

THE FATIGUE FACTOR: IMPACT ON ORGANIZATIONAL COMMITMENT AND JOB SATISFACTION IN PHARMACEUTICALS"

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Abstract

Working conditions in modern times are a key factor related to fatigue, organizational commitment and job satisfaction of employees in pharmaceutical companies. The purpose of this study was to investigate the levels of fatigue, organizational commitment and professional satisfaction of employees in pharmaceutical companies in the area of Athens. The effect of fatigue on the two aforementioned variables (organizational commitment and job satisfaction) was also investigated. The research involved 102 employees of different specialties (medical visitors, administrators, laboratory staff, etc.) with an average age of 43 years. Participants completed the Fatigue Assessment Scale (FAS), the Meyer and Allen Organizational Commitment Questionnaire, and the Employee Satisfaction Inventory (ESI). The results showed that fatigue was statistically significant correlated with the various dimensions of organizational commitment and job satisfaction, while it was also pointed out that it could be considered as their predictors as well. In conclusion, research on organizational commitment and job satisfaction or interventions aimed at enhancing them should take the fatigue factor into highly consideration.

1. Introduction

1.1 Fatigue

Fatigue is a subjective experience and due to its subjectivity it is difficult to define (Foets & Sixma, 1991). It is in fact a complex of psychological, social and biological processes and can be described as a condition, which is characterized by a decrease in the ability to work and efficiency of the individual, while usually accompanied by a feeling of irritability (Alikari et al., 2016). Depending on its etiology, fatigue can be divided into acute and chronic (Magnusson, 2001; Radbruch et al., 2008), while in terms of its dimensions, they are often distinguished into physical fatigue and mental fatigue (Marcora, Staiano & Manning, 2009).

Physical fatigue is characterized by difficulties and diminished ability to perform physical work and as a result can lead to decreased endurance, reduced control of movement and a general feeling of discomfort (Gawron,

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French & Funke, 2001; Côté et al., 2005; Huysmans et al. al., 2010). These effects can cause lessened productivity, negatively affect the quality of work and reduce performance in the workplace, while they have also been associated with negative impacts on social relationships and activities (Yung, 2016). On the other hand, mental fatigue reflects reduced cognitive abilities and less willingness to act according to the requirements of the project due to previous physical or mental effort (Meijman, 1997).

Fatigue is not uncommon in a healthy population and it is interesting to note that some researchers have found that the most recognized contributing factor to the onset of fatigue is work, followed by family and lifestyle (Jung & Kim, 2012; Fritschi & Quinn, 2010; Lan et al., 2020; Rahme et al., 2020). For instance, a study by Khalafi, Tangestani and Osanloo (2014) that investigated the relationship between work-related stress and social support in hospital nurses in Tehran showed that social support was a predictor of workplace stress and burnout.

Similar conclusions were reached by the research of Ariapooran (2014), which studied the determination of the prevalence of symptoms of fatigue and exhaustion and the role of perceived social support in predicting these symptoms. Social support was negatively correlated with burnout, while it appeared that family social support was an important prognostic factor for the occurrence of fatigue and burnout. The study of Fradelos et al.

(2014) also demonstrated that there is a correlation between fatigue, quality of life and social support.

Maslach (2001) who studied the relationship between job satisfaction and fatigue, found that the latter is closely related to job dissatisfaction. In fact, mental fatigue according to them (2001) was a more important cause of dissatisfaction. Another study noticed that job demands that create work stress are associated with more emotional exhaustion, more depersonalization, and less personal achievement. Support from supervisors, friends or family members, assurance of value and opportunities for growth were associated with less emotional exhaustion and higher levels of personal fulfillment (Woodhead, Northrop & Edelstein, 2016).

In general, factors that have been shown in the literature to affect fatigue in the workplace are lack of sleep (Bendak & Rashid, 2020), occupational injuries, such as neck, back and other musculoskeletal disorders (Trinkoff et al., 2007), work schedules and shifts (Han, Trinkoff & Geiger-Brown, 2014), physically and mentally demanding tasks (Barker & Nussbaum, 2011; Pourmovahed & Nasiriani, 2016), stress (Portnoy, 2011; Lee & Yom, 2013; Stokes & Kite, 2017), job satisfaction (Oh, Sung & Kim, 2011; Pirmoradi, Foroghinejad & Bedmeshki, 2017), work-family conflicts (Bakker, Demerouti & Dollard, 2008; Ilies et al., 2015), low salary and poor working conditions (Tang et al., 2019).

