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Burnout, well-being and self-reported medical errors among physicians

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Short title: Problem of burnout among physicians in Poland

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What's new?

This is to our best knowledge the first study from Poland to investigate associations between physician burnout, well-being and errors. Although it confirms research known from other countries, our findings suggest that the problem in Poland may be particularly serious. Two thirds of the respondents committed an error in the last three months and 10% of them caused a major and permanent morbidity while another 5% led to patient death. As 67% of the surveyed physicians were classified as burned-out and burnout was found to increase odds of making an error more than five times, the numbers speak for themselves. Another disturbing finding is that 13,7% of the physicians had suicidal ideation within last 12 months. Although the study was conducted prior to the coronavirus pandemic, it is almost certain that the new pandemic-related reality may only make the problem more serious.

Abstract

Introduction: Healthcare systems have been experiencing profound changes in recent years driven by technology, regulations, demographic and societal trends. This volatile and stressful environment has had its consequences for healthcare organizations and people who work for them. The resulting phenomena of burnout or lowered well-being may affect key aspects of health care delivery on individual, organizational and financial level.

Objectives: The objective of this paper was to investigate level of burnout and well-being in a group of Polish physicians, its impact on errors and associations with other factors.

Patients and methods: The cross-sectional, self-administered questionnaire survey with 65 questions and validated tools such as Maslach Burnout Inventory and WHO-5 Well-being Index. Correlations between variables were investigated using Spearman's rank correlation analysis. Univariable and multivariable logistic regression models were used to evaluate predictors of burnout and errors. The study included residents and physicians of various specialties.

Results: The total number of 125 residents and physicians, mostly internists and cardiologists, participated in the study out of which 67% were found to be burned-out. The average level of WHO-5 score was 40 points. Two thirds of all physicians admitted to making an error in the last three months which was strongly associated with burnout.

Conclusions: The level of burnout among respondents was high and had numerous negative consequences that may affect the entire healthcare system. The results suggest an urgent need to address the problem of burnout among physicians.

INTRODUCTION

Healthcare systems have been experiencing profound changes in recent years driven by technology, regulations, demographic and societal trends. This volatile and stressful environment has had its consequences for healthcare organizations and people who work for them. The phenomenon of burnout is one of them. The growing number of studies indicate that its impact is so profound that more and more organizations and academics call for a need to rethink the way healthcare systems are designed [1-2].

Burnout among healthcare staff has been proven by numerous studies to affect key aspects and dimensions of health care delivery: individual (depression, well-being, insomnia, job-life satisfaction), organizational (performance, patient safety, increased absences and turnover, patient satisfaction) or financial [3-5]. Research from across the world indicates that a percentage of healthcare staff struggling with burnout, physicians in particular, is alarmingly high. The largest sample studies provide rates of 40%-50% [6]. The recent paper by Shanafelt et al. that compared prevalence of burnout over time in a large sample of US physicians estimated it at 43.9% in 2017, 54.4% in 2014 and 45.8% in 2011 [7].

Medical errors have been common across healthcare systems for decades. Although some early studies have estimated their prevalence to be quite high [8-9], it was not until 1999 when the Institute of Medicine published a report "To Err is Human" [10] that the phenomenon gained widespread attention and initiated systemic actions aimed at improving patient safety. Subsequent research confirmed incidence of errors to be around 5-10% of hospital stays [11-13]. However, despite many efforts to reduce preventable patient harm there has been no substantial improvement in safety of care [14-15]. Only in 2019 the World Health Organization (WHO) concluded that "global efforts to reduce the burden of patient harm have not achieved substantial

change over the past 15 years” adding that there is a need for more intangible determinants of patient safety and a more integrated, system-based view of safety [16]. As growing amount of research suggests that burnout or lowered well-being may adversely affect patient safety, one may wonder whether they may be the missing link in endeavor for improving safety of medical care.

The 2020 global coronavirus pandemic is a new and unexpected source of stress for physicians and healthcare staff that will inevitably take further toll on their professional and personal lives.

The aim of this study was to evaluate level of burnout and well-being among physicians and investigate their impact on self-reported errors. This is to our best knowledge the first such study conducted in Poland.

PATIENTS AND METHODS

The study was a cross-sectional, self-administered questionnaire survey conducted between April 2019 and February 2020 among medical doctors and residents of various specialties participating in cardiology or rheumatology professional courses (see Table 1 for details). It consisted of 65 questions and the participation was voluntary. The total number of respondents was 125 with a response rate of 89%. Although some questionnaires were administered in February 2020 which was the time when the global pandemic of the coronavirus was starting to unfold, it was not until March 4th that the very first case was reported in Poland. Thus, one may assume that the pandemic did not affect the results in any way.

