The Effect of Working Conditions on Patient Care: A Systematic Review

EXECUTIVE SUMMARY

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PREFACE

Health Services Research & Development Service's (HSR&D's) Evidence-based Synthesis Program (ESP) was established to provide timely and accurate syntheses of targeted healthcare topics of particular importance to Veterans Affairs (VA) managers and policymakers, as they work to improve the health and healthcare of Veterans. The ESP disseminates these reports throughout VA.

HSR&D provides funding for four ESP Centers and each Center has an active VA affiliation. The ESP Centers generate evidence syntheses on important clinical practice topics, and these reports help:

- develop clinical policies informed by evidence,
- guide the implementation of effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures, and
- set the direction for future research to address gaps in clinical knowledge.

In 2009, the ESP Coordinating Center was created to expand the capacity of HSR&D Central Office and the four ESP sites by developing and maintaining program processes. In addition, the Center established a Steering Committee comprised of HSR&D field-based investigators, VA Patient Care Services, Office of Quality and Performance, and Veterans Integrated Service Networks (VISN) Clinical Management Officers. The Steering Committee provides program oversight, guides strategic planning, coordinates dissemination activities, and develops collaborations with VA leadership to identify new ESP topics of importance to Veterans and the VA healthcare system.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, ESP Coordinating Center Program Manager, at nicole.floyd@va.gov.

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BACKGROUND

A large body of evidence shows clear linkages between workplace conditions and employee satisfaction and stress in a wide variety of organizational and industry settings. In the healthcare industry, increasing interest in understanding these linkages stems from the idea that healthcare providers' working environments also affect important patient outcomes, including safety, quality of care and satisfaction. Additionally, meeting objectives of the current healthcare reform to increase healthcare quality by increasing the availability of primary care providers and making care safer, more efficient, effective and patient-centered hinges on the ability to deal with the documented shortage of primary care providers in the US and at the same time improve patient outcomes. The purpose of this report was to systematically review the evidence on the role of primary care providers' workplace conditions in influencing patient outcomes. We focused on patient satisfaction, safety, and quality of care for patient outcomes (note that there may be some overlap in how these patient outcomes are measured). We excluded articles that focused on one specific disease or patient population. The focus on primary care providers' work environment will provide evidence on increasing healthcare quality. Results from this review may inform policymakers as they endeavor to implement aspects of the healthcare reform related to increasing the supply of primary care providers and improving patient outcomes.

The key questions were:

Key Question #1. How are human resources (HR) practices, such as skill levels, training, workload, hours worked, autonomy, and electronic medical records/systems, associated with patient outcomes?

> a. quality of care (access and effectiveness)
> b. safety (medication errors)
> c. patient satisfaction (with provider, with clinic/practice)

Key Question #2. How are other working conditions, such as organizational culture or physical environment, associated with patient outcomes?

> a. quality of care (access and effectiveness)
> b. safety (medication errors)
> c. patient satisfaction (with provider, with clinic/practice)

Key Question #3. In studies that report provider outcomes, how are working conditions associated with provider outcomes (e.g., job satisfaction, productivity, pay)?

METHODS

We conducted searches for each of the workplace conditions (i.e., human resource practices [separate searches for staffing and workflow], organizational culture, and physical environment) in MEDLINE and PsycINFO using standard search terms. We also searched both MEDLINE and PsycINFO for studies of team-based approaches to care. We included randomized controlled trials (RCTs), systematic reviews, and prospective studies published in English from 2000

to September 2011. Our search focused on primary care physicians, nurse practitioners, and physician assistants as providers and adult patients. For provider outcomes, we searched MEDLINE and the Cochrane Effective Practice and Organization of Care (EPOC) Group Web site for recent systematic reviews or meta-analyses. We excluded articles that focused on one disease or patient population (e.g., diabetes or depression), lacked data analysis, or focused on the effect of credentials or skills (i.e., MD [physician] vs. PA [physician assistant] or NP [nurse practitioner]) on quality of care or patient safety. We excluded the latter studies as there is already a body of evidence suggesting that increased skills improve clinical effectiveness (see Agency for Healthcare Research and Quality [AHRQ] report 2003). All searches were limited to articles pertaining to human subjects and published in the English language. Additional citations were identified from reference lists of related articles.

