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Physician Burnout and Patient Satisfaction with Consultation in Primary Health Care Settings: Evidence of Relationships from a one-with-many Design

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Abstract Physician burnout, as a prolonged response to chronic emotional and interpersonal stressors on the job, has been associated with suboptimal patient care and deterioration in the patient–provider relationship. Although prior studies have identified a range of factors associated with decreased patient satisfaction, most have been conducted in tertiary care settings, with staff burnout examined at the hospital unit-level. To examine the impact of physician burnout on patient satisfaction from consultation in the primary care setting, a cross-sectional survey was conducted in Western Greece. Using a one-with-many design, 30 physicians and 300 of their patients, randomly selected, responded to the survey. Results showed that patient satisfaction correlated significantly with physician emotional exhaustion ($r = -.636$, $p < .01$) and physician depersonalization ($r = -.541$, $p < .01$). Mixed-effects multilevel models indicated that 34.4% of total variation in patients' satisfaction occurred at the physician level, after adjustment for patients' characteristics. Moreover, physician emotional exhaustion and depersonalization remained significant factors associated with patient satisfaction with consultation, after controlling for patient and physician characteristics. Patients of physicians with high-exhaustion and high-depersonalization had significantly lower satisfaction scores, compared with patients of physicians with low-exhaustion and low-depersonalization, respectively. Future studies need to explore the mechanisms by which physician burnout affects patient satisfaction.

Keywords Primary care · Physician burnout · Patient satisfaction · Mixed-effects · Multilevel analysis

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Introduction

Job burnout is a long-term stress reaction seen primarily in the human service professions. According to Maslach, Schaufeli, and Leiter (2001), burnout has three key dimensions: emotional exhaustion, in which overwhelming work demands deplete the individual's energy and emotional and physical resources; depersonalization (cynicism), in which the individual withdraws and detaches from the job; and feelings of inefficacy, in which the individual perceives reduced personal accomplishments and a lack of productivity at work. Burnout involves chronic strain that results from an incongruence, or misfit, between the worker and the job. As proposed by available theoretical models (Job Demands-Resources model; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), burnout may be predicted by high job demands (e.g., workload, negative work-home interference) and low job

resources (e.g., lack of autonomy and social support) (Hakanen, Schaufeli, & Ahola, 2008; Schaufeli, Bakker, & van Rhenen, 2009).

Burnout is of special importance in health-care providers. Burnout can lead to medical negligence and malpractice litigation, as well as suboptimal patient care practices and attitudes. For example, medical staff may discharge patients to make the service "manageable" because the team is too busy, not fully discuss treatment options or answer a patient's questions, and report treatment or medication errors that are not due to a lack of knowledge or inexperience (Shanafelt, Bradley, Wipf, & Back, 2002; Williams, Baier-Manwell, Konrad, & Linzer, 2007). Another important consequence of staff burnout is impaired job performance and patient dissatisfaction. Leiter, Harvie, and Frizzell (1998) found that patients who stayed on units of a tertiary care hospital, where nursing staff felt more exhausted and doctors' care was rated as poor, were less satisfied with the outcome of their hospital stay (i.e., with overall quality of care and meeting of expectations). In urban hospitals across the United States, nurse burnout, as measured by feeling of emotional exhaustion and lack of personal accomplishment, has been found to be a significant factor influencing how satisfied patients are with their care (Vahey, Aiken, Sloane, Clarke, & Vargas, 2004). In psychosocial rehabilitation programs for people with mental illness, patient satisfaction with the therapist (e.g., therapists' ability to communicate clearly) has been found to be positively associated with staff personal accomplishment, while patient satisfaction with treatment was negatively associated with staff emotional exhaustion (Garman, Corrigan, & Morris, 2002). Argentero, Dell'Olivo, and Ferretti (2008) found that low emotional exhaustion and high personal accomplishment levels in staff were associated with high levels of patient satisfaction with the care provided in Italian dialysis centers. Moreover, the depersonalization dimension of physician burnout has been associated with patient outcomes of lower satisfaction with hospital services and care (Halbesleben & Rathert, 2008). Thus, the literature suggests strong links between health care workers' burnout and negative consequences (such as lower satisfaction) for their patients.

