

Well-being among PhD candidates

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Summary

Aim. The aim of the pilot study was to demonstrate that PhD students declare lower psychological well-being, and more often complain about psychosomatic symptoms and illnesses compared to individuals who did not continue education after university.

Method. A total of 270 participants were involved in the study: 135 PhD students (mean age = 30.03 years) and 135 control individuals (mean age = 30.13 years) who did not continue education beyond their master's degree. The following methods were used: a sociodemographic survey taking into account a list of illnesses and psychosomatic symptoms, *the General Health Questionnaire* (GHQ-28) and the SPP-25.

Results. The results were calculated using ANOVA. The results show a significantly higher severity of the following: somatic symptoms ($F = 12.913; p < 0.001$), anxiety and insomnia ($F = 19.769; p < 0.001$), behavioral disorders ($F = 8.782; p = 0.003$), symptoms of depression ($F = 8.560; p = 0.004$) among PhD students when compared with individuals who chose not to continue education.

Conclusions. The results suggest that PhD students demonstrate a significantly lower level of general mental well-being, a higher level of behavioral disorders, somatic symptoms, anxiety and sleep problems, as well as depressive symptoms – compared to individuals who did not continue education after achieving a master's degree.

Key words: education, affective disorders, psychosomatic disorders

Introduction

In today's information society, the continuous acquisition of knowledge and skills is an important factor in achieving a high professional and social position. PhD studies are one of the form of developing knowledge – according to some estimates, OECD member states have seen a great rise in the number of PhD students over the past years – their numbers grew by as much as 40% in highly developed countries [1]. However, to take up further scientific challenges requires having also appropriate psychological resources and competences. Due to people are showing an increased interest in con-

tinuing education after their master's degree, more and more researchers are focusing on the risks associated with pursuing academic careers [2, 3]. Studies show that PhD students are especially vulnerable to affective disorders [4]. So far, studies have shown that the quality of life in PhD students is much lower compared to those who did not continue education [5, 6]. Postgraduates declare higher levels of experienced stress, more often complain about health problems (mainly recurrent respiratory infections) and mental health issues [7–9].

Hughes [10] demonstrated that postgraduate students have a tendency to negativity and a pessimistic perception of reality. When compared to individuals who did not continue education, they manifest difficulties in maintaining social relationships and in engaging in various social activities [8, 11]. Weakened psychophysical functioning negatively impacts scientific undertakings, lowers one's motivation and an ability to attain both short – and long-term goals [12]. This is important, as delaying gratification is one of key capabilities useful in scientific careers.

Until now, researches have been dividing the causes of lowered psychophysical functioning of PhD students into two categories: external and internal factors. The former include: supervision assessment and the quality of the student-supervisor relationship, undertaken social activity, the organizational structure of the university, and one's current socioeconomic status. The latter are: motivation, self-esteem, a sense of self-efficacy, and the ability to use self-regulatory strategies [3]. At the same time, PhD students most often report difficulties such as a lower economic status and lack of motivation and time [13].

Research carried out to date tends to neglect the psychological aspects of the high prevalence of depressive disorders among PhD students, that could potentially result in a decrease in well-being. One of the important psychological resources affecting well-being is resilience. Resilience is understood as a relatively persistent disposition determining the process of flexible adaptation to constantly changing life requirements [14]. The relationship between lower well-being declared by doctoral students and the severity of psychosomatic symptoms is confirmed by research showing that people who have been diagnosed with psychosomatic syndrome have lower well-being than people who have not been diagnosed with this syndrome [15].

The presented study is the first Polish attempt to objectively assess the extent to which PhD students experience affective and somatic disorders. Its aim was to demonstrate that PhD students declare lower psychological well-being, and more often complain about psychosomatic symptoms and illnesses compared to individuals who did not continue education after university. Based on this, the following research hypotheses were formulated:

H1: PhD students significantly more often declare the occurrence of psychosomatic disorders compared to people who did not continue education beyond their master's degree.

H2: PhD students declare higher severity of mental problems and physical ailments compared to people who did not continue education beyond their master's degree.

