



Research Paper

Assessing the prevalence of workplace telepressure on resident and attending physicians: A validated scale

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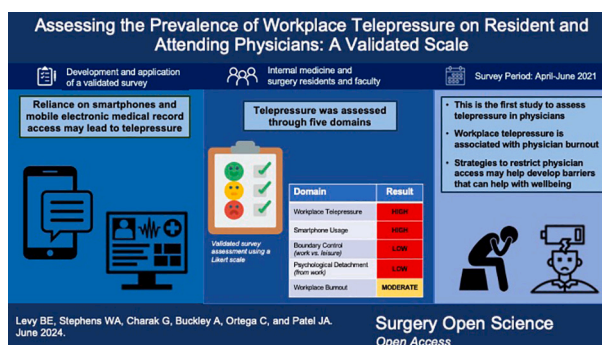
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HIGHLIGHTS

- Telepressure is associated with negative wellbeing and employee burnout.
- Smartphones and electronic health records can provide unrestricted physician access.
- The prevalence of telepressure has not been previously studied in physicians.
- Validated surveys effectively measure wellbeing and telepressure.
- Physicians experience a high level of workplace telepressure.

GRAPHICAL ABSTRACT



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ABSTRACT

Background: Physician wellbeing and burnout are significant threats to the healthcare workforce. Mobile electronic medical record access and smartphones allow for efficient communication in healthcare but may lead to workplace telepressure (WPT).

Methods: An IRB-approved survey related to five domains of burnout [WPT, smartphone usage, boundary control, and psychologic detachment] was circulated. Internal medicine and general surgery faculty and residents were surveyed between 3/2021 and 6/2021. Survey results were analyzed for internal consistency with a Cronbach alpha coefficient and validation against a known physician burnout scale.

Results: The domains were internally valid with a Cronbach alpha of 0.888. Validation against the physician burnout scale was significantly correlated with WPT domains but was overall positively correlated across domains. Surgical trainees reported the highest burnout rate related to every domain.

Conclusion: Survey-based WPT burnout scales provide insight into the daily pressures on physicians. Targeted interventions to limit WPT are needed to improve physician wellbeing.

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Key message

Workplace telepressure (WTP) is associated with negative wellbeing and employee burnout and has been well described in various professions. Smartphones and electronic health records may impose WPT and have a negative impact on physician wellbeing.

Introduction

Burnout rates exceed 50 % amongst physicians regardless of training or seniority [1,2].

Physician burnout and well-being are significant threats to the healthcare industry, leading to adverse patient outcomes, rising physician suicide rates, and a record number of providers leaving the healthcare field. [3–6] This is particularly true for surgical specialties, which are highly demanding for time and intensity of training and practice [7,8].

While a novel area of research within medical fields, sociology literature has been examining the effects of work-related smartphone use on wellness and burnout within other high-stress professional occupations [1]. This area of study, regarding electronic device usage inducing burnout and mental health concerns, has been termed “telepressure.” [9–11] Accepted domains related to telepressure include workplace telepressure, boundary control, expectations, psychological detachment, and burnout to study how around-the-clock accessibility psychologically impacts employees in a variety of professional fields [12–15].

Message-based telepressure has been of particular interest in the medical field after the advent of electronic medical record (EMR) integration of chat features to improve collaboration and communication across diverse care environments [16]. Chat integration, along with video call and telehealth accessibility following the COVID-19 pandemic, have provided unprecedented access to medical providers [17,18]. This access is afforded both between colleagues and between patients and their providers [19]. However, specific evaluation of telepressure in the post-COVID-19 era for medical providers across training levels has not been evaluated.

Following the COVID-19 pandemic, the reduction of physician burnout has become a high priority for healthcare systems. However, a standardized and validated scale to measure burnout related to telepressure has not been adopted. We hypothesize a standardized scale related to the five domains of telepressure can be adopted and validated in a cohort of physicians across specialties and training levels for future use in measuring the impact of targeted interventions related to physician burnout and general well-being.

Methods and materials

Scale development

Existing scales regarding telepressure were identified, and themes within five domains, including workplace telepressure (WTP), smartphone usage (SU), boundary control (BC), psychological detachment (PD), and self-identification of workplace burnout (WBO) were also identified. To devise the physician telepressure (PTP) scale, questions were crafted and adapted to fit within one of these five domains. All scale items were scored on a Likert scale.