However, most of the literature has focused on patients' satisfaction with hospital services and quality of tertiary care provided. Little attention has been given to patients' satisfaction with interaction and communication between them and their health care providers, although such an interaction and patient-centered style of verbal communication has been found to lead to favorable outcomes and significantly influence patient satisfaction, compliance, comprehension, clarification, information sharing, friendliness, encouragement, and reassurance (Beck, Daughtridge, & Sloane, 2002). Effective physician–patient communication can lead to improved patient health outcomes, such as symptom resolution, increased functional status, control of physiologic measures (e.g., blood pressure, glucose level), and pain control (Aikens, Bingham, & Piette, 2005; Stewart, 1995). The health care setting under study has frequently been the tertiary care hospital, while primary care has rarely been the site of study, although the role of primary health care is crucial for health promotion and disease prevention through screening services and vaccination programs, and adoption of health-related behaviors (e.g., exercise, dietary modification, smoking cessation) and adherence to medical recommendations with regard to management of chronic diseases such as hypertension, rheumatoid arthritis, asthma, and diabetes. In primary care, the physician-patient consultation is the fundamental platform for service delivery (Cheraghi-Sohi et al., 2008).

Although the hospital unit may be an appealing level of analysis, particularly in terms of intervention development and implementation, such a strategy is limited in that previous studies have suggested that less than 5% of the variation in overall patient satisfaction occurs at the department, hospital, or practice levels (Hekkert, Cihangir, Kleefstra, van den Berg, & Kool, 2009; Salisbury, Wallace, & Montgomery, 2010). Therefore, linking a patient's satisfaction with the burnout levels of all physicians working in a hospital department setting may not be the most appropriate way of analysis. In this regard, Hekkert et al. (2009) have suggested that variance in patient satisfaction may be caused by factors on a lower level than the hospital and the department, but a higher level than the patient (i.e., individual doctors). Moreover, since the health care provider–patient interaction is the foundation of health care delivery for patients, it is an important unit of analysis too. Subsequently, this study is unique in that it focuses on patients' satisfaction with consultations in primary care, and matches patients with health care providers, using a one-with-many design, by taking multiple satisfaction measures about the same physician. A multilevel modeling approach was used (a) to simultaneously explore the extent to which factors at the level of doctor and the patient determine measures of patients' satisfaction with consultation, (b) to examine sources of variation in patient satisfaction scores, at different levels of organization in the health service. This approach allowed for a more direct test of impact of health care provider burnout on patient outcomes that could address gaps left by previous research, given that patient satisfaction might be influenced in different ways at doctor level versus patient level. Therefore, taking into account specific micro-units within departments, such as individual doctors and their patients, could yield new insights about sources of patient satisfaction, and focus policy improvements on a particular level of intervention.

The main aim of the present study was to examine relationships between physician burnout and patient satisfaction with consultation. It was hypothesized that physician's scores on burnout would be negatively associated with patient ratings of satisfaction with doctors' care and information provided, after controlling for physician and patient age and gender, and number of patient visits to the medical center. In keeping with the literature reviewed on the importance of the medical consulting role in patient satisfaction, it was also expected that an appreciable proportion of variation in patient satisfaction with consultation scores would occur at the level of physician.

Method

Participants and Procedure

A cross-sectional study was performed in western Greece, involving a survey of all physicians working in three large primary health care centers. Since five physicians did not agree to participate in this study (85.8% response rate), the final pool of participants was 30 physicians, who provided primary care to their patients. For each physician, 10 patients were selected to participate, recruiting one in every three consecutive patients by systematic random sampling. Thus, 300 patients took part in the study. Adult patients, able to understand Greek, were invited to participate. Immediately after consultation, patients were asked to complete questionnaires, seal their completed questionnaires in an envelop provided, and deposit this in a box on the reception desk. A specific code number was assigned to each physician of the health centers, so that it was possible to identify a patient's envelop as corresponding to a particular physician who had attended to him/her. Precautions were taken to secure anonymity and confidentiality, including assignment of nonidentifying numeric codes and secure storage of data. Participants were assured that only investigators would have access to the code key and that they would be able to withdraw from the research at any time, without giving reasons and without detriment to their care. The study was approved by the human research ethics committee.

Measures

Demographic Variables

Demographic variables assessed included gender (both patient and physician), age group (both patient and physician), physician specialty, physician work experience, number of patient's consultation visits to the health center during the last year.

