Original article

# Estimating the association between burnout and electronic health record-related stress among advanced practice registered nurses

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## ABSTRACT

*Background:* Health information technology (HIT), such as electronic health records (EHRs), is a growing part of the clinical landscape. Recent studies among physicians suggest that HIT is associated with a higher prevalence of burnout. Few studies have investigated the workflow and practice-level predictors of burnout among advanced practice registered nurses (APRNs).

*Aim:* Characterize HIT use and measure associations between EHR-related stress and burnout among APRNs.

*Methods:* An electronic survey was administered to all APRNs licensed in Rhode Island, United States (N = 1197) in May–June 2017. The dependent variable was burnout, measured with the validated Mini z burnout survey. The main independent variables were three EHR-related stress measures: time spent on the EHR at home, daily frustration with the EHR, and time for documentation. Logistic regression was used to measure the association between EHR-related stress and burnout before and after adjusting for demographics, practice-level characteristics, and the other EHR-related stress measures.

*Results:* Of the 371 participants, 73 (19.8%) reported at least one symptom of burnout. Among participants with an EHR (N = 333), 165 (50.3%) agreed or strongly agreed that the EHR added to their daily frustration and 97 (32.8%) reported an insufficient amount of time for documentation. After adjustment, insufficient time for documentation (AOR = 3.72 (1.78–7.80)) and the EHR adding to daily frustration (AOR = 2.17 (1.02–4.65)) remained predictors of burnout.

*Conclusions:* Results from the present study revealed several EHR-related environmental factors are associated with burnout among APRNs. Future studies may explore the impact of addressing these EHR-related factors to mitigate burnout among this population.

## 1. Introduction

Resulting from chronic job-related stress, burnout is characterized by emotional exhaustion, depersonalization, and decreased job satisfaction (Maslach, Schaufeli, & Leiter, 2001). Given the high-stress nature of clinical environments, burnout among healthcare workers has been shown to exceed that of the general population (Shanafelt, Boone, Tan, et al., 2012). Among physicians, the first published report of "burnout" emerged in 1981 (Pines, 1981). A nationally representative survey of United States physicians revealed that nearly half (45.8%) experienced at least one symptom of burnout (Shanafelt et al., 2012; Shanafelt, Hasan, Dyrbye, et al., 2015). Moreover, results indicated that over 50% of physicians in "front line" specialties (e.g., emergency

medicine and general internal medicine) reported one or more symptoms of burnout (Shanafelt et al., 2012). Several studies have identified associations between physician burnout and poorer quality of care (Melville, 1980; Yuguero, Marsal, Esquerda, & Soler-Gonzalez, 2017), reduced patient satisfaction (Haas et al., 2000), and increased risk of turnover (Williams, Konrad, Scheckler, et al., 2001). However, despite the breadth of literature investigating burnout among physicians, significantly fewer studies have explored burnout among advanced practice registered nurses (APRNs) (Hoff, Carabetta, & Collinson, 2017).

In 2010, the Agency for Healthcare Research and Quality estimated that over 100,000 APRNs practice in the United States, with over half (52.0%) working in primary care (Agency for Research Health and Quality, 2012). As of 2017, the number of APRNs has grown to 234,000

in the United States (American Association of Nurse Practitioners, 2017; Hoff et al., 2017). Similar growth of the APRN workforce has been observed in the Netherlands, Canada, Australia, Ireland and New Zealand from 2005 to 2015 (Maier, Barnes, Aiken, & Busse, 2016). APRNs comprise a large and crucial component of the clinical workforce especially as physician shortages in both primary and specialized care settings continue to increase (Hoff et al., 2017; Norful, Swords, Marichal, Cho, & Poghosyan, 2017). Despite the growth of the APRN workforce in the United States and internationally, few studies have investigated the work-related psychological outcomes experienced by this population. One study showed that compared to emergency nurses and nurse managers, APRNs tend to experience less burnout (Browning, Ryan, Thomas, Greenberg, & Rolniak, 2007). The authors suggested that lower burnout among APRNs may be because they enter the field to gain more autonomy (Whelan, 1997), a job characteristic that is typically associated with greater job satisfaction (Tri, 1991). A recent review of job satisfaction, burnout, and job turnover among APRNs and physician assistants revealed that although APRNs generally report high job satisfaction, considerable variation exists across studies (Hoff et al., 2017). The authors also noted that the literature examining burnout among APRNs has a number limitations: 1) many studies with sample sizes of less than < 200, 2) a predominance of univariable and bivariable analyses, as opposed to multivariable statistical methods, and 3) a limited consideration of work setting and organizational factors (Hoff et al., 2017).