Study group

The participants were 135 PhD students and 135 working individuals who held a master's degree but did not continue education at the third-cycle level. The respondents graduated from (master's degree) or were PhD students of various majors and specialties at universities all over Poland. Before starting the study, each person had to agree to participate in the study and was informed about the possibility of resigning from participation at each stage of the study.

Inclusion criteria for PhD students: PhD student status. People who had already obtained a doctoral degree were excluded from the study. Inclusion criteria for comparative group: possession of master's degree, lack of continuity of doctoral and post-graduate studies, any form of employment.

The group of PhD students comprised 87 women and 48 men aged 24 to 50 (age: $\mu = 30.06$; $SD = 5.598$). Among those who did not continue education, the same gender distribution and a similar age distribution were secured (age: $\mu = 30.13$; $SD = 5.113$). In the second group, the age ranged from 24 to 48. The results of statistical analysis using Student's *t*-test for independent samples showed no significant difference between the ages in the two groups ($t = -0.102$; $p = 0.919$). A separate analysis was carried out to compare the ages of male and female respondents (Student's *t*-test for independent samples); no statistically significant differences were found here, either ($t = 0.353$; $p = 0.724$). The mean age of studied women was $\mu = 30.18$ with a standard deviation $SD = 5.113$ (age range from 24 to 50 years). The mean age of studied men was $\mu = 29.94$ with a standard deviation $SD = 5.134$ (age range from 24 to 48 years). The study groups did not differ from each other in the assessment of the current material situation ($\chi^2 = 3.78$, $p = 0.44$) or fertility rate ($\chi^2 = 0.43$, $p = 0.94$). In addition, in the recruitment process of doctoral students and people from the comparative group, attempts were made to maintain a proportional distribution of the fields of science they represented (they were classified according to the current division in accordance with the Regulation of the Minister of Science and Higher Education of 20 September 2018 – Figure 1). At a similar average level, the study participants determined the burden they felt: activities related to the preparation of their doctoral dissertation (PhD students) and workload (people with master's degree) (about 6 on a 10-point scale; $t = -0.67$; $p = 0.50$).

Methods

1. Researchers' own survey to examine sociodemographic data, economic situation, the presence of symptoms and psychosomatic illnesses. Furthermore, PhD students were asked which year they were in and whether the studies were full – or part-time; they were also asked about their university profile and the perceived workload during the studies. Individuals from the control group were presented with an alternative set of work-related questions. The respondents were also supposed to declare any diseases and psychosomatic illnesses.
2. *The General Health Questionnaire* GHQ-28 by D. Goldberg [16] for evaluating mental health in adults. The test consists of 28 items and makes it possible to

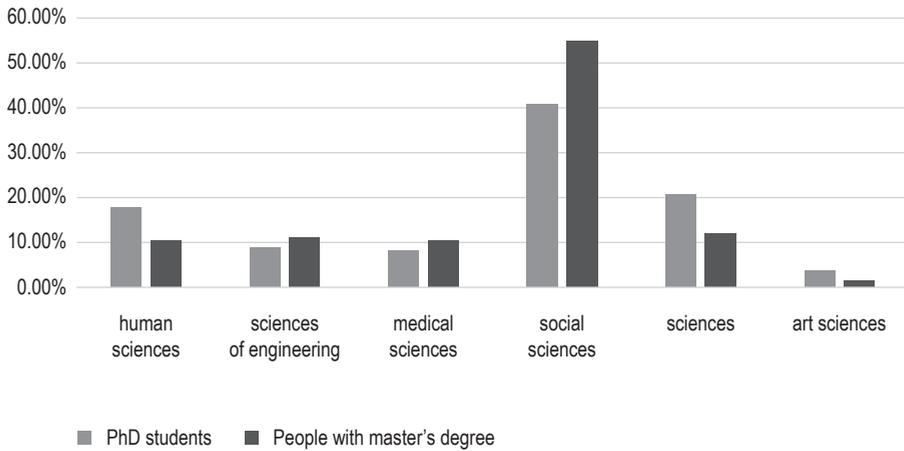


Figure 1. **Distribution of scientific fields represented by PhD students and people with master's degree**

single out individuals whose mental health has deteriorated, be that in short – or long-term. The questionnaire is made up of four scales: (1) “Somatic symptoms”; (2) “Anxiety and insomnia”; (3) “Dysfunction”; (4) “Depressive symptoms”. An overall score (a sum of all scales) can also be calculated – this is a “General welfare index”. Lower scores indicate a higher level of psychological well-being.

