



# The Effectiveness of Team Based Learning on Learning Outcomes in Health Professions Education: A Best Evidence for Medical Education (BEME) Systematic Review

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## background

- There is a growing interest in active learning strategies in health professions education due to the belief that active learning may enhance knowledge retention.
- Team based learning (TBL) is an active learning method grounded in student-centred learning, requiring less faculty time and fewer resources than other active learning methods.
- First developed by Larry Michaelsen in a business curriculum, TBL is characterised with three main phases:
  - (1) advanced preparation by students
  - (2) individual and group readiness assessment
  - (3) application exercises, including discussion and analysis with the entire class (Koles et al., 2010).
- While TBL may have real pedagogical value, individual studies present inconsistent findings.
- The aim of this systematic review was to assess the effectiveness of TBL on improving learning outcomes in health professions education in order to provide curriculum planners with more direction in their decision-making with regard to TBL implementation.

## characteristics

- This is the first systematic review that we are aware of that examines the effects of TBL in health professions education.
- The inclusion criteria required studies to comply with a definition of TBL verified with two experts in the field and use a valid comparator.
- The 14 studies assessed at least 3,535 participants (exact numbers are not known as 3 studies did not report the number of control group participants).
- Among the included studies were 13 undergraduate and 1 graduate study. The studies assessed students in medicine, pharmacy, dentistry, and nursing programs.
- Kirkpatrick's framework of learning outcomes was used to categorise each trial (Kirkpatrick, 2006). All 14 trials assessed changes in knowledge, and 7 studies assessed changes in learner reaction.

### References

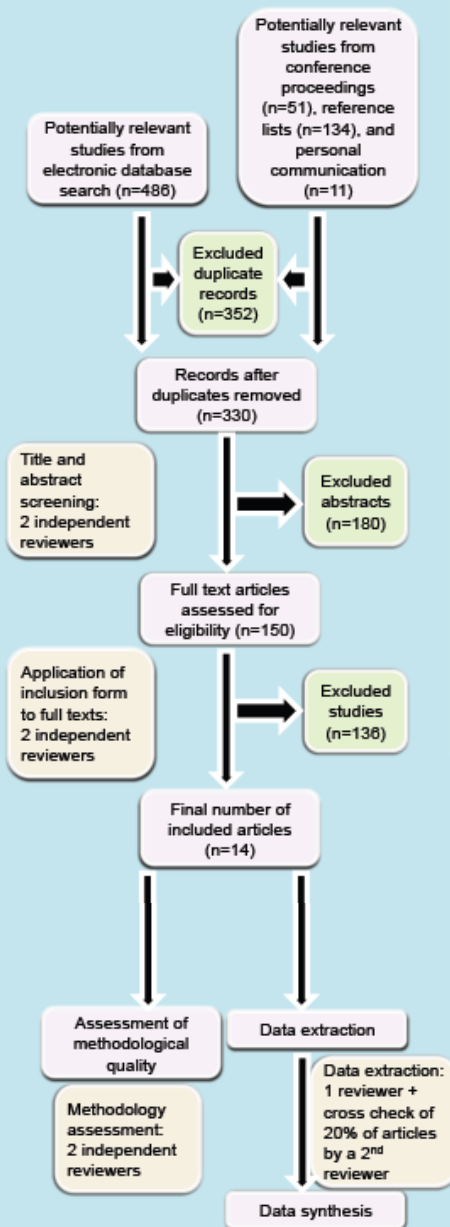
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## flow of studies



## quality assessment

Type of study	#	Common sources of bias in included studies
Randomized controlled trials	1	1/1: allocation concealment/blinding were incomplete
Non-randomized controlled trials	2	1/2: inadequate comparability of control 2/2: allocation concealment/blinding were incomplete
Concurrent cohort studies	4	4/4: inadequate comparability of control 3/4: not truly representative of the average health professions student
Non-concurrent cohort studies	7	6/7: inadequate comparability of control 3/7: incomplete participant follow-up

## results

- Knowledge Outcomes:**
- all 14 studies assessed knowledge outcomes
  - 7 of 14 studies reported a statistically significant increase ( $p < 0.05$ ) in the knowledge scores for the TBL group
  - 4 studies reported no statistically significant difference between knowledge scores of the TBL and non-TBL group
  - 2 of these 4 studies found a significant difference in subgroup analyses, but could not report a significant difference between TBL and comparator groups overall
  - 3 studies did not report a p-value and did not comment on significance, despite a clear trend in reported knowledge scores favouring TBL
- Learner Reaction Outcomes:**
- 7 of 14 studies looked at reaction scores
  - Only 1 study reported significant improvement ( $p < 0.05$ ) favouring the TBL group
  - Another study reported significant student preference the TBL comparator
  - 3 studies reported non-significant differences
  - 2 studies did not report p-values

## discussion

- This review presents predominantly positive and neutral effects of TBL on knowledge scores.
- Learner reaction scores were mixed but presented a largely negative trend; however, none of the included studies used a recurrent TBL curriculum, making it difficult to determine if students get accustomed to TBL and react more positively over time.
- The major limitations of this review are due to the methodological quality of studies; most were cohort designs and had limited reporting with respect to statistical results.
- However, the trend in findings from the cohort studies corresponded to those of trial designs, and therefore likely to do not skew the results.

## conclusion

- Team based learning may improve knowledge scores but yields predominantly negative learner reaction; the authors hypothesize that this may be due to increased student workload.
- While a causal relationship cannot be inferred from these studies, this review shows that TBL may be associated with increased knowledge scores in health based education across disciplines and settings.
- More trial-based studies are needed in TBL research; more thorough reporting and statistical analysis is required in future studies.