

Association of Primary Care Team Composition and Clinician Burnout in a Primary Care Practice Network

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Abstract

Objective: To determine the relationship of the emotional exhaustion domain of burnout with care team composition in a Midwestern primary care practice network.

Participants and Methods: We studied 420 family medicine clinicians (253 physicians and 167 nurse practitioners/physician assistants [NP/PAs]) within a large integrated health system throughout 59 Midwestern communities. The observational cross-sectional study utilized a single-question clinician self-assessment of the emotional exhaustion domain of burnout on a scale of 0 (never) to 6 (daily) conducted between March 1 and April 2, 2018, and administrative data collected between January 1, 2017, and December 31, 2017. We used a multivariable linear mixed model for data analysis, adjusted for clinical- and team-level factors, including clinician sex, panel size and complexity, clinician type (physician or NP/PA), clinician full-time equivalent (FTE), total care team panel size, and number of clinicians on the care team.

Results: Among 217 survey respondents (51.7%), the median frequency of the emotional exhaustion domain of burnout was once per week. Adjusted analyses revealed that a greater proportion of physician FTE on the care team was associated with a lower emotional exhaustion domain of burnout among individual clinicians ($P=.05$). Female clinicians had a higher emotional exhaustion domain of burnout than male clinicians ($P=.05$). None of the other variables in the model were associated with emotional exhaustion.

Conclusion: Primary care teams containing both physicians and NP/PAs had lower levels of emotional exhaustion with increasing proportion of physician FTE. More work is needed to explore what other variables may be associated with burnout in primary care team-based practices.

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The syndrome of job burnout was first described in the 1970s as a psychological state of emotional exhaustion, cynicism, and inefficacy (low sense of personal accomplishment) occurring in response to workplace stress.¹ Rates of burnout are high among US physicians, although they have fluctuated over time as reported in serial national assessments that found rates of professional burnout of 45.5% in 2011, a peak of 54.4% in 2014, and most recently, a trend back toward 2011 levels with 43.9% in 2017.² The rates of burnout vary across specialties and stages of training and career ranging from 30% to 60%, with the highest

levels occurring at the front lines of patient access—emergency medicine and primary care.^{3,4} The consequences of clinician burnout include increased medical errors,⁵⁻⁷ reduced patient satisfaction,⁷ and early retirement from the workforce.⁸⁻¹²

The assessment of burnout in health care workers has evolved. The Maslach Burnout Inventory (MBI) was developed and refined in the 1980s and 1990s as a validated assessment tool quantifying the presence and degree of burnout for people working in human services and health care.^{1,13} The MBI is a 22-item survey that utilizes a 7-point Likert scale to assess burnout in 3 domains: emotional exhaustion,

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depersonalization, and personal accomplishment. This instrument has been utilized in many studies of clinicians but has some practical limitations because of its length and cost. Single-question assessments of the emotional exhaustion and depersonalization portions of the MBI have been validated as useful surrogates for assessing burnout and have a particularly strong positive correlation with the emotional exhaustion domain of the MBI.^{14,15} Recent community-based studies have found that single-item assessments of burnout are specific but not sensitive, underestimating its incidence and severity but confirming the strong association with MBI burnout prediction.¹⁶

The shortage of primary care physicians in the United States has transformed primary care medical practices.¹⁷⁻¹⁹ One change has been recruitment and integration of nurse practitioners/physician assistants (NP/PAs) into the primary care workforce. Increasingly, physicians and NP/PAs are integrated into collaborative care teams with the goal of expanding access to care.^{20,21} In large practice settings, NP/PAs working with physicians in teams provide high-quality care for patients with chronic diseases.²²

Burnout within primary care teams is related to elements of the workplace environment. High staff turnover within the team, working among an understaffed team, and having a patient panel that exceeds team capacity (overempanelment) have been associated with clinician burnout.^{23,24} Small studies have found increased job satisfaction for primary care teams that incorporate NP/PAs^{25,26} and reduced burnout for clinicians who work consistently with the same support staff within a team culture.²⁷ Little is known about the effect of varying staff ratios of NP/PAs and physicians on primary care teams and clinician burnout. Therefore, we investigated the relationship between the composition of NP/PAs and physicians on family medicine care teams and clinician burnout.