3. Resiliency Assessment Scale SPP-25 (Polish adaptation – Ogińska-Bulik, Juczyński, 2008) [17] – a 25-item self-descriptive scale consisting of five sub-scales: (1) “Persistence and determination in action”; (2) “Openness to new experiences and a sense of humor”; (3) “Personal coping skills and tolerance for negative emotions”; (4) “Tolerance for failure and treating life as a challenge”; (5) “Optimistic outlook on life and capacity for self-mobilization”. Additionally, the sum of all scales makes up an overall result. The respondents mark their answers on a 5-point scale.

Results

The statistical analyses were performed with the SPSS 25.0 statistical package. To determine the level of mental well-being in PhD students, we used the analysis of covariance (ANCOVA) with two between-subject factors: group and gender. Because psychological resilience is one of important protective factors in mood disorders [18, 19], we decided to add this variable to the model as a covariate (Table 1).

Table 1. Resilience subscales – intra-group differences

	PhD students (n = 135)		Comparison group (n = 135)		t	p
	M	SD	M	SD		
Persistence and determination	14.19	3.103	13.86	3.081	0.87	0.387
Openness to new experiences	15.79	2.868	15.50	2.875	0.83	0.409
Personal coping skills	14.36	3.352	13.71	3.176	1.64	0.102
Tolerance for failure	14.46	3.131	14.24	2.760	0.60	0.550
Optimistic outlook on life	13.18	3.492	12.68	3.383	1.19	0.237
Resilience	71.98	13.408	70.00	12.826	1.24	0.217

M – mean; SD – standard deviation; t – value of Student's *t*-test; p – level of statistical significance.

The study groups were compared in terms of resilience and its components, using Student's *t*-test for independent groups. It was found that they do not differ statistically significant in terms of resilience ($t = 1.24$; $p = 0.217$) and its components: persistence and determination ($t = 0.87$; $p = 0.387$), openness to new experiences ($t = 0.83$; $p = 0.409$), personal coping skills ($t = 1.64$; $p = 0.102$), tolerance for failure ($t = 0.60$; $p = 0.550$), optimistic outlook on life ($t = 1.19$; $p = 0.237$).

The results showed that PhD students display a significantly higher severity of somatic symptoms which are indicative of fatigue and weakness, as well as of physiological manifestations of tension, e.g., headaches, when compared to individuals who did not continue education beyond the master's degree ($F = 15.622$; $p < 0.001$; $\eta^2 = 0.051$). A higher level of the tested variable was found in women when compared to men ($F = 14.296$; $p < 0.001$; $\eta^2 = 0.056$). The analysis showed no interaction between factors ($F = 0.081$; $p = 0.776$). Fit to the model was $R^2 = 0.145$. Figure 2 shows intergroup and inter-gender differences of the "somatic symptoms" variable.

Figure 3 presents differences between PhD students and persons who did not continue education at the doctoral level in terms of anxiety and insomnia. This scale reflects how severe anxiety is and whether or not the respondents experience difficulties sleeping. The analyses showed that PhD students had a greater severity of anxiety and sleep disorders when compared to those who did not decide to follow the route to earn a PhD ($F = 25.266$; $p < 0.001$; $\eta^2 = 0.087$). Gender differences in terms of "Anxiety and insomnia" can be found ($F = 6.678$; $p = 0.01$; $\eta^2 = 0.025$). Women are characterized by higher levels of anxiety and sleep disorders. The interactive effect between the group factor and the gender factor was not statistically significant ($F = 0.029$; $p = 0.865$). The proportion of variance accounted for by the model was $R^2 = 0.181$.

