Well-being of academic staff in Belgium during the SARS-CoV-2 pandemic: a cross-sectional study

Iris Steenhout (iris.steenhout@vub.be)
Vrije Universiteit Brussel

Sven Van Laere
Vrije Universiteit Brussel

Lara Vesentini
Vrije Universiteit Brussel

Johan Bilsen
Vrije Universiteit Brussel

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Abstract

The 2020 severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic introduced unprecedented disruptions in both working conditions and social life. This lead to a variety of additional stressors for academics. The objective of this study was to determine the effect of the SARS-CoV-2 measures on academics, introduced during the first SARS-CoV-2 wave in Belgium, and to verify possible intervening variables in coping with these measures (stress management). The position, family and home situation of the respondents was checked. A cross-sectional study design was used. The study included 1837 respondents from the different Belgian universities. The overall mental and physical well-being amongst academics was lower during the SARS-CoV-2 measures. The results of a hierarchical regression suggest that decline in physical health is associated with an increase in tasks at home, sickness, less options to plan work and breaks, the self-perceived lower quality of teaching and research and the fear that the measures create a backlog at work. Furthermore, having kids had a negative effect on the work/private life balance, which in turn had an effect on physical well-being. A decline in mental well-being was associated with a fading boundary between work and private life, the necessity to take on more house-keeping tasks, sickness, the fear that the disruptions would create a backlog at work, less control over the work planning and less periods of pause during work.

Introduction

Since December 2019 SARS-CoV-2 spread from Wuhan, China, across the globe. It became a pandemic that affected every country. At the time of writing, there were 116.521.281 confirmed cases, including 2.589.548 deaths globally. The virus has a high basic reproductive number and is mainly spread via droplets and fomites (Karia et al., 2020; World Health Organization, 2020). Although scientific debate is ongoing with regards to the anti-epidemic strategies, the focus in most countries is on minimizing the spread of the virus by reducing direct social contact (Cohen & Kupferschmidt, 2020). Among the measures to promote social distancing, home confinement and curfew became a reality in many countries, face masks were advised or even obliged, non-essential businesses had to close, home working and distance learning (e-learning) was introduced. Social isolation became the primary defense against infection. Parents had severely reduced access to daycare or kinship care. Yet academics were expected to teach, research and publish, while this group also needed to provide homeschooling for younger kids. Often e-learning was quickly deployed, but internet bandwidth was not foreseen for all members of the family working from home. At the same time, some people had to cope with the loss of family members or friends, without being able to visit these loved ones in their final moments or even take part in the funeral. Such a sudden disruption of work and social life, combined with the psychological stress associated with an infectious outbreak and uncertainty over the future, can have a detrimental effect on well-being.

To fruitfully explore the well-being of a group it is required to start with understanding what well-being is. The World Health Organization (2010) considers well-being as a key element for individuals to realise their own abilities, cope with the ordinary stress of life and to be successful and productive, both at work

and in the private sphere. It could be seen as “the extent to which an individual is satisfied with his or her life, experiences a preponderance of positive affect (such as happiness), and possesses a healthy body and mind“ (Giacalone et al., 2016). There is no clear definition of the concept ‘well-being’ however, since it is inherently a social construct. Its meaning is embedded in a variety of shared structural, cultural, political, economic, and historic determinants and is dependent on the individual perception of each member within this social group. Well-being can take on many forms, including subjective, psychological, physical, and social ones (Keyes, 1998). It is thus a subjective given and cannot be objectified, since “*this blinds us to the subjective interpretation of the state of affairs of the person*” (Antonovsky, 1979, p. 36). In western societies, however, both personal as work factors are considered to have a significant effect on the well-being (Florean & Engelhardt, 2020; Fukasawa et al., 2020)

Prior studies suggest that health-related disasters are associated with a decline in well-being (Sprang & Silman, 2013). Yet current studies are fragmented as different groups within society are impacted in different ways. Several studies focus on the impact of, and coping with, SARS-CoV-2 measures on well-being in different countries, sharing quite similar cultures, including Belgium (Beutels et al., 2020). Some studies focus on the effect on drug and alcohol use during the pandemic (Vanderbruggen et al., 2020). Quite a lot of, also more specialized, attention has gone to health care workers, offering first line help to infected people, even while knowingly putting themselves at risk (Evanoff et al., 2020). Other studies focus on the well-being of social workers (Berg-Weger & Morley, 2020; Florean & Engelhardt, 2020; Miller et al., 2020).

Yet the current understanding of the effects of the SARS-CoV-2 measures on academic staff received little attention. Students and academics at universities had to switch abruptly to digital courses and ongoing research was often severely impacted. Few studies described the effect of the SARS-CoV-2 measures on students (Cao et al., 2020; Son et al., 2020; Wathelet et al., 2020). Some scholars focused on mental well-being of staff at specific universities or faculties (Alfawaz et al., 2021; Evanoff et al., 2020). The burden of the measures on the well-being of academics nationwide, however, has been largely neglected. Moreover, since the anti-epidemic measures vary per country, differentiation in effects on well-being is to be expected.

