Emotional Exhaustion in Primary Care During Early Implementation of the VA's Medical Home Transformation

Patient-aligned Care Team (PACT)

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Objective: Transformation of primary care to new patient-centered models requires major changes in healthcare organizations, including interprofessional expectations and organizational policies. Emotional exhaustion (EE) among workers can accompany major organizational change, threatening its success. Yet little guidance exists about the magnitude of associations with EE during primary care transformation. We assessed EE during the initial phase of national primary care transformation in the Veterans Health Administration.

Research Design: Cross-sectional online surveys of primary care clinicians (PCCs) and staff in 23 primary care clinics within 5 healthcare systems in 1 veterans administration administrative region. We used descriptive, bivariate, and multivariable analyses adjusted for clinic membership and weighted for nonresponse.

Participants: 515 veterans administration employees (191 PCCs and 324 other primary care staff).

Measures: Outcome is the EE subscale of the Maslach Burnout Inventory. Predictors include clinic characteristics (from administrative data) and self-reported efficacy for change, experiences with transformation, and perspectives about the organization.

Results: The overall response rate was 64% (515/811). In total, 53% of PCCs and 43% of staff had high EE. PCCs (vs. other primary care staff), female (vs. male), and non-Latino (vs. Latino) respondents reported higher EE. Respondents reporting higher efficacy for change and participatory decision making had lower EE scores, adjusting for sex and race.

Conclusions: Recognition by healthcare organizations of the potential for clinician and staff EE during primary care transformation is critical. Methods for reducing EE by increasing clinician and staff change efficacy and opportunities to participate in decision making should be considered, with attention to PCCs, and women.

Key Words: primary care, practice redesign, change implementation, veterans

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Transforming primary care to incorporate new team-based models of patient-centered care necessitates changes to the organizational culture including its internal and external policies, interprofessional norms, and routine practices.[1–4] Emotional exhaustion (EE), the sense of feeling overwhelmed and exhausted, is an essential component of the multidimensional psychological syndrome of burnout in response to job stress.[5] This syndrome is also conceptualized with 2 additional components: cynicism, or feeling depersonalized and detached from the job, and professional efficacy, or lack of a sense of personal accomplishment related to work goals.[5,6] However, EE is considered to be the most central, the most widely reported, and in some studies seen as first domain that manifests as part of the burnout syndrome.[6,7] Burnout, including EE is common among healthcare professionals[7–9] and has known negative effects, including worsened mental and physical health,[10] reduced work performance,[11] greater patient safety risks,[12] lower organizational commitment,[13,14] and increased workforce turnover and demand.[15]

A recent survey of a national sample of physicians[16] found that US physicians were more burned out than other types of workers (38% vs. 28%),[17] and that front-line physicians were among the most burned out, with highest rates found among physicians who are women, white, or

practicing in primary care.[12,16,18] Burnout can be exacerbated by major organizational change in primary care, which adds new stressors to challenging conditions of high workload, time limitations, and general chaos in busy practices.[18] Although burnout has frequently been studied in relationship to work outcomes of healthcare professionals, particularly physicians, fewer studies have investigated its associations in response to the role changes required by new patient-centered models of primary care such as the patient-centered medical home (PCMH).

Some evidence from the veteran's administration (VA) suggests that lower burnout is associated with some elements of team-based care, including participatory decision making.[19,20] Other factors that may buffer work burnout during PCMH implementation include perceived efficacy to adapt to change,[21–23] team functioning,[24,25] and perceptions about the practice's organizational setting including leadership support and interactive communication-centered care.[26] In addition, VA leadership has reported experiencing some of the same stresses found among those providing clinical care in Patient-Aligned Care Teams (PACT).[17,18] The work presented here investigates the associations between these factors and burnout across a wide variety of clinicians and staff as they implemented PACT.

Because primary care clinicians (PCCs) tend to experience a more hectic work environment compared with specialists, they tend to remain in the workforce for shorter durations compared with specialists. Thus, to retain PCCs in the workforce, one of the goals of PCMH is to improve working conditions and thereby increase primary care job satisfaction.[27] The VA's PCMH model, PACT, emphasizes open access scheduling within the context of continuity patient panel management by "teamlets." Teamlets typically consist of a physician or nurse practitioner, a registered nurse, a practical nurse or medical assistant, and a clerk, with the goal of a 3 to 1 staffing ratio of support per PCC. Additional PACT components focus on, for example, expanding non–face-to-face visits, improving care coordination, and activating patient self-management. To achieve VA's goals, minimizing primary care workforce burnout even during early implementation is critical.

