Problem-based learning in pre-clinical medical education: 22 years of outcome research.
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Abstract
PURPOSE:
To conduct a systematic review of problem-based learning (PBL) in undergraduate, pre-clinical medical education.

METHODS:
A research librarian developed comprehensive search strategies for MEDLINE, PSYCINFO, and ERIC (1985-2007). Two reviewers independently screened search results and applied inclusion criteria. Studies were included if they had a comparison group and reported primary data for evaluative outcomes. One reviewer extracted data and a second reviewer checked data for accuracy. Two reviewers independently assessed methodological quality. Quantitative synthesis was not performed due to heterogeneity. A qualitative review with detailed evidence tables is provided.

RESULTS:
Thirty unique studies were included. Knowledge acquisition measured by exam scores was the most frequent outcome reported; 12 of 15 studies found no significant differences. Individual studies demonstrated either improved clerkship (N = 3) or residency (N = 1) performance, or benefits on some clinical competencies during internships for PBL (N = 1). Three of four studies found some benefits for PBL when evaluating diagnostic accuracy. Three studies found few differences of clinical (or practical) importance on the impact of PBL on practicing physicians.

CONCLUSIONS:
Twenty-two years of research shows that PBL does not impact knowledge acquisition; evidence for other outcomes does not provide unequivocal support for enhanced learning. Work is needed to determine the most appropriate outcome measures to capture and quantify the effects of PBL. General conclusions are limited by methodological weaknesses and heterogeneity across studies. The critical appraisal of previous studies, conducted as part of this review, provides direction for future research in this area.

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