1.2 Organizational commitment and job satisfaction

Organizational commitment and job satisfaction were two of the recurring conceptual constructs in the scientific literature on work organization. In a study of organizational commitment, Meyer and Allen (1990) have defined three types of it: the affective, the continuance and the normative. Affective commitment is the emotional attachment and identification of employees with their organization. Continuance commitment premises that the employees do not risk leaving their job, as they perceive the fear of finding a new one as too great, while the normative commitment is the sense of the moral obligation of the employees to remain in the organization that gave them a position with certain earnings and somehow invested and believed in them.

It has been observed that to ensure the achievement of consistent corporate goals, organizations strive to create an atmosphere of commitment and cooperation with their employees through policies and strategies that facilitate their satisfaction. One such strategy is to increase wages. However, it has been shown that this alone is not enough to motivate organizational commitment and job satisfaction (Wiens-Tuers & Hills, 2002; Vandenberghe & Tremblay, 2008; Singh & Loncar, 2010). Therefore, other strategies pay special attention to the training and

continuous development of employees' skills (Woodruffe 2000; Costen & Salazar, 2011; Eslami & Gharakhani, 2012) or support a holistic approach that covers both fair wages and good benefits, as well as employment conditions that allow for career development (Champion-Hughes, 2001; Parvin & Kabir, 2011).

Respectively, the factor of working hours has been examined. A number of studies (Thorsteinson, 2003; Clinebell & Clinebell, 2007; Al Omar et al., 2011) examining differences in job satisfaction between full-time and part-time workers have shown that no significant difference is observed. However, there is a difference in job commitment, and this may be due to the fact that part-time employment is often an additional job and source of income, while employees have other main professional obligations, to which they are more committed (Thorsteinson, 2003).

Concerning the pharmaceutical industry in particular, in a research by Anis, Khan and Humayoun (2011), which aimed to study the relationship between employee retention, job satisfaction, perceived supervisory support and compensation, considering organizational commitment as a mediating variable in employees of six pharmaceutical companies, showed that there is a positive and significant relationship between compensation, supervisory support and organizational commitment. The results also concluded that organizational commitment has a strong and positive relationship with employee satisfaction and their stay at work.

Furthermore, Parvin and Kabir (2011) argued that working conditions, fairness, development opportunities and wages are key factors influencing the satisfaction of employees of pharmaceutical companies. They claimed that by increasing wages and providing good compensation, employees are more motivated, their job satisfaction increases and at the same time the quality of services and organizational efficiency are improved. Also, they point out (2011) that in addition to financial incentives, a good working environment in which favorable working conditions prevail can further increase employee satisfaction and commitment.

Although research has been conducted on fatigue, organizational commitment and job satisfaction in different workgroups (Cordes & Dougherty, 1993; Tan & Akhtar, 1998; Maslach, 2001; Oh, Sung & Kim, 2011; Tourigny et al., 2013; Ali & Kakakhel 2013), the number of surveys conducted in Greece and those particularly that concern employees in the pharmaceutical industry are extremely limited. The purpose of this study is to investigate the rates of fatigue, organizational commitment and professional satisfaction of employees in pharmaceutical companies in the area of Athens, as well as the effect of fatigue on the other two variables (organizational commitment and job satisfaction). Our main research hypothesis is that there will be a statistically significant effect of fatigue on the rates of organizational commitment and job satisfaction in the population under investigation.

2. Method

2.1 Research Design and Sample

The variables examined in this quantitative cross-sectional study were the rates of fatigue, organizational commitment and job satisfaction of employees in pharmaceutical companies. The present research involved personnel of different specialties (eg medical visitors, administrative staff, laboratory staff, etc.) working in Athens. For the selection of the sample were set as admission criteria people to be over 18 years old, to work at least one year in this field and to know the Greek language fluently. The main exclusion criterion was the presence of any psychiatric disorder.

