

Well-being and depressive symptoms among corporate workers during the COVID–19 pandemic

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Summary

Aim. The study aimed to assess the well-being of corporate employees and whether it changed from the beginning of the first wave of COVID–19 (March) to the development of the second wave of the disease (October). The essence of the study was to estimate the risk of depressive symptoms in the study population.

Method. The study involved 250 corporate employees. The study was conducted using the WHO–5 questionnaire and Beck’s Depression Inventory. Statistical significance was determined by the Wilcoxon test ($p = 0.05$).

Results. In the first stage of the study, the mean well-being of the respondents was assessed at 20.2 points, indicating well-being at a moderate level. It was observed that the mean well-being was worse among women (18.4 points) than among men (22.0 points). In the last stage of the study, the sampling of the subjects was 11.0 points – the level of poor well-being (10.0 points in women and 12.0 points in men). The percentage of people with mild and moderate depression was found to be higher in the October stage than in the March stage.

Conclusions. On the basis of the study, it can be concluded that COVID–19 and its associated restrictions harmed the mental condition of the subjects.

Key words: well-being, depression, COVID–19, SARS–CoV–2, corporate employees

Introduction

Experiencing distressing events and difficulties in coping with them are important predictors of anxiety, stress and depression [1]. Depression is one of the main generators of disability in modern times [2, 3]. Experiencing epidemics or natural disasters increases its risk in human populations [3, 4], which can also increase suicide rates [5, 6]. The world is currently facing a critical situation caused by the SARS-CoV-2 virus, which has significantly contributed to increased levels of depression in different parts

of the world [7]. The situation of the population in countries that have been severely affected by the epidemic is particularly worrying [3, 4].

SARS-CoV-2 is a highly infectious droplet-transmitted virus of the *coronavirus* family that is mainly associated with respiratory impairment. The World Health Organization (WHO) has named the disease caused by this virus COVID-19 [8]. The first infections were observed in the city of Wuhan (China) in 2019, but the virus' ability to spread rapidly has led the WHO to declare COVID-19 a global pandemic [9]. The pathogen has now become one of the most important health, social and economic problems in recent years [10]. Many studies have shown the impact of COVID-19 on human well-being. In countries particularly affected by the pandemic, a full-scale mental health crisis associated with social misinformation, the fact of contracting the disease or bereavement due to the death of a family member has been noted [11]. Depression among populations affected by COVID-19 has received particular research attention [12–14]. Depression consists of symptoms related to low self-assessment, sadness and worthlessness [15], which lead to lower self-esteem and lack of interest in life [16]. This disorder is closely associated with a lower likelihood of achieving life goals and deteriorating health (mental and somatic) and with suicide attempts [17, 18]. Tendencies towards depressive behavior may be related to internal (individual) factors such as genes, but also external factors such as the environment in which we live [17]. In the case of COVID-19, the main stressor is not the fact of contracting the disease, but also isolation, lack of contact with loved ones, changes related to work/learning mode, and other indirect factors related to the imposition of sanitary restrictions by state governments [19].

Economic development, the emergence of modern technologies and their spread in everyday life have resulted in a multitude of corporations providing services performed remotely using IT (information technology) solutions. The health and well-being of corporate employees are mainly affected by stress related to performance pressure, increasing competition and working in a network of interrelated processes [20, 21]. Overwork and stress can even lead to death. Already in the 1960s, Japanese scientists described the phenomenon of *karoshi*, i.e., death from overwork, resulting in a stroke or myocardial infarction. Workaholics and perfectionists are at high risk of *karoshi*, as well as people who are busy, who do not get enough sleep, and who are always under pressure of time and results [22].

Therefore, the group to which it was decided to devote this paper are corporate employees. They are an interesting group in that their work is mainly computer-based and they work part of their working hours from home in what is known as remote working. Therefore, the sudden introduction of full-time remote working should not be a stress factor for them. The study aimed to find out whether the respondents' well-being changed between the beginning of the first wave of COVID-19 (March) and the development of the second wave (October). The essence of the study was to estimate the risk of depressive symptoms in the study population.