PARTICIPANTS AND METHODS

Study Setting

We studied 420 family medicine clinicians employed by the same large integrated health

system in 59 Midwestern communities throughout southern Minnesota, western Wisconsin, and northern Iowa during the 2017 calendar year. Specifically, 253 physicians (60.2%) and 167 NP/PAs (39.8%) represented 110 individual care teams caring for a combined total of 419,567 empaneled patients. Care teams consisted of a varying number of physicians (MD or DO) and NP/PAs, based on prior practice needs, hiring ability, or even building design. Care teams comprised a median of 4 clinicians, with a maximum care team size of 10. Other members of the care team included nurses (LPN and RN), clinical/medical assistants, pharmacists, social workers, and integrated behavioral health staff; however, not all of these personnel, specifically the pharmacists, social workers, and integrated behavioral health staff, were available for every care team. Ten care teams located in rural settings had no physicians and were staffed only by 1 to 2 NP/PAs. Four care teams had internists and/or pediatricians in addition to family medicine clinicians.

We included all physicians and NP/PAs who were assigned to a family medicine care team. Teams with only pediatricians or primary care internists were excluded because these teams serve a specific population of patients, are likely to be present only in urban and larger group practices, and were outside the scope of this project. We excluded clinicians whose practice was entirely related to urgent care, hospital medicine, skilled nursing facilities, or residency training programs. Supplemental clinicians with no assigned care teams and clinicians who provided acute care encompassing multiple care teams were also excluded.

The model for care delivery was based on the Mayo Clinic model of community care, which was a systematic strategy designed to provide better patient experience, improve health outcomes, and lower the cost of care.^{28,29} Because this is an evolving model, some variation exists among care team composition, sizes, NP/PA roles, empanelment of patients to NP/PAs, and payment models. All care teams included in the analysis had defined panels of patients assigned to physicians or NP/PAs who were designated as the patient's primary care provider (PCP); these patients were also collectively attributed to

the team of their respective PCP. Some NP/PAs were unpaneled but contributed to the care of patients attributed to their team. The practice was managed with a goal of maintaining care continuity primarily within the PCP's practice and secondarily within the care team.

Data Collection

We retrospectively analyzed data that were routinely collected for each clinician between January 1, 2017, and December 31, 2017. We included all physicians and NP/PAs who were assigned to a family medicine care team. Data collected from administrative data repositories included each individual clinician's role (physician or NP/PA), practice location, care team assignment, sex, and mean full-time equivalent (FTE) over the course of the year, Time in clinical practice (TCP) was defined as the proportion of clinical FTE spent in direct patient care, panel size, and mean panel complexity as defined by the Centers for Medicare and Medicaid Services hierarchical condition category model normalized to 1.0. The length of time the clinician had been in the practice was calculated from their start date in their current role. The study was approved by the Mayo Clinic Institutional Review Board.

Survey Instrument

Clinicians were surveyed by email using online survey software (Qualtrics Inc, version March 2018) between March 1 and April 2, 2018. Two reminders were sent following the initial survey invitation. Self-reported clinician burnout was measured using a validated single-item survey assessing the emotional exhaustion domain of burnout.^{14,15} Clinicians were asked to respond to the statement, "I feel burned out from my work" and instructed to select one of the following options: 0 = never, 1 = a few times a year or less, 2 = once a month or less, 3 = a few times a month, 4 = once a week, 5 = a few times a week, and 6 = every day.

Statistical Analyses

Data were analyzed with JMP Pro software, version 13.0.0 (SAS Institute). Descriptive statistics consisted of frequencies for categorical variables and means with standard deviations for continuous variables. Bivariate statistics

TABLE 1. Comparison of 420 Clinicians Responding and Not Responding to a Single-Item Burnout Survey^{a,b}

Variable	Responders (n=217)	Nonresponders (n=203)	P value
Female	143 (65.9)	115 (56.7)	.06
FTE	0.89±0.17	0.90±0.17	.72
TCP	0.54±0.20	0.55±0.21	.46
Panel size	1036±636	1015±620	.73
Care team size	5.0±2.1	4.5±2.0	.07
Years in practice	11.3±9.1	11.6±8.7	.73
Burnout score ^c	4.1±1.4	NA	NA
Burnout score ≥4	184 (84.8)	NA	NA
Region			.95
A	51 (23.5)	50 (24.6)	
B	42 (19.4)	36 (17.7)	
C	51 (23.5)	49 (24.1)	
D	42 (19.4)	35 (17.2)	
E	31 (14.3)	33 (16.3)	
Physicians	123 (56.7)	130 (64.0)	.12

^aFTE = full-time equivalent; NA = not applicable; TCP = time in clinical practice (percentage of FTE in direct patient care).

^bData are presented as No. (percentage) of participants or mean ± SD.