2.2 Questionnaires

Initially, participants filled out a form with their demographic and professional details. Participants then completed the "The Fatigue Assessment Scale (FAS)", which is a tool for assessing perceived fatigue and consists of 10 questions on a five-point Likert scale (1 = never to 5 = always), with a score of ranges between 10-50. Five

questions are about physical and five questions are about mental fatigue. This scale is considered a reliable tool for measuring fatigue for both healthy people and people with diseases (Michielsen et al., 2003; Michielsen et al., 2004).

Respondents also completed the Organizational Commitment Questionnaire, which includes 18 statements based on the three-dimensional model of organizational commitment, according to Meyer, Allen and Smith (1993). This tool evaluates both organizational commitment and its three dimensions, namely affective commitment, continuance commitment, as well as normative commitment. For each dimension the tool includes 6 statements. The employee responds using the Likert 5-point scale (Allen & Meyer, 1990).

The Employee Satisfaction Inventory - ESI (Koustelios & Bagiatis, 1997) was used to measure job satisfaction. This questionnaire was chosen because it explores all the dimensions that compose the concept of staff satisfaction, but also because its validity and reliability have been examined in similar surveys in Greece (Koustelios & Bagiatis, 1997; Koustelios & Kousteliou, 1998). The recording scale consists of a total of 24 items and has the following six subscales: Working Conditions, Salary, Nature of Work, Direct Supervisor, Organization as a whole and Promotion. To answer whether respondents considered each ability important, they used a fivepoint scale (1 = strongly disagree to 5 = strongly agree).

2.3 Procedure

The researchers turned to various pharmaceutical companies to participate in the research. questionnaires were distributed to all those who showed interest and wanted to participate. All participants in the survey were informed in detail about the purpose of the survey through the consent form they were asked to sign. In this form there was also a clear description of their right to withdraw data. The anonymity of the participants was ensured, as well as the confidentiality of the data. Completion of the questionnaires took approximately 10-15 minutes.

2.4 Statistical analysis

The socio-demographic profile of the sample was presented and in particular the quantitative variables were described with mean and standard deviation ($M \pm SD$) and the categorical variables with frequencies and percentages (%). Kolmogorov - Smirnov checked for the regularity of the sample. Spearman correlation and multiple regression analysis were performed to investigate the relationship between fatigue and organizational commitment and job satisfaction. All three tools used in this study showed very good reliability (Cronbach α), that is .896 for the fatigue questionnaire, .814 for the organizational commitment questionnaire and .781 for the job satisfaction questionnaire. The statistical analysis was run with the statistical program IBM SPSS Statistics 23. The value $p < 0.05$ was considered to indicate statistical significance.

3. Results

3.1 Sample characteristics

In the present study the total sample consisted of 102 people, of whom 52.9% were men and 47.1% women. The majority was university graduates (58.8%), married or with a cohabitation agreement (58.8%), medical visitors (35.3%) and having a position of responsibility (61.8%). The mean age of the study participants was 43.3 years (± 7.66). The average total working hours was 13 ± 7.8 , the average working hours in the department was 8.17 ± 6.54 and the average weekly working hours was 38.5 ± 14.3 . More information is shown in Table 1.

Table 1. Demographics and other characteristics of the participants

	N	%
gender		
men	54	52.9

women education	48	47.1
lyceum	9	8.8
University	60	58.8
postgraduate / doctoral marital status	33	32.4
unmarried	33	32.4
married - cohabitationagreement	60	58.8
divorced	6	5.9
widowed specialty	3	2.9
research / laboratorystaff	15	14.7
medicalvisitors	36	35.3
administrativestaff	18	17.6
seniorexecutives (managers) position of	33	32.4
responsibility		
yes	63	61.8
no	39	38.2

*N=102

Also, 52.9% of the sample did not have fatigue, while 47.1% did. The mean of physical fatigue was 11.6 ± 3.3 , of mental fatigue was 8.97 ± 2.65 and the mean of total fatigue was 20.6 ± 5.4 . The mean of affective commitment was 20.7 ± 4.8 , continuance commitment was 18.9 ± 4.6 , normative commitment was 17.7 ± 4.7 and total commitment was 57.3 ± 10.9 . The average satisfaction with the working conditions was 18.9 ± 3.9 , the satisfaction with the salary 12.4 ± 3.3 , the satisfaction with the promotion 9.3 ± 2.3 , the satisfaction with the nature of the work 15.7 ± 3 , by the immediate supervisor 15.1 ± 4.1 and the satisfaction from the organization 13.1 ± 3.7 .

