

## Evaluation of team-based learning for teaching neurology in China: a meta-analysis of randomized controlled trials

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### ADMINISTRATIVE INFORMATION

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**Review Stage at time of this submission** - Data analysis.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202650038

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 May 2026 and was last updated on 7 May 2026.

### INTRODUCTION

**Review question / Objective** This meta-analysis aimed to compare the effects of Team-based learning (TBL) alone or in combination with other methods versus lecture-based learning (LBL) on improving the teaching effects of neurology in China.

**Condition being studied** Current studies related to TBL approach on neurology teaching are frequently limited by small sample sizes and single-center designs. Additionally, some studies have yielded inconsistent results. To address these issues, we performed a meta-analysis to compare the teaching efficacy of TBL or TBL combined with other teaching methods with traditional LBL on neurology education in China.

### METHODS

**Search strategy** The search terms used were as follows: ("team-based learning" OR "TBL" ) AND ("lecture-based learning" OR "LBL" OR "traditional teaching") AND "neurology". Furthermore, the search strategy was modified to comply with the requirements of different databases.

**Participant or population** Campus-based students receiving neurology education as well as rotating interns and residents in Neurology in mainland China.

**Intervention** TBL or TBL combined with other teaching methods.

**Comparator** Traditional LBL approach.

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**Study designs to be included** Randomized controlled trials.

**Eligibility criteria** We defined the inclusion criteria based on the evidence-based PICOS principles and the criteria were outlined below: (1) P (participant): campus-based students receiving neurology education as well as rotating interns and residents in Neurology in mainland China; (2) I (intervention): TBL or TBL combined with other teaching methods; (3) C (comparison): traditional LBL approach; (4) O (outcome): theoretical knowledge scores or practical skill scores; (5) S (study design): randomized controlled trials (RCTs).

**Information sources** Pubmed, Cochrane Library, Web of Science, China National Knowledge Infrastructure (CNKI), Chinese VIP database and Chinese Wanfang Database were searched up to July 2025. Prior reviews and meta-analyses were also searched to identify additional studies.

**Main outcome(s)** The primary outcome was theoretical knowledge scores or practical skill scores. Secondary outcomes included self-study capacity, communication skills, teamwork ability as well as student satisfaction.

**Quality assessment / Risk of bias analysis** The Cochrane Collaboration's risk of bias tools were applied to evaluate the risk of bias.

**Strategy of data synthesis** This meta-analysis was performed by using the Review Manager 5.2 software and STATA 15.0 software. The outcomes were expressed as standardized mean differences (SMD) for continuous variables and odds ratios (ORs) for dichotomous variables, with 95% confidence intervals (CI). The Chi<sup>2</sup> tests and the I<sup>2</sup> statistic were adopted to assess the heterogeneity among the contrasts. The studies were regarded significantly heterogeneous if I<sup>2</sup> > 50%, and a random-effects model was applied. Otherwise, a fixed-effects model was used. We applied meta-regression analyses to explore the sources of high heterogeneity. Subgroup analyses were conducted to assess differences in effects based on intervention methods, intervention duration and types of participants. Sensitivity analyses were performed to evaluate the reliability of the results. Publication bias was assessed by visual inspection of a funnel plot, and further checked by Egger's test and the trim-and-fill method. p-value < 0.05 in Z test was considered statistically significant.

**Subgroup analysis** Subgroup analyses were conducted to assess differences in effects based

on intervention methods, intervention duration and types of participants.

**Sensitivity analysis** Sensitivity analyses were performed to evaluate the reliability of the results.

**Language restriction** The articles published in English or Chinese were included.

**Country(ies) involved** China.

**Keywords** meta-analysis, neurology, team-based learning, lecture-based learning.

#### **Contributions of each author**

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