



Assessment of the Relationship Between an Adverse Impact of Work on Physicians' Personal Relationships and Unsolicited Patient Complaints

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Abstract

Objective: To evaluate the relationship between an adverse impact of work on physicians' personal relationships and unsolicited patient complaints about physician behavior — a well-established indicator of patient care quality.

Participants and Methods: We paired data from a physician wellness survey collected in April and May 2013 with longitudinal unsolicited patient complaint data collected independently from January 1, 2013, to December 31, 2016. Unsolicited patient complaints were used to calculate the Patient Advocacy Reporting System (PARS) score, an established predictor of clinical outcomes and malpractice suits. The primary outcome was PARS score tercile. Ordinal logistic regression mixed effects models were used to assess the association between the impact of work on a physician's personal relationships and PARS scores.

Results: Of 2384 physicians eligible to participate, 831 (34.9%) returned surveys including 429 (51.6%) who consented for their survey responses to be linked to independent data and had associated PARS scores. In a multivariate model adjusting for gender and specialty category, each 1-point higher impact of work on personal relationships score (0-10 scale; higher score unfavorable) was associated with a 19% greater odds of being in the next higher PARS score tercile of unsolicited patient complaints (odds ratio, 1.19; 95% CI, 1.07-1.33) during the subsequent 4-year study period.

Conclusion: An adverse impact of work on physicians' personal relationships is associated with independently assessed, unsolicited patient complaints. Organizational efforts to mitigate an adverse impact of work on physicians' personal relationships are warranted as part of efforts to improve the quality of patient experience and malpractice risk.

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Recent years have seen an increased interest in physician occupational well-being. Physician well-being includes both positive (eg, professional fulfillment and favorable mental/emotional health) and negative dimensions (eg, moral distress, fatigue, and depression). Occupational burnout is one of the most common and best studied domains of work-related distress in physicians.^{1,2} Burnout is a WHO recognized occupational syndrome³ associated with adverse health consequences⁴⁻⁷

including depression,⁸⁻¹⁰ sleep-related impairment,^{11,12} diabetes,¹³ and heart disease.^{14,15} Physician burnout is also associated with adverse patient care outcomes¹⁶⁻¹⁹ and higher health care costs.²⁰⁻²⁶ Studies of occupational distress in physicians commonly assess components of burnout including exhaustion and depersonalization at work.

The interpersonal effects of occupational distress also extend to relationships outside of work.²⁷⁻²⁹ Physicians' personal relationships

may be particularly strained by less favorable work-life integration relative to workers in other fields.^{30,31} Strained or neglected personal relationships due to occupational distress can have a profound impact on physicians. This may in turn affect their work and the care they provide their patients. Although the relationships between work-home conflicts³²⁻³⁵ and problems with work-life integration^{30,31} and risk of burnout have been explored, the effects of occupational distress and work demands on physicians' personal relationships have not been as well explored.³⁶ The impact of work on personal relationships (IWPR) is a specific dimension of work-life integration that is distinct from other aspects such as self-care (eg, exercise and sleep), recreation (eg, hobbies and vacations), and pursuit of personal interests and growth (eg, spiritual practice, the arts, and volunteer work).

To our knowledge, no previous study has directly assessed the association of the IWPR in physicians and its relationship to independent measures of patient outcomes. In the present study, we evaluate the relationship between adverse IWPR in physicians and unsolicited patient complaints about physician behavior — a well-established indicator of patient care quality.³⁷⁻³⁹ We also assess the association of adverse IWPR with professional fulfillment, depression, sleep-related impairment, anxiety, and burnout (ie, work-exhaustion and interpersonal disengagement).

PARTICIPANTS AND METHODS

The Stanford 2013 Doctor Survey provided the data for this analysis. Details of the 2013 Stanford Doctor Survey have been reported elsewhere¹² and are briefly summarized here. No previous reports from this dataset have assessed the IWPR or the relationship between this domain and patient outcomes, which are the focus of the current report.