Physician Burnout

Burnout was measured with the Maslach Burnout Inventory (MBI; Maslach & Jackson, 1986) completed by the study physicians. This instrument comprises a total of 22 items, focusing on emotional exhaustion (EE; e.g., I feel used up at the end of the workday), depersonalization (DP; e.g., I feel I treat some patients as if they were impersonal objects), and personal accomplishments (PA; e.g., I have accomplished many worthwhile things in this job). The inventory asks participants to indicate on a 7-point Likert scale (ranging from 0 = *never* to 6 = *every day*) the frequency with which they have been experiencing certain job-related feelings for the previous 12 months. This instrument has been translated into Greek and has been shown to have satisfactory reliability and construct validity (Anagnostopoulos & Papadatou, 1992; Papadatou, Anagnostopoulos, & Monos, 1994).

Patient Satisfaction

Participant patients completed the Consultation Satisfaction Questionnaire (CSQ; Baker, 1990; Poulton, 1996), The CSQ is a 18-item instrument containing a "general satisfaction" sub-scale with 3 items (e.g., I am totally satisfied with my visit to this doctor) and three sub-scales that measure patients' satisfaction with perceived length of the consultation time (e.g., The time I was allowed to spend with the doctor was not long enough to deal with everything I wanted), the depth of relationship (e.g., I felt this doctor really knew what I was thinking) and the professional care provided (e.g., This doctor examined me very thoroughly). Patients are asked to report what they think of their visit to the doctor. Items cover mixed positive and negative statements, scored on a 5-point Likert scale ranging from 1 = *strongly agree* to 5 = *strongly disagree*. Higher scores indicate higher levels of satisfaction. The CSQ was translated from English into Greek, by two bilingual professional translators who understood content of the scale. The translated instrument was then back-translated into English by two other bilingual translators and compared to its original version. This procedure ensured clarity and comprehensibility of items. Any discrepancies in comparison were discussed and a few minor adjustments were applied, after pilot-testing. Although four separate sub-scale scores could be obtained, we combined the scores of the components of the CSQ to indicate overall satisfaction, as described by Kinnersley, Stott, Peters, Harvey, and Hackett (1996). Thus, a total satisfaction score was calculated by adding the scores for all individual items. For ease of comparison, total scores were converted to percentage maximum scores by dividing them by the maximum possible score (i.e., 90).

Statistical Analysis

Internal consistency reliability for each scale was computed based on Cronbach's alpha. Mixed effects multilevel modeling was conducted applying the MIXED procedure in SPSS (version 15), as outlined by West (2009). This type of data analysis was selected because communication behaviors and patient satisfaction were likely to be similar in different encounters by the same physician, or because different doctors were likely to attract patients with particular characteristics, leading to correlated measurements. Since such dependencies are expected to arise when patients are nested within physicians, we needed to conduct a multilevel analysis of data obtained from a hierarchy, instead of traditional ordinary least-squares techniques such as multiple regression. In our case, there were two levels of analysis: level 1 (or lower level), which involved patients, while level 2 (or upper level) involved physicians. Mixed-effects multilevel models offer distinct advantages over the traditional ANOVA models for several reasons: (1) they can handle correlated data and unequal variances and therefore modeling not only the means of the data but their variances and covariances as well, (2) they can involve both fixed factors (that are generally thought of as variables whose values of interest are all represented in the data file) and random effects factors (that are assumed to explain excess variability in the dependent variable, and whose values in the data file can be considered to represent only a random sample of a larger population or set of values), thus allowing the study results to be generalizable to all physician and patient groups and not only to those represented in our study (Saarinen, 2004).

The steps followed to employ multilevel analyses using mixed-effects models included (a) clarifying the research questions under investigation, (b) assessing whether multilevel modeling was justifiable, by building a random intercept model in which no explanatory variables were included (Model 1), (c) building the level 1 model, in which patient characteristics were entered into the equation (Model 2), (d) building a model that allowed the influence of level 1 predictors on patient satisfaction to randomly vary across physicians (Model 3), (e) building the level 2 model, in which physician characteristics were added to the equation (Model 4), (f) testing competing multilevel models using the likelihood ratio test and information criteria for model comparison (Peugh, 2010). For each model, we calculated variance partition coefficients, that represented the proportion of total variance in patient satisfaction scores that was due to differences occurring at each level (i.e., between doctors and between patients).