Material and method

Participants

The survey involved 250 corporate employees (administrative and office staff working in customer service relating to tax returns and the operation of IT systems).

The main criterion for inclusion in the study was the absence of psychiatric problems in the past that required psychotherapeutic consultation or psychiatric treatment, other health problems were not considered because all subjects were fit for work at the time of the study.

145 (58%) women and 105 (42%) men participated in the study. The mean age of the respondents was 28 years (± 3 years). All respondents were administrative-office employees of IT corporations, and the duties they performed were related to customer service (tax settlements, IT system operation). Most of the respondents lived in large cities (205 people; 82%). 195 (78%) respondents had higher education, and 55 (22%) people had secondary education. The material situation of the respondents assessed based on the question about income was classified as average – 1,500 PLN/person (for 84% of respondents). Almost 56% of respondents were married at the time of the survey, 34% declared being single or living in an informal relationship with another person. About 72% of the respondents had a minimum of one dependent child. In the second phase of the study (October), feedback questionnaires were not received from 10 respondents due to them being on leave, dismissed, or resigning from work. Missing data were replaced with averages to allow statistical inference to be made.

Research tools

The study was conducted using a questionnaire containing: a mental health interview; the WHO-5 Well-Being Index – scale developed by the Psychiatric Research Unit of WHO [23]; the Beck Depression Inventory¹ [24]; original multiple-choice questions about the impact of the epidemic situation on their current lives.

The WHO-5 was interpreted by adding up the scores for each of the 5 questions. An individual question was scored from 0 to 5, where 0 meant the worst possible quality of life and 5 meant the best possible quality of life. The point range for the scale was 0 to 25. The raw score had to be multiplied by 4 to obtain the percentage score (%). The percentage score was read according to the scale: 92–100% very good well-being; 76–91% good; 56–75% moderate; 55% and less – poor. Cronbach's α coefficient for the standardization sample was 0.82.

The Beck Depression Inventory, in turn, comprised 21 questions about the basic symptoms of depression. Questions were scored on a scale from 0 to 3, where 3 means the highest severity of a given symptom. The final score of the test consisted of adding up the points for each question and reading the severity of depression: 0–11 no

¹ Beck Depression Inventory (BDI) – a scale used in the diagnosis of depression, developed by Aaron Beck. The original version from 1961 was used in the study. The Polish version, standardized by the Psychological Test Laboratory of the Polish Psychological Association, is also available.

depression; 12–19 mild depression; 20–25; moderate depression; 26 and above – severe depression. Cronbach's α coefficient for the normalization sample was 0.93.

In the section of the questionnaire developed by the authors, respondents subjectively rated the impact of particular feelings about the COVID-19 pandemic on their lives on a scale of 0 to 10. Distinguishing factors such as fear of becoming ill (their own or a loved one's); fear of quarantine/isolation/hospitalization; fear of loss of employment; anxiety related to social misinformation; anxiety related to difficult access to medical services; anxiety related to lack of contact with family/friends were assessed. The following interpretation of the scale was adopted: 0 – least impact on the psychophysical condition, 10 – the greatest impact on the psychophysical condition.

Procedure

The questionnaire was conducted using the CAWI (Computer Assisted Web Interviews) method in four large IT services companies, and the participating administrative and office staff received invitations from management. Participants took part voluntarily and anonymously. Participants first filled in a section of the questionnaire containing basic data about themselves (metric), including their mental condition and psychiatric treatment, then completed the WHO-5 and Beck Depression Inventory, and finally were asked to answer questions about the impact of the pandemic situation on their lives.

The questionnaire survey was conducted twice on the same group of people: in the first half of March 2020 (beginning of the COVID-19 pandemic in Poland) and in October 2020 (re-tightening of restrictions) [25]. The study was approved by the Bioethical Committee of the Medical University of Silesia in Katowice (PCN/0022/KB/211/20).

Analysis plan

Statistica 13.3 software was used to process the results and statistical measures such as mean (X), standard deviation (SD), minimum and maximum value (min-max) were used to describe the results. Basic descriptive statistics were used to analyze the results. Statistical significance was determined using the Wilcoxon rank test (T). For each test, a statistical significance level of $p = 0.05$ was assumed.