While it is futile to attempt to control every aspect that might impact personal well-being during a pandemic, since life is turbulent, stressful, full of conflict and, ipso facto, combined with the beforementioned cultural and individual embedding of well-being, studies should focus on social groups that share sufficiently common grounds in order to develop appropriate responses and adequate solutions for this group (Antonovsky, 1987). In the light of expected consecutive waves, such knowledge is critically important to provide evidence-based interventions and policies.

In this study, focus is primarily at the effects of the workplace and job fulfillment on well-being. Our specific research questions are: (RQ1) Is there a decline in the well-being from academics since the SARS-CoV-2 measures were implemented? (RQ2) Well-being cannot be measured directly, but rather by a combination of factors. In this study, it was addressed via 10 relevant items that are assumed to give

meaning to the construct of well-being. Can these 10 items be explained on the basis of a smaller number of meaningful factors that relate closely to our well-being concept? (RQ3) Can we identify factors contributing to the changes in well-being?

Methods

Study design and participants

A web-based survey was conducted from April 26th until June 5th, 2020. Academics (teaching and research staff, including fellowships) of all Belgian universities were invited to participate. During this period non-essential businesses had to close and whenever possible working from home was mandatory on a national level. In the same period, kindergarten, secondary and high schools were closed and full- or part-time distant learning was the norm.

An email was sent to all universities with the request to distribute the survey within their own institution. Staff was also alerted via social media and a press release that was picked up by several newspapers. All communications included a clickable link to a voluntary and anonymous survey, available in Dutch, French and English. A written consent was given by all participants before filling in the questionnaire. The survey was designed to take under 15 minutes to complete. The study has been approved by the ethical board of the Vrije Universiteit Brussel.

Survey instrument

The questionnaire was implemented in the Qualtrics survey software. Socio-demographic questions included sex, year of birth, and home situation (living alone, with partner, kids, parents or others, health status, quiet workplace at home, percentage of employment). Questions about job performance and control included the perception of proper teaching and research quality, the amount of control over the work planning, the level of disturbances and breaks during the job. The envisioned consequences of the SARS-CoV-2 were queried as well. These included the fear of impact on the career and the creation of backlog at work.

To prevent central-tendency bias, self-reported changes in control over the job, changes in work/life balance and the demands with regard to home-keeping tasks were assessed using an 11-point scale for both current to pre-measurements period. Since in Belgium, measurements against SARS-CoV-2 started in March 2020, the questions about the pre-measurements period questioned about the respondent's feelings and sentiments before March 2020. Assessment of teaching and research quality, as well as the perceived impact of measures on the future career and the presence of a quiet working space at home was done via a 5-point scale since – in general – opinions are more outspoken on these topics, minimizing the risk for central-tendency bias. For both teaching and research, a 'non applicable' section was foreseen since not all staff members combine both.

Outcome measures

The items to assess the individuals' perception of their well-being, before and during the SARS-CoV-2 measures, were constructed specifically for the present study. All items were measured using an 11-point scale that polled the presence of 10 items (ranging from 0 = item not suffered at all to 10 = suffered a lot), namely: head and/or neck aches, shoulder and arm problems, back problems, weight gain and eye problems (e.g. dry eyes), fatigue, lack of fitness, sleeping problems, irritability and stress and tension.

Statistical analysis

Data analysis was performed using R statistical software and R Studio, with statistical significance set to <.05 for all analyses. The present analysis happened in three phases. First, the well-being during the pre-measurements and current period was tested via paired one-sided t-tests. Second, an exploratory factor analysis (EFA) was used to determine meaningful composite measures within the different items regarding well-being. In the third phase, the composite measures found in the EFA served as the dependent variables in a hierarchical linear regression to detect the effects of socio-demographic elements (block 1), the assumed impact on future career (block 2) and job performance and control (block 3).

Results

A total of 2440 participants took part in the questionnaire. After removing the participants without a completed survey, 1837 participants from all 11 universities were involved in the current study. 439 (23.9%) of the respondents had a Flemish university as their main workplace, whereas 670 (36.5%) came from a Walloon university and 728 (39.6%) from a Brussels' university. Furthermore, 991 (54.2%) of the respondents were female and 839 (45.8%) were male.

Changes in well-being since the introduction of SARS-CoV-2 measures

To test the hypothesis that there was a decline in well-being after the SARS-CoV-2 measures were implemented, one-sided paired samples t-tests were conducted on each of the 10 measured items. As illustrated by table I, all t-tests were associated with a statistically significant decrease in the well-being component that was measured (df=1836, p<.01).