The first domain within the PTP regarding WTP consists of 6 items examining respondents' feelings of needing to respond to workplace communications as soon as they are received. Respondents were asked to rate their level of agreement with each of the WTP items along an ordinal 5-point Likert scale (1 - “Strongly disagree” to 5 - “Strongly agree.”) Next, five items regarding SU examined respondents' SU behaviors. Respondents were asked to rate their level of agreement with each of the SU items along an ordinal 5-point Likert scale (1 - “Strongly disagree” to 5 - “Strongly agree.”) Next, the BC scale includes one item

that examines respondents' expected availability to deal with work issues during their leisure time. The BC scale item also used an ordinal 5-point Likert scale (1 - “Almost never” to 5 - “Almost always.”) The psychological detachment (PD) scale included four items that examined respondents' ability to detach themselves from the demands of their work. The PD scale items were rated using a 6-point Likert scale (1 - “Never” to 6 - “Every day.”) Finally, to validate the above domains and constructs, 22 questions related to WBO were asked on an ordinal 5-point Likert scale (1 - “Never” to 5 - “Every day”); see [Table 1](#).

Scale delivery

Following Institutional Review Board approval, internal medicine and general surgery physicians (residents and attendings) from a large academic medical center in the southeast were invited to take this survey between April and June 2021. The survey was distributed electronically via departmental email and at departmental events. Survey enrollment was voluntary without incentive for completion. Responses were collected using Qualtrics (Qualtrics XM).

Data collection

Responses were collected for each of the identified PTP domains. Additionally, demographic data such as level of training, medical specialty, age, and gender were collected for each respondent.

Statistical analysis

Negative survey questions were reverse coded and an internal reliability Cronbach alpha coefficient was calculated. Survey domain measures were aggregated by calculating the cumulative score for the WTP, SU, BC, PD, and WBO scales. Correlations between the WTP, SU, BC, PD, and WBO scales were then calculated using Spearman's rho test. All analyses were conducted using IBM SPSS version 26 (IBM Corp., Armonk, NY).

Results

Demographics

The PTP was distributed to a total of 224 physicians with a total of 102 responding (45.5 % response rate). Amongst those who identified their specialty, 78 (83 %) were surgeons and 16 (17 %) were internal medicine physicians. Response rate for surgeons was 71.6 % (78/109) and 13.9 % (16/115) for internal medicine physicians. Of respondents who specified their current rank, 31 (33 %) were attendings, 3 (3 %) were fellows, and 59 (64 %) were residents. The average age reported by our respondents was 34, with 52 identifying as male (55 %) and 42 as female (45 %). The internal reliability analysis revealed a Cronbach alpha of 0.888. No questions revealed a Cronbach alpha lower than 0.881, and therefore no questions were removed from the final scale. The means of each item were determined, along with standard deviations as detailed in [Table 1](#).

Cohorts were compared for both specialty (surgery vs. internal medicine) and career stage (trainee vs. attending.) A statistically significant difference was found concerning BC. Overall, surgeons indicated having less BC than internists (mean 4.3 vs. 3.6. p 0.004), with surgical residents demonstrating the least BC of all. When surgical residents were compared to the surgical attendings that they work with, the difference very nearly met statistical significance (mean 4.6 vs. 4.1, p 0.053).

Scale items

WTP and SU were high, and BC was low, amongst all cohorts and the group as a whole. Using a set of prompts from the workplace sociology

Table 1

Workplace telepressure, smartphone usage, boundary control, psychological detachment, and workplace burnout scale.

	Item	Mean (SD)
Workplace telepressure	It's hard for me to focus on other things when I receive a message from someone.	3.8 (0.9)
	I can concentrate better on tasks once I've responded to my messages.	4.0 (0.9)
	I can't stop thinking about a message until I've responded.	4.1 (0.8)
	I feel a strong need to respond to others immediately.	3.4 (1.1)
	I have an overwhelming feeling to respond right at the moment when I receive a request from someone.	3.9 (1.1)
	I feel a strong need to respond to others immediately.	3.7 (1.1)
	It is difficult for me to resist responding to a message right away	3.8 (1.1)
Smartphone usage	I use my smartphone intensively.	4.1 (0.8)
	I feel obligated to reply to messages during evening hours.	4.2 (0.8)
	I am online until I'm going to sleep.	4.3 (0.8)
	When my smartphone blinks to indicate new messages, I cannot resist checking them.	3.9 (1.1)
Boundary control	It is important in my work that I am available to deal with issues during leisure.	4.1 (1.0)
		4.2 (1.0)
Psychological detachment	I forget about work.	4.2 (1.0)
	I don't think about work at all.	3.2 (1.3)
	I distance myself from my work.	2.8 (1.6)
	I get a break from the demands of work.	2.1 (1.5)
		3.1 (1.6)
		3.1 (1.6)
		2.6 (0.6)
Workplace burnout	I feel emotionally drained from my work.	
	I feel used up at the end of the workday.	
	I feel fatigued when I get up in the morning and have to face another day on the job.	
	I can easily understand how my patients feel about things.	
	I feel I treat some patients as if they were impersonal objects.	
	Working with people all day is really a strain for me.	
	I deal very effectively with the problems of my patients.	
	I feel burned out from my work.	
	I feel I'm positively influencing other people's lives through my work.	
	I've become more callous towards people since I took this job.	
	I worry this job is hardening me emotionally.	
	I feel very energetic.	
	I feel frustrated by my job.	
	I feel I'm working too hard on my job.	
	I don't really care what happens to some patients.	
	Working with people directly puts too much stress on me.	
I can easily create a relaxed atmosphere with my patients.		
I feel exhilarated after working closely with my patients.		
I have accomplished many worthwhile things in this job.		
I feel like I'm at the end of my rope.		
In my work, I deal with emotional problems very calmly.		
I feel patients blame me for some of their problems.		

