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Promoting Student Argumentation through Argumentation Instruction in Problem-based Learning

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Introduction: Medical students are encouraged to engage in the hypothetico-deductive reasoning (HDR) process through small group discussions in problem-based learning (PBL). Students' HDR abilities depend on the ability to generate sound arguments, providing appropriate justifications for claims, such as data and warrants. It is necessary to promote students' argumentation according to HDR phases. The purpose of this study was to investigate the effect of argumentation instruction on the quality of student argumentation in PBL.

Method: Participants were eight small groups of six to eight Korean medical students. Four small groups (an experimental group) received the argumentation instruction that involved understanding and prompting argument structures according to HDR phases, whereas the other four groups (a control group) did not receive. During one-week-long PBL module on the respiratory system, small group discussions for the control and experimental groups were audio-recorded. The arguments constructed by each condition group were analyzed according to four levels of argumentation. The mean frequencies of each level of argumentation were compared between the control and experimental groups for the overall HDR process and each HDR phase respectively.

Findings: For the overall HDR process, the experimental group produced more high-level arguments including three essential components (a claim, data, and a warrant) than the control group, and the chi-square test showed significant differences in the quality of argumentation between the two condition groups ($\chi2 = 43.00$, $p < .001$). For each HDR phase, the chi-square tests revealed significant differences in the quality of argumentation between the two condition groups in the hypothesis generation phase ($\chi2 = 11.45$, $p < 0.01$) and the inquiry strategy phase ($\chi2 = 15.65$, $p < 0.01$).

Conclusion: The findings suggest the argumentation instruction can help students construct sound arguments, which will provide guideline for facilitating students' meaningful discussion and enhancing their HDR in PBL.