3.2 Main results

In the correlation analysis (Table2), the results showed that the physical fatigue was negatively associated with affective commitment ($r = -.385$, $p < .001$), with satisfaction from working conditions ($r = -.390$, $p < .001$), satisfaction from the salary ($r = -.225$, $p = .023$), satisfaction from promotion ($r = -.238$, $p = .016$), the nature of the work ($r = -.599$, $p < .001$), the immediate supervisor ($r = -.252$, $p < .001$), and with satisfaction from the organization ($r = -.428$, $p < .001$). However, there was a positive correlation between physical fatigue and continuance commitment ($r = .217$, $p = .028$).

In addition, the correlation analysis (Table2) demonstrated that mental fatigue was negatively related to affective commitment ($r = -.396$, $p < .001$), normative commitment ($r = -.268$, $p < .001$), total commitment ($r = .217$, $p = .029$) and with satisfaction from working conditions ($r = -.308$, $p < .001$).

Similarly, mental fatigue was negatively correlated with promotion satisfaction ($r = -.230$, $p = .020$), the nature of work ($r = -.560$, $p < .001$), the immediate supervisor ($r = -.195$, $p = .049$) and finally the satisfaction from the organization ($r = -.488$, $p < .001$).

Regarding total fatigue (Table2), the correlation analysis indicated that it was negatively related to affective commitment ($r = -.421$, $p < .001$), to the satisfaction from working conditions ($r = -.387$, $p < .001$), the satisfaction with promotion ($r = -.245$, $p = .013$), the nature of the work ($r = -.621$, $p < .001$), the immediate supervisor ($r = -.245$, $p = .013$) and to the satisfaction from the organization ($r = -.482$, $p < .001$). In contrast, the results showed a positive correlation between total fatigue and continuance commitment ($r = .221$, $p = .026$).

Table 2. Spearman's rho Correlations.

	1	2	3	4	5	6	7	8	9	10	11	12
												13
1. Physical												
2. Mental	.678**											
3. TotalFatigue	.930**	.891**										
4. Affective	-	-	-									
	.385**	.396**	.421**									
5.Continuance	.217*	.157	.221*	.011								
6. Normative	-.110	-	-.191	.629**	.162							
7. Total		.268**										
Commitment	-.143	-.217*	-.182	.798**	.522**	.802**						
8.												
WorkingConditions	-	-	-	.314**	.075	.125	.203*					
	.390**	.308**	.387**									
9. Salary	-.225*	.021	-.128	.345**	.047	.238*	.260**	.450**				
10. Promotion	-.238*	-.230*	-.245*	.431**	-.187	.120	.216*	.447**	.169			
11. Nature of Work	-	-	-	.447**	-.028	.160	.271**	.529**	.114	.490**		
12.	.599**	.560**	.621**									
DirectSupervisor	-.252*	-.195*	-.245*	.519**	.118	.636**	.575**	.226*	.220*	.191	.272**	
13. Organization	-	-	-	.698**	.049	.500**	.557**	.587**	.487**	.333**	.567**	.432**
	.428**	.488**	.482**									

** p< 0.01; * p< 0.05

A series of multiple linear regression analyzes (enter method) was then performed. Initially to test Whether the dimensions of fatigue could significantly predict participants' ratings of affective commitment (Table 3). The results of the regression indicated that the predictors explained 16.2% of the variance ($F(2, 99) = 9.59$, $p < .001$). Only total fatigue was found to predict affective commitment ($b = -.50$, $p = .005$).

Table 3. Fatigue Predicting Affective Commitment.