literature, the mean WPT scores out of 5 for all cohorts fell between 3.6 and 4.1. A score of 4 out of 5 would correspond to “agree” with prompts such as “I can't stop thinking about a message until I've responded,” and “I have an overwhelming feeling to respond right at that moment when I receive a request from someone.”

SU during leisure, a general measure of the role these devices play in one's leisure time, was also high for all groups. Again, using a set of validated prompts from the sociological literature means for all cohorts fell between 4 and 4.2, centering on “I agree” in response to prompts such as “I use my smartphone intensively,” “I am online until I'm going to sleep,” and “I feel obligated to reply to messages during evening hours;” [Table 1](#).

BC is defined in sociological literature as “individual perceptions of being in control over the boundaries between work and personal life” and is related in the literature to “cross-role interruptions, work-family conflict, and high inter-role conflict.” [4] Physicians in our study were asked whether “it is important in your work that you are available to deal with work issues during your leisure?” Cohort means varied between 3.6 and 4.6, with 4 corresponding to an answer of “sometimes” and 5 “almost always;” [Table 1](#).

PD is the ability to “disengage oneself mentally from work” and has been described as a “crucial aspect of any recovery process.” PD was low in all cohorts of medical physicians in this study. Means varied between 2.6 and 2.8, corresponding to an answer of between “once a month” and “a few times a year” to prompts such as “I forget about work,” “I distance myself from work,” and “I don't think about work at all;” [Table 1](#).

Relationships amongst WTP, SU, BC, and PD were highly correlated to one another using Spearman's ρ test. More specifically, an increase in WPT, an increase in leisure SU, and a decrease in BC were all strongly correlated with a decrease in the ability to achieve PD, with BC showing the strongest relationship both when comparing sums and means of the domains ($p < .01$, [Tables 2 and 3](#)). However, when validating the scale using the WBO measure, only the WTP sum was significantly correlated; [Table 2](#).

Discussion

This is the first study to examine the perceived expectations of availability, psychological recovery, and well-being in physicians as it relates to work-related SU. These are important issues as these expectations can exacerbate already high levels of burnout and could have negative effects on both medical training and patient care outcomes.

We hypothesized that accessibility expectations and work-related SU during leisure would be high amongst all physicians, and this was confirmed. In general, the physicians in this study “agreed” that they feel pressure to immediately respond to electronic requests and often feel they must make themselves available for work issues during their leisure time. Our results indicated this was true for both internal medicine doctors and surgeons, and it provides a baseline finding in a crucial, understudied field.

Workplace sociologists have documented the negative effect that these expectations and habits can have on employees as they are unable

Table 2

Spearman's rho correlations between workplace telepressure, smartphone usage, boundary control, psychological detachment, and workplace burnout domain sums.

	Workplace Telepressure	Smartphone Usage	Boundary Control	Psychological Detachment	Workplace Burnout
Workplace Telepressure	–	0.544**	0.307**	0.218*	0.213*
Smartphone Usage	0.544**	–	0.344**	0.394**	0.166
Boundary Control	0.307**	0.344**	–	0.404**	–0.002
Psychological Detachment	0.218*	0.394**	0.404**	–	0.109
Workplace Burnout	0.213*	0.166	–0.002	0.109	–

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 3

Spearman's rho correlations between Workplace Telepressure, Smartphone Usage, Boundary Control, Psychological Detachment, and Workplace Burnout domain means.

