Symptoms of Anxiety and Depression within the UNiversity community: the cross-sectional UN-SAD study

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Abstract
The increasing complexity of academia, with its demanding working conditions and uncertain career opportunities, may affect the mental health of academics and potentially lead to mental health problems. The aim of this study is to determine the prevalence of depressive and anxiety symptoms in the academic population of the University of Udine and to compare symptoms in senior and younger academics and administrative staff.

A cross-sectional survey was conducted between June and December 2020, involving academic and administrative staff in all departments. The prevalence of depressive and anxiety symptoms was assessed using the PHQ-9 and GAD-7 tools. The relationship between mental health outcomes and job role was analyzed using nonparametric tests and ordinal logistic regression.

A total of 366 individuals participated: 109 junior academics, 146 senior and 111 administrative staff. The proportion of women was 55.7% and the mean age was 47.9 years. The prevalence of depressive and anxiety symptoms in the studied population was 25.7% (95% IC 21.5–30.4) and 22.7% (95% IC 18.7–27.2) respectively, with junior academics having the higher prevalence of both symptoms. Univariate models suggest a higher risk for anxiety symptoms OR 1.89 (1.13–3.17) for women.

The prevalence of depressive symptoms is higher in our academic community than in the general population, especially among junior academics. These findings may reflect the impact of uncertain career and challenging environment on the mental health of young academics. Universities should provide more support to young academics so that they can contribute effectively and healthily to the advancement of research.

Keywords: Mental health, University, Anxiety, Depression, Career

Introduction
The academic profession is in some ways atypical: professionals are intrinsically motivated and in most cases experience high levels of job satisfaction, but they can suffer from high levels of external pressure, leading to psychological problems [1]. Recently, many concerns have been raised about the potential impact of working conditions and research and career opportunities on the mental health of academics [2–4]. Indeed, the complexity of the academia has increased, in recent years, as more attention has been paid to accountability, resource management and the internationalization of research [5–7]. All these changes have affected traditional academic profiles, which are mainly characterized by the key role of teaching, research, and institutional mission [8]. Recent studies have shown that despite the remaining positive elements that characterize the academic profession, the
main causes of stress are the increase in bureaucratic procedures, the number of students, and the professionals competing for reduced funding opportunities [9]. Some authors noted that the “publish or perish” imperative very often has a counterproductive effect and puts enormous pressure on the publication of research results, leading to increased stress levels and lower job satisfaction, especially among younger academics and women [10–13]. Increased workload, reduced autonomy and salary, overuse of fixed-term contracts, and resulting job insecurity, along with lack of promotion opportunities and difficulty balancing work life, can have a significant impact on the mental health of academics, especially younger academics [2–4, 13–16]. Moreover, some previous research suggests greater vulnerability among women who experience high levels of family and work stress and increased pressure to publish scientific papers, leading them to consider leaving their jobs [17, 18].

Despite these conditions, there is still a lack of knowledge about the current burden of mental illness in the academic community. Recent studies looking at anxiety and depressive symptoms in medical students and physicians during their residency program found a prevalence of mental health problems ranging from 20.9 to 43.2% [19–21]. These data are much higher than the prevalence in the general population, which is 4.6–9.3% [22, 23]. A 2003 study by Winefield et al. conducted at 17 Australian universities provides preliminary evidence of the high levels of stress experienced by academic professionals: 43% of them suffered from some degree of psychological distress. Their findings suggest that academics are more affected by mental health problems compared to technical and administrative staff at the same university [24].

An accurate assessment of the prevalence of anxiety and depressive symptoms representative of possible mental disorders in academics is the first step in providing prevention and support strategies for university members to prevent burnout and improve psychosocial functioning. For this reason, we decided to investigate the presence and extent of anxiety and depressive symptoms among academic professionals at the University of Udine (Italy). The aims of our study are to 1) determine the prevalence of anxiety and depressive symptoms; 2) compare the prevalence between senior, junior and administrative staff; 3) determine the demographic characteristics of those with higher prevalence.