Ethics

As questionnaires were entirely anonymous and did not include any medical or patient data, the study was excluded from the need of the ethical approval. Participants were informed about the

purpose, however they were told that it referred to well-being of physicians. The term “burnout” was not mentioned to avoid additional bias.

Study measures

Burnout

The 22-item Maslach Burnout Inventory (MBI) – Human Services Survey for Medical Personnel was used to evaluate burnout. It investigates level of Emotional Exhaustion (EE), Depersonalization (DP) and Personal Accomplishment (PA). The total score of each dimension was classified as either low, moderate or high with a high score on either EE or DP considered a burnout [17].

Fatigue and well-being

The respondents were asked to self-evaluate their fatigue using a scale from 0 (as bad as it can be) to 10 (as good as it can be) which was previously used in other studies [18-19]. The level of well-being was evaluated using the WHO-5 Wellbeing Index [20]. This is a widely used tool found relevant not only as a wellbeing measure but also a screening tool for depression. The score of 50 points or less was used as a cut-off score to indicate reduced well-being and 28 point or less to indicate depression which is in line with many other studies [21]. We also asked one question about having suicidal ideation within last 12 months.

Errors

The following question was used as an error measure: “Are you concerned you have made an error in the last 3 months?”. An error was defined as “commission or omission with potentially negative consequences for the patient that would have been judged wrong by skilled and knowledgeable peers at the time it occurred, independent of whether there were any negative

consequences". Such measures were often used in other studies referring to physicians and errors [19, 22, 23].

Statistical analysis

Statistical analysis was performed using STATISTICA (v. 13, Oklahoma USA). The distribution of data was verified using Shapiro-Wilk test. Continuous variables were presented as mean (SD) (normal distributed) or as median and interquartile range (IQR) (non-normal distributed).

Nominal variables were presented as numbers and percentages. Chi-square test or chi-square test with Yates' correction were used for nominal variables comparisons. Correlations between variables were investigated using Spearman's rank correlation analysis. Univariable and multivariable logistic regression models were used to evaluate predictors of burnout and errors..

The multivariable regression model of error prediction included items that were significantly ($P < 0.05$) associated with errors in the univariable analysis. The p-value of < 0.05 was considered statistically significant.

RESULTS

The median age of respondents was 32, IQR: 29-40 (average of 35.4) years old which is substantially lower than the average of 52 for all physicians in Poland in 2017 [24]. They were most commonly from cities with almost equal number of specialists and residents, mainly cardiologists and internists (Table 1). The median well-being score reached 40 points which is below the 50-point cutoff mark that indicates low well-being (71% had a score of ≤ 50) with 38% scoring ≤ 28 points that indicates high risk of depression. Seventeen out of 124 (13.7%) respondents that answered the question admitted to having suicidal ideation within last 12 months. Almost two thirds (63.7%) of the physicians said they committed a self-perceived error in the last 3 months with almost 80% of replies described as wrong diagnosis or wrong judgment.

While vast majority of all errors had no or little effect on patient, as much as 10% resulted in major and permanent morbidity and another 5% (4 cases out of 79) resulted in patient's death (Table 1).

More than half of physicians in our study had a high score on the DP (52.4%) or EE (51.6%) subscales which translated into 67% of all respondents meeting the criterion of having burnout (Table 2). We found a strong correlation between well-being and EE ($\rho=-0.70$, $P<0.001$) and considerably weaker for DP (-0.26 ; $P=0.003$). PA scores correlated positively with well-being (0.49 ; $P<0.001$). Physicians with high risk of depression were also very likely to be burned out (87%).

In the univariable analysis the odds of making an error were significantly higher not only among physicians with overall burnout ($OR=5.33$, $P<0.001$) but also for physicians scoring high on two of the Maslach burnout subscales independently ($OR=8.02$ for DP, $P<0.001$; $OR=2.42$ for EE, $P=0.02$). High score on the DP scale was the strongest single predictor of errors (Table 2). Other variables found to be strongly and positively associated with errors were low well-being ($OR=2.26$, $P=0.045$) and being resident ($OR=2.85$, $P=0.008$). We also found a relationship between the age of physician and risk of error: Each year of age decreased risk of errors by app. 5% ($OR=0.95$, $P=0.02$). However, most of these variables failed to be statistically significant in the multivariable logistic regression model which found only being male and burnout to be predictors of self-reported errors ($OR=2.88$, $P=0.03$; $OR=3.81$, $P=0.01$, respectively).