Participants and Study Design

A physician survey was conducted in April–May 2013 to evaluate the state of physician burnout and professional well-being at Stanford Medicine. The survey was sent to both employed (ie, faculty) as well

as non-employed (ie, adjunct and community) physicians affiliated with Stanford Medicine (N=2384). A subgroup of physicians was randomly selected (n=249) and offered a \$25 gift certificate to complete the survey, of which 162 (65.1%) participated. The remaining 2135 physicians were given the survey without incentive, of which 669 (31.3%) participated. The overall response rate was $[162+669]/2384$ (34.9%). A comparison between the incentivized and non-incentivized groups yielded no statistically significant differences in variables of interest, including work exhaustion, interpersonal disengagement, and overall burnout. Therefore, the 831 responses were pooled for subsequent analysis.

Evaluation of Professional Fulfillment and Dimensions of Personal and Occupational Distress

Burnout and professional fulfillment were measured using the 12-item version of the Professional Fulfillment Index (PFI), which has shown reliability and validity.⁴⁰ The 8-item PFI burnout scale is comprised of two 4-item subscales measuring work exhaustion and depersonalization, with items scored on a 5-point Likert scale from “not at all” to “extremely.” The 4-item PFI professional fulfillment scale includes 4 items scored on a 5-point Likert scale from “not at all true” to “completely true.”

The PFI has been shown to assess symptoms of burnout and professional fulfillment with adequate reliability and construct validity.⁴⁰ The work exhaustion and interpersonal disengagement domains of burnout as assessed by the PFI have been shown to correlate strongly with work exhaustion and depersonalization as assessed by other burnout instruments⁴¹ and to discriminate between occupational burnout and depression.⁴²

As previously described,¹² the survey also contained standardized instruments to assess depression, sleep-related impairment, and anxiety. Depression and anxiety were measured using Patient-Reported Outcomes Measurement Information System (PROMIS) 4-item scales, with items scored on a 5-point Likert scale, from “never” to “always.”^{43,44}

Sleep-related impairment was measured using the PROMIS 8-item scale, with items scored on a 5-point Likert scale from “never” to “always.”^{43,45} All scale scores, including PROMIS measures of depression, anxiety, and sleep-related impairment were standardized to a 0–10 scale range for reporting in the present analysis.

Impact of Work on Personal Relationships

Physicians’ perspectives on the extent to which work had an impact on their personal relationships over the past year was assessed using the 4-item Stanford IWPR scale. This instrument was developed through a multi-step process by Dr Mickey Trockel (Stanford University). The initial scale was refined with feedback from a group of approximately 30 physicians interested in physician wellness and subsequently pilot tested before use in this study. The 4 items in the scale are answered in response to the stem “in the past year my job has:” (1) made it harder for me to nurture existing personal relationships, (2) made it harder for me to develop new meaningful personal relationships, (3) contributed to conflict in my personal relationship(s), or (4) contributed to me feeling more isolated or detached from the people who are most important to me. Responders are asked to indicate their level of agreement to each item over the previous year on a 5-point Likert scale with options ranging from not at all true (score = 0) to completely true (score = 4). The scale score is calculated by determining the mean 0–4 score across the 4 items and then normalizing the score to a 0–10 scale with higher scores indicating a greater adverse IWPR.

Patient Advocacy Reporting System Scores Based on Unsolicited Patient Complaints

Unsolicited patient complaints represent the extreme end of patient dissatisfaction. Using a proprietary algorithm, the Vanderbilt PARS calculates scores for physicians using a rolling 4-year record of unsolicited patient complaints.⁴⁶ Recent complaints and more severe complaints are weighted more heavily than older and less severe complaints. A physician’s PARS score has been shown to

objectively predict the risk of malpractice suits³⁸ and adverse patient outcomes.^{37,39} Patient Advocacy Reporting System scores have also been associated with burnout, sleep-related impairment, and low professional fulfillment.¹² As previously detailed,¹² physicians in the present study were divided into three groups based on their approximate PARS score tercile (group 1: PARS score, 0; group 2: PARS score, 1–12; and group 3: PARS score, ≥ 13). Due to the annual PARS score calculation process, the number of physicians who took the survey with available PARS score data increased yearly during the study period from 2013 to 2016.