**Methods**

**Study design and setting**

Between June and December 2020, we conducted a cross-sectional study (UN-SAD: Symptoms of Anxiety and Depression within the University community) at the University of Udine, a university in northeastern Italy with approximately 15,000 students.

**Participants**

The study included all academic and administrative staff of all academic departments (Business and Economics, Life Sciences and Medicine, Basic Sciences and Engineering, Humanities, Political Sciences) except visiting professors.

**Recruitment and data collection**

Data were collected using an anonymous online survey with 69 questions. Invitations to participate were sent to institutional email addresses with a request to complete the survey; reminders were sent shortly before the deadline. Participant consent was implied by completion of the questionnaire.

**Measures**

The survey included questions on sociodemographic characteristics (age, sex, occupational profile, educational level, academic department, marital status, years of working experience, and commuting distance) and two validated tests of psychological assessment: the Patient Health Questionnaire–9 (PHQ-9) [25] for depressive symptoms and the General Anxiety Disorder–7 (GAD-7) [26] for anxiety symptoms. We chose these two tests because they have good sensitivity and specificity for the presence of symptoms [25, 26]. Moreover, they are widely used in both psychiatric and general medical practice to detect the presence of initial depressive and anxiety symptoms, especially in outpatient settings and in research field, thus ensuring cross-cultural applicability and comparison with previous literature.

The sample size for each group (senior, junior academics, administrative staff) was calculated with a confidence level of 95% and a precision of 7%. Based on our hypothesis of different prevalence of depression and anxiety symptoms in the three groups (15, 20, and 10% for senior academics, junior academics and administrative staff respectively), the calculated sample size was at least 86, 101, and 62 respondents for each group, respectively. The procedures performed in this study with human participants conformed to ethical standards, the 1964 Declaration of Helsinki and its subsequent amendments, or comparable ethical standards. The study was approved by the Institutional Review Board of the University of Udine, Italy.

**Data analysis**

Data were reported as frequencies and percentages for categorical variables and as means and standard deviations for continuous variables. Results were presented as
both categorical (PHQ-9: minimal or none, mild, moderate, moderately severe, and severe symptoms; GAD-7: none, mild, moderate, and severe symptoms) and dichotomous variables, with PHQ-9 and GAD-7 scores ≥ 10 showing high sensitivity and specificity, respectively, for detecting a diagnosis of the respective disorder compared with diagnostic tests [27–29]. Chi-square and Fisher's Exact tests were applied to evaluate the possible association between categorised variables. The association between categorised variables and dichotomous outcomes was assessed using univariate and multivariate logistic regression analyses. The significance level was set at 0.05. All statistical analyses were performed using R software, version 3.4.2 (R Foundation for Statistical Computing, Vienna, Austria) [R: The R Project for Statistical Computing. Available at: https://www.r-project.org/]. [Last accessed on 2021 Oct 05]].

Results
A total of 1,550 participants were eligible (600 senior academics, 500 junior academics and 450 administrative staff personnel). Of them, 366 participated in the survey, for a response rate of 23.6% (366/1550). Of these, 146 (39.9%) were senior academics, 109 (29.8%) were junior academics and 111 (30.3%) were administrative staff. In the groups of junior academics and administrative staff, most respondents were female (204; 55.7%), while the senior academics group was predominantly male (86; 58.9%). The mean age of all respondents was 47.9 ± 12.0 years, with a lower age for junior academics (33.2 ± 6.4 years). The most represented departments were Basic Sciences and Engineering (150; 41.0%) and Humanities (41; 11.2%). The full list of sociodemographic variables is shown in Table 1.

The prevalence of depressive and anxiety symptoms in the studied population was 25.7% (95% IC 21.5–30.4) and 22.7% (95% IC 18.7–27.2), respectively (dichotomous scoring criteria). Junior academics reported higher rates of depressive (39.4%) and anxiety (33.0%) symptoms than senior academics (depressive symptoms 14.4% and anxiety symptoms 15.1%) and administrative staff (depressive symptoms 27.0% and anxiety symptoms 22.5%), using dichotomous scoring criteria. Moreover, the severity of both mental disorders was higher in junior academics than in the other two groups (p < 0.001). Table 2 shows the PHD-9 and GAD-7 scores, and the risk of depressive and anxiety symptoms for all groups in the academic community.

