Evaluating longitudinal empathy changes from a supplemental mindfulness curriculum in four-year medical education program

Hema Arikala
Lehigh Valley Health Network, Hema.Arikala@lvhn.org

Steven Manobianco MD
Lehigh Valley Health Network, Steven.Manobianco@lvhn.org

Jessica S. Watson MD
Lehigh Valley Health Network

Rahul Mhaskar PhD, MPH
Lehigh Valley Health Network

Joann Quinn PhD
Lehigh Valley Health Network

Published In/Presented At

Evaluating longitudinal empathy changes from a supplemental mindfulness curriculum in four-year medical education program

Hema Arikala

Steven Manobianco MD, Jessica Watson MD, Rahul Mhaskar PhD MPH, Joann Quinn PhD

Lehigh Valley Health Network, Allentown, Pennsylvania

Background

Figure 1: Burnout Rates in Medical Students
Medical students are at increased risk for burnout, depression, and depersonalization compared to the general population

- 13.5% absolute increase in prevalence of depression after beginning medical school
- 11.1% report suicidal ideation during medical school

Rotenstein et al. 2016
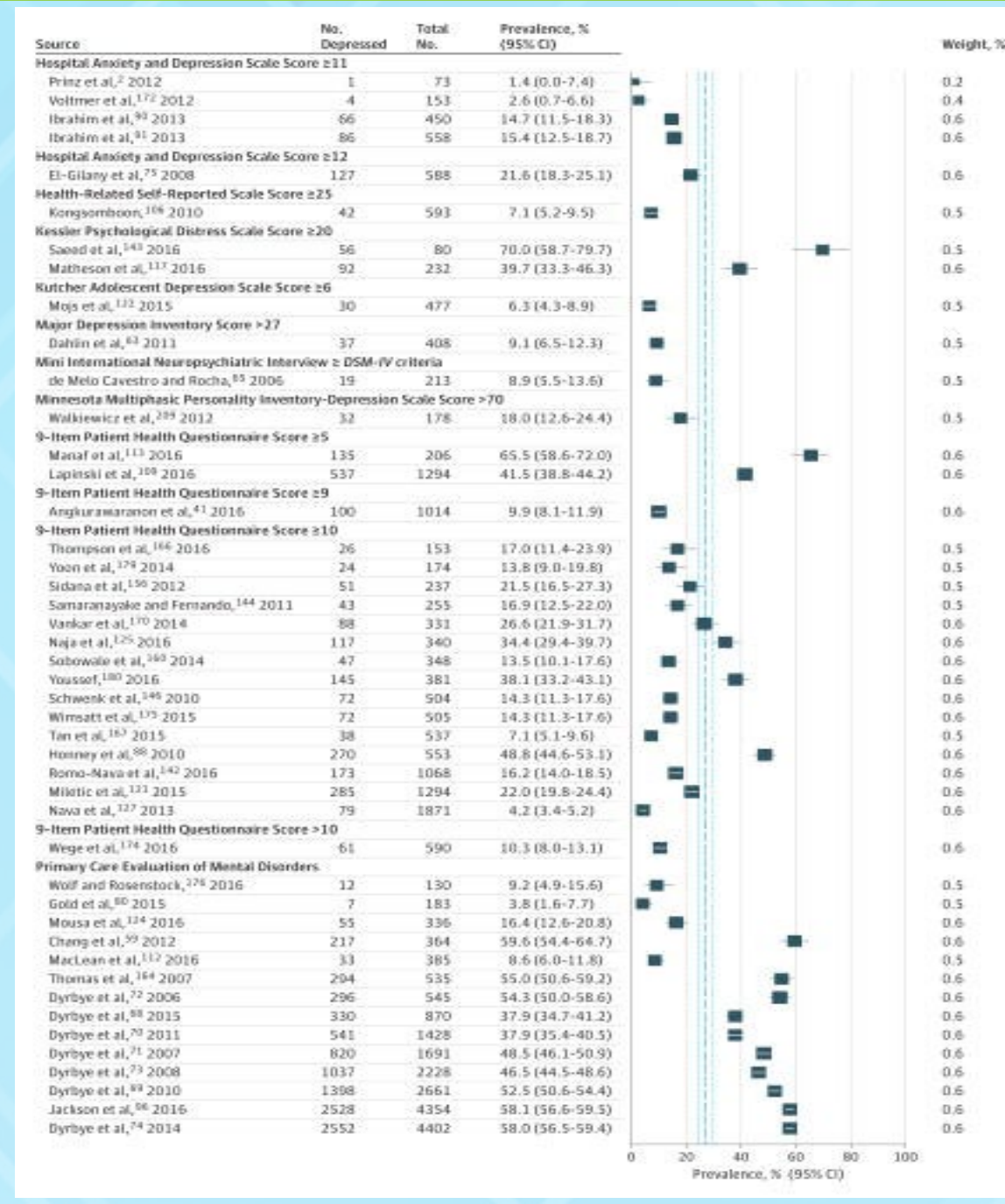
Figure 2: Empathy Trends in Medical Students
Empathy and mindfulness ratings significantly decrease throughout medical education