^cEmotional exhaustion domain of burnout scale (0 = never, 1 = a few times a year or less, 2 = once a month or less, 3 = a few times a month, 4 = once a week, 5 = a few times a week, 6 = every day).

comparing the emotional exhaustion domain of burnout between the categorical independent variables of sex, clinician type (physician vs NP/PA), practice location, and care team used an *t* test or analysis of variance as appropriate. A multivariable linear mixed regression model was used to assess the relationship between the 7-point scale for the emotional exhaustion domain of burnout and individual and care team characteristics. The variables chosen for the multivariable mixed model were selected based on factors that were considered potential contributors to individual clinician burnout. Individual characteristics included clinician sex, panel size, panel complexity (hierarchical condition category), FTE, and clinician type (physician or NP/PA). Care team characteristics included the number of clinicians on the care team and the total care team panel size. Because our primary objective was to test the hypothesis that the proportion of physician effort on the care team would be related to the emotional exhaustion domain of burnout, we included this variable as a fixed effect in the linear mixed model. The proportion of physician

TABLE 2. Bivariate Analysis of Factors Associated With the Emotional Exhaustion Domain of Burnout^a

Characteristic	Mean \pm SD score ^b	Median score	P value
Categorical variables			
Clinician sex			.19
Male	3.96 \pm 1.58	4	
Female	4.23 \pm 1.38	5	
Clinician type			.92
Physician	4.13 \pm 1.51	5	
NP/PA	4.15 \pm 1.38	4	
Region			.01
A	4.08 \pm 1.52	4	
B	3.81 \pm 1.38	4	
C	4.49 \pm 1.35	5	
D	4.52 \pm 1.38	5	
E	3.58 \pm 1.50	3	
Continuous variables			
	Estimate ^c	Pearson <i>r</i>	
Panel size (per 1000)	0.17	0.073	.29
Panel complexity (HCC)	4.00	0.038	.59
Clinician FTE	3.39	0.098	.15
Clinician TCP	1.32	0.17	.01
Years in practice	0.003	0.017	.80
Care team variables			
No. of clinicians on care team	-0.08	-0.12	.09
Care team panel size (per 10,000)	-0.29	-0.05	.46
Proportion of physicians	-0.69	-0.11	.18
Proportion of physician FTE	-0.86	-0.13	.05
Proportion of physician TCP	-0.62	-0.10	.14

^aFTE = full-time equivalent; HCC = hierarchical condition category; NP/PA = nurse practitioner/physician assistant; TCP = time in clinical practice (percentage of FTE in direct patient care).
^bScore on the emotional exhaustion domain of the burnout scale.
^cEstimate from linear regression analysis with emotional exhaustion domain of burnout as the dependent variable.

effort was measured as the proportion of physician FTE divided by the total care team clinician FTE. We added clinician practice location as a random effect to account for potential clustering. $P < .05$ was considered statistically significant.

RESULTS

Of the 420 clinicians within the study area, 253 (60.2%) were physicians, 167 (39.8%) were NP/PAs, and 256 (61.0%) were women. A total of 217 (51.7%) responded to the burnout survey question. There were no significant differences between respondents and nonrespondents (all $P > .05$; Table 1).

Of the 217 respondents (Table 1), the mean \pm SD burnout response was 4.1 \pm 1.4, which was similar to the median value of 4

(once a week). A total of 184 respondents (84.8%) reported levels considered “high risk” (score ≥ 4). In bivariate analyses (Table 2), the emotional exhaustion domain of burnout was not associated with clinician sex ($P = .19$) or provider type (physician or NP/PA) ($P = .92$). Provider sex and type were also not predictive of membership in the high-risk group ($P = .81$ and $P = .45$, respectively). Provider FTE was not associated with the emotional exhaustion domain of burnout ($P = .15$), but time spent in clinical practice was associated with the emotional exhaustion domain of burnout ($r = 0.17$; $P = .01$). The mean \pm SD time in clinical practice was greater among those in the high-risk group compared with those not in this group (0.52 \pm 0.17 vs 0.46 \pm 0.20 FTE, respectively; $P = .02$). The emotional exhaustion domain of burnout was not associated with individual or care team panel size, panel complexity, or the length of time the clinician had worked in the practice ($P = .80$). The proportion of physician FTE on the care team had a significant inverse relationship with the individual emotional exhaustion domain of burnout ($P = .05$) (Figure).