Results

Respondents first completed the COVID-19 experience section of the questionnaire. In the first phase of the study (March), the most common experience that impacted respondents' lives the most was self-isolation (as a form of prevention) with 42% of respondents. The second most common option was to suspect COVID-19 in oneself or a family member (16%). For the experience of administrative quarantine and isolation/hospitalization, such an option was marked by 4% and 2% of the respondents, respec-

tively. Re-implementation of the questionnaire (October) showed that respondents' experiences of COVID-19 had changed. At this stage of the study, the most frequently selected option was again self-isolation (56%), followed by suspected COVID-19 (46%), administrative quarantine (30%), and isolation/hospitalization (6%). A large increase in the percentage of responses was observed for the options "suspected COVID-19" (an increase of 30 percentage points) and "administrative quarantine" (an increase of 26 percentage points). Statistically significant differences were observed between the study periods ($Z = 4.518$; $p = 0.002$).

Respondents were also asked about their attitudes towards COVID-19. In this case, the data also provided some interesting observations. In the March stage of the research, 70% of respondents declared that they considered the COVID-19 threat to be real, while 8% downplayed it (22% had no opinion). In the October phase of the survey, there was a decrease in those who did not take the threat seriously (4%) in favor of the group of people who take COVID-19 seriously (82%). 14% had no opinion on the topic. The difference between the study periods was confirmed by a statistical test ($Z = 3.944$; $p = 0.001$).

Respondents were asked to rate on a 10-point scale the level of selected negative feelings associated with the disease caused by SARS-CoV-2, where 10 meant the highest level of a given emotion. Based on the collected data, a positive trend became apparent for emotions such as: "fear of getting sick", "fear of losing employment", "anxiety about social misinformation". The mentioned distinctions showed temporal variability – negative feelings related to the mentioned phenomena increased between the research stages ($Z = 2.342$; $p = 0.003$). No relationship was observed for the other emotions. Detailed results are presented in Table 1.

Table 1. Own feelings about COVID-19 in the study group ($N = 250$)

Feelings associated with COVID-19*	MARCH			OCTOBER			p
	X	SD	min-max	X	SD	min-max	
Fear of becoming ill (either oneself or a loved one)	5.6	±1.0	2-7	8.0	±0.6	5-10	<0.05
Fear of quarantine/isolation/hospitalization	2.0	±0.8	0-4	2.2	±0.6	1-5	>0.05
Fear of losing employment	4.8	±1.2	2-6	8.2	±1.0	5-10	<0.05
Concern over public disinformation	3.6	±0.8	2-6	6.8	±1.0	4-9	<0.05
Concerns about impeded access to Medical services	2.2	±0.6	0-4	2.6	±0.8	1-5	<0.05
Anxiety over lack of contact with family/friends	2.8	±1.2	0-4	3.2	±1.0	1-5	>0.05

*all items were rated on a scale of 0–10, where 10 represents the highest level of emotion in a given category.

The level of well-being was assessed using the WHO-5. As in other cases, the assessment was performed twice. In the first stage of the study, the mean well-being

of the respondents was assessed at 20.2 points (80.8%), which means well-being at a moderate level. It was observed that the mean well-being was worse among women (18.4 points; 73.6%) than among men (22.0 points; 88.0%). In the last stage of the research, the respondents assessed their well-being as poor (11 points) – the level of poor well-being: 10 points (40%) in women and 12 points (48%) in men. The difference between the study periods was confirmed by statistical test ($Z = 5.743$; $p = 0.001$) – Table 2.