For the present analysis, each physician’s wellness survey data was paired with their PARS scores by a third party that houses the identified wellness survey dataset. The third party then completely de-identified the dataset before delivery to the research team for analysis. The paired de-identified data was subsequently used to analyze the correlations between physician survey measures and PARS scores. The protocol using de-identified data was deemed exempt from further oversight by Stanford University’s internal review board.

Analysis

We calculated Cronbach’s alpha for all scales to estimate internal consistency reliability for the current data. We also performed a confirmatory factor analysis to assess adequacy of fit with the current data of the hypothesized measurement model including all measures developed at Stanford University: work exhaustion, interpersonal disengagement (both work exhaustion and interpersonal disengagement make up the PFI burnout scale), professional fulfillment, and IWPR. A standardized root mean squared residual of less than 0.08 indicates adequate fit of the measurement model specified in the confirmatory factor analysis.⁴⁷ We also calculated the Pearson correlation of the IWPR scale scores with measures of burnout, professional fulfillment, sleep-related impairment, anxiety, and depression. A one-way analysis of variance was performed to assess

TABLE 1. Impact of Work on Personal Relationships: Response Distribution^a

"In the past year my job has..."	Not at all true	Somewhat true	Moderately true	Very true	Completely true
Made it harder for me to nurture existing personal relationships	160/480 (33.3)	156/480 (32.5)	87/480 (18.1)	57/480 (11.9)	20/480 (4.2)
Made it harder for me develop new meaningful personal relationships	162/478 (33.9)	108/478 (22.6)	90/478 (18.8)	82/478 (17.2)	36/478 (7.5)
Contributed to conflict in my personal relationship(s)	223/481 (46.4)	137/481 (28.5)	57/481 (11.9)	44/481 (9.1)	20/481 (4.2)
Contributed to me feeling more isolated or detached from the people who are most important to me	228/478 (47.7)	134/478 (28.0)	62/478 (13.0)	36/478 (7.5)	18/478 (3.8)

^aValues shown are n/N(%).

the relationship of IWPR quartile with burnout, professional fulfillment, sleep score, depression, and anxiety. Because of extreme outliers in the PARS data, a Kruskal-Wallis one-way test was performed to test the relationship of IWPR quartile with PARS scores.

We used ordinal logistic regression to estimate the association of model-independent variables with odds of higher PARS score categories of unsolicited patient complaints. Random effects were specified to account for the data structure of multiple PARS score estimates across time for individual physicians. Seven random effects ordinal regression models were specified (1: unadjusted; 2: adjusted for surgical specialty and gender; 3: adjusted for surgical specialty, gender, and interpersonal disengagement; 4: adjusted for surgical specialty, gender, and work exhaustion; 5: adjusted for surgical specialty, gender, and overall burnout; 6: adjusted for surgical specialty, gender, and sleep-related impairment; and 7: adjusted for surgical specialty gender, and professional fulfillment). Analysis was conducted using Lavaan package in R,⁴⁸ HML8,⁴⁹ and Pandas^{50,51} and Scipy⁵² in Python. Statistical significance was set at .05.

RESULTS

Of the 831 survey responders (see Methods), 583 (70.2%) were faculty physicians employed by Stanford. Among these faculty physicians, 482 (82.7%) consented to allow use of their email addresses to link their survey responses

to independent data of whom 424 (88.0%) had associated PARS scores. Of the 424, 331 had PARS scores from all 4 years, 37 from 3 years, 24 from 2 years, and 32 from 1 year. In aggregate, 333, 368, 392, and 422 physicians who completed the survey had PARS scores available in 2013, 2014, 2015, and 2016, respectively (Supplemental Table 1, available online at <http://www.mayoclinicproceedings.org>). Among 482 faculty physicians, 198 were female (41.1%), 234 male (48.5%), and 50 were missing information on gender (10.4%). With respect to specialty area, 75 practiced in a surgical discipline (15.6%), 395 a nonsurgical discipline (82.0%), and 12 did not report a specialty (2.5%).