In a multivariable linear mixed model analysis with practice site as a random effect (Table 3), the proportion of physician FTE on the care team was related to the individual emotional exhaustion domain of burnout ($P = .05$). Although not significant in the bivariate analysis ($P = .19$), female clinicians had a higher burnout score than male clinicians ($P = .05$). Panel complexity, clinician type (physician vs NP/PA), panel size, individual clinician FTE, number of clinicians on the care team, and total care team panel size were not related to the emotional exhaustion domain of burnout.

In sensitivity analyses, substituting TCP for FTE or adding years in practice to the multivariable model had no substantial effect on the estimates or significance of the relationship between clinician sex or proportion of physician FTE on the care team and the emotional exhaustion domain of burnout. Time in clinical practice ($P = .14$) and years in practice ($P = .99$) were not significant in the multivariable model.

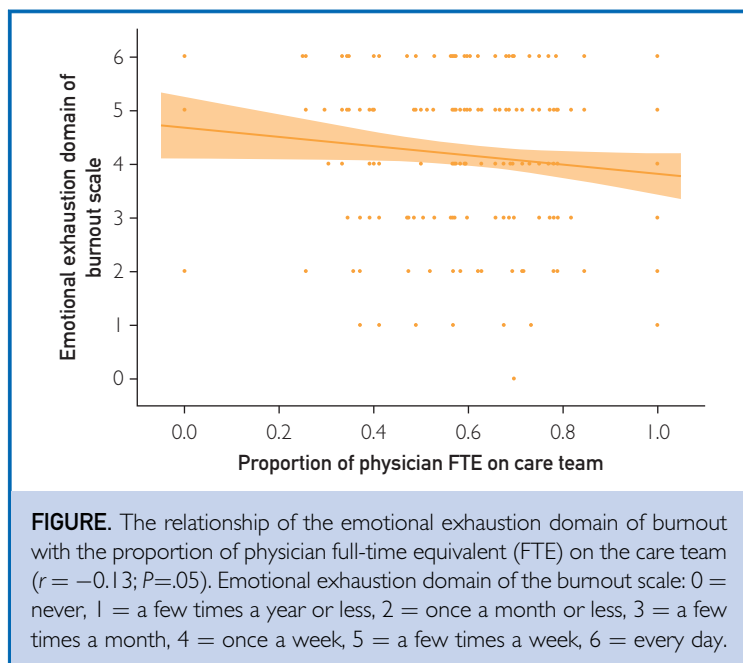
DISCUSSION

We found that among family medicine care teams including both physicians and NP/PAs,

a greater proportion of physician FTE on the care team was associated with a lower score for the emotional exhaustion domain of burnout among individual clinicians. Female clinicians were at greater risk of emotional exhaustion domain of burnout. We did not find an independent association of the emotional exhaustion domain of burnout with time spent in practice (either FTE or TCP), panel size, or type of clinician. Our study contributes important information about the relationship of care team composition to the emotional exhaustion domain of clinician burnout. However, further study is needed to understand why having a higher proportion of physicians on a care team was associated with less burnout.

Our clinician prevalence of 84.8% (184 of 217 respondents) for high risk of the emotional exhaustion domain of burnout was much greater than other reported burnout rates among primary care clinicians, ranging from 45% to 55%.^{23,24,27} Some studies reported even lower levels of burnout of approximately 25% to 40%.³⁰⁻³² In a repeated national survey of physicians using the full MBI, trends over time were reported comparing data from 2011 to 2014 to 2017. Specifically among family physicians, reported burnout changed significantly from 53.1% in 2011 to 63.0% in 2014 ($P < .001$) and then dropped to 43.9% in 2017 ($P < .001$).² Because we measured only the emotional exhaustion domain of burnout, we may underestimate the true prevalence of burnout as measured with the MBI, as some clinicians will have symptoms of depersonalization and/or low personal accomplishment without symptoms of emotional exhaustion. We found similar rates of the emotional exhaustion domain of burnout in NP/PAs and physicians on our care teams.

Other studies examining burnout among NP/PAs and physicians have combined both roles into a single group of clinicians^{23,24,27,31} and/or compared rates of burnout between clinicians and nonclinician staff rather than between each other.³⁰ To our knowledge, none have examined NP/PAs and physicians separately and how they related to team composition. Our findings indicate that among family medicine care teams including both physicians and NP/PAs, a greater proportion of physician



FTE on the care team is associated with a lower emotional exhaustion domain of burnout among individual clinicians. This finding is important when considering care team composition, particularly as it relates to the roles of physicians and NP/PAs. The role of physicians on the care team seems to have a protective influence on emotional exhaustion among individual clinicians. This finding may reflect aspects of effective teamwork and delegation between physicians and NP/PAs, but more research is needed to explore this relationship.