The fact of making an error was not associated with well-being of physicians as average well-being scores were similar in both groups.

DISCUSSION

Burnout

The reported prevalence of overall burnout among the physicians at 67% is very high, however matching it with other studies is somewhat challenging and may be confusing as the recent systematic review of 182 papers on burnout prevalence by Rotenstein et al. [6] found the rates to range between 0% to 80.5% with 47 distinct definitions of overall burnout based just on the MBI. Studies reviewed by Rotenstein with the matching instrument (MBI-HSS) and overall burnout criteria as ours (score of ≥ 27 on EE or ≥ 10 on DP) provide the range of 25% to 60.1% with a weighted average of 49.1%. However, none of the 182 papers included in the review was conducted in Poland. We have identified through the systematic review by Zgliczynska et al. [25] five papers on burnout prevalence among Polish physicians that used the 22-item MBI. Although none of them reported the overall burnout rate, three reported the average score for some subscales. The average EE scores of 21 points [26], 27 points [27] and 22 points [28] were slightly lower or close to the 26.7 points in our study. The same refers to the average EE scores of 9 points [26, 27] and 10 points [28] compared with the 10.8 in our respondents. Another two studies [29, 30] provided percentage of high scores on EE (52%, 48% , respectively) or DP (35%, 34%, respectively) which is almost identical in case of EE, however significantly lower for DP compared with our study (51% for EE and 52% for DP).

The high prevalence of burnout in the study may to some extent be attributed to the Polish healthcare system model and features. According to the most recent OECD data [31] Poland has the lowest number of practicing physicians per 1000 population (2.4), one of the highest number of consultations per physician annually (3197), and one of the lowest expenses per capita and relative to GDP (6.3%) in the European Union. Provision of health services relies upon a highly

regulated monopolistic public payer that finances a network of public hospitals. Role of the private sector is limited primarily to out-patient treatment. Such picture seems to correspond with the latest and comprehensive model of burnout contributory factors in which external environment (regulations, policies) and work system factors (excessive workload, workflow, administrative burden) are the first to blame [2]. The most frequently indicated sources of work frustration in our study – bureaucracy (by 94.7%) and organization of healthcare system (by 89.4%) seem to be in line with such reasoning (See Table 1). These factors were also much more frequently indicated as sources of frustration by respondents with burnout than ones without it ($P=0.08$ and $P=0.03$, respectively). Last but not least, we did not identify any statistically significant individual factors that would predict burnout such as age, sex, having children, marriage/informal relationship, number of night shifts or jobs (Table 3). The underlying cause of this may be that the overall burnout rate was very high and in fact referred to the large majority of the studied group which may have blurred some associations [32]. Nevertheless, it may also be associated with the mentioned model of contributory factors in which individual factors have the least impact on fostering burnout among physicians.

Errors

The percentage of respondents admitting to error in last three months is substantially higher than in similar studies with 10.5% reported by Tawfik et al. [19], 14.7% by West et al. [33] (among residents only) or 8.9% by Shanafelt et al. [23]. This difference may to some extent be explained by definitions of errors as the mentioned studies investigated “major error” not just “error” used in our study. The comparable rate (61.3%) of errors not specified as only “major” was found by O’Connor et al. [34] among Irish junior doctors. The Incidence of different types of errors (Table 1) was comparable [19, 23, 33] while incidence of errors leading to patient death roughly

identical at 5% as in recent studies or reviews [19, 35] as well as a pioneer work in this field [9]. The studies investigating prevalence of errors in Polish hospitals physicians are scarce, however some of the existing ones confirm the problem of errors is relevant [13, 36].

The relationship between burnout and errors has been confirmed by numerous studies. However, it is important to distinguish between self-reported and objective errors as associations usually refer to the former. Studies that investigated correlations between objective errors and burnout usually found weaker or no correlations at all. In the review by Hall et al. [37] five out of thirty studies did not report any associations between burnout and error with all of them referring to objective errors such as reported adverse events or medication errors. There seems to be an inevitable discrepancy in sensitivity of objective and self-reported errors. The latter are obviously much more general in their nature and include an incomparably larger number of all kinds of mishaps, omissions, wrong judgments or near-misses that are difficult or even impossible to define according to strict, objective rules. Also, resources that are necessary to identify objectively defined errors (eg, charts review), compromised anonymity or simply complexity of medical care make it further difficult to identify such errors and investigate their associations with other factors. In this context - world of complex medicine with limited resources - anonymously self-reported errors may be considered, perhaps not ideal, but a useful patient safety indicator. The study by O'Neill et al. that concurrently compared errors reported by physicians and ones identified in medical charts in a hospital revealed that app. 45% of them referred to the same patients. The former were however more frequently considered preventable and cost incomparably less to identify [38]. The strength of the association between burnout and self-reported errors in the study (OR=5.33 in the univariable model and OR= 3.81 in the multivariable model) was noticeably greater than the overall odds ratio of 2.72 (95% CI, 2.19-3.37) in the

recent meta-analysis that investigated relations between burnout and self-reported errors in 13 studies and over 20 000 physicians [39].