The results of analysis concerning dysfunction are presented in Figure 4. When compared to individuals who did not continue education, PhD students appeared to have more difficulties in decision-making and fulfilling everyday duties ($F = 12.746$; $p < 0.001$; $\eta^2 = 0.046$). A higher level of dysfunction was found in women when compared to men ($F = 9.176$; $p < 0.003$; $\eta^2 = 0.033$). No interactive effect was found

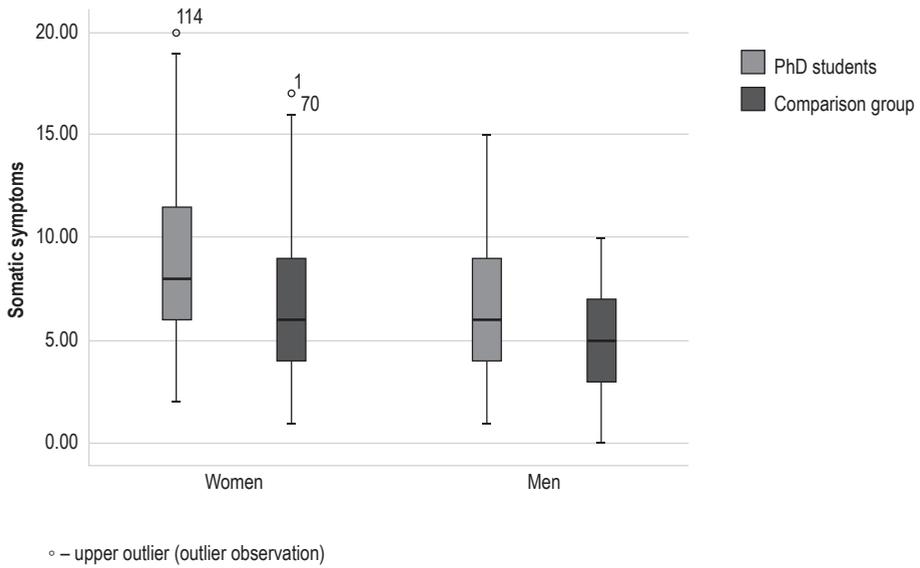


Figure 2. Relationship between factors (group and gender) in terms of severity of somatic symptoms

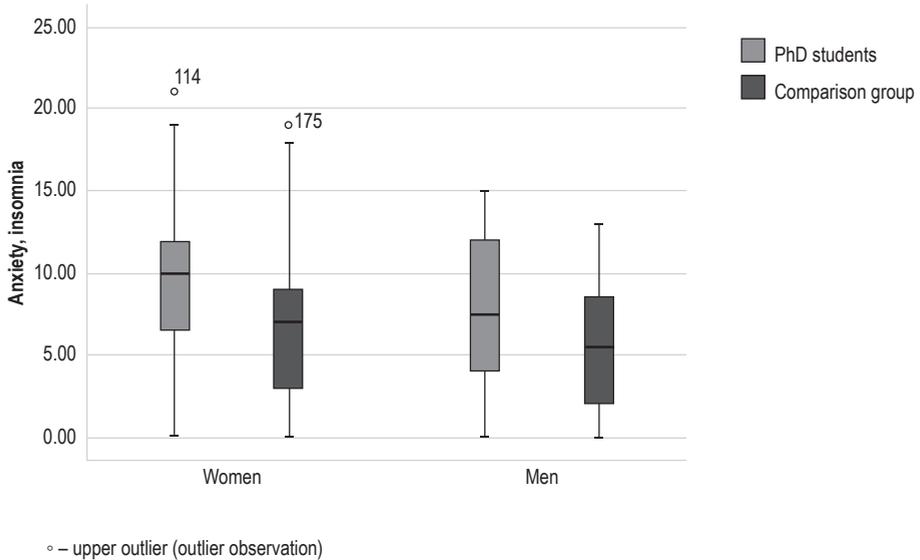
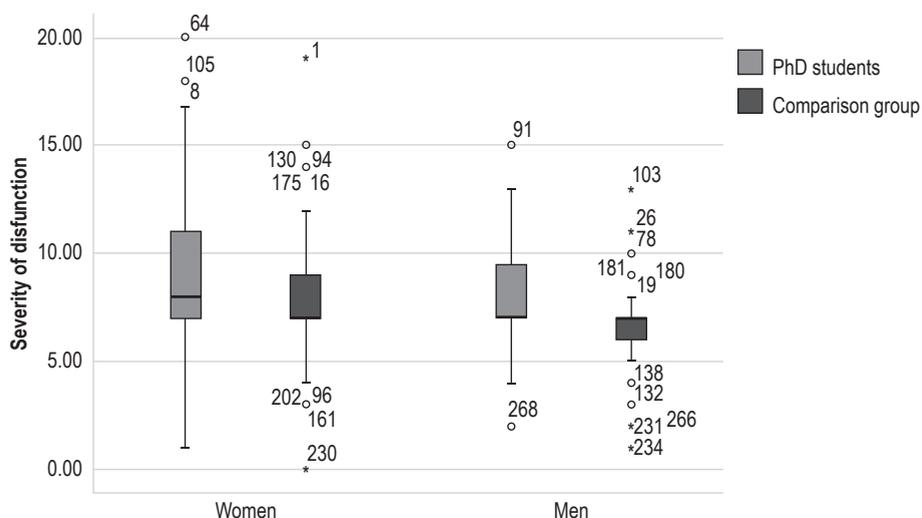