Titles, abstracts, and articles were reviewed by researchers trained in critical analysis of literature. We attempted to pool data if appropriate. Other data were summarized narratively.

Study characteristics, patient characteristics, and outcomes were extracted by a trained research associate under the supervision of the Principal Investigator. We assessed risk of bias in individual studies according to established criteria for randomized controlled trials and based on population, outcomes, measurement, and confounding for non-randomized trials. Strength of evidence was determined for primary outcomes.

DATA SYNTHESIS

We constructed evidence tables for study characteristics and for outcomes, organized by working condition. We analyzed studies to compare their characteristics, methods, and findings. Findings from VA or active service populations were identified and highlighted.

PEER REVIEW

A draft version of this report was reviewed by members of our technical expert panel, as well as clinical leadership. Reviewer comments were addressed and our responses were incorporated in the final report (Appendix C).

RESULTS

The Effect of Human Resources Practices (Key Question #1)

For Key Question #1, we screened 1008 abstracts and 95 full text articles related to staffing and 1,581 abstracts and 94 full text articles related to workflow. We included 14 references from the staffing search and 9 references from the workflow search. Four additional references were added from our hand search of reference lists for a total of 27 references. Among these studies, three were randomized controlled trials, seven were longitudinal (cohort or pre-post with repeated cross-sections) studies and 17 were cross-sectional.

Nine out of eleven of the studies we examined that focused on patient quality of care as an outcome specifically measured clinical effectiveness, thus there is insufficient evidence on the role of provider workplace conditions on access as a quality of care measure. The most frequently studied HR practice for quality of care was workload and while three of the studies

suggested that an increase in workload results in lower quality of care, one study also found a positive effect and one found no effect. The other HR practices studied were evaluated less frequently, but there was more consistency in the results across studies: more training (2 studies), shorter hours (2 studies), and computerized systems (3 studies) lead to better quality. Only one study we reviewed examined provider autonomy or flexibility and found mixed effects on quality of care scores; this is insufficient evidence for the role of autonomy. Overall, these results are suggestive but make it difficult to make strong conclusions about the role of HR practices on patient quality of care.

We identified four studies in our review that explicitly examined the role of workplace conditions on patient safety in the primary care setting. While these were relatively well designed studies, more studies are needed. Because only two studies examined workload, one examined autonomy, one examined teams, and one examined computerized systems, there is insufficient evidence to answer our key question about how HR practices influence patient safety.

We identified 17 unique studies that investigated how HR practices influence patient satisfaction with either the provider or the clinic. We found mixed evidence on the role of provider skills (MD vs. NP/PA) on patient satisfaction; two studies found no effect and two studies found a negative effect of skills. We found mostly no effect of provider workload on patient satisfaction (3 studies), with the exception of one Norwegian study reporting that a longer listsize resulted in greater patient satisfaction. All four of the studies that examined provider training and all three that examined provider work hours found that they had no effect on patient satisfaction. Thus, there was suggestive evidence that training and work hours do not effect patient satisfaction, but again because of the lack of well-designed studies, we cannot make strong conclusions about these findings. Similarly, we conclude that there is inconsistent evidence on the role of skills and workload. We identified no studies that looked at how electronic medical records or computerized systems affect patient satisfaction.

The Effect of Organizational Culture and Physical Environment (Key Question #2)

For Key Question #2, we screened 541 abstracts and 44 full text references from our search for studies related to organizational culture. We included 2 references from our organizational culture literature search, 1 reference from our team-based care literature search, and 6 references that were identified by hand searching. Our physical environment search yielded 49 abstracts to review. From the 49 abstracts, we reviewed 3 full text articles; none met inclusion criteria. We included 2 references identified by hand searching.

Our findings on the effect of organizational culture are similar to findings of earlier reviews. The diversity of study methodologies used and constructs of organizational culture studied and the lack of consistent and validated outcome measures limit the ability to draw conclusions. Two studies (one randomized controlled trial and one pre/post study) found a positive effect of provider teams on patient quality of care, though one found no effect (case control study). Two studies that examined the effect of implementing patient centered medical homes (PCMH) found positive effects on quality of care. A cross-sectional study also found that organizations with an organizational culture that emphasized the importance of information sharing had high quality of care.

Although there has been research on the effect of physical environment (notably lighting, color,

auditory stimuli, and temperature) on workplace performance, much of that work has been done in industrial settings and what has been done in healthcare has largely focused on hospitals rather than the primary care setting.