Variable	B	SE	β	t	p
MentalFatigue	.363	.360	.202	1.008	.316
TotalFatigue	-.506	.177	-.571	-2.853	.005

$R^2 = .162$

Also, to test whether fatigue could predict statistically significant satisfaction with working conditions (Table 4). This model explained 13.8% of the variance ($F(2, 99) = 7.9$, $p < .001$). Based on the results, both mental ($b = .61$, $p = .04$) and total fatigue ($b = -.50$, $p < .001$) were predictors of satisfaction with working conditions.

Table 4. Fatigue Predicting Satisfaction from Working Conditions.

Variable	B	SE	β	t	p
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MentalFatigue

	.615	.296	.423	2.080	.040
TotalFatigue	-.495	.145	-.692	-3.404	.001

$R^2 = .138$

Moreover, regression analyzes were run to examine whether mental and total fatigue were predictive factors of salary satisfaction, job satisfaction based on the nature of the work, and satisfaction from the organization. In the first case (Table 5), the model explained 10.8% of the variance ($F(2, 99) = 6.02, p < .001$), with the results showing both mental ($b = .78, p < .001$) and total fatigue ($b = -.44, p < .001$) as predictors of salary satisfaction.

Table 5. Fatigue Predicting Salary Satisfaction

Variable	B	SE	β	t	p
MentalFatigue	.776	.255	.627	3.037	.003
TotalFatigue	-.436	.126	-.716	-3.468	.001

$R^2 = .108$

In the second case (Table 6), the model explained 35.8% of the variance ($F(2, 99) = 27.6, p < .001$), however only total fatigue was a predictor of job satisfaction related to nature of work ($b = -.34, p < .001$).

Table 6. Fatigue Predicting Job Satisfaction related to Nature of Work.

Variable	B	SE	β	t	p
MentalFatigue	.012	.199	.011	.060	.952
TotalFatigue	-.339	.098	-.608	-3.467	.001

$R^2 = .358$

Respectively, in the last case (Table 7), the model explained 20.5% of the variance ($F(2, 99) = 12.73, p < .001$) and again only the total fatigue was found to predict statistically significant satisfaction from the organization ($b = -.30, p = .03$).

Table 7. Fatigue Predicting Job Satisfaction related to the Organization.

Variable	B	SE	β	t	p
MentalFatigue	-.027	.272	-.020	-.100	.921
TotalFatigue	-.298	.134	-.435	-2.228	.028

$R^2 = .205$

4. Conclusion

The purpose of this study was to investigate the rates of fatigue, organizational commitment and job satisfaction of employees in pharmaceutical companies in the area of Athens, as well as to investigate the effect of fatigue on the organizational commitment and job satisfaction. A general conclusion is that it seems a large number of employees in pharmaceutical companies are experiencing fatigue. This finding is in complete agreement with the others of similar studies. In particular, the study of Rahme et al. (2020) recorded high scores of emotional, mental and physical fatigue in the workplace in a group of pharmacists. Also, the study of Lan et al.

(2020) demonstrated high rates of pharmacists regarding fatigue, stress and burnout.

In the context of evaluating the association of fatigue with organizational commitment and job satisfaction of employees in pharmaceutical companies, our main research hypothesis was confirmed. The results showed that

those who did not exhibit fatigue, had higher scores in terms of affective commitment, satisfaction with working conditions, satisfaction with the nature of work and satisfaction with the organization compared to employees who experienced fatigue. Thus, supporting the findings of Ali and Kakakhel (2013), who heightened the relationship between work stress and organizational commitment on pharmaceutical workers.

Additionally, several studies have examined the impact of burnout on affective commitment. Tan and Akhtar (1998) in their study of a Hong Kong banking organization supported this emotional element and showed that burnout has a large effect on employee engagement. Tourigny et al. (2013) showed that emotional exhaustion is negatively associated with affective commitment of nursing staff in China, while Jung and Kim (2012) noted that South Korean journalists have experienced a higher level of burnout due to the growing rate of reduced professional efficiency in their work. Particularly, the inability to do their job, as well as the lack of ability to achieve the desired results was factors that led to apathy and indifference of employees towards their organization. The preventive measures of the fatigue of the employees in pharmaceutical companies must be carried out at the level of the organization, at the individual level and at the individual-organizational level. At the organizational level it is imperative to hire new employees taking into account the conditions for the execution of the specific job, learning new skills, acquiring knowledge both professional and applicable to deal with stress, improving physical and mental working conditions and cultivating communication and collaboration. At the individual level, it is important to develop relaxation skills in high-intensity situations, self-improvement, the ability to accept and modify unpleasant experiences, and the development of the ability to assign, negotiate, and set goals.

