Impact of Confidence Levels on Self-assessment and Skill Improvement Among Surgical Residents in Simulation Training

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Background

- In the general process of skill acquisition, excessive confidence in one's abilities is commonly believed to impair self-assessment capabilities and hinder skill improvement.
- Surgical resident education: Unclear relationship between resident's skill confidence, actual skill, and improvement degree

Hypothesis

- Surgical residents with strong confidence in their skills tend to overestimate themselves compared to surgical residents with weak confidence.
- Confident surgical residents have smaller skill growth during a curriculum than less confident surgical residents.

The curriculum for surgical residents

- Skills tests at the beginning and the end of the rotation.
- Answer a confidence survey before each test.
- Evaluation by residents themselves and single trained evaluator using assessment sheets.
- Mentoring session in the surgical simulation lab and education in the OR

Curriculum in Rotation

START
>Confidence survey
>Pre-test

ROTATION
>Mentoring session in the sim lab
>Education in the OR

END
>Confidence survey
>Post-test

Methods

- Retrospective review of data for surgical residents who rotated on acute care surgery (ACS)
- Data from demographics, confidence surveys, self assessed scores, and evaluator-assessed scores were reviewed

Skills test for ACS rotation

- Laparoscopic cholecystectomy(LC) task using VR simulator
- Assessment sheets
  >Global Operative Assessment of Laparoscopic Skills (GOALS)
  >LC-specific simulation assessment form (LC-SIM)
  >Objective Structured Assessment of Technical Skills (OSATS)

Statistic analysis

Group comparisons made with Chi-square and Wilcoxon rank-sum tests, p<0.05.



Symbionix 3D LAP mentor; 3D Systems Healthcare CO USA

Demographic

- 30 surgical residents (PGY2-4) rotated on ACS during 2019-2022.
- The median confidence survey score :31 (Total score: 40)
- Low confidence group (LC; confidence survey score ≤30) : 14 residents
  High confidence group (HC; confidence survey score >30) : 16 residents
- No significant difference between 2 groups for their demographics

	Low Confidence	High Confidence	p-value
Total Participants	14	16	
Experience [N (%)]			0.2459
PGY2	8 (57.1)	5 (31.3)	
PGY3	6 (42.9)	9 (56.3)	
PGY4	0 (0.0)	2 (12.5)	
Male [N (%)]	7 (50.0)	10 (62.5)	0.4906
Left Hand Dominance [N (%)]	0 (0.0)	1 (6.3)	0.5333
Age [Mean ± SD]	29 ± 2	29 ± 2	0.2273

Result

Pre-test assessment score

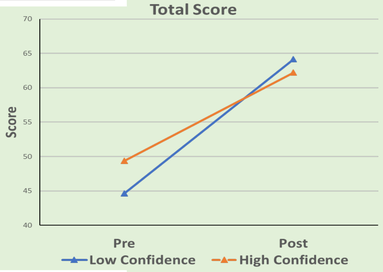
- Self assessed score: HC > LC ; p<0.05
- Evaluator assessed score: No significant difference between 2 groups

Post-test assessment score

- Self assessed score: HC > LC ; p<0.05
- Evaluator assessed score: No significant difference between 2 groups
- Confidence survey score after curriculum: HC > LC ; p<0.05

Skills Improvement during curriculum

- Skills improvement during curriculum assessed by evaluator: LC > HC ; p<0.05
- GOALS score improvement assessed by evaluator: LC > HC ; p<0.05
- "Bimanual Dexterity" and "Efficiency" in GOALS assessed by evaluator: LC >HC ; p<0.05



	Low Confidence	High Confidence	p-value
Self-assessment			
GOALS + Lap-SIM & OSAT (15-75)	42.5 ± 9.5	53.4 ± 8.4	0.0017
Evaluator assessment			
GOALS + Lap-SIM & OSAT (15-75)	44.6 ± 8.7	49.4 ± 11.6	0.2106

	Low Confidence	High Confidence	p-value
Self-assessment			
GOALS + Lap-SIM & OSAT (15-75)	57.8 ± 7.2	63.1 ± 5.4	0.0186
Evaluator assessment			
GOALS + Lap-SIM & OSAT (15-75)	64.1 ± 5.1	62.2 ± 5.8	0.4277
Confidence Survey (8-40)	31.4 ± 4.1	35.8 ± 3.4	0.0073

	Low Confidence	High Confidence	p-value
Improvement Pre to Post			
GOALS + Lap-SIM & OSAT (15-75)	19.5 ± 8.3	12.8 ± 9.2	0.0274
Goals Total Score (5-25)	6.2 ± 2.0	2.9 ± 3.0	0.0024
Depth Perception (1-5)	1.1 ± 0.9	0.6 ± 0.9	0.0848
Bimanual Dexterity (1-5)	1.5 ± 0.7	0.7 ± 0.6	0.0015
Efficiency (1-5)	1.3 ± 0.5	0.6 ± 0.9	0.0141
Tissue Handling (1-5)	1.1 ± 1.0	0.5 ± 0.7	0.1251
Autonomy (1-5)	1.2 ± 1.0	0.6 ± 1.2	0.0544
Lap-SIM & OSAT (10-50)	13.3 ± 6.8	9.9 ± 7.0	0.1757

Limitations

- Retrospective review of a prospective database
- Single institution
- Small sample size
- Single evaluator

Discussion and Conclusions

- Confident surgical residents may tend to rate their own performance higher than less confident surgical residents, despite relatively similar objective performance.
- Confident surgical residents may tend to have stronger confidence and evaluate their skills higher than less confident surgical residents even after taking a curriculum.
- Confident surgical residents may have smaller skill growth than less confident surgical residents.
- Identifying these tendencies in a simulated setting before a skills curriculum may potentially aid in optimizing coaching styles in the operating room.