The random effects across physicians model the covariance between intercepts and slopes. To establish which model best fit the data, the −2LL (−2 times log-likelihood), the Akaike information criteria (AIC), and the Bayesian information criteria (BIC), were examined (Brown & Prescott, 2006). Variance components were estimated using maximum likelihood (ML) estimation, which enables comparison between the relative fit of competing models (SPSS, Inc., 2005). Estimates of fixed effects were evaluated based on F statistics and t-tests. Covariance parameters were evaluated based on the Wald Z statistic. Estimated marginal means gave estimates of predicted mean values for the cells in the model. The ultimate objective of this statistical analysis was to make inference about the fixed effects of burnout, taking into account the specified covariance matrix of random effects of patient grouping.

Results

Descriptive and Correlation Statistics

The physician sample included 17 men and 13 women. Physician age was over 50 years (43.3%), while 40% of physicians were within the age range of 36–50 years. The majority of physicians (83.3%) were married, with three or more children (60%). Physicians with a specialty qualification were predominantly certified as general practitioners (63.4%), and pathologists/internists (23.3%). Working experience was more than 10 years (53.3%). Regarding the patient sample, 163 (54.3%) were female, and 83% were married. Patient mean age was 53.5 years ($SD = 14.9$; range = 22–84 years). Approximately 62% of patients had elementary school level of education. The majority of patients had previously visited the primary care health center 1–2 times (35%) or 3–5 times (34%). Presenting conditions included cardiovascular diseases (35.7%), infectious diseases (15%), psychiatric disorders (12.3%), endocrine diseases (10.7%), and orthopaedic disorders (9.3%).

Cronbach's alphas were calculated for each of the subscales used in the study and are reported in Table 1. All appeared to be acceptable. Means and standard deviations are also reported in Table 1.

Care unit-level satisfaction scores were calculated as mean scores across all patients associated with each physician. The correlation matrix, shown in Table 1, reveals significant relationships between physician emotional exhaustion and patient satisfaction, $r = -.636$, $p < .01$. Physician depersonalization correlated significantly with patient satisfaction, $r = -.541$, $p < .01$. Physician personal accomplishment, in contrast, did not significantly correlate with patient satisfaction, $r = .259$, $p = .168$.

Table 1 Mean values (*M*), standard deviations (*SD*), ranges, MBI and CSQ scales reliability coefficients, and Pearson's correlation coefficients between main variables ($n = 30$)

	M	*SD*	Range	Alpha	Depersonalization	Personal accomplishment	Patient satisfaction
Emotional exhaustion	16.93	7.33	4–37	.745	.424*	−.175	−.636**
Depersonalization	4.10	2.90	0–13	.710		−.151	−.541**
Personal accomplishment	30.37	5.59	17–40	.780			.259
Patient satisfaction	0.71	0.12	0.43–0.90	.966			

* $p < .05$ (two-tailed), ** $p < .01$ (two-tailed)

MBI Maslach Burnout Inventory, *CSQ* Consultation Satisfaction Questionnaire

Mixed-effects Modeling: Variance at the Patient Level

Following standard practice in multilevel modeling, before testing any hypotheses we tested an unconditional (or null) means model (Model 1). In this analysis, there were no predictors at either level 1 or level 2 estimating the mean and the variance that was within- and between-groups and the model is presented below. Level 1: $y_{ij} = \beta_{0j} + r_{ij}$. Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$.

In this model, y_{ij} was a level-1 measure of satisfaction for patient i in physician j, β_{0j} was a random coefficient representing the mean of patient satisfaction for each physician j (across the i patients in each group), while the residual term r_{ij} reflected the within-group (physician) variance (denoted by σ^2; patient satisfaction differences around the mean of physician j). At level 2, γ_{00} was the grand mean patient satisfaction score (the mean of the group means, β_{0j}), and the intercept term u_{0j} reflected the between group (physician) variance (denoted by τ_{00}; a physician-specific deviation from the grand mean).