This study aims to understand EE and its correlates among interprofessional team members most engaged in early-stage PACT implementation. Specifically, we sought to understand EE among PCCs and staff who work with PCCs and factors that may be correlates of EE and also describe the magnitude of EE. On the basis of the limited literature, we expect to find lower levels of EE among PCCs and staff with less challenging work conditions, those who are men and nonwhite, and those who report having higher perceived efficacy to successfully achieve change or perceive a more supportive organizational setting because of the medical home transformation.

METHODS

Conceptual Framework

We explore the relationship between EE and potential correlates of EE informed by some of the elements that are included in the Consolidated Framework For Implementation Research (Fig. 1).[28,29] The framework considers 5 domains that affect the success of healthcare innovations; EE within this framework is an intermediate measure of the success of PACT.[30] In our analyses, measures within 4 of the 5 domains are independent variables for predicting burnout. The 5 domains are: (1) intervention characteristics, (2) outer setting, (3) inner setting, (4) characteristics of individuals, and (5) implementation process (unmeasured). The overall intervention that frames this study (unmeasured) is the early stage of PACT implementation, a complex, transformational PCMH implementation[31] that began nation-wide in 2010.

Participants and Procedures

We report data from completed baseline surveys distributed to a sample of all PCCs and other primary care staff working in 23 outpatient clinics in 5 VA Healthcare Systems within 1 administrative region spanning Southern California and Nevada (Veterans Integrated Service Network or VISN 22).[22] This work was part of a baseline evaluation for a larger study conducted by the Veterans Assessment and Improvement Laboratory for Patient-Centered Care (VAIL), 1 of 5 diverse VA PACT Demonstration Laboratories funded by the VA Office of Patient Care services to support and evaluate VA's transition to PACT primary care. The VAIL intervention, begun just after national initiation of PACT in 2010, aimed to help VA implement PACT successfully, using a multilevel evidence-based quality improvement approach[32,33] based on research-clinical partnerships. Subsequent longitudinal survey data will assess PACT and VAIL outcomes over time.

Survey Methods

Two versions of the survey were developed, one for PCCs that includes physicians, nurse practitioners, and physician assistants, and another for all other clinical staff members who work in or with PACTs, including nurses, care/case managers, dietitians/nutritionists, health educators, health technicians, medical assistants, medical technicians, integrated mental health professionals, social workers, and pharmacists. The surveys were nearly identical with the exception of tailoring some items to make them relevant for both groups or dropping items not relevant. Approximately 130 items were included in the survey.

The survey was fielded from November 30, 2011 through March 30, 2012. All PCCs and other primary care staff providing team care in VISN 22 (excluding residents and non-VA clinics that contract with the VA to provide care) were sent an email invitation to participate in a survey about clinician/staff experiences providing team-based care at primary care practices. We invited 811 VA clinicians/staff (354 PCCs and 457 other staff) to complete the web-based surveys. The RAND Corporation administered the survey. Participants were directed to a survey link to enter the User ID provided in the invitation. Email invitations also included instructions for requesting a paper copy of the survey. Each person who visited the survey web page or received a paper copy of the survey was given the opportunity to enter a lottery to win an iPad 2 whether or not they completed the survey. Both the VA and RAND Institutional Review Boards approved this protocol.
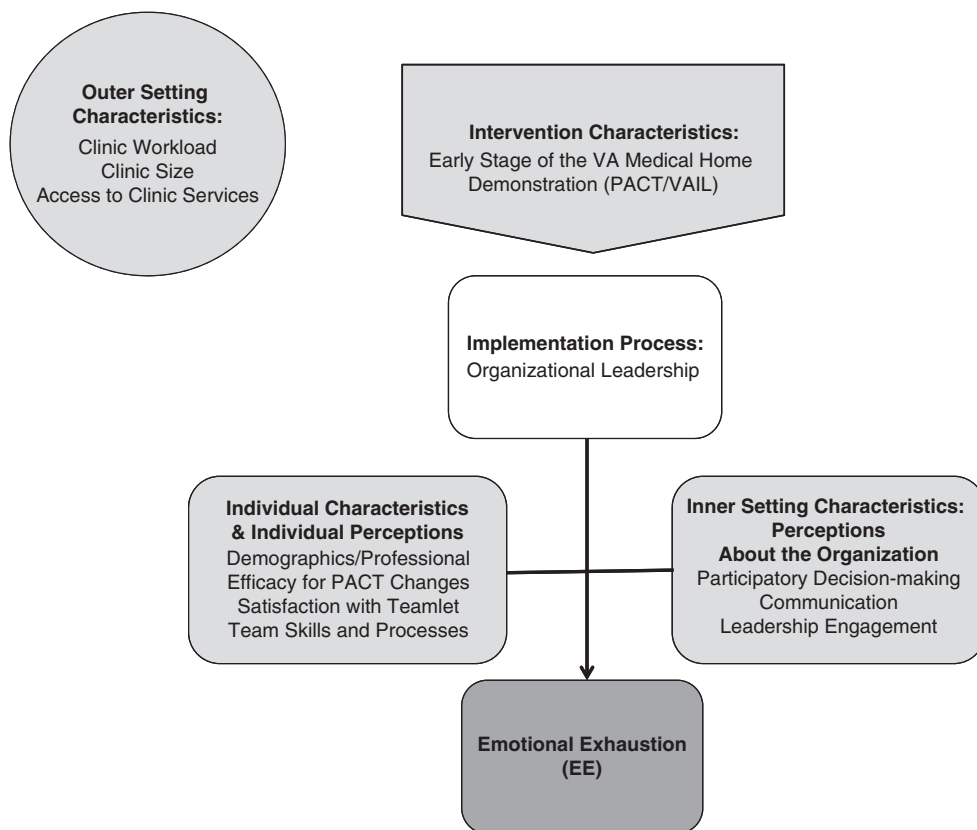
FIGURE 1. EE and features associated with EE during early implementation of organizational change. EE indicates emotional exhaustion; PACT, Patient Aligned Care Team; VAIL, VA Improvement Laboratory.