In univariate analysis, junior academics were more likely to suffer from depressive and anxiety symptoms OR (95% CI) 3.86 (2.12–7.14) and 2.77 (1.52–5.13), respectively, compared with senior academics; similar results, although less severe, were found for administrative staff, who reported a higher frequency of depressive symptoms 2.20 (1.18–4.15) and anxiety symptoms 1.64 (0.86–3.12) compared with senior academics. In our population, female sex was associated with a significantly higher risk for anxiety symptoms OR 1.89 (1.13–3.17), whereas no statistically significant differences were found for depressive symptoms OR 1.48 (0.91–2.39).

Univariate regression confirmed that administrative staff also had a higher risk for depressive symptoms OR 2.20 (1.18–4.15), but not for anxiety symptoms OR 1.64 (0.86–3.12). However, when both sex and age were taken into account (with mean age as the cutoff), the significance of the role association decreased with a relative risk for depressive symptoms of 1.92 for junior academics (0.86–4.41) and 1.91 (0.99–3.71) for administrative staff. This model for depressive symptoms showed no difference with respect to sex (p = 0.33), but the overall risk for depression decreased with age OR 0.43 (0.21–0.88). For anxiety symptoms, the risk was higher among junior academics OR 2.12 (0.92–5.28) and among administrative staff OR 1.30 (0.70–2.55) than among senior academics. The risk for anxiety symptoms was significantly higher in women than in men (OR 1.85 (1.07–3.19)), while there was no significant association with age (p = 0.54). No significant differences were found in any of the multivariate models with respect to years of work experience, commuting distance, educational profile, marital status, or university department, so these results were not presented. The results of the multivariate model are presented in Table 3.

Discussion
The UN-SAD study aimed to determine the prevalence of anxiety and depressive symptoms among academics at the University of Udine, to obtain data on mental health problems in academia [30, 31].

The results on depressive symptoms revealed a prevalence of 25.7% in our academic community, which seems to confirm a higher prevalence of moderate or severe depressive symptoms among academics compared to the general population, as reported both nationally [21] and internationally [7, 22, 23, 32]. The prevalence of depressive symptoms among junior academics (39.4%) is higher than among PhD students in biomedical sciences (10.1%) and in economics (18.0%), as well as among colleagues pursuing a master’s degree (39.0%) [30, 33, 34]. In addition, the distribution of PHQ-9 scores showed that a high proportion of junior academics suffered from moderate (28.4%), severe or moderately severe (11%) depressive symptoms. As for anxiety symptoms, only 22.7% of participants reported suffering from this mental health problem. Studies conducted in other countries such as Australia or the United Kingdom (UK) using the General
Health Questionnaire (GHQ) to assess mental illness found that the prevalence of mental disorders in Australia was 43.7% [35], whereas in the UK it ranged from 31.8% among lecturers and senior lecturers [36] to 53% among academic staff [37]. It is likely that differences in the tool used for this assessment may have prevented us from making a fair comparison across data.

This study supports previous findings suggesting that the academic community is at higher risk for mental illness, particularly junior academics, compared with the general population and other occupations as reported by Winefield, e.g., engineers, transportation workers, general university staff [35]. Although some authors found no significant difference according to position or age [38, 39] and others found higher stress levels among senior positions [40], several studies reported higher stress levels among teachers in junior positions [6, 41, 42]. Some authors explained this by lower autonomy, lower salary, and greater job insecurity [1, 6, 13, 43]. In contrast to reports on Italian medical students [44], a higher prevalence of depressive or anxiety symptoms was not found among members of the academic community working away from home.