By fitting an unconditional model to the data, we obtained estimates presented in the second column of Table 2 (Model 1). The overall patient satisfaction mean (taken across physicians) was estimated as $\gamma_{00} = 0.7086$ ($SE = 0.0222$) and the estimate of the overall variance was 0.0349. This overall variance could be partitioned into two components: the between physicians intercept variance ($\tau_{00} = 0.0126$) based on departures of group (physician) means from the overall (grand) mean, and the within- physicians (between-patient) residual variance ($\sigma^2 = 0.0223$) based on individual (patient) departures from group mean. Both variance components were significantly different from 0, based on the Wald *Z* statistic. These estimates suggested that physicians did differ in their average patient satisfaction scores and that there was even more variation among patients (nested within physicians). Actually, the variance component within physicians was nearly two times the size of the variance component between physicians. The level 2 (between physician) variance estimate could be converted to a standard deviation, i.e., square root of $(0.0126) = 0.1122$, to facilitate its interpretation. Specifically, assuming that the residuals were normally distributed, 95% of physicians were expected to have mean patient satisfaction scores between 0.4887 and 0.9285, i.e., 0.7086 ± 1.96 (0.1122). The inter-class correlation coefficient (ICC) was equal to $\text{ICC} = \tau_{00}/(\tau_{00} + \sigma^2) = (0.0126)/(0.0126 + 0.0223) = 0.361$. Thus, 36.1% of the total variance in patient satisfaction scores was due to between- physician differences. Although most of the variation (63.9%) was at level 1, a large proportion of variation in patient satisfaction scores lay at level 2. The presence of such variance heterogeneity provided an impetus for adding level 1 and level 2 explanatory variables to the unconditional model, and testing different multilevel models in subsequent analyses.

In Model 2, three patient-level (level 1) predictors were added: patients' gender, patients' age, and patients' visits. This model involved both fixed effects of predictors (where the influence of predictors on patient satisfaction was not allowed to randomly vary across physicians) and random effects of intercept (where the intercept, but not the slope, of the group regression lines was allowed to vary randomly from physician to physician). Random intercept models assume that each subject (physician) has a different intercept, while the intercepts have a normal distribution with a mean of zero and unknown variance τ_{00}. For patients with the same score on an explanatory variable associated with a positive estimate, a physician with a high value of the intercept is predicted to lead to a higher patient satisfaction than a physician with a low value for the intercept. The intercept, that is the expected patient satisfaction for patients of average age, visits, and gender values (i.e., scoring 0 on these variables), was $\gamma_{00} = 0.6649$ ($SE = 0.0213$). In addition, the influence of patients' gender ($\gamma_{10} = -0.0206$) and patients' age ($\gamma_{20} = -0.0009$) on patient satisfaction was not statistically significant. However, the influence of patients' visits on patient satisfaction (with a $\gamma_{30} = 0.0473$) was significant, taking other predictors in the model into account. This suggests that a 1-unit increase in patients' visits frequency (e.g., from 1–2 times to 3–5 times during the preceding year) results in an

Table 2 Multilevel data analysis within mixed-effects modeling: Model summaries

Parameters	Model 1 (unconditional)	Model 2 (plus fixed level 1 predictors)	Model 3 (plus random slopes)	Model 4 (plus level 2 predictors)
Fixed part	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Intercept	0.7086** (0.0222)	0.6649** (0.0213)	0.6599** (0.0219)	0.6673** (0.0171)
Patients' gender		−0.0206 (0.0111)	−0.0191 (0.0109)	
Patients' age		−0.0009 (0.0007)	−0.0006 (0.0007)	
Patients' visits		0.0473** (0.0077)	0.0398** (0.0075)	0.0430** (0.0089)
Physicians' exhaustion				−0.0072** (0.0016)
Physicians' depersonalization				−0.0137* (0.0057)
Physicians' accomplishments				0.0024 (0.0033)
Random part				
Residual variance (within physicians)	0.0223** (0.0019)	0.0208** (0.0018)	0.0171** (0.0017)	0.0213** (0.0018)
Intercept variance (between physicians)	0.0126** (0.0038)	0.0109** (0.0034)	0.0119** (0.0036)	0.0044** (0.0017)
Patients' gender variance			0.0019 (0.0011)	
Patients' age variance			0.0001 (0.0001)	
Patients' visits variance			0.0002 (0.0003)	
Information criteria				
−2LL	−232.77	−255.47	−275.44	−269.19
Number of estimated parameters	3	6	15	7
AIC	−226.77	−243.47	−245.44	−255.19
BIC	−215.66	−221.25	−189.89	−229.26

