• Close every second work station
• Nobody waiting
• Masks for client and hairdresser
• No drinks, no journals
• Wash hair before cutting
• PoC test before entering the parlor
• Hand disinfection

Implementation of occupational health and safety during the SARS-CoV-2 pandemic in hairdressers’ salons
Occupational Disease (OD) – because of COVID-19 of the compensation board BGW in 2020, 2021 and 2022

Claims

Confirmed OD

Claims 376,557
Confirmed OD 232,880
Confirmation rate 62%

All compensation boards in Germany > 500,000 claims

37,772
111,055
227,730
16,622
76,618
131,640
Occupational disease (OD) because of COVID-19 since beginning of pandemic separated by sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>confirmed OD</th>
<th>case / 100 full time equivalences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>53,789</td>
<td>6.97</td>
</tr>
<tr>
<td>Child care*</td>
<td>36,772</td>
<td>6.75</td>
</tr>
<tr>
<td>Geriatric care</td>
<td>65,108</td>
<td>6.49</td>
</tr>
<tr>
<td>Administration, Social Work</td>
<td>3,576</td>
<td>3.28</td>
</tr>
<tr>
<td>Welfare and Social Work</td>
<td>23,221</td>
<td>3.16</td>
</tr>
<tr>
<td>Workplaces for persons with handicaps</td>
<td>7,724</td>
<td>1.87</td>
</tr>
<tr>
<td>Education (Vocational Training)</td>
<td>1,100</td>
<td>1.44</td>
</tr>
<tr>
<td>Doctors’ Office</td>
<td>5,711</td>
<td>1.19</td>
</tr>
<tr>
<td>Therapeutic Practices (e.g. physiotherapy)</td>
<td>2,406</td>
<td>0.84</td>
</tr>
<tr>
<td>Dentistry</td>
<td>608</td>
<td>0.25</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>240</td>
<td>0.16</td>
</tr>
<tr>
<td>Hairdresser</td>
<td>167</td>
<td>0.08</td>
</tr>
<tr>
<td>Veterinary Medicine</td>
<td>27</td>
<td>0.08</td>
</tr>
<tr>
<td>Beauty und Wellness</td>
<td>17</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200,505</strong></td>
<td><strong>3.94</strong></td>
</tr>
</tbody>
</table>

Data until 30.09.2022

Sorted by case / 100 FTE

* In top 3 since Dec. 2021
## COVID-19 by year and severity of disease

<table>
<thead>
<tr>
<th>Year</th>
<th>Claims</th>
<th>Treatment in hospital</th>
<th>Death</th>
<th>Sick leave &gt;6 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>2020</td>
<td>21,147</td>
<td>1,018</td>
<td>4.8</td>
<td>32</td>
</tr>
<tr>
<td>2021</td>
<td>111,043</td>
<td>3,431</td>
<td>3.1</td>
<td>109</td>
</tr>
<tr>
<td>2022</td>
<td>227,497</td>
<td>281</td>
<td>0.12</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>359,687</td>
<td>4,730</td>
<td>1.3</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction 2020 to 2022</td>
<td>97.5</td>
<td>92.0</td>
<td>94.3</td>
<td></td>
</tr>
</tbody>
</table>
Proportion treated in hospitals of all ODs because of COVID-19 in 2021 separated by month

- 50,575 ODs,
- 950 hospital treatment,
- 1.9% of all ODs with SARS-CoV-2 infection in 2021

Month of Infection of OD in 2021

COVID-19 as an Occupational Disease—Temporal Trends in the Number and Severity of Claims in Germany

Albert Nienhaus, Johanna Strauszinger and Agnessa Kozak

Intention to receive vaccination and proportion of vaccinated HWs

**Nov.-Dec. 2020**
- **Intention:** Bauernfeind et al.: 60% (83% Physician; 53% Nurse)
- Karagiannidis et al.: 64% (73% Physician; 50% Nurse)

**Jan.-Febr. 2021**
- **Vaccinated/intention:** Nohl et al.: 57%
- Kozak et al.: 76%
- Holzmann-Littig et al.: 92%

**March-May 2021**
- **Vaccinated/intention:** Kozak et al.: 62+22% (83% Physician; 50% Nurse)

**March-May 2022**
- **Vaccinated or infected:** KROCO 3. wave: 96%

**Sept.-Dec. 2021**
- **Vaccinated:** KROCO 3. wave: 96%

**Juni-Aug. 2021**
- **Vaccinated/intention:** Nohl et al.: 57%
- Kozak et al.: 76%
- Holzmann-Littig et al.: 92%
- RKI: 2021, 2022