Although some studies have not found an association between depressive or anxiety symptoms and sex or age [24, 31], our findings are consistent with those reporting higher levels of stress among women in academia, confirming the presence of some known gender

### Table 1: Sociodemographic characteristics of respondents

|                         | Senior academics (N = 146) | Junior academics (N = 109) | Administrative staff (N = 111) | Overall (N = 366) |
|-------------------------|----------------------------|---------------------------|-------------------------------|------------------|
| **Sex, n (%)**          |                            |                           |                               |                  |
| Female                  | 60 (41.1)                  | 58 (53.2)                 | 86 (77.5)                     | 204 (55.7)       |
| Male                    | 86 (58.9)                  | 51 (46.8)                 | 25 (22.5)                     | 162 (44.3)       |
| **Age (yr), mean ± SD** | 55.6 ± 7.0                 | 33.2 ± 6.4                | 52.3 ± 7.7                    | 47.9 ± 12.0      |
| **Marital status, n (%)**|                            |                           |                               |                  |
| Single                  | 15 (10.3)                  | 67 (61.5)                 | 16 (14.4)                     | 98 (26.8)        |
| Divorced/separated      | 13 (8.9)                   | 1 (0.9)                   | 13 (11.7)                     | 27 (7.4)         |
| Married/cohabiting couples | 116 (79.5)              | 41 (37.6)                 | 78 (70.3)                     | 235 (64.2)       |
| Widowed                 | 2 (1.4)                    | 0 (0.0)                   | 4 (3.6)                       | 6 (1.6)          |
| **Educational level, n (%)**|                            |                           |                               |                  |
| PhD                     | 105 (71.9)                 | 69 (63.3)                 | 6 (5.4)                       | 180 (49.2)       |
| Medical specialty       | 3 (2.1)                    | 1 (0.9)                   | 0 (0.0)                       | 4 (1.1)          |
| Doctor or equivalent    | 3 (2.1)                    | 0 (0.0)                   | 6 (5.4)                       | 9 (2.5)          |
| Master’s or equivalent  | 35 (24.0)                  | 39 (35.8)                 | 54 (48.6)                     | 128 (35.0)       |
| Bachelor’s or equivalent| 0 (0.0)                    | 0 (0.0)                   | 7 (6.3)                       | 7 (1.9)          |
| Upper secondary education | 0 (0.0)                   | 0 (0.0)                   | 38 (34.2)                     | 38 (10.4)        |
| **Profile, n (%)**      |                            |                           |                               |                  |
| Full professor          | 39 (26.7)                  | /                         | /                             | 39 (10.7)        |
| Associate professor     | 70 (47.9)                  | /                         | /                             | 70 (19.1)        |
| Senior researcher       | 37 (25.3)                  | /                         | /                             | 37 (10.1)        |
| Junior researcher       | /                          | 22 (20.2)                 | /                             | 22 (6.0)         |
| Fellow                  | /                          | 55 (50.5)                 | /                             | 55 (15.0)        |
| PhD student             | /                          | 32 (29.4)                 | /                             | 32 (8.7)         |
| **Department, n (%)**   |                            |                           |                               |                  |
| Business and Economics  | 22 (15.1)                  | 8 (7.3)                   | /                             | 30 (8.2)         |
| Life Sciences and Medicine | 14 (9.6)              | 15 (13.8)                 | /                             | 29 (7.9)         |
| Basic Sciences and Engineering | 84 (57.5)     | 66 (60.6)                 | /                             | 150 (41.0)       |
| Humanities              | 23 (15.8)                  | 18 (16.5)                 | /                             | 41 (11.2)        |
| Political Sciences      | 2 (1.4)                    | 1 (0.9)                   | /                             | 3 (0.8)          |
| Missing                 | 1 (0.7)                    | 1 (0.9)                   | /                             | 111 (30.3)       |
| **Years of working experience (yr), mean ± SD** | 25.0 ± 8.1 | 5.72 ± 5.1 | 24.7 ± 8.9 | 19.2 ± 11.6 |
| **Commuting distance (km), mean ± SD** | 29.7 ± 60.5 | 47.9 ± 1120 | 15.6 ± 16.8 | 30.9 ± 73.5 |
differences in mental health problems [45, 46] even within the academic community, where women experience high levels of family and work stress [47]. In addition, depressive and anxiety symptoms occurred more frequently in our younger academics, confirming the observation of their higher levels of stress, which may be related to job insecurity [39]. In contrast to the reports of Winefield et al. [24], senior academics were less likely to suffer from depressive and anxiety symptoms than junior academics and administrative staff.