Provider Outcomes (Key Question #3)

For Key Question #3, we included provider outcomes from studies identified in the literature searches for Key Questions #1 and #2. We also included systematic reviews pertaining to provider outcomes in primary care.

The relationships between workplace conditions, provider outcomes, and patient outcomes are complex and dynamic in such a way that not only are the effects felt at many levels (provider, patient, healthcare system), but also they create a cycle of reinforcing behaviors and outcomes. There are several potential policy interventions at the various levels that might positively influence provider well-being. In this study, we focused on studies that shed light on possible workplace interventions (as opposed to provider self-care or higher-order system level interventions) that could ultimately impact patient outcomes. Such changes to workplace conditions will likely <u>also</u> influence provider outcomes. However, we presented these results as only suggestive, but consistent with other literature, that has established evidence on the intermediate link between workplace conditions and provider outcomes.

Strength of Evidence

We evaluated the strength of evidence for the workplace conditions and patient outcomes for which we had at least three studies. Strength of evidence overall was low for patient satisfaction and provider skills, workload and hours; and for quality of care and provider workload and electronic medical records. Most of the evidence was rated high or moderate on risk of bias due to the lack of many well-designed RCTs or observational studies that address potential biases. There was also inconsistent measurement of both the workplace condition constructs and the patient outcome constructs, which made comparisons across studies difficult. There was insufficient evidence for patient safety and all workplace conditions, quality of care and training and hours, and patient satisfaction and electronic medical records (EMRs). Additionally, there was insufficient evidence on provider autonomy and all patient outcomes.

CONCLUSIONS

Overall, the studies we reviewed suggest that in primary care settings

- a lighter provider workload/shorter work hours, more provider training, and computerized systems result in higher patient quality of care
- provider training and work hours have no effect on patient satisfaction.

We found mixed evidence on the effect of provider skill levels and workload on patient satisfaction. We identified very few studies in our review that explicitly examined the role of workplace conditions on patient safety or the role of the physical environment on patient outcomes in the primary care setting, thus more studies are needed. Several workplace conditions have been insufficiently studied and thus there is no evidence on how these practices matter in ambulatory care settings: the effect of computerized systems, provider autonomy and teams on patient satisfaction; the effect of autonomy on quality of care.

The available literature provides low strength or insufficient evidence for varied components of organizational culture including PCMH, team-based care, care environment, and clinic values and their effect on outcomes highlighted in our key questions. Such evidence does not permit conclusions with regard to quality of care, patient safety, and patient satisfaction.

We found two studies that focused on the effect of physical environment in primary care clinics. No study attempted to isolate any one component of the physical environment. Reported outcomes included self-report of satisfaction (worker and provider/staff) with no objective measures of patient safety or quality of care or provider performance.

Consistent with more thorough systematic reviews of the literature examining how workplace conditions affect providers' stress, job satisfaction, etc., among the studies in our review that also examined provider outcomes, we found that greater workloads and less control over work tasks resulted in greater provider stress, burnout, and less job satisfaction. One study we examined found that electronic medical records did not result in greater provider stress.

FUTURE RESEARCH

There is little research that investigates the effects of working conditions on patient safety, which we measure specifically as medication errors, in the primary care setting. More generally, more well-designed studies are needed to replicate the few that have been conducted. For example, all ten of the studies we reviewed that investigated the role of workload were cross-sectional studies. While undertaking randomized controlled trials may be impractical, well-designed cohort studies or other pre-post designs will allow for more convincing evidence on the causal effect of the workplace conditions. Additionally, there is a need for research that looks rigorously at the interdependent role of human resource practices (such as hours worked, provider autonomy, and electronic medical records), organizational culture, and physical environment in explaining patient outcomes in primary care settings. For example, implementation of team-based work is often accompanied by other changes in the workplace, such as the use of electronic medical records/computerized systems or changes in organizational culture to foster teamwork. Therefore, any changes in patient outcomes from such an implementation could be the result of the teamwork, but could also be attributable to the changes in the organizational culture or computerized systems, etc. Current studies do not adequately try to isolate these effects. Finally, the development of or more consistent use of construct valid measures of both working conditions and patient or provider outcomes in the primary care settings is needed to make comparisons across studies easier.