

*Communication*

# No Signs of Excessive Burnout in Public Forest Officers Working in the Temperate Region During the Covid-19 Pandemic

Ernest Bieliniś<sup>1</sup> \*, Emilia Janeczko<sup>2</sup>, Aneta Anna Omelan<sup>3</sup> and Grażyna Furgała-Selezniow<sup>3</sup>

<sup>1</sup> Department of Forestry and Forest Ecology, Faculty of Agriculture and Forestry, University of Warmia and Mazury in Olsztyn, Poland; ernest.bielinis@uwm.edu.pl

<sup>2</sup> Department of Forest Utilization, Institute of Forest Sciences, University of Life Sciences in Warsaw, Nowoursynowska 159, 02-776 Warsaw, Poland; emilia\_janeczko@sggw.edu.pl

<sup>3</sup> Department of Tourism, Recreation and Ecology, Faculty of Geoengineering, University of Warmia and Mazury, Poland; aneta.omelan@uwm.edu.pl (A.A.O); graszka@uwm.edu.pl (G.F-S.)

\* Correspondence: ernest.bielinis@uwm.edu.pl (E.B.)

## Abstract:

The Covid-19 pandemic has influenced the style of work of many people. However, it remains a question to what extent it has influenced the work of outdoor workers like forestry workers. Therefore, the objective of this study was to assess the level of professional burnout among forestry workers, as a lack of burnout symptoms is a dimension of well-being at work.

The Oldenburg Burnout Inventory was administered to 42 respondents. Both subscales of the inventory were reliable: Cronbach's alpha was 0.806 for disengagement and 0.865 for exhaustion. The mean number of overtime hours was 10.13 hours per month. The mean disengagement score of 2.24 was lower than the reference value of 2.25, but the mean exhaustion score of 2.33 was higher than the reference value of 2.1. Age correlated significantly with stage of work, as did exhaustion with stage of work, and overtime hours with disengagement.

The average forestry officer had no symptoms of disengagement and slight symptoms of exhaustion. These results suggest that being in the forest can help prevent burnout.

Overtime work and a heavy workload appear to threaten forestry workers' well-being, as they can cause exhaustion and lower commitment.

**Keywords:** burnout; foresters; OLBI; Sars-Cov-2; work

## 1. Introduction

The Covid-19 pandemic influenced the style of work of many people, e.g., remote work became more popular during this time [1]. However, this influence does not seem to be particularly relevant in the case of forestry workers, who work outdoors. Thus, it is interesting to assess the well-being of this group because they are members of a profession that was only slightly affected by the pandemic (because they were working in a healthy environment, with a small number of people per hectare in the forests). Moreover, the well-being of this group might be easily and fruitfully compared with the well-being of other groups, who were more influenced by stressful work conditions during the pandemic, particularly health workers [2].

One of the dimensions of well-being connected with the work environment is a lack of signs of burnout. Burnout is defined as a "syndrome of exhaustion, depersonalization, and reduced professional efficiency" [3]. Burnout is associated with two factors, "exhaustion", connected with excessive job demands, and "disengagement", connected with insufficient job resources [4]. The adverse changes experienced during burnout are worsened by poor organizational resources, and burnout may increase the risk of poor mental

health [5]. In the forestry sector during the time of the pandemic, there has usually been no problem with resources, and thus disengagement might be relatively minor, but the workload may have increased, which could lead to exhaustion [6,7].

A good example of a country with public forests located in a temperate region of the world is Poland. In this country, one public company, the "National State Forests", manages 70% of the forested areas and employs almost 26,000 employees, including 17621 employees in the Forest Service (more than 68% of the employees), 5558 administrative employees (more than 21% of the employees), 1920 staff workers, and 705 annual trainees. Women make up 28.4% of the workforce; 12.72% of the women hold management positions. Almost 70% of the employees have received education in forestry (Report on "Social Responsibility of State Forests" [8]). The company is divided into 17 regional directorates, each of which includes several of the total pool of 429 forest districts.

The working conditions in forestry have been studied for more than 50 years in many countries [9–12]. In Poland, this issue was addressed in the 1990s [13], at which time, significant changes began in Polish forestry work. On a larger scale, research on the workload of Polish foresters, particularly field workers, has been carried out since the beginning of the XXI century [14–21]. The changing work pattern in forestry, resulting from the replacement of manual-machine technologies by semi-automatic solutions, generates new burdens and occupational problems. The demands of operating improved equipment do not always go hand in hand with a person's mental proficiency. Many of the studies to date have focused on determining the level of psychological strain on operators of multi-operational machinery used in forestry, such as harvesters and forwarders [18,19,22,23]. These studies have shown that the monotony of work and the repetitive movements of the operators of multi-operational machines causes forms of central fatigue [15], and isolation from external stimuli and the unchanging conditions of the working environment increase the feeling of fatigue [24], which leads to slowed reactions, impaired perception, and increased risk of accidents [22,23].