**Limitations and strengths**

The present study has several limitations. The first is the use of a cross-sectional design at a single Italian university, which limits the representativeness of the study for the entire academic community. For this reason, our results should be interpreted with caution given the small sample size. Second, the choice of a direct e-mail invitation as recruitment method and the use of a self-report tool may have led to some self-selection bias, a well-known limitation of online surveys. Because the questionnaire addressed anxiety and depressive symptoms, it may have attracted participants who were more exposed to these symptoms than the rest of the group, possibly leading to an overrepresentation of depressive and anxiety symptoms. Finally, the unequal participation of the groups may have compromised the effectiveness of the comparison of occupational profiles.

Despite these limitations, this study also has some strengths. To our knowledge, this is the first Italian study

| Variable | PHQ-9 | GAD-7 | Adjusted OR (95%CI) | p-value |
|----------|-------|-------|---------------------|---------|
| PHQ-9    | 125 (85.6; 79.0–91.4) | 21 (14.4; 9.6–21.0) | 126 (34.4) | < 0.001 |
| GAD-7    | 66 (60.6; 51.2–69.2) | 43 (39.4; 30.8–48.8) | 69 (18.9) | 0.003 |

**Table 2** Results of PHQ-9 and GAD-7 tests

| PHQ-9, n (%) | Senior academics (N = 146) | Junior academics (N = 109) | Administrative staff (N = 111) | Overall (N = 366) | p-value |
|--------------|---------------------------|---------------------------|-------------------------------|-------------------|---------|
| None         | 62 (42.5)                 | 26 (23.9)                 | 38 (34.2)                     | 126 (34.4)        | < 0.001 |
| Mild         | 63 (43.2)                 | 40 (36.7)                 | 43 (38.7)                     | 146 (39.9)        |         |
| Moderate     | 14 (9.6)                  | 31 (28.4)                 | 24 (21.6)                     | 69 (18.9)         |         |
| Moderately severe | 7 (4.8) | 7 (6.4) | 6 (5.4) | 20 (5.5) |         |
| Severe       | 0 (0.0)                   | 5 (4.6)                   | 0 (0.0)                       | 5 (1.4)           |         |

**Table 3** Crude and adjusted odds ratios resulting from the multivariate models for the prevalence of depressive and anxiety symptoms

| Variable | Crude OR (95%CI) | Adjusted OR (95%CI) | p-value |
|----------|-----------------|---------------------|---------|
| Category | PHQ-9 | GAD-7 | PHQ-9 | GAD-7 | PHQ-9 | GAD-7 | p-value |
| Junior Academics vs Senior Academics | 3.86 (2.12–7.14) | 2.77 (1.52–5.13) | 1.92 (0.86–4.41) | 2.12 (0.92–5.28) | 0.114 | 0.083 |
| Administrative Staff vs Senior Academics | 2.20 (1.18–4.15) | 1.64 (0.86–3.12) | 1.91 (0.99–3.71) | 1.30 (0.70–2.55) | 0.055 | 0.435 |
| Male vs Female | 1.48 (0.91–2.39) | 1.89 (1.13–3.17) | 1.30 (0.77–2.19) | 1.85 (1.07–3.19) | 0.33 | 0.027 |
| > 47.9 years vs ≤ 47.9 years | 0.33 (0.20–0.54) | 0.76 (0.50–1.16) | 0.43 (0.21–0.88) | 0.79 (0.37–1.74) | 0.019 | 0.541 |
that aims to assess the burden of mental health problems within the academic community by providing details on the different roles within the same university at a given time. Second, the use of two validated and widely used tools to assess depressive and anxiety symptoms (PHQ-9 and GAD-7, respectively) underpins the findings of this study, which may be useful in the implementation of prevention and support strategies by the university. Finally, the overall response rate was satisfactory and the different academic groups were homogeneously represented. To improve knowledge and awareness of the burden of mental illness among academics, this study would need to be expanded on a national scale.