Responses to items and statistics regarding the IWPR scale and each corresponding scale item are presented in Tables 1 and 2. On average, respondents had the highest score (unfavorable) on the item inquiring if "their job made it harder to develop new meaningful personal relationships." Of 478 responding to this item, 208 (43.5%) indicated this was moderately, very, or completely true over the last year. On average, respondents had the lowest score (favorable) on the item inquiring if "their job contributed to feeling more isolated or detached from the people who are most meaningful to them." Of 478 responding to this item, 116 (24.3%) indicated moderately, very, or completely true in the last year. The relationship between demographic characteristics and the IWPR is shown in Supplemental Table 2 (available online at <http://www.mayoclinicproceedings.org>).

TABLE 2. Impact of Work on Personal Relationships: Descriptive Statistics

Responses	Mean \pm SD ^b	Minimum value (%)	Maximum value (%)	Median (IQR)	Spearman Correlation with Scale Score
“In the past year my job has...”					
Made it harder for me to nurture existing personal relationships	3.03 \pm 2.88	0.0 (32.9)	10.0 (4.1)	2.5.0 (0.0 to 5.0)	0.92
Made it harder for me to develop new meaningful personal relationships	3.55 \pm 3.28	0.0 (33.3)	10.0 (7.4)	2.5 (0.0 to 5.0)	0.89
Contributed to conflict in my personal relationship(s)	2.41 \pm 2.88	0.0 (45.8)	10.0 (4.1)	2.5 (0.0 to 5.0)	0.81
Contributed to me feeling more isolated or detached from the people who are most important to me	2.29 \pm 2.79	0.0 (46.8)	10.0 (3.7)	2.5 (0.0 to 2.5)	0.84
Impact of Work on Personal Relationships	2.81 \pm 2.61	0.0 (22.6)	10.0 (2.3)	2.5 (0.63 to 4.38)	N/A ^a

^aN/A = not available.

^bRange 0-10; higher scores are less favorable.

The confirmatory factor analysis including the measures of the IWPR scale along with the work exhaustion, depersonalization, and professional fulfillment scales had a standardized root mean squared residual of 0.053, suggesting that the hypothesized measurement model fits the current data adequately. The 4 items assessing the IWPR items emerged as components distinct from professional fulfillment and the two burnout domains (work exhaustion, interpersonal disengagement). Factor loading scores are shown in [Supplemental Table 3](#) (available online at <http://www.mayoclinicproceedings.org>). The Cronbach's alpha for the IWPR scale was 0.91, and for other scales was as follows, anxiety scale: 0.87, depression: 0.89, sleep-related impairment: 0.91, burnout: 0.89, and professional fulfillment: 0.88.

The relationship of the IWPR scale score with the PARS score and other domains of personal (ie, depression and sleep score) and professional (ie, burnout and professional fulfillment) well-being are shown in [Table 3](#). An adverse IWPR showed a significant relationship with overall burnout score as well as measures of personal distress including anxiety, sleep-related impairment, and depression. Pearson correlation of scores on the IWPR with other scale scores were as follows: professional fulfillment: -0.42, work-exhaustion: 0.58, interpersonal disengagement: 0.43, overall

burnout: 0.58, sleep-related impairment: 0.48, anxiety: 0.41, and depression: 0.44. [Figure 1](#) shows the association between the quartile of scores on the IWPR scale and scores on measures of occupational distress ([Figure 1A](#)) and personal distress ([Figure 1B](#)).

A significant association between an adverse IWPR and PARS score category was also observed ([Table 3](#) and [Figure 1C](#)). This association persisted on ordinal logistic regression mixed effects models. In the unadjusted model, each 1-point increase in IWPR on the 0–10 scale was associated with 19% greater odds of being in the next higher PARS score category of unsolicited patient complaints (odds ratio [OR], 1.19; 95% CI, 1.07-1.33). The association between an adverse IWPR and PARS score category remained significant and of similar magnitude after adjusting for surgical specialty and sex (OR, 1.19; 95% CI, 1.07-1.33). Models adding additional adjustment for interpersonal disengagement (OR, 1.16; 95% CI, 1.02-1.31), work exhaustion (OR, 1.17; 95% CI, 1.02-1.35), overall burnout (OR, 1.16; 95% CI, 1.00-1.33), sleep-related impairment (OR, 1.16; 95% CI, 1.03-1.31), or professional fulfillment (OR, 1.14; 95% CI, 1.01-1.29) were not materially different from primary models and showed an independent relationship of similar magnitude between an adverse IWPR and PARS scores

