

The well-being of physicians during the COVID-pandemic in a Belgian tertiary hospital

KORTHOUDT C., MD^{1*}, KEGELS N.^{1*}, MD, DOMEN A., MD², MOORKENS G., MD-PHD³, SALDIEN V., MD-PHD⁴

*First two authors are equally first writers.

¹Department of anaesthesiology and reanimation, Antwerp University Hospital (UZA), 2650 Edegem, Belgium; ²Center for Oncological Research (CORE), Integrated Personalized and Precision Oncology Network (IPPON), University of Antwerp, 2610 Antwerp, Belgium; ³Clinical director of the department of internal medicine, Head of residency program internal medicine at the University of Antwerp Antwerp University Hospital (UZA), 2650 Edegem, Belgium; ⁴Head of the department of anaesthesiology and reanimation, Docent in anaesthesiology and reanimation at the University of Antwerp, Antwerp University Hospital (UZA), 2650 Edegem, Belgium.

Corresponding author: Korthout C., Drie Eikenstraat 655, 2650 Edegem, Belgium. E-mail: Christophe.korthoutd@hotmail.com

Abstract

Background: COVID-19 has become the largest medical challenge worldwide, affecting the physical and mental well-being of physicians. The aim of this study was to explore the well-being of physicians during the second wave of the COVID-19 outbreak in a Belgian tertiary hospital, with special attention to anaesthesiologists. They were confronted with overcrowded intensive care units, were mentally challenged during several months by an overwhelming workload.

Methods: All physicians of the Antwerp University Hospital (UZA) were invited to participate through an online anonymous questionnaire to objectively evaluate their well-being during the second wave of the COVID-19 outbreak in Belgium. Mental well-being was evaluated by the validated Warwick-Edinburgh Mental Well-being Scale (WEMWBS) summing 14 equally weighted questions (scoring range 1 to 5) about mental well-being. Demographic data such as age, gender, function, COVID exposure was collected.

Results: Ninety physicians, 42 residents and 48 staff members, completed the questionnaire with an average WEMWBS of 50.6±8.0. Participating residents were deployed more on COVID-19 departments compared to participating staff members (p=0.02) and reported a higher workload (p=0.001). Residents scored significantly lower on the WEMWBS compared to staff members (48.1±8.2 vs. 52.8±7.3, p=0.01). Also, 15 female anaesthesiologists scored significantly lower in the WEMWBS compared to their 12 male colleagues (p=0.03).

Conclusion: During the second wave of the COVID-19 outbreak in Belgium, residents reported a significantly higher workload due to COVID-19 and reported a significantly lower well-being compared to staff members.

Keywords: COVID-19, mental well-being, healthcare workers, anaesthesiologists.

Introduction

On 11 February 2020, the World Health Organization declared COVID-19 to be a “global pandemic”. COVID-19 has become the largest medical challenge of the last 50 years, affecting the entire world. Healthcare workers are known to be more vulnerable for mental health problems, such as suicide¹. The pandemic caused by the SARS-CoV-2 virus had a severe impact on physical and mental well-being of physicians throughout the world.

As a result, several psychiatric manifestations have appeared during the pandemic, especially among frontline healthcare providers²⁻⁵. One study showed that young female anaesthesiologists who treated COVID-19 patients were more vulnerable to depression⁶. Also, an Indian study revealed that a third of the doctors were depressed, with the following significant predictors; duty hours, use of protective measures and altruistic coping⁷. Furthermore, the COVID-19 pandemic can have an adverse impact on the trainee program of residents

⁸⁻¹⁰. However, research on mental well-being of physicians during the pandemic is scarce.

Therefore, the aim of this study was to explore the well-being among healthcare physicians during the second wave of the COVID-19 outbreak in a tertiary hospital. Further, the study aims to examine the difference in mental well-being between: (i) residents and staff members, (ii) physicians working on COVID versus non-COVID wards, and (iii) physicians (residents and staff members) with high and normal workload. In addition, we especially focused on anaesthesiologists as they have often been confronted with overcrowded intensive care units during several months, challenging their physical and mental well-being.

