The Influence of Sleep Quality on Student Burnout

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ABSTRACT

To prevent a further increase in the high prevalence of student burnout, this longitudinal study investigated the influence of sleep quality on burnout. The impact of engaging in university on the development of burnout was assessed in first-year psychology students (N=75) by measuring symptoms before and after their first study period. The hypothesis that a poor sleep quality is associated with higher emotional exhaustion and cynicism and lower professional efficacy was confirmed. Although the change in burnout over time was not predicted by sleep quality, the exposure to academic stressors lead to the development of emotional exhaustion in students.

Keywords

Students, burnout, sleep, depression, stress.

INTRODUCTION

The symptomology of student burnout is becoming increasingly prevalent around the world. By definition, burnout is characterized by "emotional exhaustion, depersonalization and reduced personal accomplishment", caused by long-term stress (1). Evidence suggests that about 53% of students report high stress-levels as opposed to only 5.3% with low stress levels (2). Moreover, it has been estimated that one out of three students has an increased risk of developing burnout (3) compared to an estimated lifetime prevalence of 4.2% in the general population (4). Therefore, the rising academic stress levels might cause an elevated susceptibility to burnout in students.

Burnout can have severe consequences to the mental, physical and economic well-being of students. More specifically mental health issues such as depression or anxiety disorders (5), concentration problems (2) as well as substantial study delays (6) have been reported. Therefore, the development of prevention strategies through identifying meaningful risk factors of student burnout is highly desirable.

Predictors of Burnout

Past research has mainly explored the impact of personality, low social support and high subjective workload as pre-disposing factors of burnout (7). A well-researched factor in occupational burnout is clinical depression. Although the two conditions are seen as separate syndromes, depression and burnout share common characteristics and often appear in comorbidity (8). This was also observed in a study on students where a positive depression screen was indicative of a significantly higher risk of developing burnout (9). Although the factors reported in this section have been well-established it is important to investigate other potential variables that are currently understudied in theories on burnout.

Sleep and Student Burnout

Sleep could be a promising factor in the etiology of academic burnout. Compared to the normal adult population students often show unhealthy sleeping patterns with over 60% of college students experiencing poor sleep quality, mainly caused by academic and psychosocial stress (10). Conversely, these sleep deficiencies can in return cause problems in stress-, emotion- and affect regulation (11). Evidence suggests that sleep impairments may increase stress sensitivity by potentiating the reactivity of the hypothalamic pituitary adrenal (HPA) axis, the main neuroendocrine system involved in stress adaptation (12). This provides a potential pathway how inadequate sleep contributes to the development of stress-related disorders such as depression (13). As burnout comprises a corresponding condition that is also mainly triggered by long-term stress, the elevated stress sensitivity caused by sleep deficiencies might be causally involved in the onset of the syndrome.

Few studies support the involvement of sleep in the development of student burnout. Wolf and Rosenstock (9) for example found that students who sleep less than 5 hours per night or experience pathological sleepiness display a significantly higher prevalence of burnout. Although these findings explain some of the variance in burnout scores, sleep quality instead of sleep quantity is thought to particularly influence stress sensitivity (12), affective changes, and emotion regulation (11). Therefore, to gain a detailed understanding of the etiology of burnout, the association between sleep quality and student burnout needs to be investigated.

The Present Study

Consequently, the main aim of the present study was to explore the relationship between sleep quality and student burnout in first-year college students. A sample of first-year psychology students of Maastricht University (N = 75) completed an online survey at two time points during the first period of the academic year. Two main hypotheses were examined. First of all, it is hypothesized that poor sleep quality, compared to good sleep quality, is associated with elevated levels of burnout symptoms (i.e. higher emotional exhaustion and cynicism as well as lower levels of professional efficacy). Moreover, it is assumed that over one study period the burnout levels of students will significantly increase. The more general goal of the present research is to extend the current knowledge on predictors of student burnout in order to enable successful prevention in the future.

METHODS

Participants

At the first measurement, a total of 94 students participated, which decreased to 75 subjects for the second measurement (20.2% attrition rate). Subjects were between 18 and 40 years old (M = 19.80, SD = 2.55). Out of all participants used in the analysis, 82.67% were female (N = 62) and 17.33% were male (N = 13). Followed procedures were approved by the local Ethical Committee of the Faculty of Psychology and Neuroscience (ERCPN). Informed consent was signed by

all subjects and data was treated confidentially.