In the United States, recent changes in the payment landscape (e.g., Meaningful Use and the Physician Quality Reporting System) and their connection to HIT have drawn investigators to explore potential associations between HIT and burnout among physicians (Shanafelt et al., 2012; Shanafelt, Dyrbye, Sinsky, et al., 2016). One recent survey of a nationally representative sample of United States physicians reported that overall satisfaction with electronic health records (EHRs) was typically low and that physicians who used EHRs had higher odds of burnout (Shanafelt et al., 2016). Dissatisfaction with HIT has also been observed among physicians and nurses internationally (Griffon et al., 2017; Leslie & Paradis, 2018; Ologeanu-Taddei, Morquin, & Vitari, 2017). Similar to physicians, APRNs engage with HIT as part of their practice (Bowles, Dykes, & Demiris, 2015; Cooper, Baier, Morphis, Viner-Brown, & Gardner, 2014; Fund TC, 2017); however the relationship between HIT and burnout among this population remains unstudied. Therefore, the current study's primary aim is to address several of the limitations in the literature by estimating the association between EHR-related stress and burnout among APRNs, while adjusting for demographic and organizational factors using multivariable methods. To further describe APRN engagement, attitudes and perceptions about HIT, our study's secondary aim is to characterize other dimensions of HIT and EHR use (e.g., office communication). We hypothesize that EHR-related stress will be significantly associated with burnout.

## 2. Methods

Administered by the Rhode Island Department of Health, a statewide electronic survey was sent to all 1197 APRNs licensed and in practice in Rhode Island. The survey period was from May 8th, 2017 to June 12th, 2017. As part of a legislative mandate (State of Rhode Island Plantations, 1998), the survey measures and publically reports aggregated measures of HIT use among physicians, physician assistants and APRNs in the state. A description of the publically reported measures and survey process has been previously reported (Cooper et al., 2014). A total of 371 APRNs contributed data for a response rate of 31.0%. The present study was reviewed by the Rhode Island Department of Health's Institutional Review Board (IRB) and deemed exempt.

### 2.1. Sample characteristics

Participant age and gender were obtained through the Rhode Island Department of Health's publically available APRN licensure file and matched using the participant's self-reported APRN license number. Age was categorized into three groups (24–40; 41–60; and 61–80 years of age). Participants also provided information regarding their specialty, practice setting (outpatient/office or inpatient/hospital), practice size, whether they provide primary care and whether they use a medical scribe (Shanafelt et al., 2012; Shanafelt et al., 2015; Shanafelt et al., 2016). Practice size was categorized into four groups (1–3 clinicians; 4–9 clinicians; 10–15 clinicians; 16+ clinicians). Due to the small number of Neonatal specialists (n = 5), their specialty was combined with Pediatrics.

### 2.2. Dependent variable

Burnout was measured using a single question item from the Mini z, a 10-item survey developed from the Physician Work Life Study (McMurray et al., 2000; Puffer, Knight, O'Neill, et al., 2017; Williams, Konrad, Linzer, et al., 1999). Using a 5-point likert scale, participants were asked to identify their symptoms of burnout (Maslach et al., 2001): 1) "I enjoy my work. I have no symptoms of burnout"; 2) "I am under stress, and don't always have as much energy as I did, but I don't feel burned out"; 3) "I am definitely burning out and have one or more symptoms of burnout, e.g., emotional exhaustion"; 4)"The symptoms of burnout I am experiencing won't go away. I think about work frustrations a lot"; 5) "I feel completely burned out. I am at the point where I may need to seek help". Similar to previous studies, we dichotomized this measure into no symptoms of burnout ($\leq 2$) and 1 or more symptoms of burnout ($\geq 3$) (McMurray et al., 2000; Schmoldt, Freeborn, & Klevit, 1994). This single-item measure has been previously validated for physicians (Rohland, Kruse, & Rohrer, 2004) and shown to have a sensitivity of 83.2% and specificity of 87.4% when compared to the Maslach Burnout Inventory (Dolan, Mohr, Lempa, et al., 2015).

### 2.3. Independent variables

The present study's main independent variables of interest are three EHR-related stress measures: 1) whether the EHR adds to daily frustration, 2) sufficiency of time for documentation, and 3) the amount of time spent on the EHR at home. As with the outcome of interest, the three EHR-related stress measures were adopted from the Mini z (Williams et al., 1999; Williams et al., 2001). For the first measure, participants rated how much they agreed that EHRs add to their daily frustration using a 4-point likert scale ("strongly agree", "agree", "disagree", or "strongly disagree"). We dichotomized these responses into two categories: agree (combining "agree" with "strongly agree") and disagree (combining "disagree" with "strongly disagree"). The second EHR-related stress measure assessed sufficiency of time for documentation using a 5-point likert scale ("poor", "marginal", "satisfactory", "good", "optimal"). Responses were dichotomized into either insufficient ("poor" and "marginal") or sufficient ("satisfactory", "good", and "optimal") time for documentation. Last, for the third measure, participants were asked to rate how much time they spend on the EHR at home using a 5-point likert scale ("excessive", "moderately high", "satisfactory", "modest", or "minimal/none"). Responses were categorized into three groups: 1) "minimal/none", 2) "modest" and "satisfactory", and 3) "moderately high" and "excessive".

### 2.4. Additional health information technology use measures

As few studies have explored the distribution, attitudes, and perceptions of HIT among APRNs, we included a number of HIT use- and perception-related survey questions. Any EHR use, either at a main or secondary practice site, was measured with a binary yes/no response.