Study Measures

We selected measures that based on the literature might be associated with EE. Outer setting measures (described below) were obtained from VA administrative data. All other measures were from the self-reported surveys of PCCs and other staff. Their correspondence to the conceptual framework is noted in parentheses after measure headings.

EE

Our dependent variable was the full EE subscale from the original Maslach Burnout Inventory,[5,34,35] which measures EE by summing across 9 items rated on a 7-point frequency scale (never, a few times a year, every month, a few times a month, every week, a few times a week, every day). Scale scores ranged from 0 to 54 (where 63 is the highest possible score). The aggregate scale had high reliability ($\alpha = 0.92$).

Intervention Characteristics

To control for potential differences due to earlier participation in the VAIL intervention, we used a binary indicator for demonstration site to distinguish the first group of 3 clinics participating in VAIL's demonstration beginning in 2010 from the other clinics not participating in VAIL (PACT only).

Outer Setting

We included 3 clinic-level measures thought to affect the ability of clinicians/staff to effectively and productively care for their patients and have an impact on EE: (1) number of unique patients in the clinic panel as an indicator of workload, (2) number of providers in the clinic as an indicator of clinic size, and (3) distance (in hundreds of miles) from to the local VA Medical Center (VAMC) for coordinating the full range of inpatient and outpatient services as an indicator of access to services (with greater distance indicating lower access to specialists and other services located within the VAMC). Because VA clinics are generally managed from, and specialty, tertiary and emergency care is generally based at, parent VAMCs, distance of the clinic from the parent VAMC incorporates a range of characteristics including use of non-VA specialists, hospitals, and emergency services as well as distance from VAMC-based managers.

Individual Characteristics

We included 3 demographic characteristics: age, scored as a continuous measure; sex, coded as a binary indicator representing male (compared with female); and race/ethnicity, scored with a pair of binary indicators for Latino and nonwhite, non-Latino (compared with white). We included 2 variables to measure professional characteristics: years at clinic, scored as a continuous measure and type of clinician, scored as PCC (compared with other staff).

Individual Perceptions

We measured 3 types of respondents' perceptions. Efficacy for PACT changes was assessed with 4 items adapted from the change efficacy subscale developed by Holt et al[36] ($\alpha = 0.74$). Items were: "As we implement PACT, I feel I can handle it with ease"; "I have the skills that are needed to make my role in PACT successful"; "My past experiences make me confident that I will be able to perform successfully as PACT-related changes are made"; and "There are some PACT-related tasks that I don't think I can do well" (reversed scored). We assessed respondents' satisfaction with the teamlet (ie, local PACT physician, nurse, and clerk team) using a single 5-point Likert-scale item in response to the statement, "Overall, I am satisfied with the help I received from my teamlet." We measured respondents' assessment of the degree to which members of their primary care team share information[37] using 3 items from the team process subscale and 3 items from the team experience and skills necessary for the job subscale. On the basis of exploratory factor analysis, we found that the questions from the team subscales measured a similar underlying construct (eg, loaded on the same factor). We created a combined scale of team skills and processes ($\alpha = 0.75$). These items were adapted for this study and were pretested for face validity with a group of VA PCCs/staff.