Procedure
Students were recruited through online and paper advertisements at the university. The same web-based survey had to be filled out at two consecutive points in time: at the beginning of the academic year (baseline) and at the end of the period (after the final exams) which covers a total of eight weeks. At each testing week, the survey hyperlink (data acquisition website: "Qualtrics") was sent via e-mail for which subjects were given one week (7 days) to complete with two additional reminder e-mails. The survey consisted out of five self-report questionnaires.

Materials
General information. Demographic data was collected with 10 questions based on prior research on student burnout (9). These questions included biographical items such as prior years of study engagement as well as questions addressing modifiable health behaviors such as smoking, alcohol and caffeine consumption.

Burnout. The Maslach Burnout Inventory – General Survey for Students (MBI-GS (S)) (1) was used to measure the level of burnout. With 16 items this measure assesses the average burnout score on the three subscales: emotional exhaustion (EE), cynicism (CY) and professional efficacy (PE). Emotional exhaustion indicates tiredness combined with emotional depletion. Cynicism is known as depersonalization or indifference with one's study. The score of professional efficacy describes the level of satisfaction with one's study performance. The scores were classified as clinical burnout cases according to the official cut-off scores and decision rule by Maslach (9, 14: p.102). This measure assesses the perception at the current moment with answers ranging from 0 ("never") to 6 ("every day"). The MBI-GS (S) is a gold standard measure with acceptable Cronbach alpha reliability coefficients above $\alpha = 0.7$ (EE: 0.77; CY: 0.72; PE: 0.81) (15).

Sleep Quality. The Pittsburgh Sleep Quality Index (PSQI) (16) was used to assess the sleep quality of students during the past month. The measure comprises 19 items that are rated on a 0 to 3 scale with higher values implying worse sleep quality. In this study, sleep quality was defined by its index, computed by the sum of seven sleep components: "subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction" (16: p.195). Based on the official cut-off score subjects with an index of 5 or above were classified as poor quality sleepers whereas a global score below 5 was indicating a "good sleep quality" (16). The PSQI persists as a valid and reliable measure (Cronbach $\alpha = 0.83$) (16).

Stress. The stress level was measured with the Perceived Stress Scale (PSS-10) consisting of ten items (17). The subject evaluates the perception of the last month on a 5-point Likert scale. In a sample of college students, this scale displayed an almost excellent internal consistency ($\alpha = 0.89$) (17).

Depression. The Center for Epidemiologic Studies Depression Scale (CES-D) (18) was used to evaluate the presence of depressive symptoms. On 20-items participants rate how many times they experienced depressive symptoms within the past week on a 4-point scale. The psychometric properties of the CES-D are well-researched, indicating a high reliability (Cronbach $\alpha = 0.85$) and validity (18).

Statistical Analyses
To analyze the data, the statistical software SPSS Statistics 21.0 was used (SPSS Statistics 21.0 for Windows, IBM, Armonk, New York). All subjects that participated in only one of the two measurements were excluded from analysis. To examine the sample characteristics and prevalence, descriptive statistics and independent sample t-tests were conducted. The main analysis were three repeated measures analyses of variance (ANOVA) to investigate the main effects of sleep quality (poor vs. good) and time (baseline vs. end of period) as well as a possible interaction for each burnout subscale separately. All results are interpreted at a significance level of 5% (two-tailed).

RESULTS

Sample Characteristics
At baseline, 49.3% ($N = 37$) of the students were classified as poor sleepers compared to 50.7% ($N = 38$) good sleepers. While the distribution of gender did not differ between the groups, students with poor sleep quality reported significantly higher depression scores ($M = 19.57$, $SD = 11.23$) than students with good sleep quality ($M = 10.13$, $SD = 6.11$), ($t(55.27) = 4.5$, $p < 0.001$, $d = 1.044$). Moreover, a significantly higher stress level ($M = 21.27$, $SD = 6.11$) was observed in poor sleepers compared to good sleepers ($M = 12.89$, $SD = 4.86$), ($t(63.68) = 5.97$, $p < 0.001$, $d = 1.518$). Regarding age differences, poor quality sleepers ($M = 19.08$, $SD = 1.12$) were significantly younger than good quality sleepers ($M = 20.55$, $SD = 3.9$), ($t(42.89) = -2.19$, $p = 0.034$, $d = 0.51$).