**Jan.-Febr. 2022**
- **Vaccinated:** DKG-survey: 90%
- HW with patient contact: 95%

**March-May 2022**
- **Vaccinated or infected:** DKG-survey: 94%

**Start vaccination campaign (27.12.20)**

**Literature:**
- https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Projekte_RKI/KROCO.html; DKG, 2022, https://www.dkgev.de/dkg/presse/
COVID-19 and Post-COVID are multi-organ diseases or syndromes
Typical symptoms following the Long-/Post-COVID guideline of the German scientific medical associations

<table>
<thead>
<tr>
<th>very often</th>
<th>often</th>
<th>seldom</th>
</tr>
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<tbody>
<tr>
<td>• Fatigue</td>
<td>• Cough</td>
<td>• Paralysis, sensory disturbance</td>
</tr>
<tr>
<td>• Dyspnea</td>
<td>• Insomnia</td>
<td>• Vertigo</td>
</tr>
<tr>
<td>• Performance/Activity Limitations</td>
<td>• Depressed mood</td>
<td>• Nausea</td>
</tr>
<tr>
<td>• Headache</td>
<td>• Anxiety symptoms</td>
<td>• Diarrhea</td>
</tr>
<tr>
<td>• Smell and taste disorders</td>
<td>• PTSD Symptoms</td>
<td>• Loss of appetite</td>
</tr>
</tbody>
</table>

• General pain
• Altered breathing pattern
• Cognitive impairment
• Hair loss

• Paralysis, sensory disturbance
• Vertigo
• Nausea
• Diarrhea
• Loss of appetite
• Tinnitus
• Earache
• Loss of voice
• Heart palpitations
• Tachycardia
## Typical symptoms following the Long-/Post-COVID guideline of the German scientific medical associations

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<td>PTSD Symptoms</td>
<td>Loss of appetite</td>
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</tr>
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<td></td>
<td></td>
<td>Tachycardia</td>
</tr>
</tbody>
</table>
Sleep disorders, depressive symptoms, anxiety, post-traumatic stress in HW during pandemic

- 14 studies with hospital workers
- Considerable level of stress, depressive and anxious symptoms. Severe symptoms were found in 2.2–14.5% of respondents.
- Sleep disorders up to 36%

Mental Health Disorders in Nurses During the COVID-19 Pandemic:

- Nurses should be educated on how to deal with anxiety, depression, post-traumatic stress disorder and other mental health issues in order to better protect themselves.
Diseases caused by COVID-19

Risk of pulmonary embolism after a COVID-19 infection by time

Hospital cases

RR >2, stat. sig.

Meta-Analyse performed in March 2023 in cooperation with A. Seidler and his group, University Dresden
Long-Term Effects of COVID-19 on Workers in Health and Social Services in Germany – a follow-up survey

Claudia Peters, Madeleine Dulon, Claudia Westermann, Agnessa Kozak, Albert Nienhaus

Int J Environ Res Public Health 2022, 19, 6983
Response rate and population

Letter sent in Feb. 2021
N = 4,325

Response first survey
N = 2,053 (47%)

Response second survey Oct. 2021
N = 1,428 (70%)

Response third survey March 2022
N = 1,261 (61%)

Sample n = 2,053

Age 18 – 81 years, Median 51 years

Long-Term Effects of COVID-19 on Workers in Health and Social Services in Germany
Claudia Peters 1,*, Madeleine Dulong 2, Claudia Westermann 3, Agnessa Kozak 1,2 and Albert Nienhaus 1,2

Persisting symptoms > 15 months after infection (n=1,094) (unpublished data)

Symptoms after COVID-19

- first survey: 76%
- second survey: 72%
- third survey: 70%

Fatigue: 84.8%
Memory problems: 74.3%
Physical exhaustion: 72.7%
Depressive symptoms: 65.7%
Dyspnea: 65.7%
Insomnia: 61.2%
Muscle or joint pain: 53.1%
Headache: 47.5%
Smell and taste disorders: 35.1%
Vertigo: 33.5%
Workability before and after COVID-19

8% are on sick leave (3. survey >15 month after COVID-19)
13% rehabilitation performed, 30% indicate need for rehabilitation
Summary

- Infection prevention and control was effective
- Vaccination reduced the number of severe COVID-19
- High need for rehabilitation after COVID-19
- Prevention is still needed, because of re-infection risk
- Compensation of Post-COVID is fair, but the need for compensation is difficult to assess
Thank you for your attention!

The projects of CVcare are supported by the social partners of the self-government of the BGW