Inner Setting

We created 3 measures to assess perceptions about the organization using previously published items. Decision making and communication within clinics were assessed using items from the Survey of Organizational Attributes for Primary Care.[38] Participatory decision-making items measured the degree to which clinicians, nurses, and other primary care staff are encouraged to be involved in making decisions, taking initiative, and making improvements (5 items, $\alpha = 0.86$). The communication subscale measured the quality of work relationships within the clinic and the ability of staff to resolve conflict and reduce tension (4 items, $\alpha = 0.84$). Two additional items were created to assess communication ($\alpha = 0.63$), that is, the degree to which coworkers from different (VA-specific) clinical and administrative backgrounds work together effectively. We combined all 6 items to form a new communication scale ($\alpha = 0.86$).

We assessed perceived organizational leadership with 4 items assessing leadership norms, 2 items from Caldwell et al[39] to assess the extent to which leadership is perceived to articulate clear visions and define measurable objectives, and 2 items from the Organizational Readiness to Change Assessment[20] to measure perception of leadership readiness to change (ie, how leadership and management work cooperatively to make changes and understand implementation challenges). We combined all 8 of these items to form a leadership engagement scale ($\alpha = 0.91$).

Statistical Analysis

We used descriptive summary statistics to describe respondent demographics, rates of burnout, and hypothesized correlates of EE.[16] We computed multivariable ordinary least squares regression to identify clinic characteristics and individual perceptions about efficacy for PACT change and perceptions about the organization associated with EE.

For multivariable regression models predicting EE, we first checked the intercorrelations among the independent variables and covariates, verified the absence of multicollinearity and confirmed that the scores met assumptions of normality required for ordinary least squares model specification. We transformed all scales specified as right-hand side variables to standard scores (ie, number of SDs above mean) to facilitate comparability of coefficients across scales. We ran 4 models that in which we sequentially entered blocks of variables in sets moving from features of the intervention and clinic characteristics measured at the higher level of analysis to individual characteristics and perceptions about PACT and the organizational setting. We chose to use a sequential modeling approach (not stepwise) to better understand the unique contributions of various sets of potential correlates of EE. We began with intervention characteristics (model 1) followed by measures of the outer setting (demonstration site identifier and clinic characteristics, model 2). We next entered individual characteristics (demographics and professional characteristics, model 3), followed by measures of individual perceptions and measures of the inner setting (communication, decision making, and leadership engagement). To account for clustering of respondents within clinics assuming a random effect, we computed cluster-adjusted robust SEs for regression coefficient estimates.

All analyses were performed using standard statistical software (Stata 11.2). We created poststratification weights to adjust for survey nonresponse[40] where strata were defined by clinic and type of health profession, and weights were calculated based on the sampling frame of all PCCs and other staff in VISN 22 that were identified in 2011. All analyses were run weighted and unweighted to assess sensitivity to survey nonresponse.

RESULTS

Clinician/Staff Characteristics

We received 515 completed surveys (191 PCCs and 324 staff) for an overall response rate of 63% (PCCs 54% and staff 71%). Table 1 shows the demographics for the study sample in aggregate and separated for PCC and other staff. Most respondents were women (67%), 1 in 7 was Latino (14%) and close to half were nonwhite (40%). The average age was 46.5 years, and PCCs and staff averaged about 8 years working at the clinic. PCCs were significantly more likely to be men ($P < 0.001$), less likely to be Latino ($P < 0.001$), and had a longer tenure at the VA ($P < 0.001$) relative to other staff.

Levels of EE and Correlates of EE

Descriptive statistics (mean scores and their ranges) for EE and measures hypothesized to be correlates with EE (eg, perceptions of PACT and the organization) are shown in Table 2. In this sample, 53% of PCCs and 43% of staff had significant EE. Although not shown in the table, we note that every hypothesized correlate of EE was significantly negatively correlated with EE ($r = -0.26$ to -0.39, $P < 0.01$) for the full sample. These are considered medium ($r = 0.21–0.36$) or large ($r > 0.36$) effect sizes according to Cohen.[41,42] The

TABLE 1. Demographic and Professional Characteristics of Primary Care Clinicians (PCCs) and Other Clinical Staff

