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Examining the link between burnout and medical error: A checklist approach

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ABSTRACT

Background: The aim of this cross-sectional study was to develop an evidence-based systematic Medical Error Checklist (MEC) for self-reporting of medical errors. In addition the study examined the comparative influence of individual, structural, and organizational factors on the frequency of self-reported medical errors.

Research design: A three-step process was followed in order to develop three checklists, for internists, surgeons and pediatricians respectively. The Maslach Burnout Inventory (MBI), the Utrecht Work Engagement Scale (UWES) and the teamwork-subscale of the Hospital Survey on Patient Safety Culture (AHRQ) were used in order to measure physicians' levels of burnout, job engagement and teamwork respectively. A total of 231 doctors working in a large teaching hospital in Greece participated in the study (response rate: 49.8%).

Results: Internal reliability coefficients were high for all three checklists. Gender, age, clinical experience, and working hours were not related to medical errors in any of the medical specialties. In surgeons, medical errors were negatively related to engagement ($R^2 = 0.210$, $p = 0.004$), while teamwork and depersonalization were the only predictive factors of frequency of medical errors, in both pediatricians and internists ($R^2 = 0.306$ $p < 0.001$).

Conclusions: The Medical Error Checklists developed in this study advance the study of medical errors by proposing a comprehensive, valid and reliable self-assessment tool. The results highlight the importance of hospital organizational factors in preventing medical errors.

1. Introduction

Incident reporting and analysis has been systematically used in an attempt to improve patient safety. The main reason for reporting incidents to improve patient safety is the belief that safety can be improved by learning from incidents and near misses, rather than pretending that they have not happened (Smith, 2007). However, a consistent finding in the literature is that nurses and physicians can identify error events, but nurses are more likely to submit written reports or use error-reporting systems than are physicians (Mahajan, 2010). One of the main factors contributing to the use of incident reporting is the way the data are gathered. Traditional mechanisms have utilized self-reports to clinically significant medical errors; yet the correlation with actual errors has been low (Cullen, Bates, & Small, 1995). However, self reports are still a widely used method for error recording, especially in studies examining associations between individual and organizational risk factors and medical errors. The exemplar studies in this area have used single-item open-ended assessments (Hayashino, Utsugi-Ozaki, Feldman, & Fukuhara, 2012; Shanafelt et al., 2010; West et al., 2006). For example, Shanafelt et al. (2010) used one question ("Are you concerned you have made any major medical error in the last 3 months?") to assess medical errors among 7905 American surgeons (Shanafelt et al., 2010). This study showed a strong association between medical errors reported by surgeons and burnout. Using the same methodology, West et al. (2006) and Hayashino et al. (2012) found the same relationship between burnout and medical error with residents and practicing physicians, respectively (Hayashino et al., 2012; West et al., 2006).

The aforementioned studies highlight the link between error reporting and burnout. However, single-item assessments suffer from common method bias that overestimates relationships (Brannick, Chan, Conway, Lance, & Spector, 2010). In addition, retrospective and social desirability biases associated with single-item

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assessments can also confound the reported relationships between burnout and reported medical errors. The problems associated with the use of single-item approaches can be overcome via the development of a systematic reliable and valid checklist that will allow us to link specific errors to specific risk and preventive factors in different medical specialties (Resar, Rozich, & Classen, 2003). Additionally, checklists that use behavioural rather than attitudinal items, have the potential to more reliably assess the relationship between self-report measures. They achieve this by reducing the tendency for respondents to believe that two constructs are related by an implicit theory (i.e., making mistakes and being stressed), because if they are, then the respondents are motivated to provide answers that are consistent with that theory (Podsakoff, Whiting, Podsakoff, & Blume, 2009).

Self-reports can be used effectively for error prevention purposes, as well as for training doctors or involving them in quality improvement practices (Thomas and Petersen, 2003). The only study using a systematic methodology to assess medical errors with self-reports was the MEMO study conducted in primary care settings (Williams, Manwell, Konrad, & Linzer, 2007). Their nine item scale assessing the likelihood of future errors was related to a single item measure of burnout, but at a very low level of significance, in contrast to single-item studies which indicate moderate-high correlations. To our knowledge no instrument exists to systematically self assess frequency of medical errors in hospital settings.

