

Impact of an online spaced repetition-learning module on residents medical knowledge competency



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Background

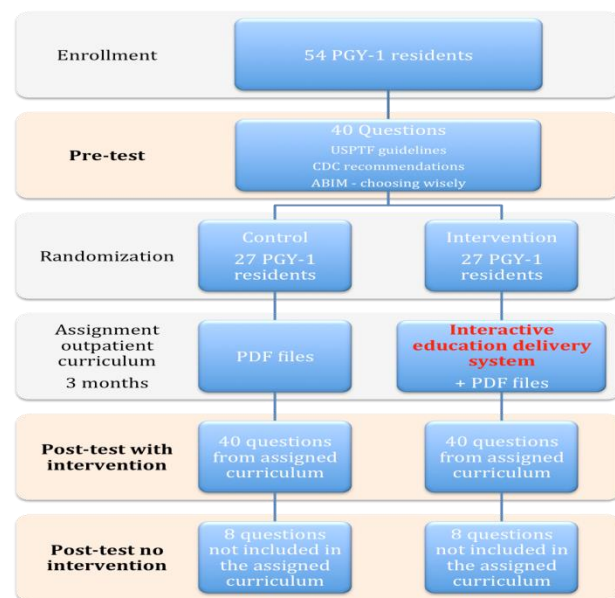
- Spaced repetition education, a learning method where information is presented and repeated over intervals of time, has not been used to decrease the residents medical knowledge gap present at the beginning of training.

Objectives

- To test if an online spaced based learning module can decrease the knowledge gap present at the beginning of the residency training.
- To compare the online spaced based learning module with the traditional method of electronically delivering the pre-rotation curriculum.

Methods

- Prospective, randomized controlled study of medical knowledge acquisition in PGY-1 residents:



- Multivariable regression models were used to evaluate the effect of spaced education intervention.
- An end of study survey was done to evaluate the residents satisfaction with the educational program, confidence for patient care and likelihood of changing behavior.

Results

Table 1. Residents characteristics*

| | Control group (N = 27) | Spaced education group (N = 27) | p value |
|-------------------------------|---------------------------|------------------------------------|---------|
| Age (years) | 27.8 ± 2.6 | 26.9 ± 1.9 | 0.16 |
| Male gender | 20 (74.1) | 10 (37.0) | <0.01 |
| Trainee type | | | 0.82 |
| USMD | 14 (51.9) | 15 (55.6) | |
| IMG | 10 (37.0) | 8 (29.6) | |
| DO | 3 (11.1) | 4 (14.8) | |
| Years since graduation | 1.5 ± 2.6 | 0.7 ± 1.1 | 0.13 |
| USMLE 1 | 234.7 (17.8) | 233.5 (16.8) | 0.81 |
| USMLE 2 | 243.7 (15.6) | 244.9 (12.2) | 0.76 |
| ITE | 62.5 (10.7) | 59.7 (7.5) | 0.31 |
| Pre - test | 48.8 (9.4) | 49.1 (9.3) | 0.91 |
| Post - test with intervention | 57.9 (9.6) | 73.3 (17.9) | <0.001 |
| Knowledge gap decrease | 8.6 (9.9) | 24.2 (15.4) | <0.001 |
| Post-test no intervention | 57.5 (18.8) | 57.2 (17.4) | 0.95 |

*Numbers represent mean ± SD or number (percent) as appropriate

Figure 1. Residents medical knowledge (%)