Characteristics	PCCs (n = 191)[†]	Staff (n = 324)[†]	Full Sample (n = 515)[†]
Female, n (%)	87 (48.6)	237 (76.7)	329 (67.4)*
Latino, n (%)	9 (5.1)	58 (19.0)	67 (13.9)*
Non-Latino nonwhite, n (%)	74 (38.7)	131 (40.4)	205 (39.8)
Age, mean years (SD)	50.0 (10.2)	44.7 (11.9)	46.5 (11.5)*
Years in clinic, mean (SD)	11.2 (8.6)	6.1 (6.9)	7.9 (8.0)*
Job type, n (%)			
Physician	131 (68.6)	—	131 (25.4)
General practice/family medicine	14 (7.3)	—	14 (2.7)
Internal medicine	110 (57.6)	—	110 (2.1)
Other specialty[‡]	7 (3.7)	—	7 (1.4)
Nurse practitioner	55 (28.8)	—	55 (10.7)
Physician assistant	5 (2.6)	—	5 (1.0)
Registered nurse	—	108 (33.3)	108 (21.0)
Licensed practical/vocational nurse	—	114 (35.2)	114 (22.4)
Mental health professional	—	12 (3.7)	12 (2.3)
Social worker	—	4 (1.2)	4 (0.8)
Dietician or nutritionist	—	7 (2.2)	7 (1.4)
Pharmacist	—	29 (9.0)	29 (5.6)
Health/medical technician/assistant	—	15 (4.6)	15 (2.9)
Clerk	—	35 (10.8)	35 (6.8)

[†]Number of observations for demographic variables do not sum to full sample sizes due to missing data.
[‡]Other specialties include rheumatology, geriatrics, and infectious diseases.
*$P < 0.001$, where PCCs and staff differ significantly for these variables (based on univariate regression).

correlations were somewhat higher for PCCs (ranging from -0.26 to -0.47) than for other staff (ranging from -0.21 to -0.34) with a nearly identical pattern for PCCs and other staff.

Multivariate Correlates of EE

Results of OLS regression models in Table 3 illustrate the associations of independent variables and EE. Because the unweighted models did not differ significantly from the weighted models, only weighted results are shown.

None of the clinic characteristics or the early implementation indicator in model 1 was significantly associated with EE. In model 2, which added individual characteristics, the indicator for Latino (vs. non-Latino) was significantly negatively associated with EE (an 8 point decrease, $P < 0.001$) and the indicator for PCC (vs. other staff) was significantly positively associated with EE (a 5 point increase, $P < 0.05$). In model 3, which adds perceived efficacy for PACT changes, satisfaction with teamlet, and team skills/processes, the indicator for men (vs. women) becomes significantly negatively associated with EE (nearly 4 points lower, $P < 0.05$), the effect for Latino remains, and higher efficacy for PACT changes is associated with lower EE ($P < 0.05$) where a 1 SD increase in efficacy for PACT changes was associated with about a 2–3 point decrease in EE). After adding-in measures of the inner setting (perceptions about the organization in model 4), the significant associations of male, Latino, and efficacy remain and there is a significant negative association of decision making with EE (a 2 point decrease, $P < 0.05$).

The base model (model 1) that included only intervention characteristics and outer setting measures accounted for only 1% of the variation in EE. Each set of additional variables contributed a significant increase in explanatory power. Adding demographic and professional characteristics (model 2) accounted for 9% of the variation in EE. Model 3, which included efficacy for PACT changes and perceptions of the teamlet, contributed an added 14% of explanatory power.

TABLE 2. Descriptive Statistics for Emotional Exhaustion and Hypothesized Correlates

Measures	PCCs (n = 191)		Staff (n = 324)		Full Sample (n = 515)
	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)
Emotional exhaustion	22.3 (13.0)	1–53	19.6 (13.7)	0–54	20.6 (13.5)
Individual clinician/staff perceptions of PACT					
Efficacy for PACT changes	15.2 (2.8)	7–20	15.6 (3.0)	5–20	15.5 (3.0)
Individual clinician/staff perceptions about the team(let)					
Satisfaction with teamlet	3.5 (1.1)	1–5	3.9 (1.1)	1–5	3.7 (1.1)
Team skills and processes	21.6 (4.1)	10–30	23.0 (4.3)	6–30	22.5 (4.3)
Clinician/staff perceptions about the organization					
Participatory decision making	13.6 (3.3)	4–20	12.6 (3.8)	4–20	13.2 (3.5)
Communication	18.9 (4.8)	6–29	20.0 (4.6)	6–30	20.0 (4.7)
Leadership engagement	19.9 (4.5)	6–30	20.9 (4.6)	6–30	20.6 (4.6)

PACT indicates Patient Aligned Care Team; PCC, primary care clinicians.