TABLE 3. Relationship between Impact of Work on Relationships Score and Other Dimensions of Personal and Professional Well-being^{a,b}

Adverse IPWR Quartile	PARS Score ^c		Burnout ^c		Professional Fulfillment ^d		Sleep Score ^e		Depression ^c		Anxiety ^c	
	Mean	P	Mean	P	Mean	P	Mean	P	Mean	P	Mean	P
1 ^e	8.66	.005	1.10	<.001	8.15	<.001	1.18	<.001	0.35	<.001	0.44	<.001
2	8.84		1.89		7.43		2.44		0.36		0.63	
3	11.66		2.83		6.53		3.05		0.78		1.26	
4 ^f	12.45		3.75		5.86		4.05		1.99		1.98	

^aIPWR = impact of work on personal relationships; PARS = Patient Advocacy Reporting System.

^bMeans for PARS, burnout, professional fulfillment, sleep, depression, and anxiety scores by quartile of adverse impact of work on personal relationships scale (higher quartile = less favorable). A one-way analysis of variance was performed for burnout, professional fulfillment, sleep score, depression, and anxiety; the P value is shown next to the mean. Due to extreme outliers in the PARS data, a Kruskal-Wallis one-way test was performed for PARS.

^cHigher score unfavorable.

^dHigher score favorable.

^eMost favorable.

^fLeast favorable.

(Table 4). Additional details from these models are shown in Supplemental Tables 4 through 9 (available online at <http://www.mayoclinicproceedings.org>).

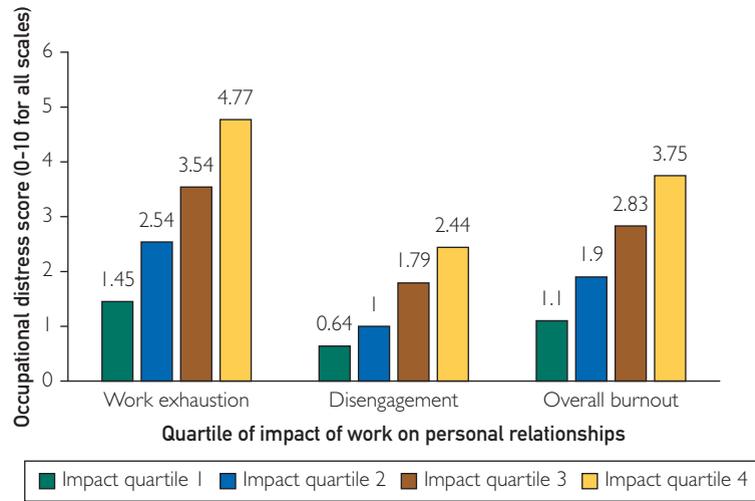
DISCUSSION

To our knowledge, the present study is the first to evaluate the impact of work on physicians' personal relationships and its association with objective, independent measures of patient experience. The confirmatory factor analysis supports the separation of the construct of IWPR from other aspects of occupational well-being. This study shows a significant association between an adverse IWPR and unsolicited patient complaints, which persisted after adjusting for gender, specialty, interpersonal disengagement, work exhaustion, overall burnout, sleep-related impairment, and professional fulfillment. These results indicate that an adverse IWPR has a negative effect on patient experience and outcomes, independent of the effects of burnout and sleep-related impairment.