SE standard error, *−2LL* −2 Log Likelihood, *AIC* Akaike's Information Criterion, *BIC* Schwarz's Bayesian Information Criterion. * $p < .05$; ** $p < .01$

increase of 0.0473 in mean patient satisfaction with consultation score. Regarding estimates of covariance parameters, the estimated variance of the random effects associated with the intercept in the model (signifying variability in patient satisfaction means across physicians) was significant and equal to $\tau_{00} = 0.0109$. This estimate was smaller than that of the previous, unconditional, model and was reduced by approximately 13%, i.e., (0.0126–0.0109)/0.0126, as a result of adding level 1 predictors as covariates. Including level 1 predictors also slightly reduced the within- physician variance σ^2 by approximately 7%, i.e., (0.0223–0.0208)/(0.0223). The total variance in patient satisfaction was 0.0317, and the intra-class correlation coefficient indicated that 34.4% of the unexplained variance in patient satisfaction was due to differences between physicians. Compared to the proportion of between physicians variation observed in Model 1, the corresponding proportion obtained from Model 2 was reduced, because some of the variation had been explained by known patient-related variables.

In Model 3, random slopes were added that allowed the influence of level 1 predictors on patient satisfaction to randomly vary across physicians. In random intercepts and slopes models, each physician has a different intercept and slope, while pairs of intercepts and slopes are assumed to have bivariate normal distribution with a mean of zero and some unknown covariance matrix. Since this model involved random effects, the predicted means of the predictors were computed by averaging the random effects over physicians. Differences in values for the slope coefficient for an explanatory variable associated with a positive estimate, can be interpreted to mean that the relationship between that patient variable and the predicted patient satisfaction is not the same across physicians. A statistically significant and positive patients' visits effect estimate ($\gamma_{30} = 0.0398$) indicated that patient satisfaction increased as patient visits increased. With respect to the random effects coefficients, a significant intercept variance ($\tau_{00} = 0.0119$) suggested that physicians did differ in average patient satisfaction scores, even after controlling for the effects of patients' visits and that there was additional variation in physician mean satisfaction scores that was not explained by the predictors. The change in the likelihood ratio test statistic comparing the random slope Model 3 and the corresponding random intercept Model 2 was equal to $-2\text{LL} = 19.97$. This difference represents a test statistic that follows a χ^2 distribution with 9 degrees of freedom. The p value fell below the standard .05 significance level ($p = .018$), which suggested that there was strong evidence in favor of keeping the random slopes in the model.

Mixed-effects Modeling: Variance at the Physician Level

In Model 4, level 2 covariates, such as physicians' exhaustion, depersonalization, and accomplishments, were added to the previous Model 3, after having grand- mean centered these covariates. Estimates of fixed effects quantified the influence of physicians' burnout on the patient mean satisfaction scores. The intercept (i.e., the expected patient satisfaction scores for patients with average visits values), was significant and equal to $\gamma_{00} = 0.6673$. A statistically significant and positive patients' visits effect estimate ($\gamma_{10} = 0.0430$) indicated that patient satisfaction increased as patient visits increased. Influence of physicians' exhaustion on intercepts ($\gamma_{01} = -0.0072$) was negative and statistically significant, as was effect of physicians' depersonalization ($\gamma_{02} = -0.0137$), over and above any level 1 influences. Each 1-unit increase in physician exhaustion and depersonalization was associated with a decrease of 0.0072 and 0.0137 points on the patient satisfaction measure, respectively. Thus, patients who consulted highly exhausted and depersonalized physicians had significantly lower satisfaction scores than patients of less exhausted and depersonalized physicians, on average. With respect to random effects, both the within physicians variance ($\sigma^2 = 0.0213$) and the between physicians variance ($\tau_{00} = 0.0044$) were statistically significant. The former implied significant variance in observed versus predicted patient satisfaction within physicians, while the latter suggested significant variation in patient satisfaction scores across physicians, at average patient level. Addition of level 2 variables reduced variance at this level from 0.0109 (Model 2 intercept variance) to 0.0044 (Model 4 intercept variance). Adding level 2 predictors to Model 2 reduced the between physicians variance in patient satisfaction scores by 59.6%, i.e., (0.0109–0.0044)/0.0109. The intra-class correlation coefficient indicated that 17.1% of the unexplained variance in patient satisfaction was due to differences between physicians. The large negative AIC (= −255.19) and BIC values (= −229.26) indicated that the fitted models with fixed and random effects, and with both level 1 and level 2 predictors, were favored strongly over the mixed models without these effects. It should be noted that in Model 4 we also tested for physicians' age, gender and working experience effects, but there was no significant relationship observed with patient satisfaction. Therefore, following recommendations in multilevel modeling (e.g., Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2004) we eliminated those variables from the final models.