The issue of workload in non-manual (managerial/office) positions in forestry has not yet received much attention from researchers [21]. Among the few Polish studies that have analyzed how multifunctional forest management changes the structure of working time in the Forest Service are the following: [13][17]. According to the Forest Act (Art. 45), the Forest Service includes employees involved in forest management, forest management and protection, supervision, and combating offences that damage the forests. Additionally, it should be kept in mind that psychological and physical loads can be much higher in difficult working conditions, e.g., when working on steep slopes [25] or on surfaces after natural disasters.

The research described in this manuscript aimed to i) assess the level of burnout experienced by forestry workers in one randomly chosen forest district of a temperate public forest and ii) identify the main predictors of future burnout among these workers. This assessment was done during the Sars-Cov-2 pandemic, and the results were compared to those of two published studies, the first of which was done before the pandemic began, and the second, after it began.

## 2. Materials and Methods

For assessment of the level of burnout in forestry officers, one randomly chosen forest district was investigated. An online questionnaire that was on a specially prepared website was sent to all the forestry officers in this chosen forest district in November and December of 2021. Forty-two of them decided to fill in the questionnaire (four women, thirty-eight men). The district and respondents were anonymized. The full number of forestry officers in this district is hidden because it will be possible to identify this unit by the number of workers, but usually, it is from 30 to 60 for other forest districts (45 on average approximately). Thus, we calculate the size of the sample (calculation with "z" score) for populations of 45 forest officers (average for the forest districts), with a confidence level of 95%, and an error rate of 5%, for this parameter sample size was equal to 41 respondents. The questionnaire was built with several questions about gender (male/female), age

(age groups), stage of work (five groups), and the overtime hours of work in a month (as a count of hours), and finally, the inventory to measure the level of work burnout. The validated Polish version of the Oldenburg Burnout Inventory (OLBI) was used [26,27] to quantify work burnout. This inventory contains sixteen items and is divided into two subscales: exhaustion and disengagement. Each item is evaluated on a 4-point Likert scale. As mentioned in another study [2], burnout is considered to be a score of 2.10 or greater on the exhaustion subscale, and a score of 2.25 or greater on the disengagement subscale. The mean values of all variables included in the questionnaire, the correlations between variables, and ordinary least squares regression equations were calculated with SPSS 28 for macOS software (IBM, USA).

3. Results

There were 42 responses to the online questionnaire asking about burnout in the forestry officers’ group. Both subscales of the inventory used to measure the burnout level (OLBI) in this sample were reliable: Cronbach’s alpha for disengagement was 0.806; and for exhaustion, it was 0.865. The mean age group of forestry officers was 2.4 (between groups 2 and 3, on average); the mean stage of work was 3.79. The number of overtime hours was 10.13 hours per month on average. The average disengagement score of 2.24 was lower than the reference value of 2.25, whereas the average exhaustion level of 2.33 was higher than the reference value of 2.1. This means that the average forestry officer had no symptoms of disengagement and slight symptoms of exhaustion (Table 1).

There was a significant correlation between age and stage of work, and significant correlations between exhaustion and stage of work, and overtime hours and disengagement (Table 2).

After calculation of correlations, OLS regressions were performed with disengagement and exhaustion as separate, dependent variables. For disengagement, the OLS regression model indicates that age, stage of work, and overtime hours were not significant predictors and explained only about 14% of the variance ( $R^2 = 0.141$ ) (Table 3, variable ‘disengagement’). On the contrary, for exhaustion, all three predictors were significant and explained close to 50% of the variance ( $R^2 = 0.477$ ) (Table 3, variable ‘exhaustion’).

The next stage of the analysis was to compare the foresters’ burnout results with results from other studies using independent t-tests. The forestry officers had a lower mean level of disengagement than the nurses and the physicians, but only the difference between the foresters and the nurses was statistically significant. The level of exhaustion was significantly lower in the forestry officers than in the nurses and physicians. All comparisons are listed in table 4.

**Table 1.** Descriptive statistics for five variables examined in this study (number of observations, minimum, maximum, mean, and standard deviation).