Prevalence of Student Burnout
At the end of the academic period, 21.3% ($N = 16$) of students showed high levels of burnout, according to official MBI cut-off values, compared to 78.7% ($N = 59$) without any signs of clinical burnout. There was no significant difference between the burnout prevalence rates of women (13.2%) and men (2.8%) ($\chi^2(1, 75) = 1.74$, $p = 0.187$).

The Influence of Sleep Quality on Burnout Symptoms
Emotional exhaustion
Figure 1 describes the simple and main effects of time and sleep quality on the emotional exhaustion score (EX). Results revealed a significant main effect of time ($F(1, 73) = 11.88$, $p = 0.001$, $\eta_p^2 = 0.14$). This implies that the emotional exhaustion score at the end of the period ($M = 2.83$, $SD = 1.38$) was significantly higher than at baseline ($M = 2.35$, $SD = 1.28$). Statistical analyses further revealed a significant between-subject effect of sleep quality ($F(1,73) = 30.7$, $p < 0.001$, $\eta_p^2 = 0.296$) demonstrating that students with poor sleep quality ($M = 3.24$, $SD = 1.19$) were significantly more emotionally exhausted compared to subjects with good sleep quality ($M = 1.96$, $SD = 1.14$). The interaction between time and sleep quality was insignificant ($F(1,73) = 0.436$, $p = 0.551$, $\eta_p^2 = 0.006$), indicating that the change in emotional exhaustion scores across the first period did not differ between poor and good sleepers.

Cynicism
For the burnout subscale cynicism (CY) the variable time showed a near significant main effect ($F(1,73) = 3.75$, $p = 0.057$, $\eta_p^2 = 0.049$) suggesting a trend that students became more cynical over one period. Moreover, a main effect of sleep quality illustrates that students with a good

sleep quality ($M = 1.1$, $SD = 0.97$) were significantly less cynical about their studies then poor quality sleepers ($M = 2.0$, $SD = 1.4$), $F(1,73) = 14.4$, $p < 0.001$, $\eta_p^2 = 0.165$. Due to an insignificant interaction, the effect of time on cynicism was not different in the two sleep quality groups, ($F(1,73) = 0.125$, $p = 0.724$, $\eta_p^2 = 0.002$).

Professional efficacy

Professional efficacy showed similar results with a near significant main effect of time ($F(1,73) = 3.67$, $p = 0.059$, $\eta_p^2 = 0.048$). This indicates a trend that the professional efficacy of students decreased over time. Subjects with a good sleep quality ($M = 4.44$, $SD = 0.83$) showed significantly higher levels of professional efficiency than poor quality sleepers ($M = 4.06$, $SD = 0.87$), $F(1,73) = 4.77$, $p = 0.032$, $\eta_p^2 = 0.061$. As for all burnout subscales, time and sleep quality had no significant interaction revealing that poor quality sleepers and good quality sleepers have the same amount of change in professional efficacy over time, $F(1,73) = 2.05$, $p = 0.156$, $\eta_p^2 = 0.027$.
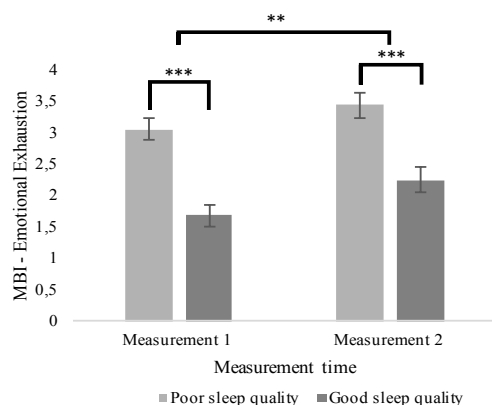

Figure 1. Emotional exhaustion scores at baseline and at the end of the period for subjects with poor and good sleep quality separately. Error bars represent one standard error. ***p < 0.001, **p < 0.01.

DISCUSSION

The aim of the present study was to investigate the influence of sleep quality on the development of burnout over one study period in first-year college students. The results of this study reveal that for all three components of burnout (emotional exhaustion, cynicism, professional efficacy) a poor sleep quality was associated with higher burnout scores compared to a good sleep quality. Although burnout symptoms (emotional exhaustion) were found to increase during the first academic period, this change was not different between the good and poor sleep quality groups. These findings indicate that sleep quality is a valuable predictor of burnout symptoms although this does not appear to influence the development during the first months of university studies. In general, a high prevalence of burnout and poor sleep quality was found among students.