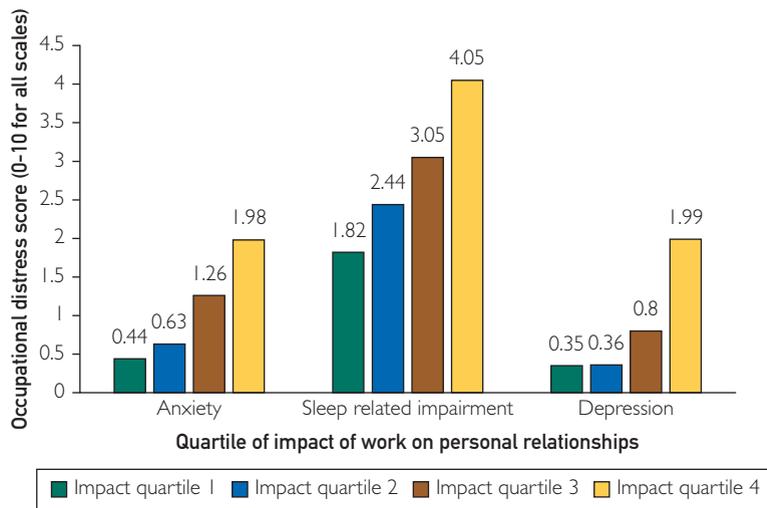
This study also reveals the strong relationship between work having an adverse IWPR and both personal (eg, anxiety, sleep-related impairment, and depression) and occupational (eg, professional fulfillment, work-exhaustion, interpersonal disengagement, and burnout) distress. Physicians are known to work long hours and

often focus less on their personal lives in the process of serving others and increasing professional efficacy.^{30,31} The findings of the present study suggest that, at some point, the lack of attention to their personal lives may become self-defeating and harm both patients and physicians if it damages a physician's personal relationships. Although our analysis evaluated how IWPR relates to future patient complaints, it is also possible that physician's responding to patient complaints in suboptimal ways (eg, self-condemnation or isolation) may also damage personal relationships. Future studies examining the potential reciprocal relationship between these dimensions could provide helpful insights.

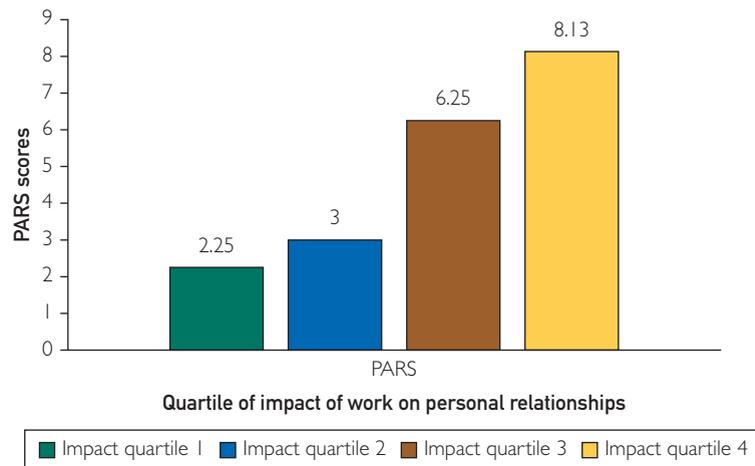
The association between the IWPR and unsolicited patient complaints is of particular interest to the field of physician well-being. Specifically, it identifies yet another important organizational rationale to establishing a work environment that cultivates physician well-being, including protecting personal relationships. Unsolicited patient complaints are an important indicator of patient care quality and are associated with risk of malpractice litigation³⁸ and adverse clinical outcomes.^{37,39} Our findings indicate that organizations that care about quality of care and patient experience cannot advance these aims through means that threaten physician



A



B



C

well-being. Organizations can mitigate the adverse IWPR through a variety of approaches. These may include improving efficiency in the practice environment to shorten the work day (eg, optimized patient rooming/checkout workflows, decreasing operating room turnaround times, and better team-based care), efforts to reduce after-hours electronic health records task burden through the use of documentation assistance (eg, team-based documentation, medical scribes, or artificial intelligence approaches) and optimized inbox management (eg, team-based inbox management or artificial intelligence approaches).⁵³⁻⁵⁶ Careful attention to ensure equitable scheduling (ie, call schedule or weekend duty), providing coverage for time away, offering less than full-time work options, more optimal family leave policies, and increasing scheduling flexibility can also be helpful.⁵⁷⁻⁶¹ More creative approaches to provide assistance with home tasks to enable physicians to attend to high work demands and preserve time for personal relationships have also been reported.⁶²

