Workplace Factors Contributing to Professional Stress in Family Medicine

Nataša Trifunović[1, 2], Hasiba Erkočević[1, 2], Elvira Hasanović[2], Hamza Jatić[3], Senada Džebo[3], Rabija Mehmedović[2], Nevena Todorović[4], Zaim Jatić[1, 2]

[1]Department of Family Medicine, Faculty of Medicine, University of Sarajevo, Sarajevo, Bosnia and Herzegovina, [2]Family Medicine Department, Public Institution Health Centre of Sarajevo Canton, Sarajevo, Bosnia and Herzegovina, [3]Clinical Centre University of Sarajevo, Sarajevo, Bosnia and Herzegovina, [4]Family Medicine Department, Faculty of Medicine, University of Banja Luka, Banja Luka, Bosnia and Herzegovina

Correspondence: *natasa.trifunovic@mf.unsa.ba*; Tel.: + 387 61 267386

Abstract

Objectives. The main objective was to assess the relationship between sociodemographic and occupational factors and stress levels among healthcare workers in family medicine in Bosnia and Herzegovina, using the PSS-10-BH scale. **Materials and Methods.** A cross-sectional study was conducted using the PSS-10-BH questionnaire distributed via Google Forms to primary care nurses and physicians between July and August 2022. **Results.** The study included 272 participants, with a mean age of 44.7 (±10.55), predominantly women (86.8%) and physicians (58.8%). The mean PSS-10-BH total score for the sample was 21.26 (±6.77) ranging from 3 to 36. The linear regression model indicated male gender and older age showed an association with slightly lower stress levels. Marital status and the number of children showed a slight positive association with stress levels. Occupation (B=-3.068, 95%CI: -5.442 to -0.694, P=0.012) was associated with stress, with physicians tending to report lower stress levels compared to nurses. Years of work experience (B=0.060, 95%CI: -0.190 to 0.309, P=0.636), and patient load (B=0.082, 95%CI: 0.027 to 0.137, P=0.004) were associated with higher stress levels. The results suggest that work-related variables are significant predictors of stress levels as measured by the PSS-10-BH scale in this sample of healthcare workers. The included predictors explain 10% of the variability in the outcome, indicating additional unidentified contributing factors. **Conclusion.** Occupational factors, particularly profession, work experience, and daily patient load, significantly influence stress levels in healthcare workers. Further research is needed to explore other potential influences and refine interventions aimed at managing stress in this population.

Key Words: Family Medicine ▪ Perceived Stress ▪ Occupational Stress ▪ Health Care Professionals.

Introduction

Over the past several decades, the healthcare field has been identified as a work environment that places high demands on employees at all levels. Widespread stress among healthcare workers has potential negative effects on job performance, care quality, absenteeism, job satisfaction, and healthcare professionals' mental health (1-3). Health care professionals have higher levels of psychosocial stress than other population samples and have been recognized as susceptible to burnout mainly due to work overload (4-7).

Family medicine staff function as the gatekeepers of the health system, taking care of a large number of unknown cases, primarily involving history taking and physical examination. Stress is a pervasive issue in the primary healthcare setting, and family medicine professionals face unique stressors that can impact their well-being and job performance. Many studies have explored the psychological impact, mainly on physicians and nurses, of work in the hospital setting (5-8). Fewer studies have looked at HCWs in the primary care setting, although medical staff in primary care institutions are also at risk of developing occupational

stress and its consequences. Professionals in this field face many stressors, and among the most intense are the extensive administrative tasks, lack of staff, unforeseen situations, insufficient time to examine a large number of patients, negative public perception and criticism, and unrealistic expectations from the patients, their families and the health system (9).

There are many tools for assessing stress levels, but the Perceived Stress Scale (PSS), since it was developed by Cohen, Kamarck and Mermelstein in 1983, has been widely used as a measuring instrument for self-assessment of stress levels (10). It was developed within the theoretical framework of the transactional model of stress, which emphasizes the interaction between stressful events and the individual's assessment of available coping resources (11).