Table I. Descriptive statistics, complemented with paired one-sided t-test results for well-being (n=1837, df=1836)

	Before SARS-CoV-2 measures (t_0)		After SARS-CoV-2 measures (t_1)		Mean difference (SE)	r	t
Outcome	**M**	**SD**	**M**	**SD**			
Dry eyes	2.78	2.82	3.76	3.43	-0.98 (.045)	.825**	-21.593**
Head or neck pain	3.45	2.73	4.65	3.28	-1.20 (.054)	.721**	-22.430**
Shoulder or arm pain	2.62	2.71	3.60	3.39	-0.98 (.049)	.788**	-20.099**
Pain in back	3.19	2.72	4.12	3.32	-0.93 (.050)	.763**	-18.459**
Weight gain	2.23	2.54	3.04	3.12	-0.81 (.055)	.670**	-14.764**
Not feeling fit	3.08	2.58	4.11	3.19	-1.03 (.064)	.565**	-16.122**
Fatigue	4.62	2.64	5.50	3.01	-0.88 (.067)	.483**	-13.030**
Stress or tension	5.10	2.59	5.95	2.93	-0.85 (.063)	.521**	-13.406**
Sleeping problems	3.10	2.81	4.17	3.31	-1.07 (.062)	.639**	-17.339**
Irritability	3.30	2.55	4.34	3.11	-1.04 (.060)	.599**	-17.180**

* P < .05, ** p < .01

The differential mean (Δmean =) was most prominent for head and neck pain, sleeping problems, irritability and feeling fit. Complaints rose with about 10% on average in these categories (|Δmean|>1). While stress or tension and fatigue were eminent in the pre- SARS-CoV-2 period as well, the change after the measures took place was smaller (|Δmean|<.90).

Well-being factors

Well-being is a so-called latent variable. One cannot measure it directly, but uses relevant questions to assess well-being. In order to simplify these different items for the subsequent multivariate regression, an exploratory factor analysis (EFA) was performed to identify a smaller set of surrogate variables out of the original 10 items for measuring well-being. The independent variables for the EFA were the differential scores of the 10 well-being items (Δ_{score}=), ranging from -10 to 10. The correlation matrix for the 10 perceptions of difference in well-being reveals that all items correlate at least .488 with another item. Furthermore, the Kaiser-Meyer-Olkin measure of sampling adequacy was .869, and thus above the recommended value of .5 (Hair et al., 2014). Significance of the correlation matrix was tested with Bartlett's test for sphericity ($\chi^2(45)=6930.742$, p<.001). The minimum amount of data for R factor

analysis was satisfied as well. The ratio of observations to variables is 183.1:1, which is well above the acceptable limit of 20:1. These indicators suggested that the set of 10 variables is appropriate for EFA.

Table II. Total variance explained by different components of well-being

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squares loadings
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	4.336	43.363	43.363	4.336	43.363	43.363	2.752
2		13.473	56.837	1.347	13.473	56.837	2.484
3		10.250	67.087	1.025	10.250	67.087	1.473
4		7.734	74.821				
5		5.439	80.260				
6		4.905	85.166				
7		4.233	89.399				
8		3.840	93.239				
9		3.707	96.946				
10		3.054	100				

Since the primary purpose was to detect composite measures for a multivariate regression, a principal components analysis (PCA), using VARIMAX rotation was conducted. As illustrated in table II, three factors were retained, using the Kaiser rule criterion (Eigenvalue > 1). As illustrated in table III, all items had significant primary loadings over .5.

Table III. VARIMAX-Rotated Component Analysis Factor Matrix

	VARIMAX-ROTATED LOADINGS Factor			
Variables	**1**	**2**	**3**	**Communality**
	Mental	**Physical**	**Fitness**	
Fatigue	.726			.677
Stress or tension	.830			.747
Sleeping problems	.774			.630
Irritability	.810			.711
Dry eyes		.558		.361
Head or neck pain		.815		.726
Shoulder or arm pain		.818		.711
Pain in back		.775		.657
Weight gain			.689	.678
Not feeling fit			.894	.811

The extracted factors explained 67.087% of the total variance, whereas a minimum of 60% is advised for psychological concepts that cannot be measured exactly (Hair et al., 2014) . The first principal component (PC) explained 43.363% and had positive high loading for items related to the mental well-being of an individual, while the second PC contributed 13.373% with high loading on items related to physical well-being. The third PC explained 10.250% and showed high loadings for fitness related items.