**Conclusions**

High external pressure, commonly referred to as the “publish or perish” aphorism, may play an important role in the mental health of academics. The higher prevalence of depressive and anxiety symptoms among junior academics may be an impact of career uncertainty and experiences in the demanding academic environment on the mental health of the younger ones. Because mental health problems are in turn associated with poor academic outcomes and productivity [48, 49] as well as retention in academic careers, investing in providing coping tools for junior academics could be strategic for both personal and professional empowerment. Universities should provide greater support to early career academics to encourage their effective and healthy contribution to the advancement of research. Nonetheless, strategies aimed at overcoming career uncertainty and supporting the process of fundraising for research would certainly contribute positively to this public health problem.

**Abbreviations**

UN-SAD: Symptoms of Anxiety and Depression within the UNiversity community; PHQ-9: Patient Health Questionnaire–9; GAD-7: General Anxiety Disorder–7.

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**Authors’ contributions**

LB, ES, MDP, ER designed the research; ES, ER collected data; ES, MDP, ER, AT, LB discussed investigation methodology and contributed to result interpretation; AT performed data analysis; LB, SB supervised the study conduction; ES, MDP wrote the original draft; LB revised contents; all authors revised the paper and agreed with the final version of the manuscript.

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**Availability of data and materials**

The dataset generated and analysed during the current study are not publicly available due permission not requested during study protocol submission and to participants during data collection but could be available from the corresponding author on reasonable request and after amendment of the study protocol.

**Declarations**

**Ethics approval and consent to participate**

The study was approved by the Institutional Review Board of the University of Udine, Italy. All subjects gave their informed consent for participation before filling the survey. All methods were carried out in accordance with relevant guidelines and regulations.

**Consent for publication**

Not applicable.

**Competing interests**

The authors declare no competing interests.