In research the PSS-10 version is most often used, due to its brevity, simple application, the comprehensibility of the items, and its favorable psychometric properties. The PSS-10 bifactor model has been favored and validated in prior research in several countries with diverse participant structures. Additionally, perceived distress (PD) and perceived coping (PC) components had higher item loadings than general factors. While perceived distress and perceived coping factors exist independently, the PSS-10 is driven by the single underlying component of perceived stress (12-16).

The questions in the PSS-10 refer to feelings and thoughts related to the previous month. The same period also applied to single questions. Scoring is calculated by summation of item scores. The scale is scored using a 5-point Likert scale ranging from 0=Never to 4=Very often. Potential total scores range from 0 to 40, with a higher score indicating higher levels of perceived stress. Scores ranging from 0-13 would be considered low stress, 14-26 moderate stress, and scores ranging from 27-40 would be considered high perceived stress (15, 17).

The aim of this study was to assess the relationship between sociodemographic and occupational factors and stress levels among healthcare workers in family medicine in Bosnia and Herzegovina, using the PSS-10-BH scale.

Materials and Methods

The study was conducted as a cross-sectional survey of HCWs, physicians and nurses, working in the family medicine service in Bosnia and Herzegovina, a total of seven centers with associated outpatient clinics. Data collection took place between July and August 2022. The link for the Google Forms with questions about socio-demographic and workplace characteristics (age, gender, marital status, number of children, occupation, level of education, work experience, and the average number of patients per day) and PSS-10-BH validated questionnaire, including informed consent, was sent to the email addresses of family physicians and nurses working in public sectors throughout Bosnia and Herzegovina. The email addresses used in the study are in the database of two registered associations of family medicine in B&H. The PSS-10-BH scale was validated in the Bosnian language and had been previously used in another local study of healthcare professionals, where the reported Cronbach's alpha was 0.87 (16).

The inclusion criteria were as follows: healthcare professionals (physicians and nurses) who had been working in the family medicine department for at least one year, were employed in the public sector, voluntarily agreed to complete the questionnaire, and answered all questions in accordance with the instructions. The exclusion criteria were as follows: healthcare professionals who were on annual leave, maternity leave, or sick leave. Additionally, staff newly recruited during the study period, and those still undergoing a training program (internship) were excluded.

Ethics Statement

The study was approved by the Ethics Committee of The Association of Family Physicians No. EK-01-011-CS/22, dated May 18, 2022.

Statistical Analysis

Descriptive statistics were calculated for all variables. Continuous variables were presented as mean and standard deviation (age, work experience, and daily workload), while categorical

variables were presented as frequencies and percentages (gender, occupation, education level, marital status, number of children, and the distribution of responses to individual items on the PSS-10-BH). Linear regression was used to analyze associations between independent sociodemographic predictors (age, gender, marital status and number of children), work related predictors (occupation, work experience and daily patients load) and the PSS-10-BH value as a dependent variable. Prior to performing linear regression, preliminary analyses were conducted to evaluate the key assumptions of the method, including linearity, normality of residuals, and homoscedasticity. The scatter plot of residuals against predicted values revealed no discernible patterns or clustering, suggesting that the assumption of homoscedasticity was satisfied.

Additionally, the residuals exhibited a consistent variance across levels of the independent variables. These findings indicated that the data met the required assumptions, justifying the use of linear regression for further analysis. The possibility of a non-linear association between continuous predictors and stress was considered during preliminary analyses. Scatter plots of predictors against the PSS-10-BH scores revealed linear trends without significant curvature, justifying the use of linear regression. While non-linear relationships may exist in specific contexts, they were beyond the scope of our study. In line with contemporary statistical recommendations and to provide a more comprehensive picture of the results, we opted to use 95% confidence intervals instead of P-values. This approach allows readers to assess the effect size and precision of estimates, avoiding dichotomous thinking about statistical significance and providing a more informative presentation of our findings. The statistical analyses were performed using IBM SPSS Statistics version 27.0.0 (IBM Corp, Armonk, NY, USA).

