



THE ECOSYSTEM
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Lessons learned in the pandemic
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10th International Conference for EBHC Teachers and Developers
10th Conference of the International Society for EBHC
Taormina, 25th - 28th October 2023

#EBHC2023



Teaching Evidence-Based Medicine to Large Classes of Undergraduate Medical Students: Team-Based Learning versus Small Group Discussions A Randomized Controlled Trial

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Background

- AUB-FM → New medical curriculum (Impact)
- EBM instruction: from 1st to 4th year
- Challenge:
 - Preclinical classes: 100-120 students/class
 - Only 7 instructors



Background

- Variable instructor availability
- Instruction format:
 - Small group discussions (SGD): 11-15 students/group; ≥ 3 instructors
 - Team-based learning (TBL): 1-2 instructors
 - Evidence of teaching effectiveness ??



Educational QI-PICO

- **P:** Preclinical medical students (1st yr)
- **I:** Teaching CA in TBL format
- **C:** Teaching CA in SGD format
- **O:** Score on Berlin Questionnaire-Set B
- **S:** RCT (Current Controlled Trials [ISRCT N1543 0424](#))



Methods

- April 2018-May 2019
- All 1st-year medical students (N=108)
- 7 EBM instructors (Anesthesiology, IM, Pediatrics, Pharmacology, Surgery)
- Random allocation (computer-generated permuted block randomization)
 - 2 Groups: TBL or SGD
- Allocation concealed until 1st day of the course



Methods

- Groups assigned same reading material
- TBL: Standard TBL instruction format
 - IRAT, GRAT, Application exercise
- SGD:
 - Active discussion with the instructor
 - Random allocation of instructors to groups



Methods

- 1st yr outcome: Student's score on the Berlin Questionnaire (end of 2nd yr)
- Sample size:
 - All 1st-yr students (N=108)
 - 80% power, 5% alpha level
 - Diff. in mean Berlin questionnaire scores = 0.55 SD



Data

- Age, gender
- Medical College Admission Test (MCAT) score
- Rank at admission to medical school (in tertiles)
- Grade on the Epi/Biostat course
- Pooled grade average of 1st yr (excluding Epi/Biostat)
- Self-reported preferred teaching method (TBL vs. GD)