The EFA assisted in constructing the composite values for mental, fitness and physical well-being and the components suggest meaningful components as well. To verify whether these items were suited to construct mean summated scores, the reliability of these scale items was measured. The Cronbach's alpha was .845 for the items in the mental well-being scale, .782 in the physical well-being scale and .608 in the fitness well-being scale. The last scale has a reliability under the recommended .70. Primary reason can be found in the fact that this scale consists of only 2 variables. Future research should identify more items to measure this last concept. For the remainder of our analysis, this component will therefore be excluded.

Influence of participants' characteristics, career perspective and perceived job quality and control on mental well-being

A hierarchical linear regression was used to explore the association between mental well-being and in first instance, the socio-demographic characteristics, secondly, the impact of SARS-CoV-2 on career

perspectives and, in a final step, the perceived job performance and control. In a first analysis, mental well-being was used as the dependent variable. In the second analysis, physical well-being was the dependent variable. Both well-being constructs were composed as the average mean of the items in the components found in the preceding factor analysis.

Table IV. Participants' characteristics (n=1830)

Variable	N (%)	Difference in mental well-being		Difference in physical well-being		
		Mean (SD)	η / r	Mean (SD)	η / r	
Gender			**.056***		.006	Block 1
Male	839 (45.8)	-.934 (1.558)		-.951 (2.091)		
Female	991 (54.2)	-1.117(1.692)		-.951 (2.355)		
Age (n=1830)			-.029		.019	
[16-26]	114 (6.2)	-.785 (1.440)		-1.000 (1.779)		
[27-36]	673 (36.9)	-1.019 (1.666)		-.932 (2.178)		
[37-46]	488 (26.7)	-1.019 (1.681)		-1.212 (2.407)		
[47-56]	315 (17.3)	-1.137 (1.639)		-.618 (2.245)		
[57-65]	197 (10.8)	-1.156 (1.592)		-1.083 (2.247)		
[66-84]	39 (2.1)	-.667 (1.101)		-.551 (1.735)		
Kids			.015		**.059***	
No	1027 (56.1)	-1.012 (1.671)		-.848 (2.140)		
Yes	803 (43.9)	-1.060 (1.586)		-1.115 (2.349)		
Living together (other than kids)			.032		**.056***	
No	587 (32.1)	-1.108 (1.767)		-1.148 (2.240)		
Yes	1243 (67.9)	-.998 (1.567)		-.879 (2.231)		
Quiet working space at home			.049		**.131*****	
Always	831 (45.4)	-.961 (1.649)		-.666 (2.142)		

Most of the time	509 (27.8)	-1.033 (1.662)		-1.075 (2.128)	
(Almost) never	490 (26.8)	-1.556 (1.574)		-1.358 (2.430)	
Percentage of employment			.034		.010
<100%	281 (7.0)	-1.022 (1.608)		-.914 (2.194)	
100%	1369 (74.8)	-1.013 (1.578)		-976 (2.175)	
>100%	180 (9.8)	-1.201 (2.044)		-.968 (2.728)	
Health situation			**.136*** **		**.150*** **
Healthy	1554 (84.9)	-.940 (1.562)		-.829 (2.184)	
Somewhat hindered by health condition	273 (14.9)	-1.563 (1.919)		-1.712 (2.378)	
Completely hindered by health condition	3 (.2)	-1.083 (1.181)		-3.917 (1.181)	
Work/life balance			**.299** **		**.336** **
Worse	1439 (78.6)	-1.148 (1.650)		-1.226 (2.204)	
Same	288 (15.7)	-.492 (1.373)		-.035 (1.727)	
Better	103 (5.6)	-.947 (1.777)		.073 (2.896)	
Home keeping tasks			**.220** **		**.282** **
More	1033 (56.4)	-1.234 (1.615)		-1.389 (2.193)	
Same	667 (36.4)	-.838 (1.558)		-.619 (1.963)	
Less	130 (7.1)	-.442 (1.692)		.623 (2.826)	

* P < .05, ** p < .01, ***<.001. Associations were calculated via Eta for categorical dependent variables (gender, kids, living together, quiet working space at home and health situation). For the remaining continuous variables, Pearson R square was used. Anova was used to test for significance.

Table IV illustrates the socio-demographic predictors that that were assumed to have an impact on mental well-being shortly after the introduction of the SARS-CoV-2 measures. Age, percentage of employment, work/life balance and home-keeping tasks are continuous variables. For the cross table above, these continuous variables were combined into classes for clarity. In further calculations the continuous variable will be used. The remaining variables were sets as dummy variables due to their categorical nature. The absence of the item was set as reference group for the variables ‘kids’ and ‘living together’. For ‘health situation’, the ‘healthy’ persons were the reference group. For sex, ‘male’ was the reference group and for the variable workspace, the presence of a quiet working space was the reference group. Because gender neutral persons accounted for < 0.5% instances the variable sex, these respondents (7 in total) were excluded.