Table 2. Results of the WHO-5 in the study group ($N = 250$)

Over the last two weeks I have felt:*	MARCH			OCTOBER			p
	X	SD	min-max	X	SD	min-max	
Cheerful and in a good spirit	4.4	±0.6	3-6	2.8	±0.8	1-4	<0.05
Calm and relaxed	4.2	±0.8	3-6	2.2	±0.4	1-4	
Active and vigorous	4.6	±0.4	3-6	1.8	±0.4	1-3	
Fresh and rested	3.8	±0.2	3-5	2.4	±0.2	1-3	
My daily life has been filled with things that interest me?	3.2	±0.4	3-5	1.8	±0.6	1-3	
TOTAL (raw score) [points]	20.2	±0.4	18-25	11.0	±0.4	8-15	
TOTAL (converted result) [%]	80.8%	±1.6%	-	44.0%	±2.0%	-	
DIFFERENCE (in relation to the previous survey period)	-			↓36.8%			
VERBAL INTERPRETATION	Moderate well-being			Poor well-being			

*all items were rated on a scale of 0–5, where 5 meant that the feeling had been with the person for at least two weeks before the study period.

The final issue addressed in the study was to estimate the risk of depression in the study group. Based on the obtained data, there was a higher proportion of people with mild (from 20% to 33%) and moderate (from 2% to 3%) depression at the October stage than at the March stage. The study did not show individuals with severe depressive symptoms. In addition, there are gender differences in the study group, with women more likely to show depressive tendencies than men ($Z = 4.521$; $p = 0.002$). The results are presented in Table 3.

Table 3. Results of the Beck Depression Inventory in the study group ($N = 250$)

Test period / / Gender of respondents		Interpretation of the result			p
		Absence of depression	Mild depression	Moderate depression	
March	Women	72%	26%	2%	<0.05
	Men	84%	16%	0%	
	Total	78%	20%	2%	
October	Women	58%	38%	4%	
	Men	70%	28%	2%	
	Total	64%	33%	3%	

Discussion

To date, there are no studies in the literature on the long-term effects of stress and fear/anxiety caused by exposure to COVID-19 in relation to employees of large companies. Most large studies are conducted among medical staff [12–14]. The results obtained in this study indicate that employees, despite being accustomed to working remotely, were affected by the current epidemic situation. This is mainly evident in the decrease in their well-being between the study periods, as well as in the increase in the percentage of people in whom the Beck Inventory indicated a suspicion of moderate or mild depression. Among the emotions associated with the pandemic, they most often cited anxiety about losing their jobs, social misinformation, and fear or anxiety about infection in themselves or a family member.

However, there is no shortage of work in the global literature that treats the issue of mental health holistically in the face of the COVID-19 crisis. It is worth mentioning that the pandemic forced many countries to introduce strict regulations to inhibit the spread of the SARS-CoV-2 virus [26]. The governments of the countries most affected by the pandemic, such as China, Italy, Spain, and Ecuador, decreed long periods of self-isolation and/or lockdown during which citizens had to stay at home [27]. This situation had a serious impact on the living conditions of the population and was particularly damaging in countries with fewer economic resources (e.g., in the South American region) [28]. Aspects of the pandemic related to the uncertainty of how it would spread, the mutation of the virus or the immunity of patients who had undergone infection, or the lack of a vaccine, led to an increased sense of fear among the population [29]. Similar fears were already evident during previous epidemics (SARS [30] and MERS [31]).

Given the global threat and impact of the COVID-19 pandemic on mental health, well-being and human development, Ahorsu et al. [32] developed a scale to measure fear of SARS-CoV-19 based on existing scientific literature (FCV-19S). This scale has been used in many countries including Iran [33], Bangladesh [34], Italy [35], Turkey [36], Russia and Belarus [37], Israel [38], Peru [39], and Paraguay [40]. An association

between COVID-19 and fear [41] and depression [32, 33] has been detected in most of these countries. Furthermore, it has been observed that COVID-19 distress is more strongly associated with fear and stress and less with depression [38]. Nevertheless, suicide cases due to COVID-19 anxiety have been reported worldwide [42].

The high daily rate of new cases and deaths [12], combined with the vast amount of information people are exposed to through the media, may influence the development of mood disorders [13]. Chinese researchers since the early stages of the pandemic have found decreased mood, increased anxiety and fear, and moderate depressive symptoms among the Asian population [14]. The relationship between stress and depression has long been documented in the scientific literature [43]. Theoretical models supported by scientific evidence, link social and environmental stress to internal biological processes that drive the pathogenesis of depression [44]. Longitudinal studies [45] also suggest that severe stress predicts depression. In highly stressful situations, there is a close association between fear and depression [46], for example, among people suffering from post-traumatic stress disorder [47–50].