TABLE 3. Summary of Regression Models for Emotional Exhaustion (n = 345)

Models With Successively Added Sets of Variables	1	2	3	4
Intercept	21.68	28.17	26.91	26.56
Intervention characteristics				
Demonstration site (early stage of implementation)	0.59	0.42	0.07	0.88
Outer setting (clinic characteristics)				
Workload (no. unique patients in clinic panel, in thousands)	0.10	0.05	0.04	−0.00
Size (no. clinicians/staff in clinic)	−0.07	−0.08	−0.09*	−0.06
Access to services (distance, in 100 s miles, to local VA Medical Center)	−0.46	−1.23	−1.38	0.16
Individual characteristics and perceptions				
Age		−0.06	−0.02	−0.05
Male		−4.02	−3.91*	−4.33**
Latino		−7.91***	−6.00***	−5.78**
Nonwhite, Non-Latino		−1.39	−0.56	−0.00
Professional characteristics				
Primary care clinician (vs. other staff)		4.64*	2.90	3.23*
Years at clinic		−0.13	−0.08	−0.09
Efficacy for PACT changes[†]			−2.56**	−2.07**
Satisfaction with teamlet[†]			−1.87*	−0.61
Team skills and processes[†]			−2.03*	−1.04
Inner setting (perceptions about the organization)				
Participatory decision making[†]				−2.02*
Communication[†]				−1.99
Leadership engagement[†]				−0.64
R^2	0.01	0.09[+]	0.23[+]	0.30[+]

*P < 0.05.
**P < 0.01.
***P < 0.001.
[+]Significant likelihood-ratio test for change in R^2 compared with smaller model, P < 0.001.
[†]Scales converted to standard scores (ie, number of SD above the mean).
PACT indicates Patient Aligned Care Team

The final model (model 4) that includes perceptions about the organization explains 30% of the variation. All results were rebust, that is, we found similar patterns regardless of non-response weighting or cluster adjustment method used.

DISCUSSION

Our high-response survey identified high levels of EE during the early stage of a medical home transformation, and we found that several characteristics assessed in this study were associated with higher EE. We did not find clinic characteristics or early exposure to the VAIL enhancements to be associated with EE. One explanation for lack of clinic-level effects is that the intervention has not yet had sufficient impact to affect broader organizational structural factors. In terms of the intervention, there may have been only limited discrimination between PACT and the enhancements that had begun for the 3 clinics in the early implementation of VAIL.

The individual characteristics of clinicians and perceptions about the organization were significant correlates of EE. Although some of the characteristics we studied cannot be changed (eg, sex and race/ethnicity), we identified 2 that were significantly associated with EE and potentially susceptible to organizational improvement (perceived efficacy for PACT changes and participatory decision making). These findings are consistent with other studies that have found that specific demographic and other perceived job characteristics are associated with high levels of burnout, EE included,[18,43] both generally and within the VA.

Our findings are supported by and validate those of a large national VA survey (that excluded this VISN 22 regional sample) on EE, and comparing findings from our study with findings from the national study, reported by Helfrich and colleagues, helps advance our understanding of EE among primary care staff when undergoing transformation. Similar to Helfrich et al,[19] we found about half of PCCs (53%) and just over 40% of staff reached our threshold for significant EE. Among potentially malleable variables, both studies (ours and Helfrich's) found participatory decision making within the organization to significantly protect against EE, and found similar protective effects of efficacy for PACT changes against burnout (but not significant in Helfrich and colleagues). We view these results as highly comparable, with differences potentially being explained by differences in survey designs, measures, and response rate. For example, the Helfrich national survey had an estimated 25% response rate and did not have an explicit sampling frame, whereas our survey achieved a 63% response rate and used an explicit sampling frame. Although we were not able to include measures of all dimensions of burnout (we did not include cynicism and professional efficacy subscales), we used the full 9 items from the original Maslach battery as opposed to the abbreviated version of burnout used by Helfrich. Our study, however, reflects only 1 VA administrative region (VISN 22), in contrast to the national scope of the Helfrich study. Therefore, our results should be considered synergistically, together providing strong evidence for potentially improvable factors affecting EE and burnout levels.

Female sex, Latino ethnicity, and job type (staff, as opposed to PCCs) were demographic characteristics associated with reduced EE. With regard to sex, the literature has been somewhat mixed but for EE, some studies have found a slightly higher level among women.[5,18] It is possible that sex role stereotyping confounds sex with occupation. However, our analyses controlled for different roles and did not find any sex differences. There is less known about differences in EE by race/ethnicity. In contrast to the literature, which finds age to be the demographic variable most consistently associated with burnout, we did not find age to be associated with EE.

Our results provide an "organizational checkup"[6] to determine how VA employees are responding to organizational change in the early stage of medical home implementation. These data can provide a reference point for quality improvement and for preventing EE by targeting some of the areas of the work environment that may be of concern, especially the functioning of primary care teams and organizational communication. In particular, we focused on potential organizational correlates of EE in an effort to understand how to efficiently target implementation support to improve organizational functioning, improve the care and working environment, facilitate clinicians and staff being more receptive to change, and ultimately prevent or ameliorate EE.

