Impact of reduction in working hours for doctors in training on postgraduate medical education and patients' outcomes: systematic review

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CRD summary
The authors concluded that there was no clear evidence of benefit or harms on patient outcomes associated with reducing the working hours of doctors in training. The authors' conclusion reflects the evidence presented but, given that most included studies were non-controlled retrospective cohorts (which are less likely to detect significant results), their conclusion should be interpreted with some caution.

Authors' objectives
To determine whether a reduction in working hours of doctors in postgraduate medical training had an effect on objective measures of medical education (not discussed in this abstract) and clinical outcome.

Searching
MEDLINE, EMBASE, Educational Resources Information Centre (ERIC), and the System of Information on Grey Literature in Europe (SIGLE) were searched between 1 January 1990 and 20 December 2010 with no language restrictions. Search terms were reported. The Internet was searched using Google Scholar. References lists of identified articles were scanned for additional articles.

Study selection
Eligible for inclusion in the review were studies of any design that assessed the impact of a change in duty hours, using any objective measure of outcome, on postgraduate medical training, patient safety, or clinical outcome.

Most of the included studies were conducted in the USA; the rest were carried out in the UK. Most studies were before-and-after cohort studies; there was one randomised controlled trial (RCT). The medical setting varied between studies and included surgery or surgical subspecialties, internal medicine, critical care, paediatrics, obstetrics, and multiple specialties. Patient outcomes measured varied; these included, but were not limited to, morbidity, mortality, length of hospital stay, adverse event incidence, medical errors, number of complications, and readmissions.

Two authors independently assessed articles for inclusion in the review.

Assessment of study quality
Study quality was assessed based on: number of participants; source and method of data collection; single or multicentre study; inclusion of a control group; whether outcomes were risk adjusted; presentation of a comparison of patients' characteristics at baseline; and reporting of a statistical analysis. Details were reported in an an online appendix (see URL for Additional Data).

Two authors independently assessed study quality.

Data extraction
Data on study authors, geographical location, year of publication, study cohort characteristics, working hours (pattern before and after the intervention), outcome measures and main results were extracted into standardised data extraction forms independently by two authors.

Methods of synthesis
Data was presented in tables. A narrative synthesis was used.

Results of the review
Thirty-four studies that reported clinical outcomes were included in the review (sample sizes ranged from 146 to over...
28 million patients, where stated). Study designs included one RCT, 20 single centre observational studies and 13 multicentre observational studies; eight of the observational studies were controlled.

Four studies (three cohort studies, one RCT) showed that a reduction in doctors’ working hours was associated with an improvement in patient outcomes. The RCT (including 634 patients and reported to be of high quality) was carried out in critical and coronary care units. This trial found medical and diagnostic error rates improved after a change in doctors’ working hours from 37 continuous duty hours with 77 to 81 hours worked a week to a rota that eliminated extended shifts and reduced the working week to 60 to 63 hours. A reduction in working hours was associated with improvements in patient mortality and length of stay in intensive care in one cohort study (n=492,173 patients), a reduction in adverse events in a second cohort study that included multiple medical specialities (n=474 patients), and improvements in complication rates after laparoscopic cholecystectomy in a third cohort study (n=2,470 patients).

Two large cohort studies found that a reduction in doctors' working hours was associated with worse patient outcomes. One study found that reduced working hours was associated with worse postoperative complications, length of hospital stay and routine discharge after surgery for hip fracture (n=48,430 patients). The second study found that reduced working hours was associated with an increase in complication rates in trauma patients (n=16,854 patients).

Twenty eight studies found no significant difference, or had a combination of positive and negative results, in patients’ outcomes after reductions in the working hours of doctors.

Authors’ conclusions
The literature examining the association between reducing doctors’ working hours and objective measures of outcomes in patients showed that there was no clear signal to indicate either benefit or harm.

CRD commentary
The review addressed a clear research question and was supported by adequate inclusion criteria. The search strategy included several databases, attempts to locate unpublished data and was not restricted by language; this reduced the risk of both publication and language bias. Review processes were carried out with sufficient attempts to minimise reviewer error and bias.

Study quality assessment was performed; full results were presented in an online appendix. Some aspects of the quality of individual studies were discussed in the results section. Given the variability between included studies in settings and outcomes reported, it was appropriate that a narrative synthesis was used.

The authors’ conclusion reflects the evidence presented, but given that most of the included studies were non-controlled retrospective cohorts that were underpowered to detect significant results, and had the potential for other procedures changed during the course of the study to bias results, their conclusion should be interpreted with some caution.

Implications of the review for practice and research
Practice: The authors stated that a consensus should be reached by the medical profession on appropriate measures to assess the quality of postgraduate medical training. These should be both quantitative and qualitative and include process measures (e.g. procedural volume) and outcome measures (e.g. results of formative assessments).

Research: The authors recommended the conduct of longitudinal studies evaluating the relationship between agreed process and outcome measures for postgraduate training and objective measures of outcomes related to patients for clinicians in the first few years of independent practice.

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