Well-being can be scaled through the validated Warwick-Edinburgh Mental Well-being Scale (WEMWBS)^{11,12}. The WEMWBS is used to measure mental well-being of a general population and is defined as a person's psychological functioning, satisfaction and ability to develop and maintain mutually benefiting relationships. In a general population sample comprised of adults ranging from 16 to 75 years and older in Scotland, where the scale was developed, the mean score was 50.7 (maximal score of 70). However, there is no upper or lower limit when using the scale, as it is not designed to identify persons with exceptionally high or low positive mental health. We have chosen this scale because (i) it is simple to self-complete without the need for additional assistance, (ii) the scoring method is very convenient and (iii) the scale has been shown to correlate well with other mental health and well-being scales⁵.

Methods

All 432 physicians, including every specialty, at the Antwerp University Hospital (UZA, Edegem, Belgium) were invited to participate by e-mail on 7 February 2021 during the second COVID-19-outbreak in Belgium in an online Dutch WEMWBS questionnaire to quantify their mental well-being objectively. The survey was closed on 30 March 2021. Informed consent was obtained online from all participants and data was collected anonymously. The outcome of the questionnaire was correlated to demographic variables: age, gender, function, department of work, degree of COVID contact, workload during the first and second COVID-outbreak in Belgium and any changes in the training program of the residents. Doctors in training were defined as residents and specialized doctors as staff members. The study was approved by the ethical committee (reference: 21/02/016) of the UZA on 25 January 2021.

Warwick-Edinburgh Mental Well-being Scale

The WEMWBS is scored through summing 14 equally weighted questions scored on a 1 to 5 scale (1 = never, 5 = all of the time). The score ranges from 14 to a maximum of 70. The higher the score, the better the level of mental well-being. A categorical approach with WEMWBS was used: a score of 40 and below corresponded to probable depression and a score of 41-44 to possible depression⁶⁻⁷. A license to use WEMWBS for non-commercial purposes was obtained on 21 December 2020 (ID: 531514376).

Statistical analysis

The quantitative data was analysed using descriptive statistics. The categorical data was presented as frequencies and percentages. The normal distribution between groups was evaluated by Pearson chi-square test or Fisher's exact test. The T-test or ANOVA was used to evaluate the WEMWBS score between groups. Statistical analysis was performed using SPSS Statistics Software, version 26.0 for Windows (IBM corp., Armonk, NY, USA). P-values less than 0,05 were considered as statistically significant.

Results

Out of 432 invited physicians, a total of 90 physicians, comprised of 42 residents and 48 staff members, completed the questionnaire with a mean WEMWBS score of 50.6±8.0. Depressive feelings were present in twenty percent of the participants. Sample characteristics with their mean WEMWBS score are shown in Table I. In Figure 1 we describe the different medical specialties among our respondents. At the end of our survey, we had a response rate of 20.8%

Gender was equally distributed between residents and staff members (p=0.438). Participating residents worked significantly more on COVID wards

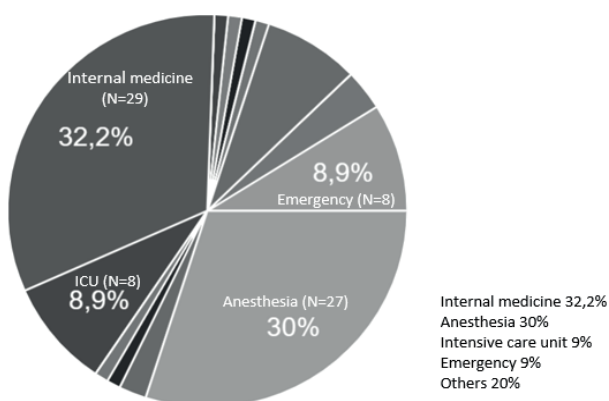


Figure 1: This pie charts shows from which different disciplines we had the highest response. There was a total of 90 respondents. (ICU = intensive care unit).

Table I. — Demographics of the participants with their mean WEMWBS. (SD = standard deviation).