Variable	N	Minimum	Maximum	Mean	SD
Age (four age groups) <sup>1</sup>	42	1	4	2.40	1.11
Stage of work (five seniority groups) <sup>2</sup>	42	1	5	3.79	1.20
Overtime hours (hours/month)	42	0	80	10.13	19.14
Disengagement (score) (Cronbach’s alpha = 0.806)	42	.75	3.50	2.24	.72
Exhaustion (score) (Cronbach’s alpha = 0.865)	42	.50	3.50	2.33	.67

<sup>1</sup>: there were four age groups to choose from on the questionnaire: 1) lower than 30 yrs., 2) between 31 and 40 yrs., 3) between 41 and 50 yrs., 4) more than 51 yrs.  
<sup>2</sup>: there were five seniority groups to choose from on the questionnaire: 1) less than 1 year, 2) between 1 year and 5 yrs., 3) between 6 and 10 yrs., 4) between 11 and 20 yrs., 5) more than 20 yrs.



**Figure 1.** The forestry officers during their work in the forest: (a) inventorying, (b) educating the public in the field, (c) measuring trees. Author: *Natalia Korcz*.

**Table 2.** Correlation values (Pearson’s *r*) calculated for five examined variables.

Variable	1.	2.	3.	4.	5.
1. Age	1	.876***	0.218	-0.011	0.273
2. Stage of work		1	0.205	0.111	.418**
3. Overwork hours			1	0.243	.537***
4. Disengagement				1	.730***
5. Exhaustion					1



**Table 3.** Results of OLS regressions calculated separately for the disengagement and exhaustion subscales. Three predictors were used in the calculations.

Variable	Predictor	Non-standardized coefficients		95% CI		Standard-ized coeffi- cients	t	p	VIF
		B	Standard Error	Lower	Upper				
Disengage- ment <sup>1</sup>	(Const.)	2.665	0.390	1.873	3.457		6.833	<0.001** *	
	Age	-0.360	0.204	-0.053	0.774	0.559	1.768	0.086	4.080
	Stage of work	0.331	0.188	-0.712	0.050	-0.557	-1.764	0.086	4.056
	Overwork hours	0.009	0.006	-0.021	0.003	-0.250	-1.558	0.128	1.051
Exhaustion <sup>2</sup>	(Const.)	3.439	0.294	2.842	4.035		11.700	<0.001** *	
	Age	-0.325	0.153	0.014	0.637	0.523	2.121	0.041*	4.080
	Stage of work	0.463	0.141	-0.750	-0.176	-0.806	-3.273	0.002***	4.056
	Overwork hours	0.017	0.004	-0.026	-0.008	-0.486	-3.881	<0.001** *	1.051

<sup>1</sup>: N = 42; R<sup>2</sup> = 0.141; F<sub>3, 38</sub> = 1.915 n.s.;  
<sup>2</sup>: N = 42; R<sup>2</sup> = 0.477; F<sub>3, 38</sub> = 10.652\*\*\*

**Table 4.** Results of comparisons (t-tests) between this study and two studies described in the literature.

Subscale of OLBI	Forestry Officers <sup>1</sup> (N = 44)		Nurses <sup>2</sup> (N= 120)		Physi- cians <sup>3</sup> (N = 232)		Forestry officers vs. nurses			Forestry officers vs. physicians		
	Mea n	SD	Mea n	SD	Me an	SD	Difference (95% CI)	t	p	Difference (95% CI)	t	p
Disengagement	2.24	.72	2.52	0.45	2.36	0.68	-0.28 (-0.47; -0.09)	2.933	0.004***	-0.12 (-0.34; 0.11)	1.043	0.298 n.s.
Exhaustion	2.33	0.67	2.67	0.47	2.71	0.58	-0.34 (-0.52; -0.15)	3.59	<0.001** *	-0.38 (-0.57; -0.18)	3.812	< 0.001***

<sup>1</sup>: this study, conducted during the pandemic  
<sup>2</sup>: a study [7] conducted before the pandemic  
<sup>3</sup>: a study [2] conducted during the pandemic

4. Discussion

The largest group among Forest Service employees are foresters and their assistants (so-called “sub-foresters” in the Polish Forest Service), which is the group that participated in our research. Previous workload studies involving this group have shown that

foresters exceed the normative working time in all months of the year. The excess ranges from 13 to 19 hours per month. In addition to overtime during the working week, work tasks are also performed on public holidays [17]. In our research sample, overtime averaged over 10 hours per month. This is consistent with the results of [28], who also found that foresters and sub-foresters consistently work overtime. A study by [21] showed that work in the field (timber issuance and retailing, nature conservation and forest education, and fire protection activities) takes up 77% of the time of foresters (of which almost 18% is spent driving) and 88% of the time of sub-foresters (of which 17.6% is spent driving).