The neurobiology of attachment may explain the relationship between IWPR and clinical performance. Humans are social creatures and stressors in personal relationships have been found to have profound neurobiological effects. Attachment insecurities have been linked with diminished sleep quality⁶³ and stress reduces activation in the areas of the brain (ie, posterior superior temporal sulcus, left inferior frontal gyrus, and left temporoparietal junction) associated with the ability to perceive, interpret, and respond to the emotional state of self and others.⁶⁴ Perceived isolation in

adults is associated with accelerated cognitive decline and poor executive functioning.⁶⁵ These neurobiological effects likely impact every aspect of an individual's life, including cognitive performance at work. In physicians, optimal executive function is critical to preserve self-calibration, emotional intelligence, professional integrity, and clinical judgement as well as provide compassionate care to patients.⁶⁶

A previous report using the current study data set showed an association between occupational distress and unsolicited patient complaints,¹² which added to growing literature on the relationship between physician burnout and patient care outcomes.⁶⁷ In particular, interpersonal disengagement or the related construct of depersonalization may be related to less favorable patient care outcomes. For example, in other studies, patients' post-hospital discharge recovery times were demonstrably longer if the doctor responsible for their care during hospitalization had higher levels of depersonalization.¹⁹ Without adjusting for burnout or sleep-related impairment, the results of the present study could be reasonably postulated as being due to a potentially confounding relationship between IWPR with burnout or sleep-related impairment and unsolicited patient complaints. However, the association between the adverse IWPR and unsolicited patient complaints persisted and was of similar magnitude after adjusting for interpersonal disengagement, overall burnout, and sleep-related impairment, arguing against this notion. A potential model integrating the findings of these studies is provided in [Figure 2](#).

FIGURE 1. Relationship between adverse impact of work on personal relationships and measures of occupational and personal distress. (A) Association between quartile of adverse impact work on personal relationships scale score (x axis) and mean scores on indicators of occupational distress (y axis, all scales normalized to 0 to 10 score). All *P* values for one-way analysis of variance (ANOVA) <.001. (B) Association between quartile of adverse impact work on personal relationships scale score (x axis) and mean scores on indicators of personal distress (y axis, all scales normalized to 0 to 10 score). All *P* values for one-way ANOVA <.001. (C) Association between quartile of adverse impact work on personal relationships scale score (x axis) and median Patient Advocacy Reporting System (PARS) scores. *P* value for Kruskal-Wallis one-way test is .005.