	N	WEMWBS (mean±SD)	P-value	Test
Total population	90	50.6±8.0		
SEX				
Female	54	49.7±7.6	0.200	T-test
Male	36	51.9±8.7		
JOB FUNCTION				
Resident	42	48.1±8.2	0.005	T-test
Staff member	48	52.8±7.3		
AGE				
21j-25j	8	49.1±8.9	0.054	ANOVA
26j-30j	33	48.1±8.5		
31j-35j	8	51.1±5.1		
36j-40j	12	53.3±9.5		
41j-45j	7	53.3±4.3		
46j-50j	9	54.4±7.2		
51j-55j	7	51.9±4.1		
56j-60j	2	36.6±6.4		
61j-65j	3	56.3±3.1		
>65j	1	57.0±0.0		
JOB				
Critical units	43	50.0±6.4	0.493	T-test
Non-critical units	47	51.1±9.3		

Table II. — Cross evaluation between residents and staff members for different parameters.

	Staff members (N= 48)	Residents (N=42)	P-value	Test
Sex (male/female)	21/27	15/27	0,438	Chi-square
COVID unit (yes/no)	21/27	29/13	0,020	Fisher exact
Workload (same/higher)	34/14	15/27	0,001	Fisher exact

compared to participating specialists ($p=0.020$). This group of residents noticed that their workload was significantly higher ($p=0.001$) and scored significantly lower on the WEMBWS (48.1 ± 8.2) compared to staff members (52.8 ± 7.3), ($p=0.01$). Demographics of the participants with their mean WEMBWS and cross evaluation between residents and staff members is shown in Table I and II, respectively.

Eight participants (3 male and 5 female) with mean WEMBWS 32.9 ± 6.8 , from whom six working on COVID wards and two on non-COVID wards, scored 40 or less on the WEMBWS, which implicates a probable depression according to the WEMBWS. Eight female participants (42.5 ± 1.5) from different specialties, of whom five worked on COVID wards, scored 41 to 44, implicating a high risk for developing a depression.

Working on a COVID or non-COVID ward did not significantly impact the WEMBWS results of the participants (49.3 ± 8.5 on COVID ward versus 52.2 ± 7.2 on non-COVID ward, ($p=0.09$)). A higher

workload (N= 41) during the pandemic had a significant impact on mental well-being compared to a normal workload (N= 49), respectively 48.7 ± 8.8 versus 52.2 ± 7.0 ($p=0.04$) (Table III). One third of the training programs of the residents underwent a

Table III. — Overview of the WEMBWS scores in function of workload, working on a COVID-19 department and if there was a change in the residents' training program. (SD = standard deviation).

	N	WEMWBS (mean±SD)	P-value	Test
Workload				
High	41	48.7±8.8	0.043	T-test
Normal	49	52.2±7.0		
COVID UNIT				
No	40	52.2±7.2	0.094	T-test
Yes	50	49.3±8.5		
TRAINEE PROGRAM				
Change	13	44.9±10.7	0,095	T-test
Planned	19	49.5±6.6		

change without a significant impact on the mental well-being score ($p=0.09$). Half of the participating emergency residents ($N=6$) had a change in their trainee program, of whom three residents had a significant lower WEMWBS 43.3 ± 1.5 versus 54.7 ± 2.5 , ($p=0.003$).

Anaesthesiology

Female anaesthesiologists scored significantly lower on the WEMWBS compared to their male colleagues ($p=0.03$). However, well-being scores between residents and staff members anaesthesiology did not significantly differ ($p=0.28$) (Table IV).

Table IV. — Anaesthesiologists and WEMWBS.

	N	WEMWBS (mean±SD)	P-value	Test
Female	15	46.7±4.8	0.034	T-test
Male	12	51.8±6.8		
Resident	18	49.9±4.9	0.282	T-test
Staff member	9	47.1±8.3		

Discussion

In general, residents showed a lower WEMWBS score than staff members, which also could be expected in non-COVID times, due to more working hours and a generally higher workload^{13,14}. The participating residents worked more on COVID-19 departments and experienced a higher workload.