On the one hand, these results indicate that the Forest Service at the district level (mainly foresters and sub-foresters) spends most of their work time in the field and is in direct contact with nature. On the other hand, they show that these Forest Service employees have a heavy workload that can lead to fatigue, withdrawal, exhaustion, and lower commitment. This can be a cause for concern, because without sufficient personal energy resources, employees are less able to cope with a given level of demands [5].

Our research shows that the average Forest Service employee did not exhibit symptoms of disengagement, but we did find minor symptoms of exhaustion. We speculate that the benefits of contact with the forest and being in nature can compensate for the consequences of overtime work. Much evidence suggests that contact with nature is extremely important for humans, but most of those studies concerned recreational use of the forest. Many studies show that outdoor, nature-based recreation contributes to renewal and maintenance of mental health [29–31], as well as stress reduction [32–34], and that the mood and positive feelings of people improve in natural areas [31,32,35–37]. Son and Ha [38] found that increasing contact with nature improves social and emotional interactions in modern society. Our previous research [39,40] also indicates that the forest environment has a relaxing effect associated with an increase in positive emotions.

On the basis of our research presented in this paper, we can conclude that the forest (regardless of the purpose for being there) has a positive effect on humans, regardless of whether a person is in the forest for recreation, health, or strictly for work purposes.

With regard to the foresters in this study, it can be speculated that the timing of the coronavirus pandemic influenced the results. In many countries, including Poland, there were temporary restrictions on access to forests, which was perceived by many people as a significant constraint on recreation [41]. However, these bans did not apply to forest professionals. In this respect, working in the forestry sector appears to have provided a social benefit. Awareness of this benefit may have altered the respondents' perceptions of the work they were doing, which could be one of the reasons why their levels of withdrawal and exhaustion were not particularly high.

The results of this study indicate that overtime by Polish Forest Service employees is associated with professional exhaustion: the more overtime the respondents worked, the more their professional exhaustion increased. Overtime work is considered to be an important factor leading to high levels of stress [42], which probably influences the level of professional burnout. The results also indicate that the age of the surveyed employees and their length of service are associated with their level of occupational exhaustion: the older the employee and the longer their work experience, the higher their level of occupational exhaustion.

As understanding of the positive impact of the natural environment on humans increases, there are also reports that the intensity of this impact may be determined by specific spatial features. Some researchers argue that the 'environment is therapeutic' idea cannot be accepted uncritically [43]. Thus, will being on a logging or post-hurricane surface during the working day generate the same degree of regeneration as being in a reserve or forest relatively little changed by humans? Simultaneously, it is important to consider whether the type of work carried out affects the intensity of the positive impact of the forest. For example, does harvesting work create the same mental burden as, say, forest protection or silviculture work? This topic requires additional, more detailed research

to be undertaken into the working environment of foresters and their levels of withdrawal, fatigue, and exhaustion. It is also worth comparing the results obtained from psychological measurements with those based on physiological changes.

In our study we used the Polish version of the Oldenburg Burnout Inventory (OLBI). Previous studies that performed ergonomic evaluation of fatigue at workstations, e.g., Berger [23] and Grzywinski and Hołota [15], have used other psychological tests. Fatigue assessment at workplaces can also be investigated using physiological methods. This can be accomplished by, among others, measurement of electrodermal activity, determination of cardiovascular activity, electromyography, monitoring of respiratory rate and amplitude, measurement of temperature, and electroencephalography [44]. It would be worth comparing the results of both types of measurements for a different perspective on the professional exhaustion of Forest Service employees in Poland.

## 5. Conclusions

The forest has a positive influence on people's mental health, regardless of their reason for being there (recreation or work). Foresters are a particularly privileged group in this respect, as they spend part of their working day in the forest. As mentioned earlier, at the time of the first lockdown, they were basically the only people in Poland who could stay in this environment without being subject to punishment, which (presumably) mitigated the negative effects of the pandemic. This is supported by our results, which showed that the average forestry officer had no symptoms of disengagement. Our results also suggest that being in the forest can prevent burnout, but further research in this area would be needed to confirm this.

The therapeutic impact of the forest on Forest Service employees seems indisputable, but this should not obscure the disturbing information we obtained during our research. First of all, it should be noted that survey foresters and sub-foresters consistently work overtime and have a heavy workload. And while (as stated earlier) they had no symptoms of psychological withdrawal, they did show the first small signs of exhaustion. Employers should take this into account when assigning tasks to their employees because these two factors (work overtime and heavy workload) can lead to fatigue, withdrawal, exhaustion, and lower commitment.

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