For difference in mental well-being, a marginal association was found with gender (η=.056,p<.05) and the health situation of the respondent (η=.136,p<.001). Furthermore, a positive correlation was found between the work/life balance (r=.299,p<.01) and the home-keeping tasks (r=.220,p<.01). These significant associations were included in the first phase of the hierarchical linear regression with mental health as the dependent variable.

For difference in physical well-being, marginal associations were found with having kids in the house (η=.059,p<.05) and living together with someone (η=.056,p<.05). Also, an association was found between having a quiet working space in the house (η=.131,p<.001) and health situation (η=.150,p<.001). Positive correlations were also found between physical health and work/life balance (r=.336,p<.01) and between physical well-being and the need to perform chores at home (r=.282,p<.01).

Table V. Assumed effects of SARS-CoV-2 measures on the career

Variable	N (%)	Difference in serenity Well-being		Difference in mental well-being		
		Mean (SD)	r	Mean (SD)	r	
Fear that COVID-19 measures will impact career			**.220****		**.130****	Block 2
Yes	725 (39.6)	-1.433 (2.360)		-1.227 (1.769)		
Neutral	458 (25.0)	-.963 (2.084)		-1.090 (1.714)		
No	647 (35.4)	-.443 (2.082)		-.776 (1.365)		
Fear that COVID-19 measures create backlog at work			**.362****		**.242****	
Yes	1003 (54.8)	-1.554 (2.207)		-1.312 (1.750)		
Neutral	364 (19.9)	-.668 (1.996)		-.928 (1.491)		
No	463 (25.3)	.077 (2.050)		-.511 (1.315)		

* P < .05, ** p < .01, ***<.001. Associations were calculated via Eta for these categorical dependent variables. Anova was used to test for significance.

In model 2, the assumed effects of the SARS-CoV-2 effects on the career were introduced, as illustrated in table V. Both variables were continuous. The results suggest that 39.6% of the respondents fear a negative impact on the career, while 35.4% thinks the SARS-CoV-2 measures will have a positive impact on their career. All groups see a decline in both mental and physical well-being, though this is most prominent in the group that fears a negative impact on the career. Most respondents fear that the SARS-CoV-2 measures will create a backlog at work, while 25.3% think these will in fact create an opportunity to catch up witch work. The latter group is the only one that sees an increase in mental well-being. All other groups see a decline, which is most prominent in the group that fears the work backlog.

A significant association was found between mental and physical well-being and the fear for impact on career perspectives (r=.220,p<.01;.130,p<.01). Both mental and physical well-being showed an association with the fear that the measures introduced a work backlog (r=.362, p<.01 and r=.242, p<.01 respectively).

The significant associations were introduced in step 2 of the hierarchical linear regression.

Table VI. Perceived job performance and control

Variable	N (%)	Difference in mental well-being		Difference in physical well-being		
		Mean (SD)	η / r	Mean (SD)	η / r	
Perceived work quality of teaching after COVID-19 measures			**.119*** **		**.117*** **	Block 3
No teaching activities	391 (21.4)	-.763 (2.193)		-.815 (1.633)		
Worse	834 (45.6)	-1.143 (1.725)		-1.440 (2.271)		
Same	449 (24.5)	-.865 (1.388)		-.572 (1.869)		
Better	156 (8.5)	-.941 (1.778)		-.064 (2.564)		
Perceived work quality of research after COVID-19 measures				.117***	**.179*** **	
. No research activities	192 (10.5)	-1.375 (1.833)		-1.072 (2.383)		
Worse	884 (48.3)	-1.136 (1.678)		-1.301 (2.231)		
Same	591 (32.3)	-.852 (1.525)		-.690 (2.052)		
Better	163 (8.9)	-.727 (1.402)		-.022 (2.355)		
Control over work planning			**.262** **		**.490** **	
Less	1129 (61.7)	-1.285 (1.648)		-1.566 (2.143)		
Same	398 (21.7)	-.704 (1.535)		-.281 (1.847)		
More	303 (16.6)	-.528 (1.515)		.373 (2.218)		
Disturbances during the job			**-.219** **		**-.326** **	
Less	648 (35.4)	-.838 (1.629)		-.254 (2.248)		
Same	280	-.763		-.715		

	(15.3)	(1.385)		(1.939)	
More	902 (49.3)	-1.257 (1.679)		-1.554 (2.153)	
Breaks during the job			**.207****		**.231****
Less	641 (35.0)	-1.351 (1.784)		-1.612 (2.238)	
Same	576 (31.5)	-.841 (1.405)		-.749 (1.897)	
More	613 (33.5)	-.881 (1.623)		-.492 (2.371)	

* P < .05, ** p < .01, ***<.001. Associations were calculated via Eta for categorical dependent variables (perceived work quality of teaching and research). For the remaining continuous variables, Pearson R square was used. Anova was used to test for significance.