Results

The study participants (272) were family medicine health care professionals aged 25 to 69, with a mean age of 44.7 (±10.55). Most participants were women (N=236; 86.8%) and physicians (N=160; 58.8%) with specialization in family medicine (43%). In family medicine in Bosnia and Herzegovina, 746 family medicine physicians work in the public sector. In the databases of the two Associations, there are 578 email addresses to which the questionnaire was sent. Of this number, 272 respondents gave their consent to the survey, which makes the response rate 47%. There were no subjects who did not give informed consent (negative answer to the initial/first question), all who approached and filled out the questionnaire gave informed consent. There were no incompletely filled out questionnaires. Demographic (age, gender, education level, marital status and number of children) and professional variables (profession, work experience and daily patients' workload) are presented in Table 1.

Table 1. Demographic and Work-Related Variables

Demographic & Work-Related Variables	Total (N=272)
Age	
M±SD	44.7±10.11
Range	25-69
Gender (N; %)	
Women	236 (86.8)
Men	36 (13.2)
Profession (N; %)	
Physician	160 (58.8)
Nurse	112 (41.2)
Education level (N; %)	
High school	79 (29)
University degree	76 (27.9)
Specialization	117 (43)
Marital status (N; %)	
Married	214 (78.7)
Single	58 (21.3)
Children (N; %)	
No	75 (27.6)
1	74 (27.2)
2	108 (39.7)
3	11 (4.0)
4	3 (1.1)
5	1 (0.4)
Work experience	
M±SD	17.8±10.55
Range	1-42
Self-reported daily patients' workload	
M±SD	42.42±18.06
Range	3-80

The mean PSS-10-BH total score for the sample was 21.26 (±6.77) with a range from 3 to 36. The means of the subscales Perceived Distress and Perceived Coping were 14.77 (±4.96) and 6.49 (±2.68). Individual scores on the PSS could range from 0 to 40 with higher scores indicating higher perceived stress. According to data from the literature, the PSS score can be categorized as low, moderate or high perceived stress. Among the respondents in this study, 12.5% had a low level of stress, 62.9% moderate, and almost one quarter had a high level of stress (24.6%), as measured by the PSS-10-BH score. In Table 2, the frequencies of responses to the PSS-10-BH questions are presented, divided into Perceived Distress and Perceived Coping.

The linear regression model assessing the relationship between the sociodemographic and occupational variables and stress levels, as measured by the PSS-10 scale, accounted for 10.5% of the variance in stress levels ($R^2=0.105$). The overall model demonstrated statistical significance (F=3.221, 95%CI: 1.123 to 5.319), suggesting that the model as a whole is significantly better than the intercept alone. The F-test does not confirm the significance of all individual predictors but rather shows that at least one predictor (variable) is significantly associated with stress levels.

Several variables exhibited statistically significant associations with stress levels. Occupation (B=-3.068, 95%CI: -5.442 to -0.694, P=0.012) was associated with stress, with physicians tending to report lower stress levels compared to nurses/technicians. Years of work experience (B=0.060, 95%CI: -0.190 to 0.309, P=0.636) showed a positive correlation, indicating that increased work experience was associated with higher stress levels. Each additional year of employment increased stress by 0.060 points on average, although this effect is not significant. Daily patient load (B=0.082, 95%CI: 0.027 to 0.137, P=0.004) also demonstrated a positive association, suggesting that a higher number of patients seen daily corresponded with increased stress levels.