The observation that poor sleep quality is associated with higher burnout symptoms, is in line with previous research in students. Poor sleep quality was strongly associated with a cynical attitude and a low academic efficiency (19). The present study also confirms a large body of research demonstrating that sleep quality is particularly relevant in the context of affective symptoms (11). Other studies have shown that burnout symptoms may also be involved in the etiology of sleep impairments (20). It has been proposed that long-term

stress exposure causes sleep disturbances which make subjects more sensitive to stress (12) and cause emotional exhaustion (19). Therefore, although poor sleep quality predisposes students to higher burnout scores their bi-directional relationship might lead to a vicious cycle of stress, sleep impairments and burnout (19, 20).

The first period of exposure to university life might constitute a highly stressful experience for students since they became significantly more emotionally exhausted. This main effect of time also trended towards significance for cynicism and professional efficacy. These findings can be explained by the different temporal onsets of burnout components (21). The exposure to emotional stressors initially causes the development of emotional exhaustion which in return triggers depersonalization and cynicism which lead to the perception of a lower professional accomplishment over time (21). Therefore, a significant change in cynicism and professional efficacy levels might have shown if a larger time interval had been chosen.

In this study, sleep quality was not found to influence the change in burnout symptoms across the first period. Therefore, although subjects with a poor sleep quality started and ended the period with higher burnout scores, both sleep quality groups showed the same increase in burnout over time. These results are contradictory to Söderstrom et al. (20) who proposed that sufficient sleep indicates less rumination and will lead to more restorative processes that prevent the onset of burnout symptoms. A possible explanation for this contradiction is that this study did not control for sleep quality changes over time. Hence, some subjects who started university with good sleep might have decreased their sleep quality due to stress making them more vulnerable to burnout (20). Therefore, sleep quality after exposure to stress might predict the distant development of burnout. As research on the topic is scarce, future studies should investigate the complex interaction between sleep quality, stress, and burnout.

After two months of university, burnout (21.3%) and a poor sleep quality (48%) were highly prevalent among students. Likewise, other studies (9) report that one out five students shows an increased risk of developing clinical burnout. Moreover, a prevalence of poor sleep quality around 50% is in line with other studies (10). Additionally, within the group of poor quality sleepers, a significantly higher depression score was found which supports the well-established relationship between depression and inadequate sleep (13). This might also explain why 53.3% of students showed a high level of depression. As all three prevalence rates (burnout, sleep quality, depression) are highly above the numbers in the general population, this study once more stresses the severe issue of mental health and burnout in college students.

Limitations and Further Implications

Because only first-year psychology students participated in this study over a relatively short time-interval, findings might not be generalizable to the whole student population. Moreover, there might be a risk for recall bias. Therefore, future studies should include students from different academic disciplines (22) and cohorts (9) and measure over longer time intervals. Additionally, this study is limited in its explanatory power of clinical burnout as the student's symptomology was not clinically assessed, which should be done in future studies.

The results of this study accentuate the need for burnout

prevention strategies such as mindfulness-based stress reduction (MBSR) (22). However, interventions should also include education about the importance of sleep for example by supporting the use of sleep-hygiene instructions and emphasizing the promotion of regular sleep-wake schedules (23). Further studies addressing the potential of such interventions are needed.

Conclusion

In this study, poor sleep quality in college students was associated with significantly higher burnout symptoms. Furthermore, over one study period students became significantly more emotionally exhausted due to the start of university life, and displayed a trend towards increased cynicism and reduced professional efficiency. The high prevalence of burnout and poor sleep quality found among students presents an increasing problem with severe mental, physical and economic consequences. To the best of our knowledge, this is the first study which includes sleep quality combined with a longitudinal component in first-year college students. Because sleep is a modifiable health behavior (9), future interventions need to include it as a key variable to prevent a further increase in numbers of student burnout around the world.

ROLE OF THE STUDENT

This study was conducted by the undergraduate student Isabelle Göhre as part of the MARBLE research program of Maastricht University. The research idea was a synthesis of the student's interest in burnout and was inspired by prior research in the field of sleep quality and depression with the same supervisor Jens H. van Dalfsen. The study was carried out by the student through participant acquisition, administration of the online questionnaires, statistical data analysis and writing of the research paper.