As illustrated in table VI, model 3 bundles the perceived job performance and control. For the assessment of the proper performance, the two most prominent tasks of academics were polled. The first was the quality of research. This variable was coded as a dummy variable with the group that had no research in the job description as reference group. The second variable covers the quality of teaching. Here, the reference group was the group without teaching in the job description. Control over the work planning, disturbances during the job and breaks during the job were all continuous variables.

The perceived quality of teaching and research were associated with both mental (η=.119,p<.001, η=.117,p<.001) as physical well-being (η=.117,p<.001, η=.179,p<.001). Control over the proper work planning showed a positive correlation with mental and physical well-being (r=.262,p<.01 and r=.290,p<.01 respectively), while disturbances during the job was negatively correlated with these dependent variables (r=-.219,p<.01; r=-.326,p<.01). Finally, the breaks that one could take during the job also showed a positive correlation with mental and physical well-being (r=.207,p<.01; r=.231,p<.01).

The significant associations were introduced in step 3 of the hierarchical linear regression.

Table VII. Hierarchical regression analysis with mental well-being as dependent variable

	Mental well-being (n=1830)					
Variable	Step 1 (β)		Step 2 (β)		Step 3 (β)	
Participants' characteristics						
Intercept	.055		-1.256***		-.984***	
D_female	.113	1.004				
D_hindered by illness at times	.-.675***	1.003	-.529***	1.006	-.506***	1.007
D_always hindered by illness	-3.469**		-2.958**		-2.531*	
Work/life balance	.202***	1.064	.152***	1.098	.053**	1.236
Less housekeeping tasks	.254***	1.062	.213***	1.077	.149***	1.113
Assumed effects of SARS-CoV-2 measures on the career perspectives						
Fear for direct impact on career			.050	1.132		
Fear for work backlog			.392***	1.171	.274***	1.131
Perceived job performance and control						
Planning work					.123***	1.343
Pausing during job					.130***	1.043
Disturbances during job					-.097***	1.122
D_Teaching evaluated worse					-.059	1.035
D_Teaching evaluated same					.119	
D_Teaching evaluated better					.251	
D_Reasearch evaluated worse					-.002	1.027
D_Research evaluated same					.093	
D_Research evaluated better					.490*	
R^2	.189		.238		.322	
ΔR^2	.189***		.049***		.087***	

* P < .05, ** p < .01, *** p < .001 Variables starting with D_ represent dummy variables.

After controlling for confounding variables, a three step hierarchical regression was performed. As shown in table VII, in step 1, the mental well-being of women was marginally better than the mental well-being of men. The effect was however not significant (β=.055, p>.05). The presence of illness hindering work from time to time, had a significant negative effect on the well-being compared to the group that was healthy (β=-.675, p<.001). For the group that was hindered completely from working, this effect was more prominent (β =-.675, p<.01). A better work-life balance and less house-keeping tasks suggest and improvement of mental well-being. Both effects were significant (β =.202, p<.001; β =.254, p<.001). After step 1, the model accounted for 18.9% of the variation in well-being. The model also proved to be significant (R^2=.189, p<.001).

In step 2 of the hierarchical regression analysis, the significant predictors from step 1 were preserved. With regards to the presumed effects of SARS-CoV-2 on the career, no significant differences were detected with the reference group. The group that completely agreed they feared a backlog in work due to the measures however, showed a significant decline in mental well-being compared to the reference group that had no opinion on this matter (β =-.392, p<.001). After the introduction of these new predictors the effect of the health status became smaller, but remained significant. The coefficient for the group that was hindered from time to time during the job was -.529 (p<.001), while the coefficient for the group that was always hindered from working became -2.958 (p<.01). The effect of work/life balance, and house-keeping became less prominent as well, while staying significant (β =.152, p<.001; B=.213, p<.001). Model 2 improved the R^2 score from model 1 significantly by 4.9% (R^2=.238, p<.001).

Finally, in step 3, the perceived job performance and control was introduced. The ability to plan the work and being able to take breaks, improved mental well-being significantly as well (β =.123, p<.001; β =.130, p<.001). Being interrupted often during the job performance, had a significant negative impact on mental well-being (β =-.097, p<.001). The effect of perceived teaching quality had no significant effect, whereas the perceived quality of research did. The group that scored their research better due to the SARS-CoV-2 measures, saw an increase of .490 (p<.05) compared to the reference group with no research activities in the curriculum. The introduction of these new predictors damped the effect of previous predictors from model 1. The coefficient for the group that was hindered from time to time during the job became -.506 (p<.001), while the coefficient for the group that was always hindered from working became -2.531 (p<.05). The effect of work/life balance, and house-keeping became less prominent as well, while staying significant (β =.053, p<.01; β =.149, p<.001). The coefficient of the group that completely agreed they feared a backlog in work due to the measures became -.341 (p<.01), whereas the coefficient of the group that completely disagreed increased to .820 (p<.001) and the coefficient of the group that agreed became .593 (p<.05).