Last but not least, at the individual - organizational level, it is essential to clarify roles, to seek the promotion of support from superiors and colleagues and to match individual opportunities and employment requirements. These prospects are expected to lead to an improvement in the quality of care provided. Regarding the limitations of the present study, it is noted that the results should be further investigated in larger samples from other pharmaceutical companies and compare the results, so that more reliable conclusions can emerge. Future research should focus on finding other factors that affect rates of fatigue, organizational commitment and job satisfaction in this population as well as in others.

Disclosure of interest

The authors declare that there are no conflicts of interest with respect to the authorship or the publication of this article.

References

- Al Omar, A., Lolli, J., Chen-McCain, S. L., & Dickerson, J. (2011). A comparison between full and part-time lodging employees on job satisfaction, organizational commitment, and job performance. In Proceedings of the International CHRIE Conference-Refereed Track, Denver, CO, USA.
- Alikari, V., Fradelos, E., Sachlas, A., Panoutsopoulos, G., Lavdaniti, M., Palla, P., & Zyga, S. (2016). Reliability and validity of the Greek version of «the Fatigue Assessment Scale». *Archives of Hellenic Medicine*, 33(2), 231-238.
- Ali, N., & Kakakhel, S. J. (2013). Relationship between occupational stress and organizational commitment (empirical evidence from pharmaceuticals industry). *Journal of Managerial Sciences*, 7(2), 292-298.

- Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of occupational psychology*, 63(1), 1-18.
- Ariapooran, S. (2014). Compassion fatigue and burnout in Iranian nurses: The role of perceived social support. *Iranian journal of nursing and midwifery research*, 19(3), 279.
- Anis, A., Khan, M. A., & Humayoun, A. A. (2011). Impact of organizational commitment on job satisfaction and employee retention in pharmaceutical industry. *African Journal of Business Management*, 5(17), 7316-7324.
- Bakker, A. B., Demerouti, E., & Dollard, M. F. (2008). How job demands affect partners' experience of exhaustion: Integrating work-family conflict and crossover theory. *Journal of Applied Psychology*, 93(4), 901.
- Barker, L. M., & Nussbaum, M. A. (2011). Fatigue, performance and the work environment: a survey of registered nurses. *Journal of advanced nursing*, 67(6), 1370-1382.
- Bendak, S., & Rashid, H. S. (2020). Fatigue in aviation: A systematic review of the literature. *International Journal of Industrial Ergonomics*, 76, 102928.
- Costen, W. M., & Salazar, J. (2011). The impact of training and development on employee job satisfaction, loyalty, and intent to stay in the lodging industry. *Journal of Human Resources in Hospitality & Tourism*, 10(3), 273284.
- Champion-Hughes, R. (2001). Totally Integrated Employee Benefits. *Public Personnel Management*, 30(3), 287–302.
- Clinebell, S. K., & Clinebell, J. M. (2007). Differences between part-time and full-time employees in the financial services industry. *Journal of Leadership & Organizational Studies*, 14(2), 157-167.
- Côté, J. N., Raymond, D., Mathieu, P. A., Feldman, A. G., & Levin, M. F. (2005). Differences in multi-joint kinematic patterns of repetitive hammering in healthy, fatigued and shoulder-injured individuals. *Clinical Biomechanics*, 20(6), 581-590.
- Cordes, C. L., & Dougherty, T. W. (1993). A review and an integration of research on job burnout. *Academy of management review*, 18(4), 621-656.
- Eslami, J., & Gharakhani, D. (2012). Organizational commitment and job satisfaction. *ARP Journal of Science and Technology*, 2(2), 85-91.
- Fradelos, E., Mpelegrinos, S., Mparo, C., Vassilopoulou, C., Argyrou, P., Tsironi, M., & Theofilou, P. (2014). Burnout syndrome impacts on quality of life in nursing professionals: The contribution of perceived social support. *Progress in Health Sciences*, 4(1), 102-109.