Means of patient satisfaction across different burnout levels might not be equal, but could vary considerably. To study such a relationship, we treated burnout as a trichotomized variable where low, moderate, and high levels for each burnout subscale were determined, dividing each frequency distribution to tertile of scores, with the 33rd and 67th percentiles as cut-off values. Such a trichotomous conceptualization of burnout and a categorization of study participants into low, moderate and high in burnout, has already been used in previous burnout research (e.g., Ratanawongsa et al., 2008). Estimated marginal means of patient satisfaction for each burnout level, i.e., predicted population means that did account for our fitted model and that were computed by averaging the random effects over physicians, indicated that low emotional exhaustion physicians had the highest average patient satisfaction score ($M = .812$, $SE = .030$, 95% CI = 0.750–0.874), that was significantly higher than that corresponding to moderate and high emotional exhaustion physicians. Moreover, pairwise comparisons suggested that significant mean exhaustion differences existed between physicians, $F(2, 30) = 7.946$, $p < .01$. However, the difference in average patient satisfaction between the moderately ($M = .681$, $SE = .029$, 95% CI = 0.622–0.740) and highly exhausted physicians ($M = .654$, $SE = .024$, 95% CI = 0.605–0.702) was not statistically significant at the .05 level, applying the Bonferroni test and adjusting for the fact that multiple comparisons were made.

Figure 1 shows graphically that there is a gradual decline in patient satisfaction, as physician emotional exhaustion changes from low to high. Regarding depersonalization, the only significant difference in patient satisfaction scores was between low depersonalization ($M = 0.7222$, $SE = 0.030$) and high depersonalization physicians ($M = 0.6530$, $SE = 0.025$), $F(2, 30) = 5.064$, $p = .013$. As long as "physicians" were conceptualized as a random effect factor, these findings might be generalized to all physicians, not just those in the sample.

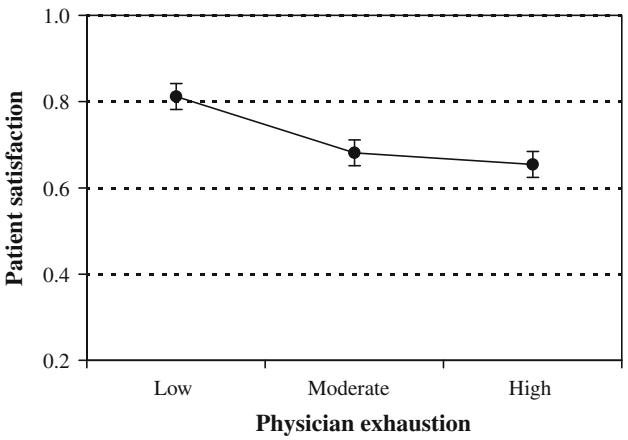

Fig. 1 Average patient satisfaction scores together with their standard errors as a function of physician emotional exhaustion levels

Discussion

By taking appropriate account of the hierarchical nature of the data, this study has provided estimates of the impact of physician and patient related characteristics on patients' satisfaction with consultation. Although most of the variation in patients' satisfaction occurs at the patient level, the fact that 34.4% of total variation occurs at the physician level, after adjustment for patients' characteristics, is a strong endorsement for the use of physician-related factors in surveys of patients' satisfaction. In addition, the reduction (to 17.1%) in unexplained variation at the physician level once the model was adjusted for a series of physician-related factors (e.g., physician burnout) implies that much of the variation between physicians can be explained by these factors. Our findings are consistent with that of previous studies (Rodriguez, Scoggins, von Glahn, Zaslavsky, & Safran, 2009). Furthermore, certain patient characteristics (i.e., patients' visits to the health center) were found to have significant associations with patient satisfaction.