Table 2. Distribution of Responses to PSS-10-BH Items, Perceived Distress and Perceived Coping

PSS-10 Item	In the last month, how often have you …	N; %				
		0[*]	1[†]	2[‡]	3[§]	4[ǁ]
Perceived distress						
Q1	… been upset because of something that happened unexpectedly?	1 (0.4)	26 (9.6)	85 (31.3)	103 (37.9)	57 (21.0)
Q2	… felt that you were unable to control the important things in your life?	10 (3.7)	55 (20.2)	95 (34.9)	76 (27.9)	36 (13.2)
Q3	… felt nervous and "stressed"?	2 (0.7)	29 (10.7)	74 (27.2)	97 (35.7)	70 (25.7)
Q6	… found that you could not cope with all the things that you had to do?	16 (5.9)	62 (22.8)	94 (34.6)	71 (26.1)	29 (10.7)
Q9	… been angered because of things that were outside your control?	2 (0.7)	34 (12.5)	85 (31.3)	80 (29.4)	71 (26.1)
Q10	… felt difficulties were piling up so high that you could not overcome them?	18 (6.6)	59 (21.7)	80 (29.4)	67 (24.6)	48 (17.6)
Perceived coping						
Q4	… felt confident about your ability to handle your personal problems?	37 (13.6)	103 (37.9)	105 (38.6)	21 (7.7)	6 (2.2)
Q5	… you felt that things were going your way?	25 (9.2)	97 (35.7)	104 (38.2)	42 (15.4)	4 (1.5)
Q7	… been able to control irritations in your life?	31 (11.4)	89 (32.7)	112 (41.2)	37 (13.6)	3 (1.1)
Q8	… felt that you were on top of things?	20 (7.4)	87 (32)	107 (39.3)	50 (18.4)	8 (2.9)

[*]Never; [†]Almost never; [‡]Sometimes; [§]Fairly often; [ǁ]Very often.

Table 3. Multiple Linear Regression Results for Predictors of Stress Levels Among Healthcare Workers

Model	Coefficients			t	Sig.	95% Confidence Interval for B	
	Unstandardized		Standardized				
	B	Std Error	Beta			Lower bound	Upper bound
Constant	21.404	4.526	–	4.729	0.000	12.476	30.333
Variables							
Age	-0.003	0.135	-0.004	-0.021	0.983	-0.270	0.264
Gender	-1.454	1.460	-0.070	-0.996	0.321	-4.335	1.427
Marital status	0.940	1.693	0.041	0.555	0.579	-2.400	4.281
Number of children	0.458	0.729	0.044	0.628	0.531	-0.980	1.896
Occupation	-3.068	1.203	-0.215	-2.550	0.012	-5.442	-0.694
Work experience	0.060	0.126	0.085	0.473	0.636	-0.190	0.309
Daily patients load	0.082	0.028	0.206	2.924	0.004	0.027	0.137

Dependent Variable: PSS-10-BH.

Other variables did not display statistically significant associations, but their coefficients suggested certain trends. Age (B=-0.003, 95%CI: -0.270 to 0.264, P=0.983) showed a slight negative association with stress levels. Each additional year of age slightly reduced stress, but this effect is negligible and statistically non-significant. Gender (B=-1.454, 95%CI: -4.335 to 1.427, P=0.321) indicated a tendency for males to report lower stress levels. Marital status (B=0.940, 95%CI: -2.400 to 4.281, P=0.579) contributed to a small increase in stress levels, the results suggested that married individuals may experience higher stress levels. The number of children (B=0.458, 95%CI: -0.980 to 1.896, P=0.531) showed a slight positive association with stress levels. The coefficients described here are specific to the current model and its selected predictors. The inclusion of additional variables, such as potential confounders or mediators, could influence both the strength and direction of the associations observed between the predictors and stress levels.

The results of multiple linear regression for predictors of stress levels among healthcare workers are presented in Table 3.