The addition of job performance and control elements to our model explained an additional 8.7% of the variation in mental well-being (R^2=.322, p<.001).

Residual and scatter plots indicated that the assumptions of linearity, homoscedasticity and normality were satisfied. Additionally, to test for multicollinearity was used. This metric is preferred over VIF when

dummy variables with 3 or more categories are involved. Collinearity statistics were within the accepted limits, suggesting that the assumption of having no multicollinearity has been met (Hair et al., 2014).

Influence of participants' characteristics, career perspective and perceived job quality and control on physical well-being

Furthermore, an interaction effect was found. Having kids affected the work/personal life balance and this interaction was thus integrated in our model. Table IV showed associations with physical health that were not present in the model for mental well-being. Having kids, living together and having a quiet working space at home were added in the first step of our model, while gender was excluded. The composition of the remaining blocks was similar to previous model.

Table VIII. Hierarchical regression analysis with physical well-being as dependent variable

	Physical well-being (n=1830)					
Variable	Step 1 (β)		Step 2 (β)		Step 3 (β)	
Participants' characteristics						
Intercept	-.646***		-1.116***		-1.201***	
D_living with kids	.014*	1.575	.021	1.548	.027·	1.563
D_living together	.039	1.023				
D_hindered by illness at times	.-.412***	1.006	-.355***	1.008	-.333***	1.009
D_always hindered by illness	-.338		-.166***		-.139	
Work/life balance	.071***	1.380	.054***	1.927	.027·	1.476
Less housekeeping tasks	.105***	1.103	.090***	1.234	.075***	1.133
D_kids: work_life_balance	-.037	1.911	-.049*	3.627	-.059**	1.915
Assumed effects of SARS-CoV-2 measures on the career perspectives						
Fear for direct impact on career			-.001	1.141		
Fear for work backlog			-.171***	1.387	.132***	1.131
Perceived job performance and control						
Planning_work					.055***	1.346
Pausing during job					.049***	1.047
Disturbances during job					-.012	1.047
D_Teaching evaluated worse					-.151*	1.042
D_Teaching evaluated same					-.070	
D_Teaching evaluated better					-.215*	
D_Reasearch evaluated worse					.282**	1.028
D_Research evaluated same					.289**	
D_Research evaluated better					.324**	
R^2	.079		.107		.141	
ΔR^2	.079***		.028***		.034***	

* P < .05, ** p < .01, *** p < .001. Variables starting with D_ represent dummy variables.

Table VIII illustrates the results of the three-level hierarchical regression. In step 1, having kids suggested a significant, but marginal improvement of well-being compared to having no kids (β=.014, p<.05). It is interesting to zoom into the interaction of this variable with the work/life balance. Where a better work/personal life balance suggests an improvement to physical well-being, having kids affects this work/personal life balance in a complex manner. Furthermore, a significant decline in physical well-being was found in the group that was hindered by health problems at times compared to the group without health problems (β=-.412, p<.001). This change was less prominent and not significant in the group that was always hindered due to health problems (β=-.338, p>.05). Less house-keeping tasks significantly improved physical well-being. The model explained 7.9% of the variation in physical well-being (R^2=.079, p<.001).

In step 2, career related fears were added to the model. The effect of the coefficients from model 1 became smaller, but apart from 'having kids', all coefficients remained significant (p<.001). The fear for direct impact on the career showed no significant effect, whereas the fear for backlog of work had a significant negative effect on physical well-being (β=-.171, p<.001). Model 2 improved the R^2 score from model 1 significantly by 2.8% (R^2=.107, p<.001).

Model 3 encompasses the perceived job performance and control. The ability to plan work and to pause more frequently had a positive and significant effect on the physical well-being (β =.055, p<.001; β =.049, p<.001), whereas the coefficient of being more disturbed during work was negative, but non-significant (β =-.012,p>.05). Teaching staff was negatively affected compared to the non-teaching reference group. However, the group that evaluated its teaching quality as the same before and after the SARS-CoV-2 measures showed no significant change (β =-.151, p<.05; β =-.070, p>.05; β =-.049, p<.05). In contrast, the group that did research showed a significant positive effect on physical well-being, even if they perceived the quality of their work as lower compared to the period before the SARS-CoV-2 measures (β =.282, p<.01; β =.289, p<.01; β =.324, p<.01). The third model explained an additional 3.4% of the variation in physical well-being (R^2=.141, p<.001).

Collinearity, normality of the residuals and homoscedasticity remained within the accepted limits at all times after applying the Lambert W transformation on the outcome variable.