Results



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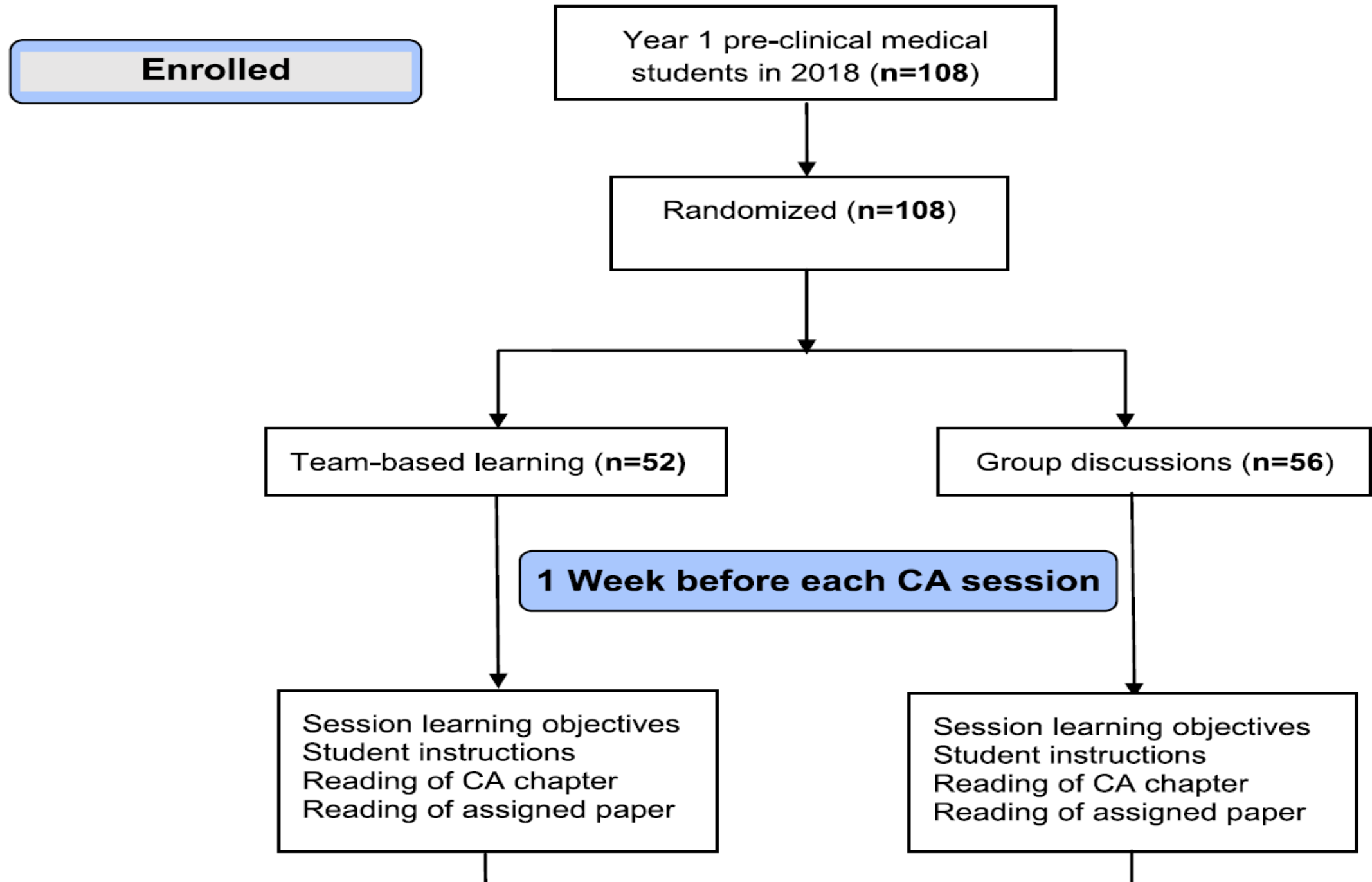
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Enrolled

Year 1 pre-clinical medical
students in 2018 (n=108)

Randomized (n=108)