Figure 3. Relationship between factors (group and gender) in terms of severity of anxiety and insomnia

between the group and respondents' gender ($F < 0.001$; $p = 0.990$). 18% of variance of dysfunction can be attributed to the three factors ("group", "gender" and "resilience").

Figure 5 demonstrates the results of the severity of depressive symptoms, conviction of one's worthlessness, as well as suicidal thoughts and plans in both examined groups measured with the "Depressive symptoms" scale (GHQ-28). A higher level of the tested variable was found in PhD students when compared to their peers who did not continue education ($F = 13.583$; $p < 0.001$; $\eta^2 = 0.049$). The results indicate there are no significant inter-gender differences in the levels of depression severity ($F = 1.331$; $p = 0.250$). No significant interactive effect between the factors was found, either ($F = 0.033$; $p = 0.855$). The coefficient of determination is $R^2 = 191$.

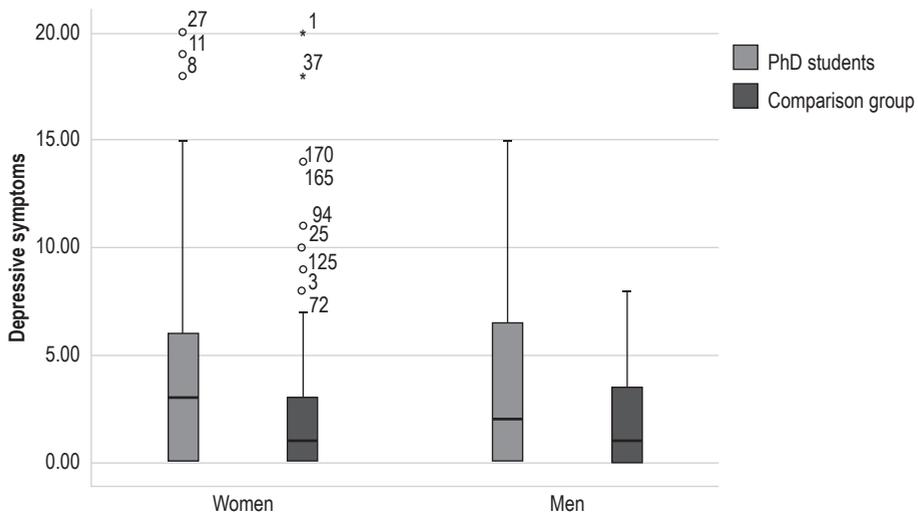


◦ – upper and lower outlier (outlier observation); * – upper and lower extreme observation

Figure 4. Relationship between factors (group and gender) in terms of severity of dysfunction

The results of an overall welfare index presented in Figure 6 show a significantly higher level of mental health issues among PhD students when compared with individuals who did not continue education at the third-cycle level ($F = 29.187$; $p < 0.001$; $\eta^2 = 0.099$). Differences between the two genders also proved significant. Women demonstrate lower mental well-being when compared to men ($F = 11.760$; $p < 0.001$; $\eta^2 = 0.042$). No interaction between the group factor and the gender factor was found ($F = 0.011$; $p = 0.917$). In this model, the percentage of the explained variance was 26% ($R^2 = 0.257$).