This study population of physicians at the Antwerp University Hospital scored average on the WEMWBS during the second wave of the COVID-19 pandemic. However, our survey highlights discrepancies of the impact from the COVID-19 pandemic on the mental well-being of staff members and residents. Our findings are in conflict with earlier research, which recognized a conclusive impact of COVID-19, but focused on all healthcare workers' well-being¹⁴⁻¹⁶. There could be several possible explanations. Our study was conducted during the second wave of the pandemic in Belgium when there probably was a better understanding of the virus. Also, hospitals were better prepared and took more adequate precautionary measures. In our hospital, sufficient personal protection material for all doctors was available. Further, information brochures and posters for mental support were provided.

High workload due to COVID-19 was related with lower mental well-being, which is in line with the stress theory that describes the motivation

that drives humans to both maintain their current resources and to pursue new resources, also known as the conservation of resources theory¹⁷. This result is consistent with findings among other healthcare workers. Mo et al. illustrated that nurses with long working hours, which might correlate with high workload, had a positive relation with working stress during the COVID-19 pandemic¹⁸. Also, Tsan et al. associated burnout and depression among anaesthesiologists during the pandemic to the increased workload due to COVID-19¹⁹.

Salem et al. already described the burden of COVID-19 on the training program of residents, and demonstrated that surgical specialities were most affected¹⁶. This could be translated to Belgian surgeons as well¹¹. In our survey, the training program of emergency residents was most affected. However, these results are based on a small sample size. To be noted, our question was regarding the disruption of proposed training program, not specifically the lesser opportunities to specialty experience. We also had a very low response rate, less than 5%, of surgeon residents in our survey.

Previous studies demonstrated that female and younger anaesthesiologists have a higher prevalence rate of anxiety or depression^{1,6,20-23}. The same was true in our survey, where residents and female anaesthetists scored lower on their well-being. Remarkably, in the study of Farid et al. female surgeons were more worried than their male colleagues.

The main limitations of our survey are the relatively small study group and the single centre study set-up. Although similar consequences of COVID-19 on the mental well-being of residents and staff members were seen in other hospitals, the small study sample size does limit the ability to generalize our results. Nevertheless, the mean WEMWBS score of our study group confirms the results of studies with a larger number of subjects^{11,12}.

Due to the study design with an online survey and the response rate of 20.8%, sample selection bias may have occurred. The use of self-reported questionnaire may have introduced some social desirability bias and common method bias. However, since we used an anonymous survey, such biases were reduced²⁴.

Conclusion

Residents worked significantly more on COVID wards compared to participating specialists and reported a higher workload due to COVID-19 and significantly lower well-being compared to staff members who experienced a lower workload

and a higher well-being. One out of five doctors experienced depressive feelings. Attention should be paid on the prevention and treatment of well-being among physicians, especially residents.

Acknowledgment: We want to thank all the participating physicians of the Antwerp University Hospital. Special thanks to dr. Domen A. who guided us with the statistical analysis. Also to prof. dr. Moorkens G. and dr. Saldien V., who revised our manuscript. There was no conflict of interest or financial disclosure.