- Fritschi, C., & Quinn, L. (2010). Fatigue in patients with diabetes: a review. *Journal of psychosomatic research*, 69(1), 3341.
- Foets, M., Sixma, H. (1991). *Eennationalestudie van ziektenenverrichtingen in de huisartspraktijk. Basisrapportgezondheidengezondheidsgedrag in de praktijkpopulatie* 'A national study concerning diseases and activities in the general practitioner-practice.. Report on health and health behavior in the GP-practice population'. Utrecht, The Netherlands: Nivel.
- Gawron, V. J., French, J., & Funke, D. (2001). *An overview of fatigue*. In P. A. Hancock & P. A. Desmond (Eds.), *Human factors in transportation. Stress, workload, and fatigue* (p. 581–595). Lawrence Erlbaum Associates Publishers.
- Han, K., Trinkoff, A. M., & Geiger-Brown, J. (2014). Factors associated with work-related fatigue and recovery in hospital nurses working 12-hour shifts. *Workplace health & safety*, 62(10), 409-414.
- Huysmans, M. A., Hoozemans, M. J., van der Beek, A. J., de Looze, M. P., & van Dieen, J. H. (2010). Position sense acuity of the upper extremity and tracking performance in subjects with non-specific neck and upper extremity pain and healthy controls. *Journal of rehabilitation medicine*, 42(9), 876-883.
- Ilies, R., Huth, M., Ryan, A. M., & Dimotakis, N. (2015). Explaining the links between workload, distress, and work–family conflict among school employees: Physical, cognitive, and emotional fatigue. *Journal of Educational Psychology*, 107(4), 1136.
- Jung, J., & Kim, Y. (2012). Causes of newspaper firm employee burnout in Korea and its impact on organizational commitment and turnover intention. *The International Journal of Human Resource Management*, 23(17), 36363651.
- Khalafi, A., Tangestani, Y., & Osanloo, S. (2014). Relationship between job stress and social support and burnout in nurses. *Journal of Novel Applied Sciences*, 3(1), 48-52
- Koustelios, A. D., & Bagiatis, K. (1997). The Employee Satisfaction Inventory (ESI): Development of a scale to measure satisfaction of Greek employees. *Educational and psychological measurement*, 57(3), 469-476.
- Koustelios, A., & Kousteliou, I. (1998). Relations among measures of job satisfaction, role conflict, and role ambiguity for a sample of Greek teachers. *Psychological Reports*, 82(1), 131-136.
- Lan, Y. L., Huang, W. T., Kao, C. L., & Wang, H. J. (2020). The relationship between organizational climate, job stress, workplace burnout, and retention of pharmacists. *Journal of Occupational Health*, 62(1), e12079.
- Lee, J. M., & Yom, Y. H. (2013). Effects of work stress, compassion fatigue, and compassion satisfaction on burnout in clinical nurses. *Journal of Korean Academy of Nursing Administration*, 19(5), 689-697.