In order to compare the prevalence of psychosomatic disorders among PhD students and a group of individuals who did not continue education beyond their master's degree,



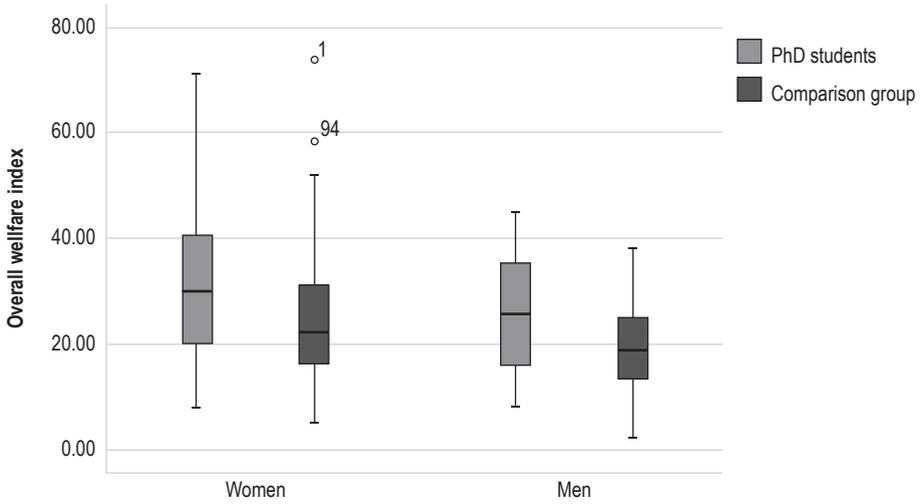
○ – upper and lower outlier (outlier observation); * – upper and lower extreme observation

Figure 5. Relationship between factors (group and gender) in terms of severity of depressive symptoms

a test of independence was carried out. Based on that, we were able to demonstrate significant relationships between the occurrence of a disease and a tested group as far as obesity ($\chi^2 = 4.573$; $p = 0.032$) and hypertension ($\chi^2 = 7.596$; $p = 0.006$) was concerned. Compared to the control group, significantly more PhD students admitted having at least one somatic disease ($\chi^2 = 5.121$; $p = 0.024$). The percentage distribution of the prevalence of psychosomatic diseases in both tested groups is presented in Figure 7.

Figure 8 shows the percentage distribution of the prevalence of psychosomatic ailments in tested groups. Statistical analyses (test of independence) demonstrated that PhD students significantly more frequently suffered from insomnia ($\chi^2 = 3.267$; $p = 0.071$), chronic fatigue ($\chi^2 = 7.174$; $p = 0.007$) and the reduction in physical activity ($\chi^2 = 3.199$; $p = 0.074$) compared to master's degree holders who did not continue education. PhD students were more likely to experience unreasonable anxiety ($\chi^2 = 3.070$; $p = 0.080$), have difficulties concentrating ($\chi^2 = 4.424$; $p = 0.035$), and go through panic attacks ($\chi^2 = 4.573$; $p = 0.032$) more often than their peers who did not follow the path to a PhD. However, there was no difference between the two groups in terms of having at least one psychosomatic illness ($\chi^2 = 0.026$; $p = 0.872$).

In view of significant differences in terms of experienced mental well-being between PhD students and individuals who did not continue education beyond their master's degree, we decided to establish whether the former are significantly more likely to be at risk of having mental illnesses than the latter. As a cut-off point, we used 40 points on four-point scale (0-1-2-3). It was found that 21.5% of postgraduates' scores and 8.1% of control subjects' scores indicated poor mental condition. The results of



◦ – upper outlier (outlier observation)

Figure 6. Relationship between factors (group and gender) in terms of the overall welfare index