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**References**

1. Kinman G, Jones F. A life beyond work? job demands, work-life balance, and well-being in UK academics. J Hum Behav Soc Environ. 2008;17(1–2):41–60.
2. Schillebeeckx M, Manrique B, Lewis C. The missing piece to changing the university culture. Nat Biotechnol. 2013;31(10):938–41. Available from: http://dx.doi.org/10.1038/nbt.2706.
3. Shaw C, Ward L. Dark thoughts: why mental illness is on the rise in academia. 2014.
4. Phillips S, Heywood-Roos R. Job security for early career researchers is a significant factor in helping research make an impact. 2015. Available from: https://blogs.lse.ac.uk/impactofsocialsciences/2015/06/30/early-career-paths-of-doctorate-holders-es-fokot/.
5. Mudrak J, Zabrodaska K, Kveton P, Jelinek M, Blatny M, Solcova I, et al. Occupational well-being among university faculty: a job demands-resources model. Res High Educ. 2018;59(3):325–48. Available from: http://link.springer.com/10.1007/s11162-017-9467-x.
6. Kinman G, Johnson S. Special section on well-being in academic employees. Int J Stress Manag. 2019;26(2):159–61.
7. Padilla MA, Thompson JN. Burning out faculty at doctoral research universities. Stress Heal. 2016;32(5):551–8.
8. Vera M, Salanova M, Martin B. University faculty and work-related well-being: the importance of the triple work profile. Electron J Res Educ Psychol. 2017;8(21):581–602. Available from: http://oj.suai.es/op/index.php/EJREP/article/view/1373.
9. Darabi M, Macaskill A, Redy L. A qualitative study of the UK academic role: positive features, negative aspects and associated stressors in a mainly teaching-focused university. J Furth High Educ. 2017;41(4):56–80. Available from: https://www tandfonline.com/dofull/1080s/0309877X.2016.1159287.
10. Gillespie NA, Walsh M, Stough C, Winefield AH, Dua. J. Occupational stress in universities: staff perceptions of the causes, consequences and moderators of stress. Work Stress. 2001;15(1):53–72.
11. LHullier B. Publish or perish. Accounting, Audit Account J. 2012;25(6):1071.
12. Neill US. Publish of perish, but at what cost? J Clin Invest. 2008;118(7):2368.
13. Kinman G, Wray S. Higher stress. A survey of stress and well-being among staff in higher education. Univ Coll Union. 2013.
14. Petersen AM, Riccaboni M, Stanley HE, Pammolli F. Persistence and uncertainty in the academic career. Proc Natl Acad Sci. 2012;109(14):5213–8. Available from: http://www.pnas.org/cgi/doi/10.1073/pnas.1121429109.
15. Lee Y-N, Walsh JP, Wang J. Creativity in scientific teams: Unpacking novelty and impact. IFLS Policy. 2015;44(3):684–97. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0048733314001826.
16. Kinman G. Pressure points: a review of research on stressors and strains in UK academics. Educ Psychol. 2001;21(4):473–92. Available from: http://www.tandfonline.com/doi/abs/10.1080/01434110120090849.
17. Blix AG, Cruse RJ, Mitchell BM, Blix GG. Occupational stress among university teacher. Educ Res. 1994;36(2):157–69. Available from: https://www.tandfonline.com/doi/full/10.1080/0138849036200205.
18. Clarkson GP, Hodgkinson GP. What can occupational stress diaries achieve that questionnaires can’t? Pers Rev. 2007;36(5):684–700. Available from: https://www.emerald.com/insight/content/doi/10.1108/004834071073990/full.html.
19. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students. Jama. 2016;316(2):2214. Available from: http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2016.17324.
20. Mata DA, Ramos MA, Basual N, Khan R, Guille C, Di Angelantonio E, et al. Prevalence of depression and depressive symptoms among resident physicians: a systematic review and meta-analysis. JAMA. 2015;314(22):2373–83. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26647259.
21. Epicentro, Istituto Superiore di Sanità. Sorveglianza Passi, Passi on line 2015–2018. L’epidemiologia per la sanità pubblica, ISS. Available from: https://www.epicentro.iss.it/passi/dati/depressione.
22. Pratt LA, Brody DJ. Depression in the U.S. household population, 2009–2012. NCHS data brief, no 172. Hyattsville: National Center for Health Statistics; 2014. Available from: https://www.cdc.gov/nchs/data/databriefs/db172.pdf.
23. Kessler RC, Berglund P, Demler O, Jin R, Koretz D, Merikangas KR. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). JAMA. 2003;289(23):3095–10. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12813115.
24. Winifield AH, Gillespie N, Stough C, Dua J, Hapuarachchi J, Boyd C. Occupational stress among university student: Results from a national survey. Int J Stress Manag. 2003;10(1):51–63. Available from: http://doi.apa.org/getdoi.cfm?doi=10.1037/1072-5245.10.1.51.
25. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606–13. Available from: http://www.ncbi.nlm.nih.gov/pubmed/11536941.
26. Spitzer RL, Kroenke K, Williams JB, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16717711.
27. Arolf B, Goodyear-Smith F, Crengle S, Gunn J, Kerse N, Fishman T, et al. Validation of PHQ-2 and PHQ-9 to screen for major depression in the primary care population. Ann Fam Med. 2010;8(4):348–53. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20644190.
28. Levis B, Benedetti A, Thoms BD. Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: individual participant data meta-analysis. BMJ. 2019;1476. Available from: https://www.bmj.com/lookup doi/10.1136/bmj.l1476.
29. Kroenke K, Spitzer RL, Williams JB, Lowe B. Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. Ann Intern Med. 2007;146(5):317–25. Available from: http://www.ncbi.nlm.nih.gov/pubmed/1739617.
30. Nagy GA, Fang CM, Hish AJ, Kelly L, Nicchitta CV, Dzirasa K, et al. Burnout and mental health problems in biomedical doctoral students. CBE Life Sci Educ. 2019;18(2):1–14.
31. Levecque K, Anseel F, De Beuckelaer A, Van der Heyden J, Gisle L, et al. The importance of context specificity in work stress research: a test of the demand-control-support model in academics. Work Stress. 2007;21(1):85–95. Available from: http://www.tandfonline.com/doi/abs/10.1080/02678370701264552.
32. Kinman G, Jones F. Effort-reward imbalance and overcommitment: predicting strain in academic employees in the United Kingdom. Int J Stress Manag. 2008;15(4):381–95. Available from: http://doi.apa.org/getdoi.cfm?doi=10.1037/a0013213.
33. O’Laughlin EM, Bischoff LG. Balancing Parenthood and Academia. J Fam Issues. 2005;26(1):79–106. Available from: http://journals.sagepub.com/doi/10.1177/0192513X04265942.
34. Darabi M, Macaskill A, Reidy L. A qualitative study of the UK academic role: positive features, negative aspects and associated stressors in a mainly teaching-focused university. J Furth High Educ. 2017;41(4):566–80.
35. Arnold GL, Rosevear SG, Trice AG, McKinnon SA. Faculty stress: the influences of institutional characteristics. 1996.
36. Ihag R, Mahmood A. Relationship between job stress and employee burnout-the moderating role of self-efficacy for university teachers. J Res Ref 2017. Available from: http://www.uwe.ac.uk/jre[cited 10 Jul 2022].
37. Chen W-S, Hanif J, Siau C-S, Seet W, Loh S-F, Jamal MHA, et al. Burnout in academics: an empirical study in private universities in Malaysia. Int J Sci Humanit Invent. 2014;1(2):62–72.
38. Silikovč A, Malič S. Work stress among university teachers: gender and position differences. Arh Hig Rada Toksikol. 2011;62(4):299–307.
39. Bert F, Lo Muro G, Corradi A, Acampora A, Agodi A, Brunelli L, et al. Prevalence of depressive symptoms among Italian medical students: The multicentre cross-sectional “PRIMES” study. PLoS One. 2020;15(1):1–19. Available from: http://dx.doi.org/10.1371/journal.pone.0231845.
40. Kuehner C. Gender differences in unipolar depression: an update of epi-demiological findings and possible explanations. Acta Psychiatr Scand. 2003;108(3):163–74. Available from: http://dx.doi.org/10.1034/j.1600-0447.2003.00204.x.
41. Emslie C, Fuhrer R, Hunt K, MacIntyre S, Shipley M, Stansfeld S. Gender differences in mental health: Evidence from three organisations. Soc Sci Med. 2002;54(4):621–4.
42. Silikovč A, Seršić D. Work Stress Among University Teachers: Gender and Position Differences. Arch Ind Hyg Toxicol. 2011;62(4):299–307. Available from: https://content.sciedupress.com/doi/10.2478/10004-1254-62-2011-2135 [cited 10 Jul 2022].
43. Hysenbegasi A, Hass SL, Rowland CR. The impact of depression on the academic productivity of university students. J Ment Health Policy Econ. 2005;8(3):145–51. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16278502.
44. Eisenberg D, Golberstein E, Hunt JB. Mental Health and Academic Success in College. B E J Econom Anal Policy [Internet]. 2009;9(1). Available from: http://dx.doi.org/10.2202/1935-1682.16278502.
45. Evans TM, Bira L, Castelum JB, Weiss LT, Vanderford NL. Prevalence of mental health problems in graduate education. Nat Biotechnol. 2018;36(3):828–4. Available from: http://www.nature.com/articles/nbt.4089.
46. McMenahan CA, Gles ML, Mallett J. Occupational Stress in University Staff. Int J Stress Manag. 2001;8(4):285–98. Available from: https://doi.org/10.1023/A:1017513651891.

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