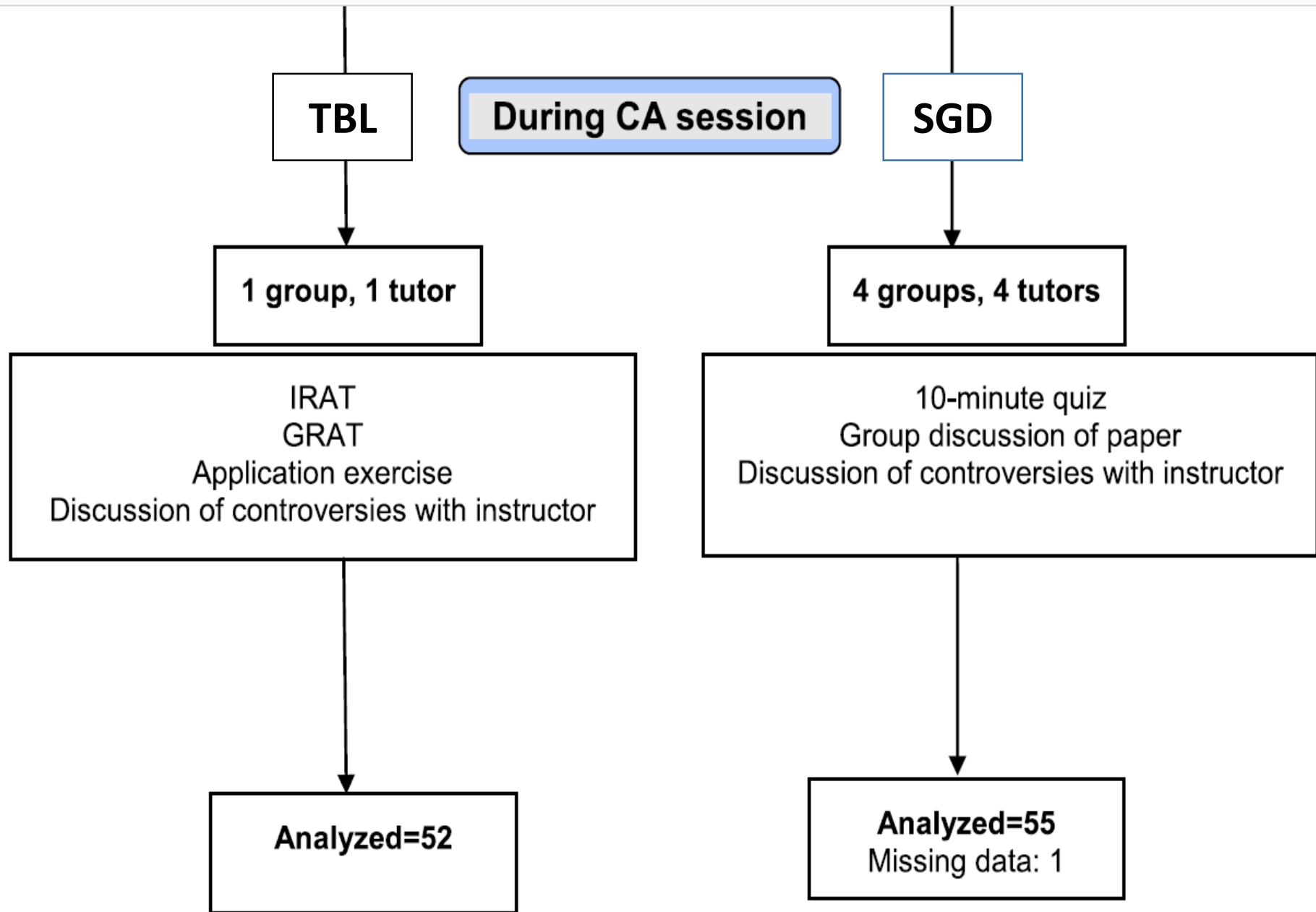
Team-based learning (n=52)

Group discussions (n=56)

1 Week before each CA session

Session learning objectives
Student instructions
Reading of CA chapter
Reading of assigned paper

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Student instructions
Reading of CA chapter
Reading of assigned paper



CONSORT flow diagram

Student Characteristics	TBL <i>n</i>=52	GD <i>n</i>=55
Categorical variables		
Female gender <i>n</i> (%)	24 (42.1)	33 (57.9)
Rank on admission <i>n</i> (%)	17 (32.7)	22 (40.0)
1st tertile	19 (36.5)	19 (34.5)
2nd tertile	16 (30.8)	14 (25.5)
3rd tertile		
Preferred instruction method <i>n</i> (%)	30 (57.7)	34 (61.8)
GD	17 (32.7)	17 (30.9)
TBL	5 (9.6)	4 (7.3)
Lecturing		
Continuous variables		
Score on MCAT <i>M</i> (<i>SD</i>)	509.4 (4.8)	509.5 (5.3)
Score on FMR <i>M</i> (<i>SD</i>)	87.4 (6.9)	88.0 (5.7)
Score on courses excluding FMR <i>M</i> (<i>SD</i>)	84.3 (5.1)	83.8 (5.1)
Score on Berlin Questionnaire <i>M</i> (<i>SD</i>)	80.4 (11.6)	80.1 (12.1)

Table 3 Predictors of Performance on the Berlin Questionnaire in Multivariate Linear Regression Analysis (N=107)

Predictor	β	95% CI	<i>p</i>
Group allocation	0.27	-3.79 to 4.33	0.900
Score on all courses excluding FMR	1.08	0.68 to 1.48	<0.001

Strengths

- 1st TBL vs. SGD comparison (RCT)
- No attrition (curricular requirement)
- Random allocation of instructors → generalizability
- Testing of long-term knowledge retention



Limitations

- Open-label
- Need to know basic Epi/Biostat a priori
- Generalizability to other settings



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Conclusions

- Teaching CA to large preclinical classes:
 - TBL and SGD are equally effective instructional formats
 - Prior competence in Epi/Biostat enhances students' performance



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