Similar to a report that female family medicine and internal medicine physicians were more likely to be burned out than their male counterparts,⁸ we observed an association between female clinician sex and increased emotional exhaustion. Although we observed no association between FTE or TCP and burnout after adjusting for panel size, complexity, provider type, and sex, other studies have reported increasing clinician burnout for physicians and NP/PAs with higher numbers of half-days worked²⁷ and with working more than 40 hours per week.³⁰

Care team size was not associated with the emotional exhaustion domain of burnout in our study. In contrast, other investigators

TABLE 3. Multivariable Linear Mixed Model of Clinician and Care Team Characteristics Associated With Burnout Frequency With Practice Site as a Random Effect (N=207)^a

Characteristic	Estimate	95% CI	P value
Clinician characteristics			
Sex (female)	0.25	0.002 to 0.50	.05
Panel complexity (HCC)	0.22	-1.26 to 1.70	.77
Clinician type (NP/PA)	-0.09	-0.38 to 0.19	.52
Panel size (per 1000)	0.19	-0.25 to 0.63	.39
FTE	0.49	-0.85 to 1.82	.40
Care team characteristics			
Proportion physician FTE ^b	-1.23	-2.44 to -0.01	.05
Care team panel size (per 10,000)	0.60	-1.19 to 2.39	.51
No. of clinicians on care team	-0.11	-0.30 to 0.08	.24

^aFTE = full-time equivalent; HCC = hierarchical condition category; NP = nurse practitioner; PA = physician assistant.

^bProportion physician FTE is defined as the total physician FTEs divided by the total FTEs of all clinicians on the care team.

found less burnout in solo practice staff compared with those in larger practices.³⁰ Decreased autonomy and increased clerical burden have been implicated in physician burnout.^{33,34} Because all clinicians in our study were employed (no independent/solo practitioners), it is possible that in our study population, team size did not change autonomy and/or administrative burden and thus did not affect burnout.

Other studies have evaluated different aspects of team structure and the relationship with burnout. Willard-Grace et al²⁷ assessed differences in burnout as measured by the Maslach emotional exhaustion scale in the context of consistency of clinician-clinical assistant (CA) pairings (working with the same CA, with one of a small number of CAs, or rarely working with the same CA/CAs) and perceived team culture. Burnout among clinicians was lower when working more consistently with the same CA and within a healthy team culture.²⁷ A cross-sectional survey study of Veterans Health Administration primary care clinic employees (including clinicians, nurses, medical assistants, and administrative workers) reported lower burnout among fully staffed teams and higher burnout on teams that had panels exceeding recommended maximum size as well as on teams with more staff turnover.²⁴

Strengths of our study included encompassing a network of family medicine care teams and clinicians over a large geographic

area of the Midwestern United States. We were also able to account for important factors, such as panel size, panel complexity, total FTE, and total time spent in direct patient care, which can influence team workload.

Our study also had several limitations. The survey was limited to family medicine care team practices, which may reduce generalizability of our results to internal medicine and pediatric primary care teams. Additionally, we did not survey all care team members such as nurses, desk staff, appointment coordinators, or other allied health staff such as pharmacists or social workers. We used only a single question to assess the emotional exhaustion domain of burnout in order to maximize response rates, which may underestimate the true prevalence of burnout. The reported prevalence of burnout will vary, depending on the instrument and cut points that are used. A single-item burnout question may underestimate the prevalence of burnout but will not likely reflect the relationship of burnout with other variables (concurrent validity).¹⁶ The response rate to the survey was just over 50%, and nonresponders may have different rates of burnout or characteristics of practice. However, there were no major differences in response rates by clinician type, clinician sex, FTE, TCP, panel size, care team size, or practice location.

CONCLUSION

With predictions of future primary care physician shortages, increased hiring of NP/PAs provides an important part of the solution. With high rates of burnout among primary care staff and clinicians leaving practice as a result, the relationship between burnout and team composition should continue to be explored. Our results suggest that maintaining physicians on care teams is an important consideration because teams with a higher proportion of physicians had lower levels of the emotional exhaustion domain of burnout. More work is needed to explore what other variables may be associated with burnout in primary care team-based practices.

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Abbreviations and Acronyms: CA = clinical assistant; FTE = full-time equivalent; MBI = Maslach Burnout Inventory; NP/PA = nurse practitioner/physician assistant; PCP = primary care provider; TCP = time in clinical practice

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