	Workplace Telepressure	Smartphone Usage	Boundary Control	Psychological Detachment	Workplace Burn Out
Workplace Telepressure	–	0.553**	0.319**	0.223*	0.167
Smartphone Usage	0.553**	–	0.344**	0.394**	0.174
Boundary Control	0.319**	0.344**	–	0.404**	–0.012
Psychological Detachment	0.223*	0.394**	0.404**	–	0.082
Workplace Burnout	0.167	0.174	–0.012	0.082	–

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

to psychologically detach during leisure and, therefore, psychologically recover from the stresses of work [11,20,21]. In our study, an increase in WPT and smartphone leisure use, and a decrease in BC, were statistically correlated with decreased PD. The ability of our cohort of physicians to psychologically detach was low with complete mental freedom from the workplace occurring, on average, monthly or less.

These results were expected but are very concerning. The high levels of workplace stress and WBO in both medical training and practice are not only common knowledge in the field but are well documented in the literature spanning all levels of medical training [22–24]. Starting at the level of medical students, burnout is identified without significant changes in medical education strategies to address these worsening statistics [22]. Recent specialty-wide surveys have focused on WBO, and they have attempted to identify physician-based risk factors amongst urologists. However, these results have not yet incited specific interventions. [25]

It is important to understand how the EMR, the widespread use of smartphones by physicians, and the ability to access the EMR on these pocket devices, including at home, can impact these baseline high levels of stress. Post-pandemic, the electronic health record design itself and the factors surrounding its use were associated with increased baseline stress levels [26]. Our data suggest the effects of persistent EMR access may be both negative and significant. If so, steps must be taken by program directors and their support staff throughout medical and surgical departments to set different expectations or to directly limit or proscribe access to the EMR apart from on-call teams during already limited leisure time.

Surgical residents were the cohort with by far the least ability to demarcate a boundary between work and leisure. This is especially true given that BC was the variable most strongly correlated with the inability to PD from work. This finding very likely highlights elements of “surgical culture” that pre-date the advent of smartphones. Nevertheless, if a pre-existing, high expectation of accessibility is now further enabled by electronic means, then surgical program directors may have the most challenging, and perhaps most urgent, mitigating role to play. Furthermore, while the majority of this survey respondents were residents, attending faculty are vulnerable as well. To that end, the burden of alleviating WPT to protect an essential part of the healthcare workforce needs to be carried out by both hospital and departmental leadership.

Our study has several limitations. We offered our survey to the entire pool of general surgery and internal medicine attendings and residents

at our institution. The problem of selection bias relates to the groups that chose to participate and whether they have a special interest or especially strong opinions on these issues of accessibility and detachment. Short of mandating participation, this is a fixed limitation of a study of this kind, and hopefully, further studies can help define its magnitude. Furthermore, though our response rate amongst the surgeons was relatively high, we had relatively few total respondents in internal medicine. This weakened our ability to make cohort comparisons. Undetected differences may exist between not only surgeons and internists but also between residents and attendings. Finally, as alluded to regarding surgical residents and BC, any assessment of the effects of EMR and smartphones on accessibility expectations and behaviors may prove difficult in quantifying the specific effect of these devices and applications versus longstanding cultures of accessibility in a field unique for its “call” and 24/7 demands. This is an important point, and it will take further and larger studies to fully address these issues, perhaps with new question prompts and instruments designed specifically to isolate the effects of devices on boundaries in medical practice.

Conclusion

By demonstrating high levels of telepressure, low boundary control, and low levels of detachment, and by demonstrating a strong correlation between all of these, we believe we have taken the first step in exposing a potentially significant contemporary problem. Given the increasing sophistication of mobile devices, it is possible that by tailoring and restricting access, especially for trainees during leisure time, the devices themselves may offer avenues for intervention and recovery.

Author contribution

Brittany Levy: Writing – review & editing, Resources, Methodology, Investigation, Formal analysis, Data curation, Visualization, Conceptualization.

OWesley Stephens: Writing – review & editing.

Greg Charak: Writing – original draft, Resources, Methodology, Investigation.

Alison Buckley: Writing – original draft, Resources, Methodology, Investigation, Conceptualization.

Cristina Ortega: Writing – review & editing.

Jitesh Patel: Writing – review & editing, Resources, Methodology, Investigation, Visualization, Conceptualization, Supervision.

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Ethics approval

This study was deemed exempt from full review by the Institutional Review Board at the University of Kentucky.

CRedit authorship contribution statement

Brittany E. Levy: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Wesley A. Stephens:** Conceptualization, Formal analysis, Investigation, Validation, Writing – original draft, Writing – review & editing. **Gregory Charak:** Conceptualization, Investigation, Writing – original draft. **Alison N. Buckley:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. **Cristina Ortega:** Formal analysis, Investigation, Writing – review & editing. **Jitesh A. Patel:** Conceptualization, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare they have no conflicts of interests.

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