Discussion

In our results, a high percentage of respondents had some level of stress, but fewer had very pronounced stress (24.6%) compared to the results of the study by Dotour et al., where 49% participants were stressed, and 32% had a very high level of stress with an average PSS-10 score of 26.4 (±6.4) (18). The mean PSS-10-BH score among our subjects was significantly higher compared to a study in Poland, where it was 16.83 (±4.47), conducted among the same population, using the same tool (19).

There was a similar mean PSS-10 score for the total sample (19.0±6.89) in the study by Chakraborti et al., without any statistically significant difference between males and females (20). Likewise, our results indicate that there was no statistically significant difference in the level of stress between the genders. Being male was associated with a slight decrease in stress levels, but this was not statistically significant (P=0.321). The reason for this difference could be that the numbers of males and females in the study were not equal, as the majority of participants were women. These results are in contrast with the results of other studies regarding the level of perceived stress between genders, with a significantly higher score among female respondents (18, 21-25). In addition, the nurses had statistically significantly higher perceived stress than the physicians in our study, as well as in other studies that assessed the stress level of healthcare professionals (22, 23). The reason could be insufficient education in stress coping options, but also the increasing volume of work and

administrative duties that are introduced in recent years and represent the responsibility of the nurse.

In our results, the average PSS-10-BH score was higher in participants who had a higher number of patients per day, with a statistically significant difference between groups, as well as in the data from the 2018 Survey of America's Physicians Foundation - Practice Patterns & Perspectives. This study found that 77.8% physicians with up to 40 patients per a day, had feelings of professional burnout (24).

An often-used term in the literature is the "panel size" of patients that represents the group of patients assigned to one specific physician or clinical team. Primary care panel size has implications for patient access, physician workload, care comprehensiveness, and quality of care. The often-quoted standard panel size is 2500, but multiple studies have observed that a panel size of 2500 is not feasible because of time constraints, and results in incomplete preventive care and health care screening services (25). According to a study published in 2023 in Bosnia and Herzegovina, the average number of patients registered in the family medicine team is 1986.4 (±511), with an average of 50 patients per day (26). These data support the results of our study that workload (a large number of patients) can be one of the factors that influence the level of stress among health workers in primary health care.

In addition to these workplace characteristics that affected the PSS-10-BH score, work experience also had a statistically significant effect on the level of stress in our respondents, although it approached the limit value to meet the definition of statistical significance. Work experience is a factor that has been shown to have a significant effect on stress levels in other studies involving healthcare professionals (22, 23). A study conducted among health workers in the Department of Emergency Medicine showed levels of high stress 32.33%, and very high stress 32.38% (23). Another study conducted in Romania among health care workers in different hospital departments showed that in the total sample, the overall level of stress was average

(65.7%), followed by low (32%), and high levels were found in only 2.4% of the cases (27).

Several studies suggest cut-off points, based on the median score, which represent the cut-off point between the "presence of stress" (score values greater than the median value) and "no stress" (score values lower than the median value). The threshold value used in research conducted among family doctors in France divided the perceived stress score into the categories: no stress PSS-10≤20, borderline 21- 26, stress ≥27, and PSS-10≥30 high stress (18). A study conducted in Ethiopia took a score of PSS-10>20 as the cut-off for the existence of stress, without gradation (3). In the light of this gradation, our participants had a significantly higher percentage of stress compared to the results of Teshome et al., 68% (95%CI: 58.4%, 65.2%), but it was approximately equal to those from the research in France, where 81% of healthcare workers had a certain level of stress, with a mean of 26.4 (±6.4) (3, 18).

Our results are almost equivalent to the results of a study from China where the prevalence of perceived stress was 53.8%, and the results from a study conducted in Ghana from 2021 among health care professionals, using the same instrument, where 64% of the participants had moderate stress (28, 29).

A Danish study conducted in the period before the pandemic, also using the PSS-10, showed that 21% of physicians in general/family medicine had a certain level of stress, which is much lower than the 52.7% of family medicine doctors who were under stress in our study (30). This different rate of stress is a consequence of the context of the pandemic, which was reported as a source of stress in the general population, among hospital medical staff, and family medicine staff were not spared (17, 18, 23, 24, 29).