As such, these findings have implications for preventing and reducing EE in primary care. We found that efficacy to change is an important variable associated with EE. This suggests that leadership needs to assess the extent to which the individual PCCs and staff are properly "primed" for the ensuing changes. Involving all staff in the developmental stages and encouraging input into decision making is likely to make change transformation more successful given that we found decision making to be an important association with EE. Another key point to emphasize is the importance of ensuring that all members of primary care teams have the skills needed to meet expectations for the new roles and changes. Efficacy for PACT changes may reflect incomplete training and role development during early PACT. This scale includes the questions: "As we implement PACT, I feel I can handle it with ease"; "I have the skills that are needed to make my role in PACT successful"; "My past experiences make me confident that I will be able to perform successfully as PACT-related changes are made"; and "There are some PACT-related tasks that I don't think I can do well." Efficacy may show improvement on subsequent surveys as additional training is undertaken nationally; this may reduce EE.

Most importantly, our data provide some lessons for how practice transformation can be most successful by addressing "hot spots" that might be linked with EE. Although organizational communication was not a significant predictor of EE, perceptions that staff are involved in making decisions about how to improve care was negatively associated with EE. These items measured the degree to which clinicians, nurses, and other primary care staff are encouraged to be involved in making decisions, taking initiative, and making improvements. Given that this scale was significant in the model, while the theoretically related scales for leadership and communication were not, these findings suggest that leadership or communication that involves an experience of participation in decisions may improve EE rates.

Although we found that the measured elements of our conceptual framework (Fig. 1, shaded boxes) overall accounted for a third of the variance in EE among the respondents to our survey, there are other measures hypothesized to be associated with EE such as staffing that were not measured. These unmeasured variables could explain the other 70% of the variation in EE. An important limitation is that we reported associations with EE using only cross-sectional data and we are unable to determine causation. However, even though we cannot identify the direction of causality in these analyses, our findings are useful because they provide insights about how to target interventions to improve or prevent EE. Another limitation is that we detected only small to medium effects suggesting that, while we observed some significant associations, the extent to which they are meaningful is uncertain.

In summary, 2 potentially malleable correlates of EE— the individual's efficacy for PACT changes and the level of participatory decision making experienced by PCCs and staff were significantly associated with lower EE. These elements should be targeted in efforts to improve implementation of new patient centered models of primary care such as PACT. The PCMH model aims to achieve these goals over time; however, a more specific focus on interventions to address these components in the short term within PACT may be fruitful.

REFERENCES

1. Langan-Fox J, Code S, Langfield-Smith K. Team mental models: techniques, methods, and analytic approaches. *Hum Factors.* 2000; 42:242–271.
2. Gillespie B, Chaboyer W. Shared mental models enhance team performance. *Nurs Crit Care.* 2009;14:222–223.
3. Berwick DM. Crossing the boundary: changing mental models in the service of improvement. *Int J Qual Health Care.* 1998;10:435–441.
4. Cronholm PF, Shea JA, Werner RM, et al. The patient centered medical home: mental models and practice culture driving the transformation process. *J Gen Inter Med.* 2013;28:1195–1201.
5. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol.* 2001;52:397–422.
6. Maslach C, Leiter MP, Jackson SE. Making a significant difference with burnout interventions: researcher and practitioner collaboration. *J Organiz Behav.* 2012;33:296–300.
7. Maslach C, Jackson SE, Leiter MP, et al. *Maslach Burnout Inventory.* 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
8. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg.* 2009;250:463–471.
9. Spickard A Jr, Gabbe SG, Christensen JF. Mid-career burnout in generalist and specialist physicians. *JAMA.* 2002;288:1447–1450.
10. Shanafelt TD, Sloan JA, Habermann TM. The well-being of physicians. *Am J Med.* 2003;114:513–519.

11. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *Lancet*. 2009;374:1714–1721.
12. Henriksen K, Battles J, Marks E, et al. *Advances in Patient Safety: From Research to Implementation (Volume 1: Research Findings)*. Rockville, MD: Agency for Healthcare Research and Quality; 2005.
13. Landon BE, Reschovsky JD, Pham HH, et al. Leaving medicine: the consequences of physician dissatisfaction. *Med Care*. 2006;44: 234–242.
14. Schroeder SA. Physician supply and the US medical marketplace. *Health Aff (Millwood)*. 1992;11:235–243.
15. Sandy LG, Foster NE, Eisenberg JM. Challenges to generalism: views from the delivery system. *Acad Med*. 1995;70(suppl):S44–S46.
16. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med*. 2012;172:1377–1385.
17. Petterson SM, Liaw WR, Phillips RL Jr, et al. Projecting US primary care physician workforce needs: 2010-2025. *Ann Fam Med*. 2012;10:503–509.
18. Linzer M, Levine R, Meltzer D, et al. 10 bold steps to prevent burnout in general internal medicine. *J Gen Intern Med*. 2014;29:18–20.
19. Helfrich CD, Dolan ED, Simonetti J, et al. Elements of team-based care in a patient-centered medical home are associated with lower burnout among VA primary care employees. *J Gen Intern Med*. 2014; 29(Suppl 2):S659–S666.
20. Helfrich CD, Li YF, Sharp ND, et al. Organizational readiness to change assessment (ORCA): development of an instrument based on the Promoting Action on Research in Health Services (PARIHS) framework. *Implement Sci*. 2009;4:38.
21. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Upper Saddle River, NJ: Prentice-Hall Inc.; 1986.
22. Chang ET, Rose DE, Yano EM, et al. Determinants of readiness for primary care-mental health integration (PC-MHI) in the VA Health Care System. *J Gen Intern Med*. 2013;28:353–362.
23. Gist M, Mitchell T. Self-efficacy: a theoretical analysis of its determinants and malleability. *Acad Manage Rev*. 1992;17:183–211.
24. Ghorob A, Bodenheimer T. Share the care: building teams in primary care practices. *J Am Board Fam Med*. 2012;25:143–145.
25. Linzer M, Manwell LB, Williams ES, et al. Working conditions in primary care: physician reactions and care quality. *Ann Intern Medicine*. 2009;151:28–36. W26-29.
26. Leiter MP, Maslach C. The impact of interpersonal environment on burnout and organizational commitment. *J Organ Behav*. 1988;9:297–308.
27. Reid RJ, Fishman PA, Yu O, et al. Patient-centered medical home demonstration: a prospective, quasi-experimental, before and after evaluation. *Am J Manag Care*. 2009;15:e71–e87.
28. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009;4:50.
29. Greenhalgh T, Robert G, Macfarlane F, et al. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q*. 2004;82:581–629.
30. Kochevar LK, Yano EM. Understanding health care organization needs and context. Beyond performance gaps. *J Gen Intern Med*. 2006; 21(suppl 2):S25–S29.
31. Nutting PA, Miller WL, Crabtree BF, et al. Initial lessons from the first national demonstration project on practice transformation to a patient-centered medical home. *Ann Fam Med*. 2009;7:254–260.
32. Rubenstein LV, Chaney EF, Ober S, et al. Using evidence-based quality improvement methods for translating depression collaborative care research into practice. *Fam Syst Health*. 2010;28:91–113.
33. Rubenstein LV, Stockdale SE, Sapir N, et al. A patient-centered primary care practice approach using evidence-based quality improvement: Rationale, methods, and early assessment of implementation. *J Gen Intern Med*. 2014;29(Suppl 2):S589–S597.
34. Maslach C, Jackson SE. The measurement of experienced burnout. *J Organ Behav*. 1981;2:99–113.
35. Schaufeli WB, Leiter MP, Maslach C, et al. Maslach Burnout Inventory - General Survey (MBI-GS). In: Maslach C, Jackson SE, Leiter MP, eds. *MBI Manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
36. Holt DT, Armenakis AA, Feild HS, et al. Readiness for organizational change: the systematic development of a sale. *J Appl Behav Sci*. 2007;43:232–255.
37. Wageman R, Hackman JR, Lehman E. Team Diagnostic Survey, Development of an instrument. 2004. Available at: https://research.wjh.harvard.edu/TDS/TDS_development_techpaper.pdf. Accessed April 29, 2013.
38. Ohman-Strickland PA, John Orzano A, Nutting PA, et al. Measuring organizational attributes of primary care practices: development of a new instrument. *Health Serv Res*. 2007;42(pt 1):1257–1273.
39. Caldwell DF, Chatman J, O'Reilly CA III, et al. Implementing strategic change in a health care system: the importance of leadership and change readiness. *Health Care Manage Rev*. 2008;33:124–133.
40. Lohr SL. *Sampling: Design and Analysis*. Pacific Grove, CA: Duxbury Press; 1999.
41. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale, NJ: Erlbaum; 1988.
42. Cohen J. A power primer *Psychol Bull*. 1992;112:155–159.
43. Mirvis DM, Graney MJ, Kilpatrick AO. Trends in burnout and related measures of organizational stress among leaders of department of veterans affairs medical centers. *J Healthc Manag*. 1999;44:353–365.