REFERENCES

1. Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory. 3 ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
2. Herbst U, Voeth M, Eidhoff AT, Müller M, Stief S. Studierendenstress in Deutschland - eine empirische untersuchung. AOK-Bundesverband. 2016(1-80).
3. Boer Td. Van succes-student naar stress-student - Hoe groot is het probleem? Landelijke Studentenvakbond. 2017:1-32.
4. Maske UE, Riedel-Heller SG, Seiffert I, Jacobi F, Hapke U. Prevalence and Comorbidity of Self-Reported Diagnosis of Burnout Syndrome in the General Population. Psychiatr Prax. 2016;43(1):18-24.
5. Eisenberg D, Goldrick-Rap S, Lipson SK, Broton K. Too distressed to learn? - Mental health among community college students. The Wisconsin HOPE Lab. 2016:2-15.
6. Gruttadaro D, Crudo D. College students speak: a survey report on mental health. National Alliance on Mental Illness (NAMI). 2012:4-22.
7. Jacobs SR, Dodd D. Student Burnout as a Function of Personality, Social Support and Workload. Journal of College Student Development. 2003;44(3):291-303.
8. Iacovides A, Fountoulakis KN, Kaprinis S, Kaprinis G. The relationship between job stress, burnout and clinical depression. Journal of affective disorders. 2003;75(3):209-21.
9. Wolf MR, Rosenstock JB. Inadequate Sleep and Exercise Associated with Burnout and Depression Among Medical Students. Academic psychiatry : the journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry. 2017;41(2):174-9.
10. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. Journal of Adolescent Health. 2010;46(2):124-32.
11. O'Leary K, Bylsma LM, Rottenberg J. Why might poor sleep quality lead to depression? A role for emotion regulation. Cognition & emotion. 2017;31(8):1698-706.
12. van Dalfsen JH, Markus CR. The influence of sleep on human hypothalamic-pituitary-adrenal (HPA) axis reactivity: A systematic review. Sleep medicine reviews. 2017.
13. Baglioni C, Battagliese G, Feige B, Spiegelhalder K, Nissen C, Voderholzer U, et al. Insomnia as a predictor of depression: a meta-analytic evaluation of longitudinal epidemiological studies. Journal of affective disorders. 2011;135(1-3):10-9.
14. Cartwright S, Cooper CL, Maslach C, Leiter MP, Schaufeli W. Measuring Burnout. The Oxford Handbook of Organizational Well Being: Oxford University Press; 2008. p. 86-108.
15. Faye-Dumanget C, Carre J, Le Borgne M, Boudoukha PAH. French validation of the Maslach Burnout Inventory-Student Survey (MBI-SS). Journal of evaluation in clinical practice. 2017;23(6):1247-51.
16. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Research. 1989;28(2):193-213.
17. Roberti JW, Harrington LN, Storch EA. Further Psychometric Support for the 10-Item Version of the Perceived Stress Scale. Journal of College Counseling. 2006;9(2):135-47.
18. Radloff LS. The CES-D Scale:A Self-Report Depression Scale for Research in the General Population. Applied Psychological Measurement. 1977;1(3):385-401.
19. Pagnin D, de Queiroz V, Carvalho YT, Dutra AS, Amaral MB, Queiroz TT. The relation between burnout and sleep disorders in medical students. Academic psychiatry: AADPRT and AAP. 2014;38(4):438-44.
20. Söderström M, Jeding K, Ekstedt M, Perski A, Akerstedt T. Insufficient sleep predicts clinical burnout. Journal of occupational health psychology. 2012;17(2):175-83.
21. Leiter MP, Maslach C. The impact of interpersonal environment on burnout and organizational commitment. Journal of Organizational Behavior. 1988;9(4):297-308.
22. de Vibe M, Solhaug I, Tyssen R, Friborg O, Rosenvinge JH, Sørlie T, et al. Mindfulness training for stress management: a randomised controlled study of medical and psychology students. BMC Medical Education. 2013;13(1):107.
23. Brown FC, Buboltz WC, Jr., Soper B. Relationship of sleep hygiene awareness, sleep hygiene practices, and sleep quality in university students. Behavioral medicine.2002;28(1):33-8.