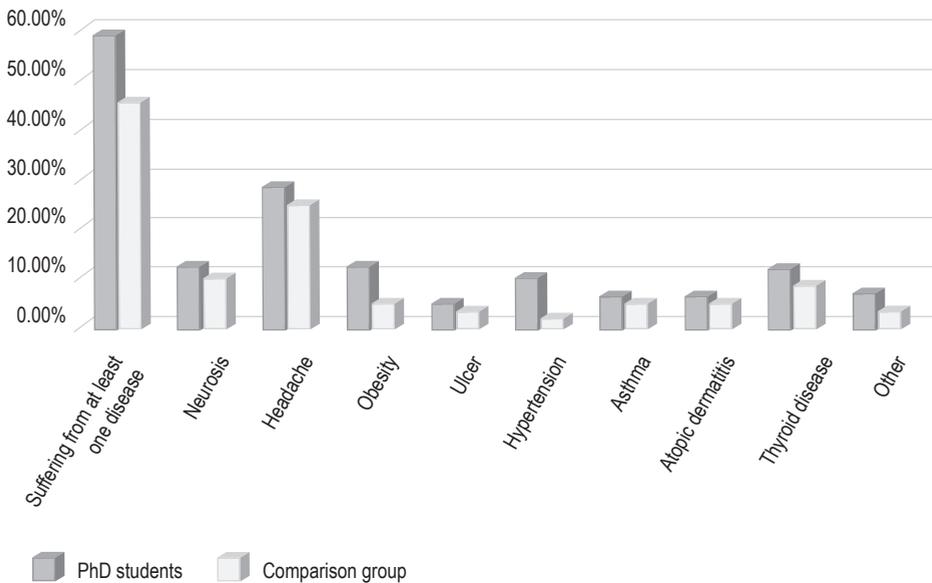


Figure 7. Percentage distribution of prevalence of psychosomatic diseases in tested groups

statistical analyses (test of independence) showed that PhD students were twice more likely to be at risk of experiencing mental issues when compared to their peers who did not continue education ($\chi^2 = 9.501$; $p = 0.002$; $\phi = 0.188$).

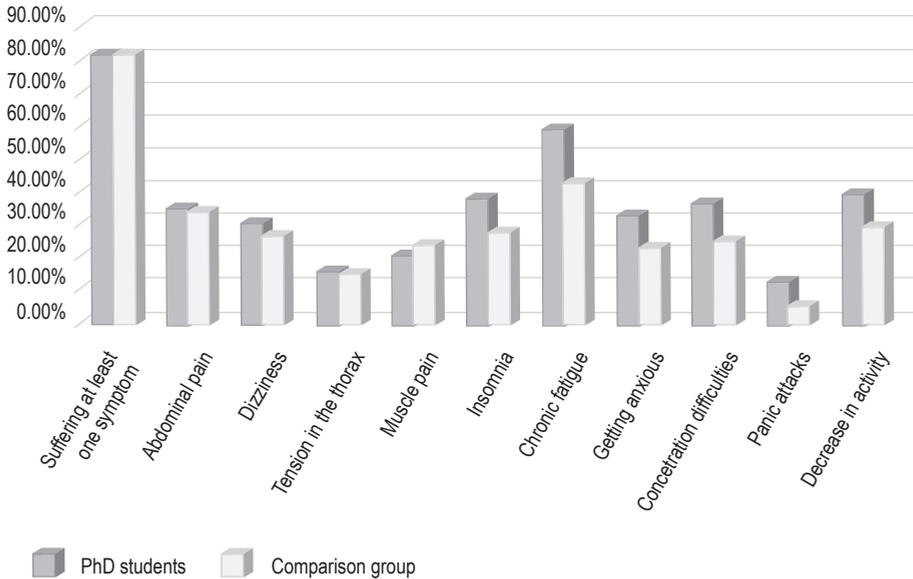


Figure 8. Percentage distribution of prevalence of psychosomatic symptoms in tested groups

Discussion of results

The empirical material gathered for this study proves that in the study group PhD students report significantly lower levels of general well-being than individuals who decided not to study at the third-cycle level. One reason for this, hinted at in international research on postgraduates, is the specific nature of PhD studies as they promote competition between participants, students are frequently evaluated, there are expectations of scientific and organizational activity – while at the same time students' status in the academic community is low [20, 21]. Additional stressors include a lack of permanent employment and the uncertain future of academic careers, a feeling of lack of support from supervisors/promoters, as well as the burden of having to fulfill other social roles [22]. This last factor, the necessity to reconcile various social roles – that of a student, employee, spouse, and parent – may be of special importance when we consider the lower overall well-being declared by female rather than male PhD students; this supports the results of studies conducted among postgraduates in Sweden [23].