The representative well-being score according to WHO-5 for Polish population is 63 points [40] which is far more than the median score of 40 points among our respondents. This result is also low compared with physicians from countries measured with the same tool. In the study from Ireland low well-being (<50 points) referred to 49.5% of physicians with 22.2% of at risk of depression [41]. Although we found associations between low well-being and errors (OR=2.14) the multivariate analysis proved it to be statistically insignificant which was inconsistent with some studies that linked well-being to patient safety [33, 42] but not all [43, 44]. These inconsistencies may partially be related to a cross-sectional, observational design of most studies and unknown direction of these associations.

Many countries have been found to have a higher risk of suicide among physicians compared with general population [45]. The rate of suicidal ideation within last 12 months at 13.7% in our respondents is higher than in physicians from some countries such as 6.9% among American physicians [19] or 11.1% in Norway [46], however comparable with studies from Italy or Sweden (14.3% and 13.7% respectively) [47]. We found suicidal ideation and burnout to be strongly associated as literally all of the respondents admitting to suicidal ideation had burnout at the same time. Not even high risk of depression matched this as in this case the rate was 64.7%. This is another indication that that lower well-being rates among physicians in general may also be related to professional factors. The recent study by Loas et al. [48] that investigated suicidal ideation among large group of physicians from Belgium concluded that dissatisfaction in the workplace was the strongest predictor of suicidal ideation. A positive correlation between burnout and suicidal ideation was also found by Dyrbye et al. in American students of medicine

(OR=3.46 with CI of 2.55 to 4.69; $P < 0.001$)[49]. According to global WHO data Poland with 13.4 suicides per 100 000 population ranks close to the global (10.2) or European (15.4) averages [50].

In general, the results of our study are consistent with many studies from other countries carried out in recent years or even decades in some cases. What stands out is the magnitude and strength of some of the findings.

This study is subject to certain limitations. The first and major is the relatively small and unrepresentative sample. This may explain why some of the observed associations were statistically insignificant or with wide confidence intervals. There was also an overrepresentation of residents which may have to some extent affected the results. Nevertheless, the high response rate makes it less prone to response bias and the major conclusions are consistent with other major studies. Another limitation is also the cross-sectional design of the study that cannot determine the causality between variables. Thus, we cannot say what is more likely: eg, whether errors lead to burnout or burnout leads to errors. This question remains largely unanswered as there is still a need for longitudinal studies to investigate associations between burnout and errors. This is to our best knowledge the first study investigating associations between burnout and errors in Poland, nevertheless there is a need for larger sample studies to confirm our observations. This need seems even more urgent in the light of the 2020 Covid-19 pandemic that is almost certain to adversely affect physicians.

CONCLUSIONS

The burnout rate among Polish physicians is alarmingly high and strongly correlates with self-reported errors. The individual subscales of burnout were also independently associated with self-

reported errors with Depersonalization being the strongest variable in the study. The average well-being level of physician is below the 50-point threshold considered to reflect “low well-being” with almost 14% admitting to suicidal ideation. The rate itself of self-reported errors is also very high and as much as 5% of them may lead to patient death. The results suggest that there is an urgent need for actions aimed at tackling the problem of burnout in Polish hospitals as it may seriously affect not only the overall level of patient safety but also well-being of physicians.

Contribution statement:

Study design: JO, RO, MM, MT

Statistical analysis: MM, JO

Data interpretation: JO, MM, RO, MT

Final revision of the manuscript: JO, MM, RO, MT

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Table 1. Characteristics of respondents.

