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#### **Title:**

Effects of two teaching interventions on nursing students' acquisition of competence in ECG interpretation.

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***Purpose:*** Nurses' ability to recognise patients' arrhythmias could contribute to preventing in-hospital cardiac arrest. Research suggests that nurses and nursing students lack competence in electrocardiogram (ECG) interpretation. The aim of this study was to compare the effects of two training strategies on nursing students' acquisition of competence in ECG interpretation.

***Materials and methods:*** Controlled randomised trial with 98 nursing students. Divided in groups of 12-16, participants were randomly allocated to one of the following 3-hour teaching intervention groups: 1) traditional instructor-led (TILG), and 2) flipped classroom (FCG). Participants' competence in ECG interpretation was measured in terms of knowledge (%), skills (%) and self-efficacy (%) using a specifically designed and previously validated toolkit at pre-test and post-test. *Two-way MANOVA* explored the interaction effect between 'teaching group' and 'time of assessment' and its impact on participants' competence. Within-group differences at pre-test and post-test were explored by carrying out paired *t-tests*. Between-group differences at pre-test and post-test were examined by performing independent *t-tests* analysis.

***Results:*** There was a statistically significant interaction effect between 'teaching group' and 'time of assessment' on participants' competence in ECG interpretation ( $F(3,190)=86.541, p=0.001$ ; Wilks'  $\Lambda=0.423$ ). At pre-test, differences in knowledge (TILG= $35.12\pm 12.07$ ; FCG= $35.66\pm 10.66$ ), skills (TILG= $14.05\pm 10.37$ ; FCG= $14.82\pm 14.14$ ), self-efficacy (TILG= $46.22\pm 23.78$ ; FCG= $40.01\pm 21.77$ ) and all other variables were non-significant ( $p>0.05$ ). At post-test, knowledge (TILG= $55.12\pm 14.16$ ; FCG= $94.2\pm 7.31$ ), skills (TILG= $36.90\pm 16.45$ ; FCG= $86.43\pm 14.32$ ) and self-efficacy (TILG= $70.78\pm 14.55$ ; FCG= $79.98\pm 10.35$ ) had significantly improved irrespective of the training received ( $p<0.05$ ). Nonetheless, participants in the FCG scored significantly higher than participants in the TILG in knowledge, skills and self-efficacy ( $p<0.05$ ).

***Conclusion:*** Flipping the classroom for teaching ECG interpretation to nursing students may be more effective than using a traditional instructor-led approach in terms of immediate acquisition of competence in terms of knowledge, skills and self-efficacy. Further research on the effects of both teaching strategies on the retention of the competence will be undertaken.