We have also demonstrated empirically in this study that physician emotional exhaustion and depersonalization are negatively associated with patient satisfaction, and that physician burnout, as indicated by feelings of emotional exhaustion and depersonalization, is a significant factor influencing how satisfied patients are with their consultation. The mixed effects, multilevel modeling, analysis showed that, compared with patients of high-exhaustion physicians, patients of low-exhaustion physicians had significantly higher satisfaction scores. Depersonalization correlated significantly with patient satisfaction, and was associated significantly with this variable in the mixed-effects analysis. Regarding personal accomplishment, neither of the analyses conducted found a significant relationship between this variable and patient satisfaction. Schaufeli, Bakker, Hoogduin, Schaap, and Kladler (2001) maintain that personal accomplishment plays an exceptional and less central role in the burnout syndrome, as compared to emotional exhaustion and depersonalization. It may be that low levels of physicians' personal accomplishments, sense of professional efficacy and productivity at work are not harmful for the quality of the consultation process. Instead, the most important factor for patient satisfaction may be the quality of the interpersonal relationship established between physicians and patients, as it is affected by physicians' feelings of depersonalization and emotional exhaustion. Results of the present study support findings of other studies indicating the lower satisfaction that patients derive from involvement in medical encounters with burnt-out health professionals (Halbesleben & Rathert, 2008; Leiter et al., 1998).

In order to explain these results, Hobfoll's (1989) conservation of resources model can be used, which examines the psychological process underlying stress using the lens of valued resources (i.e., personal characteristics, conditions, or energies that are valued by the individual or that serve as a means for goal achievement). According to this model, when interacting with their patients, burnt-out and emotionally exhausted physicians are characterized by resource depletion and may respond by reducing their resource investment in patient interaction, depersonalizing their interactions with patients, exhibiting cynicism, detachment, and withdrawal, thereby preserving scarce emotional resources (Hobfoll & Freedy, 1993). Burnt-out physicians may engage in and maintain a biomedical (instead of a biopsychosocial) communication style, focusing on informational and instructional interaction and content (Williams, Lawrence, Sydow-Campbell, & Spiehler, 2009). Such communication behaviors may negatively influence patient outcomes (e.g., patient satisfaction).

One of the strengths of our study is that it used a one-physician with many-patients design, and applied mixed-effects multilevel models to examine the relationship between physician burnout and patient satisfaction. However, limitations of this study should be noted. One limitation of the present study was that it mostly involved visits of known patients, although this type of visit constitutes the majority of primary care encounters. Moreover, the CSQ may be prone to halo-effects, that is patients' evaluations may be based more on familiarity, acquaintance, and overall liking for the doctor than on specific consultation processes (Mead, Bower, & Hann, 2002). Consequently, patient satisfaction with the medical visit, as measured using the CSQ, may be influenced by patient's liking for the physician (Hall, Horgan, Stein, & Roter, 2002). Future research should target other visit types, such as new-patient visits, using multidimensional instruments. A third limitation is the cross-sectional design of the study, so that our findings can elucidate only associations, not causality. Future research should clarify this issue. More research is also needed to understand the mechanisms by which physician burnout affects patient satisfaction, based on a relevant theoretical framework such as the social exchange model of burnout (Halbesleben, 2006), the physician-patient cycle model (Williams, Savage, & Linzer, 2006), or the process model of burnout (Bakker, Schaufeli, Sixma, Bosveld, & van Dierendonck, 2000; Leiter & Maslach, 1988) and adopting a broader relationship-centered medical paradigm (Roter, 2000).

Despite limitations of the present study, our results may guide the improvement of patient satisfaction with consultations. The most obvious implication of our findings is that changes in and attenuation of primary care physicians' burnout would appear to contribute to increased patient satisfaction with consultations. Since patients of emotionally exhausted and depersonalized physicians in the

primary care settings report decreased satisfaction with consultation, properly planned intervention programs to reduce physicians' burnout and improve worksite mental health should be implemented in primary health care settings, including both person- and organization-directed measures. Training curriculum in physicians' communication skills may also result in greater patients' satisfaction with care and lower rates of both patient complaints and malpractice litigation (Haskard et al., 2008; Roter, 2006).

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