Variable	N (%) ^a
Gender (n=122)	
Female	72 (59.0)
Male	50 (41.0)
Age of respondents (n=123), median (IQR)	32 (29 – 40)
Professional status (n=122)	
Specialist	57 (46.7)
Resident	65 (53.3)
Specialization (n=121)	
Cardiology	44 (36.4)
Internal medicine	38 (31.4)
Anesthesiology	15 (12.4)
Rheumatology	12 (9.9)
Other	12 (9.9)
Working in (n=122)	
Rural area	2 (1.6)
Small town ($\leq 20,000$)	5 (4.1)
Town (20,001 – 100,000)	24 (19.7)
City (100,001 – 500,000)	44 (36.1)
Large city ($\geq 500,001$)	47 (38.5)
Number of jobs (n=125)	
1	69 (55.2)
2	41 (32.8)
3	14 (11.2)
4	1 (0.8)
Hours worked weekly (n=121), mean (SD)	60 (15)
Night shifts monthly (n=124)	5 (3 – 7)
Civil status (n=124)	
Married	75 (60.5)
Single	35 (28.2)
Informal relationship in a common household	12 (9.7)
Divorced/separated	2 (1.6)
Children (n=125)	
0	77 (61.6)
1	15 (12.0)
2	24 (19.2)
3	7 (5.6)
≥ 4	2 (1.6)
WHO-5 Well-Being score (n=121), median (IQR)	40 (20 – 56)
Committed error in last 3 months (n=124)	79 (63.7)
Type of error (n=73)	

Wrong judgment	39 (53.4)
Wrong diagnosis	19 (26.0)
Medication error	8 (11.0)
Wrong patient	4 (5.5)
Technical error during procedure	3 (4.1)
Outcome of error (n=79)	
Minor and temporary morbidity	31 (39.2)
No effect on patient	28 (35.4)
Major and permanent morbidity	8 (10.1)
Major and temporary morbidity	7 (8.9)
Death of patient	4 (5.1)
Minor and permanent morbidity	1 (1.3)
Suicidal ideation in last 12 months (n=124)	17 (13.7)
Are you satisfied with salary? (n=123)	
No	70 (56.9)
Yes	53 (43.1)
Sources of frustration at work (n=94) ^b	
Bureaucracy	89 (94.7)
Organization of healthcare system	84 (89.4)
Restrictions imposed by the payer	70 (74.5)
Organization of work	68 (72.3)
Insufficient funds for treatment	58 (61.7)
Patient demands	44 (46.8)
Lack of training	39 (41.5)
Cooperation with supervisor	24 (25.5)

^aData are presented as number (percentage) unless otherwise indicated.

^b Answers „yes” and „rather yes” were summed

Abbreviations: IQR – interquartile range

Table 2. Self-reported errors predictors – univariable and multivariable logistic regression results.

Variable	Number of exposed, n (%)	Univariable		Multivariable	
		Odds ratio (95 % CI)	<i>P</i>	Odds ratio (95 % CI)	<i>P</i>
Burnout (high EE or DP)	84 (67.2)	5.33 (2.36 – 12.03)	<0.001	3.81 (1.37 – 10.59)	0.01
High EE (≥ 27)	64 (51.2)	2.42 (1.14 – 5.13)	0.02	-	-
High DP (≥ 10)	65 (52.0)	8.02 (3.43 – 18.78)	<0.001	-	-
Low PA (≤ 32)	58 (46.4)	2.06 (0.97 – 4.37)	0.06	-	-
Low well-being (≤ 50)	88 (70.4)	2.26 (1.02 – 5.00)	0.045	1.32 (0.45 – 3.94)	0.62
Risk of depression (well-being ≤ 28)	47 (37.6)	0.87 (0.41 – 1.85)	0.72	-	-
Suicidal ideation in last 12 months	17 (13.7)	5.12 (1.11 – 23.54)	0.04	4.44 (0.52 – 37.63)	0.17
Males	50 (41.0)	2.21 (1.00 – 4.85)	0.049	2.88 (1.13 – 7.33)	0.03
Residents	67 (54.0)	2.85 (1.32 – 6.16)	0.008	1.55 (0.40 – 6.01)	0.53
Age (increase by 1 year)	-	0.95 (0.91 – 0.99)	0.02	0.97 (0.82 – 1.04)	0.37

Abbreviations: EE- Emotional Exhaustion, DP-Depersonalization, PA-Personal Accomplishment

Table 3. Predictors of burnout – univariable logistic regression analysis.

Variable	Number of exposed, n (%)	Odds ratio (95 % CI)	<i>P</i>
Males	50 (40.9%)	1.71 (0.77 – 3.77)	0.19
Residents	67 (54%)	2.14 (1.00 – 4.58)	0.05
Having children	51 (42.1%)	0.51 (0.24 – 1.10)	0.18
Being in a relationship	87 (70.2%)	0.55 (0.23 – 1.32)	0.18
Age (increase by 1 year)	-	0.97 (0.93 – 1.01)	0.13
Number of jobs (increase by 1)	-	1.41 (0.81 – 2.45)	0.22
Number of night shifts (increase by 1)	-	1.08 (0.94 – 1.25)	0.26