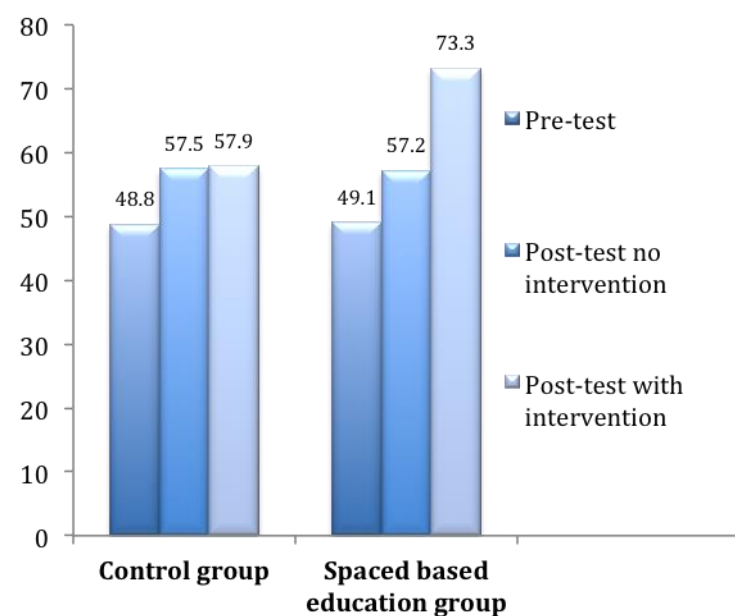


Figure 2. Residents' perception of the educational module

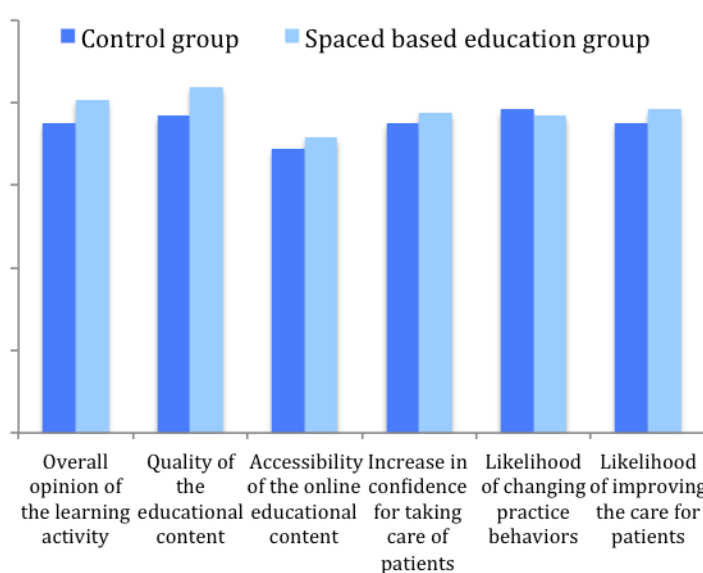


Table 2. Effect of online spaced repetition learning module on residents medical knowledge*

| | Un-adjusted | | Adjusted* | |
|---------------|-----------------|-----------|------------------|-----------|
| | OR (95% CI) | P - value | OR (95% CI) | P - value |
| Knowledge gap | 15.6 (8.3-23.0) | <0.001 | 21.4 (11.9-30.9) | <0.001 |

* Multivariable linear regression model adjusted for age, gender, trainee type, years since graduation, USMLE 1, 2 and ITE scores (%)

- Fifty-four PGY-1 residents were enrolled in the study. The control group had over 74% male participants compared to 37% in the intervention group. There were no other statistical significant differences between the two groups regarding age, trainee type, years since graduation, results at USMLE1 and 2, ITE or pre-test evaluation.
- There was a statistical significant improvement in knowledge for the group receiving the online spaced repetition module (Table 1)
- In multivariable linear regression models adjusted for demographics and other confounding variables, the residents who received the spaced repetition learning module had more than double the odds of decreasing the medical knowledge gap by 10% (Table 2).
- Residents perception and satisfaction with the educational module, measured on a 5 point Likert scale showed no statistical significant differences between the two groups in terms of satisfaction with the educational program, confidence for patient care and likelihood of changing their behavior (Figure 2).

Conclusions

- The online spaced repetition learning module represents a simple and effective tool to decrease the medical knowledge gap present at the beginning of the residency training.
- Residents perceive the education delivery system as a useful way to increase their confidence in taking care of patients.