References

1. Dutheil F, Aubert C, Pereira B, Dambrun M, Moustafa F and Mermillod M, et al. Suicide among physicians and health-care workers: A systematic review and meta-analysis. *PLoS One* 2019; 14:e0226361. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0226361> [accessed 19 December 2019].
2. Galbraith N, Boyda D, McFeeters D et al. The mental health of doctors during the COVID-19 pandemic. *BJPsych Bull* 2021; 45:93-97.
3. Amin F, Sharif S, Saeed R et al. COVID-19 pandemic-knowledge, perception, anxiety and depression among frontline doctors of Pakistan. *BMC Psychiatry* 2020; 20:459.
4. Mohd Fauzi MF, Mohd Yusoff H, Muhamad Robot R et al. Doctors' Mental Health in the Midst of COVID-19 Pandemic: The Roles of Work Demands and Recovery Experiences. *Int J Environ Res Public Health* 2020; 17:7340.
5. Vanhaecht K, Seys D, Bruyneel L et al. COVID-19 is having a destructive impact on health-care workers' mental well-being. *Int J Qual Health Care* 2021; 33:mzaa158.
6. Magnavita N, Soave PM, Ricciardi W et al. Occupational Stress and Mental Health among Anesthetists during the COVID-19 Pandemic. *Int J Environ Res Public Health* 2020; 17:8245.
7. Chatterjee SS, Bhattacharyya R, Bhattacharyya S et al. Attitude, practice, behavior, and mental health impact of COVID-19 on doctors. *Indian J Psychiatry* 2020; 62:257-265.
8. De Sio S, Buomprisco G, La Torre G et al. The impact of COVID-19 on doctors' well-being: results of a web survey during the lockdown in Italy. *Eur Rev Med Pharmacol Sci* 2020; 24:7869-7879.
9. Farid Y, Vissers G, Ortiz S et al. Surgical perspective: the psychological burden of COVID-19 and prolonged lockdown. *Br J Surg* 2021; 108:367-368.
10. Johnston K, Tyson C, Danny I et al. Impact of the COVID-19 pandemic on the career of junior doctors. *Med J Aust* 2021; 214:295-296.
11. Tennant R, Hiller L, Fishwick R et al. The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health Qual Life Outcomes* 2007; 5:63.
12. Smith ORF, Alves DE, Knapstad M et al. Measuring mental well-being in Norway: validation of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). *BMC Psychiatry* 2017; 17:182.
13. Rich A, Viney R, Needleman S, Griffin A, Woolf K. 'You can't be a person and a doctor': the work-life balance of doctors in training-a qualitative study. *BMJ Open* 2016; 6:e013897. <https://bmjopen.bmj.com/content/6/12/e013897.long> [accessed 2 December 2016].
14. Lin RT, Lin YT, Hsia YF, Kuo CC. Long working hours and burnout in health care workers: Non-linear dose-response relationship and the effect mediated by sleeping hours-A cross-sectional study. *J Occup Health* 2021; 63:e12228. <https://doi.org/10.1002/1348-9585.12228> [accessed 6 May 2021].
15. Khanal P, Devkota N, Dahal M et al. Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal. *Global Health* 2020; 16:89.
16. Salem J, Hawkins L, Gates J et al. COVID-19 and the impact on doctor wellbeing and training: A mixed methods study. *The physician* 2020; 6:1-8.
17. Hobfoll SE, Halbesleben J, Neveu J-P et al. Conservation of resources in the organizational context: The reality of resources and their consequences. *Annu Rev Organ Psychol Organ Behav* 2018; 5:103-128.
18. Mo Y, Deng L, Zhang L et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J Nurs Manag* 2020; 28:1002-1009.
19. Tsan SEH, Kamalanathan A, Lee CK et al. A survey on burnout and depression risk among anaesthetists during COVID-19: the tip of an iceberg?. *Anaesthesia* 2021; 76:8-10.
20. Lai J, Ma S, Wang Y, Cai Z, Hu J and Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open* 2020; 3:e203976. <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763229> [accessed 2 March 2020].
21. Looseley A, Wainwright E, Cook TM et al. Stress, burnout, depression and work satisfaction among UK anaesthetic trainees; a quantitative analysis of the Satisfaction and Wellbeing in Anaesthetic Training study. *Anaesthesia* 2019; 74:1231-1239.
22. Sun H, Warner DO, Macario A et al. Repeated Cross-sectional Surveys of Burnout, Distress, and Depression among Anesthesiology Residents and First-year Graduates. *Anesthesiology* 2019; 131:668-677.
23. Downey GB, McDonald JM, Downey RG. Welfare of anaesthesia trainees survey. *Anaesth Intensive Care* 2017; 45:73-78.
- 24) Podsakoff PM, MacKenzie SB, Lee JY et al. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol* 2003; 88:879-903.

doi.org/10.56126/73.1.06