- Marcora, S. M., Staiano, W., & Manning, V. (2009). Mental fatigue impairs physical performance in humans. *Journal of applied physiology*, 106(3), 857-864.
- Magnusson, K. (2001). Definition of fatigue, diagnostic criteria, and algorithms of patient evaluation. *EUROPEAN SCHOOL OF ONCOLOGY SCIENTIFIC UPDATES*, 5, 95-110.
- Maslach, C. (2001). schaufeli WB, leiter MP. *Job burnout. annu Rev Psychol*, 52, 397-422.
- Meijman, T. F. (1997). Psychischevermoeidheid [Mental fatigue]. *Vermoeidheid [Fatigue]. Cahiers Bio-WetenschappenMaatschappij*, 19e jrg. nr3. Rotterdam: Stichting Bio-WetenschappenMaatschappij, 5-15.
- Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of applied psychology*, 78(4), 538.
- Michielsen, H. J., De Vries, J., & Van Heck, G. L. (2003). Psychometric qualities of a brief self-rated fatigue measure: The Fatigue Assessment Scale. *Journal of psychosomatic research*, 54(4), 345-352.
- Michielsen, H. J., De Vries, J., Van Heck, G. L., Van de Vijver, F. J., & Sijtsma, K. (2004). Examination of the dimensionality of fatigue. *European Journal of Psychological Assessment*, 20(1), 39-48.
- Parvin, M. M., & Kabir, M. N. (2011). Factors affecting employee job satisfaction of pharmaceutical sector. *Australian journal of business and management research*, 1(9), 113.
- Portnoy, D. (2011). Burnout and compassion fatigue: watch for the signs. *Health Progress (Saint Louis, Mo.)*, 92(4), 46.
- Pourmovahed, Z., & Nasiriani, K. (2016). Perception of fatigue in female nurses employed in hospitals. *Women Health Open J*, 3(1), 1-7.
- Pirmoradi, M., Foroghinejad, N., & Bedmeshki, F. A. (2017). The relationship between job satisfaction and social support for employees with chronic fatigue. *Annals of Tropical Medicine and Public Health*, 10(6), 1681.
- Radbruch, L., Strasser, F., Elsner, F., Gonçalves, J. F., Løge, J., Kaasa, S., & Research Steering Committee of the European Association for Palliative Care (EAPC). (2008). Fatigue in palliative care patients—an EAPC approach. *Palliative Medicine*, 22(1), 13-32.
- Stokes, A. F., & Kite, K. (2017). *Flight stress: Stress, fatigue and performance in aviation*. Routledge.
- Rahme, D., Lahoud, N., Sacre, H., Akel, M., Hallit, S., & Salameh, P. (2020). Work fatigue among Lebanese community pharmacists: prevalence and correlates. *Pharmacy Practice*, 18(2), 1844-1844.
- Singh, P., & Loncar, N. (2010). Pay satisfaction, job satisfaction and turnover intent. *Relations industrielles/industrial relations*, 65(3), 470-490.

- Tang, C., Liu, C., Fang, P., Xiang, Y., & Min, R. (2019). Work-related accumulated fatigue among doctors in tertiary hospitals: a cross-sectional survey in six provinces of China. *International journal of environmental research and public health*, 16(17), 3049.
- Tan, D. S., & Akhtar, S. (1998). Organizational commitment and experienced burnout: An exploratory study from a Chinese cultural perspective. *The International Journal of Organizational Analysis*, 6(4), 310-333.
- Thorsteinson, T. J. (2003). Job attitudes of part-time vs. full-time workers: A meta-analytic review. *Journal of Occupational and Organizational Psychology*, 76(2), 151-177.
- Trinkoff, A. M., Le, R., Geiger-Brown, J., & Lipscomb, J. (2007). Work schedule, needle use, and needlestick injuries among registered nurses. *Infection Control & Hospital Epidemiology*, 28(2), 156-164.
- Tourigny, L., Baba, V. V., Han, J., & Wang, X. (2013). Emotional exhaustion and job performance: the mediating role of organizational commitment. *The International Journal of Human Resource Management*, 24(3), 514-532.
- Oh, M. O., Sung, M. H., & Kim, Y. W. (2011). Job stress, fatigue, job satisfaction and commitment to organization in emergency department nurses. *Journal of Korean Clinical Nursing Research*, 17(2), 215-227.
- Vandenberghe, C., & Tremblay, M. (2008). The role of pay satisfaction and organizational commitment in turnover intentions: A two-sample study. *Journal of Business and psychology*, 22(3), 275-286.
- Wiens-Tuers, B. A., & Hill, E. T. (2002). Do they bother? Employer training of temporary workers. *Review of Social Economy*, 60(4), 543-566.
- Woodhead, E. L., Northrop, L., & Edelstein, B. (2016). Stress, social support, and burnout among long-term care nursing staff. *Journal of applied gerontology*, 35(1), 84-105.
- Woodruffe, C. (2000). *Development and assessment centres: identifying and assessing competence*. CIPD Publishing. Yung, M. (2016). *Fatigue at the workplace: Measurement and temporal development*. UWSpace.