Discussion

The present study supports that the mental and physical well-being of academics working at Belgian universities was impacted during the first wave of the virus, after the SARS-CoV-2 measures were promptly introduced. Our results highlight the importance of work related factors, like control over the proper work planning and the ability to take breaks from the job on a regular basis. In contrast, undesired

work breaks – or interruptions – had a negative impact on the mental and physical well-being. The impact on physical well-being was however not significant. A better work/life balance was associated with an improved mental health status. Our findings are broadly consistent with prior studies that link large-scale disasters, man-made, natural or technological, to a negative impact on psychological well-being of individuals (Neria et al., 2008) and SARS-CoV-2 reflects on workers' mental well-being (Evanoff et al., 2020; Vanhaecht et al., 2021).

Academic work is typically not a 9-to-5 job, and academic staff is often familiar with working from home. Under normal conditions telework gives academics the opportunity to individually optimize the performance of their work according to their needs and time. Fieldwork, face-to-face research and teaching are however constant presences for many academics. Mandatory and continuous crisis-induced telework overturned the regular working habits (Carillo et al., 2020). In general, academics signaled less control over their agenda while teleworking, not more. Furthermore, both universities and academics were unevenly prepared to face the telework demands. Universities' technological infrastructure was not always ready for distance learning on large scale. Some researchers were unable to continue their research projects, while teaching staff sometimes missed the necessary equipment for distance learning.

Telework is also less predictable, enduring and often implies a form of after-hours work engagement through the continuous technology-enabled connectivity (Chen & Karahanna, 2018). As a result, if not handled with care, it can induce technostress, or stress due to the use of ICT in an organisational context (Srivastava et al., 2015). Technostress has been shown to affect perceived work overload and information fatigue, resulting in a decline of individuals' well-being (Srivastava et al., 2015; Tarafdar et al., 2015). Universities, like other employers, have a moral and legal obligation to provide healthy working conditions for their employees. Universities and supervisors can fulfill an important role in improving the well-being of their staff members, as also suggested by Evanoff et al. (2020). Providing the necessary infrastructure and tools, facilitating ICT training, providing an efficient help-desk support and involvement in ICT decisions that affect the tasks and workflow are crucial to counter deterioration of well-being due to technostress (Tarafdar et al., 2015).

Our findings also suggest that the personal health situation, being obliged to perform a lot of chores at home, and frequent interruptions while working at home had a detrimental effect on the individual's well-being. As expected, an interaction was found between kids and work/private life balance. The fear that the SARS-CoV-2 measures would create a work backlog was associated with a decrease in mental and physical health compared to the group that did not share this fear. These results also stress the importance of perceived supervisor support for the personal and family situation, a type of support that is often considered to be indicative for organisational support (Hammer et al., 2009; King et al., 2012). But co-workers can play an important role here as well. Even at times where social contact is limited to online contact, employees remain sensitive to social cues and interactions with co-workers in constructing their self-image and positioning themselves within an organisation. As Vorauer (2013, p. 72) argued, "People have an enduring, deeply entrenched need to know their standing with others that manifests itself in ongoing nonconscious monitoring of the social world for evaluative feedback". This peer factor is an

important element that also benefits team cohesion (Mathieu et al., 2015), a factor that should not be ignored at times of obliged distance working. In turn, team cohesion is considered to contribute to the well-being of individual team members (Vanhove & Herian, 2015).

Unlike the Middle East, South Asia and Africa that were confronted in a recent past with diseases like Ebola, MERS-CoV and SARS, the West had little recent experience with severe contagious diseases. Research on prior epidemics in the Western world is therefore lacking, and research of prior epidemics in other parts of the world cannot be extrapolated to the Western society, since measurements and reactions to counter an epidemic are always embedded within a local, cultural context. However, despite the lacking blueprint to tackle a pandemic, policies and practices can be adapted to the circumstances and improve well-being and job satisfaction (Chew et al., 2020). By assessing the work-related and personal contributing factors to a decline in well-being, a first effort is made to assist in future pandemic planning within universities that takes these factors into account.

The strengths of this study include the specific orientation towards Belgian academic staff, with respondents from all Belgian universities, and the evaluation of personal, family and work-related factors that influence the well-being of this population. To our knowledge this is the first nationwide study that targets academic staff. The cross-sectional design introduces some limitations though. This set-up does not allow to find causality between risk factors and a decline in well-being. The self-reported mental and physical health approach in this study was meant to offer an exploratory overview. However, future research would benefit from the construction of validated scales, taking into account the inherent context specific nature of the construct of well-being. Lastly, the findings of this study cannot be extrapolated outside of the academic community, since differences in socioeconomic and educational backgrounds may have an effect on the individual's well-being. Also, these results are specific for the Belgian context, since SARS-CoV-2 measures vary per country.

Declarations

Competing interests: The authors declare no competing interests.

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