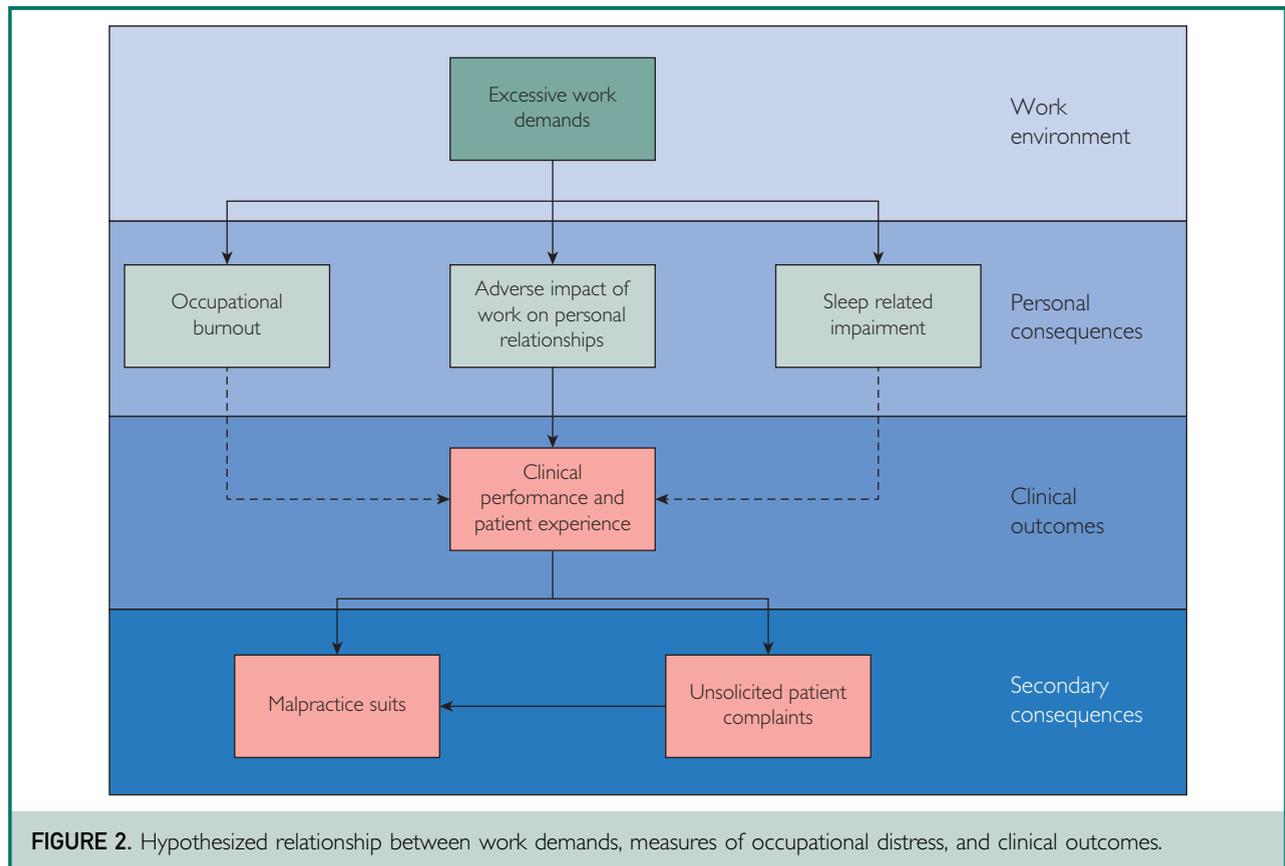
TABLE 4. Association Between Adverse Impact of Work on Personal Relationships and Unsolicited Patient Complaints

	Odds ratio for each 1-point increase of adverse impact of work on relationship scale (95% CI)	P
Unadjusted model	1.19 (1.07-1.33)	.002
Adjusted for specialty and gender	1.19 (1.07-1.33)	.002
Adjusted for specialty, gender, and interpersonal disengagement score	1.16 (1.02-1.31)	.02
Adjusted for specialty, gender, and work exhaustion	1.17 (1.02-1.35)	.03
Adjusted for specialty, gender, and overall burnout score	1.16 (1.00-1.33)	.02
Adjusted for specialty, gender, and sleep-related impairment	1.16 (1.03-1.31)	.02
Adjusted for specialty, gender, and professional fulfillment	1.14 (1.01-1.29)	.03

Study Limitations

There are several notable limitations of this study. First, this study shows an association between impact of work on personal life and patient complaints and cannot determine causality or the potential direction of effect. In addition, this is a single-site study in a large academic health system, which may limit

generalizability. Although the prevalence and severity of the IWPR may vary between centers, it seems unlikely the associations between this variable and the other dimensions studied would be unique to the center studied. Nonetheless, the relationships between the IWPR and patient experience and quality of care deserve further study.



CONCLUSION

The findings from this longitudinal study show an association between an adverse IWPR in physicians and PARS scores, a well-established metric of patient experience and outcomes. Work conditions that require physicians to sacrifice personal relationships to meet professional demands could hinder physicians' ability to provide optimal clinical care. Organizational efforts to develop, implement, and evaluate strategies to ameliorate the adverse IPWR in physicians are warranted as part of efforts to optimize patient experience and promote quality of care.

POTENTIAL COMPETING INTERESTS

The authors report no potential competing interests.

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SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at <http://www.mayoclinicproceedings.org>. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviations and Acronyms: IWPR, impact of work on personal relationships; OR, odds ratio; PARS, Patient Advocacy Reporting System; PFI, Professional Fulfillment Index

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