The aim of this cross-sectional study was to develop an evidence-based systematic checklist for self reporting of medical errors in hospital settings. In addition, using the newly developed checklist, the study examined the comparative influence of individual, structural, and organizational factors on the frequency of self-reported medical errors.

2. Material and methods

The study reported in the manuscript has been approved by the "Ethical committee of the Medical School, Aristotle University of Thessaloniki". Written consent was obtained from all participants and questionnaires were completed and analyzed anonymously.

Burnout, work engagement and teamwork were assessed as organizational factors, while gender, age and clinical experience were assessed as individual factors. Working hours were assessed as a potential contributing structural factor.

2.1. Measures

2.1.1. Development of the medical error checklists (MEC)

A three-step process was adopted in order to develop the Medical Error Checklists. The purpose of the first two phases was to develop an evidence-based, exhaustive pool of items to be used for the checklists. *Firstly,* a systematic review of the literature on self reported medical errors was conducted. The aim of the review was to identify all different types of medical errors which have been reported in three different specialties: surgery, internal medicine and pediatrics. *In the second phase*, focus groups with doctors from the three different specialties were conducted. For each specialty two focus-groups were conducted, one addressing medical residents and the other addressing medical specialists. Participants were asked to respond and discuss two questions: *"What types of medical errors can occur in your specialty"* and *"What types of medical errors have you observed occurring in your specialty"*. They were also asked to discuss the list of errors compiled from the review conducted in the first phase. The focus groups were coordinated by two members of the research team. Thematic analysis was used to analyze the results of the focus groups. Results from phase I and II were compiled to produce three checklists of medical errors, one for each specialty. In *phase III*, the checklists were reviewed by three expert panels, consisting of senior researchers from each specialty. Each item in the checklist was rated for clarity, specificity, relevance, and differential validity.

This three-step process resulted in the development of three checklists (see Appendix A), MEC-I for internists, MEC-S for surgeons and MEC-P for pediatricians. The items included in the checklists represent all types of medical errors (diagnostic, treatment, failure of communication, system failure). MEC-I consists of 26 items, MEC-S of 23 items, and MEC-P of 25 items. Each item represents a different error. To reduce biases associated with retrospective assessment and social desirability, respondents are asked to indicate in a visual analogue scale how often they have observed the occurrence of each error in their present work context.

2.1.2. Individual and structural factors (sex, age, specialty, clinical experience, working hours/per week)

A demographic questionnaire was developed for the purpose of the study. Clinical experience was evaluated as the total number of working years, including the years of specialty.

2.1.3. Job burnout

Job burnout was assessed using the Maslach Burnout Inventory (MBI). We used two components of burnout, emotional exhaustion (9 items) and depersonalization (5 items) (Maslach, Jackson, & Leiter, 1996). The Greek version of the MBI has been previously validated among Greek health care professionals (Panagopoulou, Montgomery, & Benos, 2006).

2.1.4. Job engagement

Engagement was assessed with the Utrecht Work Engagement Scale (UWES) (Schaufeli, Salanova, González-romá, & Bakker, 2002). The scale assesses three dimensions of engagement, Vigor (six items), Dedication (five items), and Absorption (six items). Responses are given in a 6- Likert scale, ranging from 0 "never" to 6 "always". The UWES has been validated in a Greek sample (Matziari, Montgomery, Georganta, & Doulougeri, 2016). In order to avoid response bias, burnout and engagement items were randomly merged into the final questionnaire.

2.1.5. Teamwork

Teamwork was measured with the teamwork-subscale of the Hospital Survey on Patient Safety Culture which was developed by the US Agency for Healthcare Research and Quality (AHRQ) (Miller, Hill, Kottke, & Ockene, 1997). The teamwork subscale includes four items. Responses are given in a 6-Likert scale, ranging from 1 "strongly disagree" to 5 "strongly agree". The total score comes by obtaining the mean of the responses to the 4 items and ranges from 1 to 5.

2.2. Procedure

The study took place in a city University hospital in the area of Thessaloniki, Greece. After obtaining ethical permission of the "Ethical committee of the Medical School of the Aristotle University of Thessaloniki", all medical staff working in the Departments of Internal medicine, Surgery, and Pediatrics were informed about the study. Staff interested in participating in the study were invited in a meeting in the hospital lecture hall and after obtaining their written consent, they were given the questionnaire to complete. Questionnaires were completed anonymously and sealed in envelopes. Clinic directors were not present during the completion of questionnaires.