Given that, in our results, the linear regression model of the three occupational variables (occupation, work experience and daily patient load) and sociodemographic variables (age, gender, marital status and number of children) explains only 10.5% of the variability in the outcome (stress levels), suggesting that there are likely several

other strong determinants of stress that were not identified in this study. Possible additional variables that could have a more significant impact on perceived stress include: socio-economic status (income, education, and social status), work environment (support from colleagues, working conditions, and relationship with superiors), personal characteristics (personality traits, family responsibilities, health status, and level of physical activity), social support (support from friends and family), organizational culture in the workplace (rules, values and norms), and relationships with patients.

Limitations of Study

The main limitation in this research is that the sample of professionals is limited to the public health sector, so the data may not be generalizable among physicians and nurses working in the private sector. There is a possibility that different models of management and organization of work processes have a different effect on modeling perceived stress, and future studies should compare and analyze the impact of different forms of management on the stress level of healthcare workers. There is a potential selection bias because those who chose to respond to the survey may have different levels of stress compared to those who did not respond, possibly skewing the results. Variables such as individual coping mechanisms, personal life events, mental health history, and support systems were not measured, but could significantly influence stress levels. The study also did not evaluate other potentially important aspects in determining the perception of stress by PHC professionals, such as environmental risk factors, income or pre-existing chronic non-communicable diseases. Given that the linear regression model indicates the possibility of the existence of other variables that have a more significant impact on PSS-10-BH results, additional research should be conducted with identification of other factors of the work environment that can significantly influence perceived stress. The use of self-reported questionnaires can introduce bias, as participants may underreport or over-report their stress levels due to social desirability or recall bias. The Cross-Sectional Design captures data at a single point in time, which does not allow for analysis of changes in stress levels over time, or the establishment of causal relationships between variables.

Conclusion

The results suggest that work-related variables (occupation, years of work experience, and daily patient load) are significant predictors of stress levels as measured by the PSS-10-BH scale in this sample of healthcare workers in family medicine. Other variables, such as age, gender, marital status, and number of children, did not show statistically significant associations, but they indicated trends that warrant further exploration. Age and gender appeared to have a minor influence on stress, with age showing a slight negative relationship and males reporting lower stress levels. Married individuals and those with children exhibited a slight tendency toward higher stress, although these results were not significant. Overall, these findings highlight the importance of occupational factors, particularly occupation, work experience, and patient load, in predicting stress levels in healthcare workers. Further research is needed to explore other potential influences and refine interventions aimed at managing stress in this population. The results of this study can contribute to the formulation of future policies relating to the health of workers in PHC institutions, improving cost-effective actions in health promotion, and the prevention of work-related disorders in the health system. To address professional stress in family medicine, it is important to implement strategies that promote self-care, work-life balance, and support for healthcare workers.

What Is Already Known on This Topic:
Healthcare workers, particularly physicians and nurses, are known to experience high levels of professional stress due to their demanding work environments, long hours, and high patient loads. High professional stress levels can lead to burnout, job dissatisfaction, mental health issues, and a reduced quality of patient care. The PSS-10 is a widely used tool to measure perceived stress levels, providing insights into how in-

dividuals perceive their stress in response to various situations. Both professional and personal life stressors contribute to overall stress levels, impacting work performance and personal well-being.

What This Study Adds:
This study provided the detailed demographic and professional profiles of healthcare workers, highlighting age, gender, profession, marital status, number of children, daily patients load and work experience. The study, using the PSS-10-BH, identified that a significant proportion of healthcare workers experience moderate to high stress. Through regression analysis, the study identified key predictors of professional stress, including occupation, work experience, and daily patient load, providing a comprehensive understanding of factors contributing to stress in healthcare professionals.

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