Moreover, based on the obtained results, we can conclude that PhD students from the study group are characterized by significantly higher levels of somatic symptoms indicative of fatigue and body weakness, as well as of physiological manifestations

of tension (e.g., headaches). An illness is called psychosomatic if its etiology, course and therapy are determined by factors of psychological (mainly emotional) and sociocultural nature (pressures and environmental challenges) [24]. Further attention is drawn to their biological component, despite the fact that research on the genetic background of psychosomatic illnesses and diseases has failed to yield consistent results [25]. The relationship between the reported lower well-being in PhD students and the severity of psychosomatic symptoms (manifestations) is supported by studies showing that individuals diagnosed with psychosomatic syndrome are characterized by lower levels of well-being compared to those in whom this syndrome has not been identified [26]. A higher incidence of illnesses and/or diseases among students than in the general population implies the importance of psychological stressors associated with the learning process in how these disorders emerge and progress [27]. The few conducted studies on the frequency and severity of psychosomatic symptoms (disorders) in students [28] at various educational levels are consistent with our findings that PhD students more often report sleeping problems, headaches and chronic fatigue compared to master's degree holders who decided not to pursue an academic career.

Finally, PhD students from the study group significantly more often declare depressive symptoms when compared to the control group – this is consistent with other pieces of research [29]. At the third-cycle level of education, both male and female participants report higher severity of depressive symptoms, a heightened sense of their worthlessness, as well as they report suicidal thoughts and plans. The study demonstrated no inter-gender differences in terms of depressive symptoms, which contradicts the results of epidemiological studies proving that women are more susceptible to depressive disorders than men [30]. This regularity has not been found in other research conducted among Polish students at the bachelor's and master's level [31]. Social changes resulting in a transformation of cultural patterns of femininity and masculinity can possibly explain why the prevalence of mood disorders in both genders has been leveling out.

Depressive disorders (especially the so-called major depression) can considerably affect one's cognitive functioning; most often, this takes the form of slowing down and impairments in executive functions and working memory [32]. Cognitive dysfunction can result in a bad mood even after typical depressive symptoms have subsided [33]; the persistent deficits significantly disrupt psychosocial functioning of the patients – this can translate into PhD students permanently experiencing the stress of being unable to achieve satisfactory results in scientific work. It may be that yet another consequence of depressive disorders in PhD students are their declared difficulties in making decisions and performing day-to-day tasks. International studies [34, 35] indicate that the anxiety, stress, exhaustion, and loss of interest that PhD students experience makes about half of them (43–56%) consider giving up their studies.

The presented study is the first ever Polish project to explore the subject of well-being and somatic symptoms in the third-cycle level students. Limitations of this pilot study are associated with a relatively small-sized sample and under-representation of various types of universities allowing conclusions to be drawn only for the studied group of PhD students. However, considering the obtained data, further studies should

utilize a larger and more diverse study group, allowing for epidemiological analysis of the prevalence of somatic symptoms and depressive disorders among third-cycle students. A more accurate estimate of the indicated disorders could be an important voice in the discussion on the protection of mental health of PhD students as well as academic staff.

The method of recruitment should also be indicated among limitations of the presented study – due to the voluntary selection, the conclusions should be carefully generalized to the entire population of PhD students.

The use of self-description methods can also be a limitation. However, both the Polish adaptation of the *General Health Questionnaire* GHQ-28 and the *Resilience Measurement Scale* SPP-25 have good psychometric properties. The reliability of the overall GHQ-28 (Cronbach's α) score is 0.93 for a sample of healthy, professionally active people who have not been under psychiatric care; the results of the reliability index (Cronbach's α) for individual factors are also satisfactory (0.86; 0.88; 0.77; 0.85, respectively). The SPP-25 reliability measured by Cronbach's α is 0.89; the absolute stability measured by retest after four weeks is 0.85.

Conclusions

1. PhD students that were participants of the study have significantly lower overall well-being compared to those who did not continue their education beyond the master's degree.
2. PhD students that were participants of the study demonstrate significantly higher dysfunction, more severe somatic symptoms, anxiety, and sleeping difficulties.
3. Compared to master's degree holders, individuals studying at the PhD level – participants of this study – also present more severe depressive symptoms.

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