In the current pandemic crisis, emerging literature is beginning to reveal some gender and age differences [14]. Women and young people show higher levels of depression, stress, and fear of COVID-19 [51]. However, most of these studies have been conducted on samples of healthcare professionals [52], and much less is known about the general population. Therefore, it is difficult to relate the results of these studies to the group of respondents involved in our study. In contrast, among young people, it has been observed that first-year students are more concerned about COVID-19 than senior students [37]. Moreover, according to some studies [43, 53], symptoms of fear and depression among these students increase with prolonged social distance and isolation. Students are also a group that has also been affected by the obligation to work (study) remotely. A study by Human Resource Executive found that 88% of employees reported having experienced moderate to severe stress in the past 4 to 6 weeks. Of those who reported stress, 62% reported lost productivity by at least 1 hour, and 32% lost at least 2 hours per day due to COVID-19 pandemic stress [54]. The same research shows that 7 out of 10 employees indicated in a survey by mental health provider Ginger that COVID-19 pandemic was the most stressful time of their entire career [55].

Studies conducted in Poland also note an association between the effects of prolonged stress associated with the COVID-19 pandemic on the general well-being and mental health of respondents. Noteworthy are studies conducted by Macieszek et al. [56] and Szcześniak et al. [57]. In the first of the cited studies [56], it was found that psychosomatic symptoms, as well as insomnia, occur more frequently in medical personnel than in employees of other professions. In our research, no serious depressive symptoms were found in corporate employees. In the first stage of the study, the respondents' well-being was at a moderate level, while in the second stage it was assessed as poor. On this basis, it can be suspected that COVID-19 and related restrictions negatively affected the psychological well-being of the respondents. The second cited study [57] found that sanitary restrictions, i.e., the need to wear protective masks, increased respondents' comfort, perception of self-protection, and general

psychological well-being. In our study, the aspect of adherence to the general DDM regimen (distance-disinfection-mask) was not included in the assessment of respondents' well-being.

Based on the research carried out so far, it can be concluded that the epidemiological situation related to the expansion of the SARS-CoV-2 virus is not only dangerous to somatic health but affects people holistically, including their mental condition. Exposure to prolonged stress may cause unexpected negative health effects and contribute to the initiation of mental disorders.

It is also worth emphasizing that the study has certain limitations. First of all, it was carried out using an internet questionnaire, which is a common practice but fraught with considerable uncertainty concerning the obtained results. In the future, the research should be repeated using a traditional questionnaire method. Additionally, in the second stage of the research, it was not possible to obtain data from 10 respondents who took part in the first period of research, and it was not possible to establish the reason for their non-participation in the second measurement (this was likely to have been a holiday or redundancy). In the future, it is planned to repeat the study and attempt to reach all individuals from the original study group composition. Finally, no attempt was made in our research to analyze the research material in terms of the family status of the respondents, while features such as having offspring, running a multi-person household could have affected the level of well-being of the respondents. This aspect will be considered in the authors' future research. In addition, it should also be emphasized that corporate employees are a group that encounters a wide range of stressors related to the performance of professional activities in their work, so it is worthwhile in the future to further investigate the level of stress associated with individual work activities.

Conclusions

Based on the obtained results, the following conclusions can be constructed:

1. The most common feelings about COVID-19 in the study group include fear of becoming ill or losing employment and anxiety about social misinformation.
2. A serious decline in well-being was observed among the respondents between the research periods. In the first stage of the study, the respondents' well-being was at a moderate level, while in the second stage it was assessed as poor. On this basis, it can be suspected that COVID-19 and its associated restrictions negatively affected the psychological well-being of the respondents.
3. There were no individuals with severe depressive symptoms in the study group, although an interesting relationship was noted – depressive symptoms worsen as the epidemic situation develops. One-third of the respondents had moderate levels of depressive symptoms and these were more often women than men.

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