Most noticeable in pre-clinical to clinical transition (second to third year)

Hojat et al. 2009
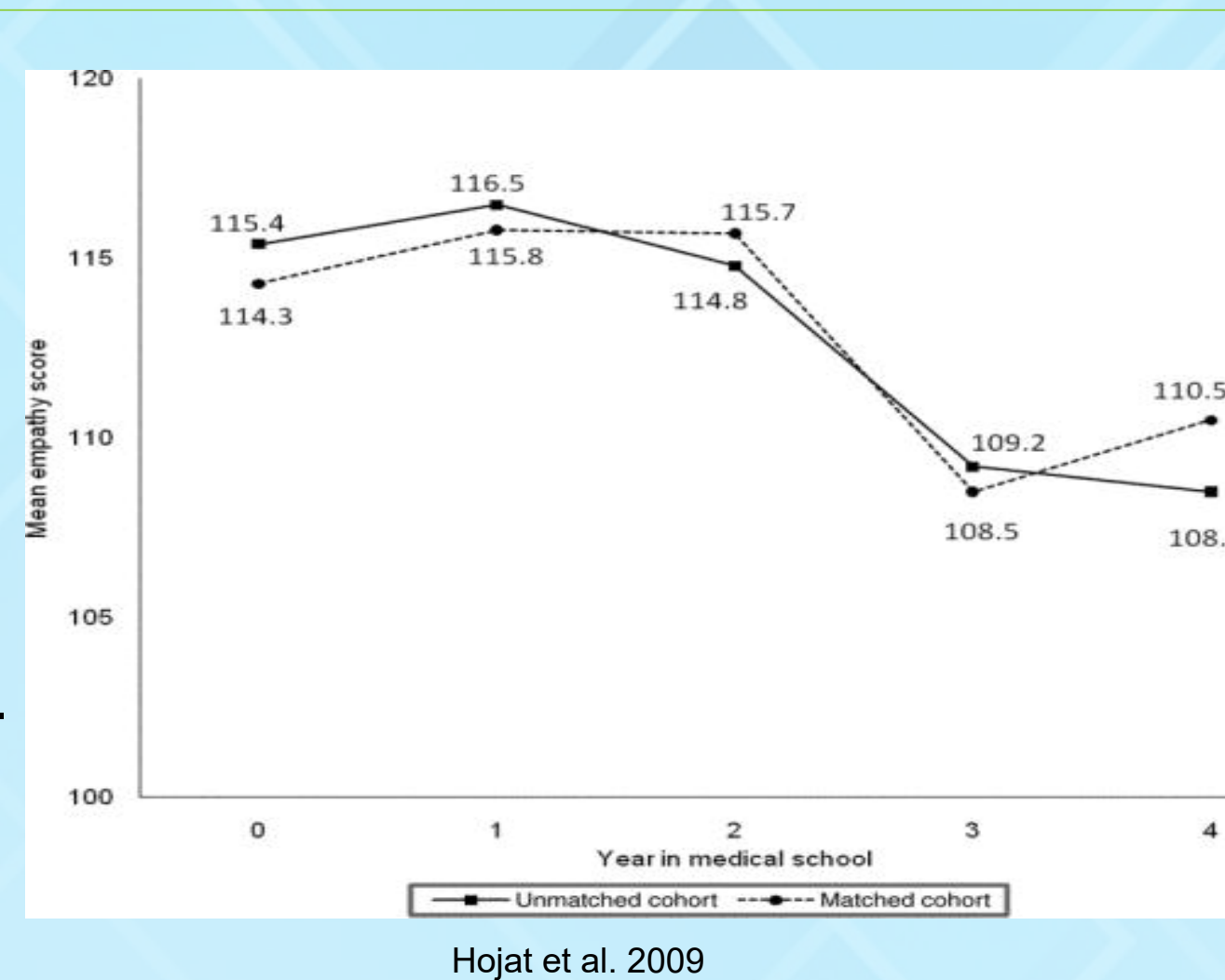
What is SELECT?
WHO: MD SELECT students taught by in-house faculty
WHAT: Emotional Intelligence Framework of 12 Competencies
WHEN: Longitudinal Four-Year Program
WHERE: Tampa, FL and Allentown, PA
WHY: Healthcare needs more deliberate, emotionally-intelligent physician leadership

Problem Statement

How does a longitudinal EI-based supplemental medical curriculum affect the mindfulness and empathy of medical students?

Methods

Table 1: Methods

IRB Status	Approved by USF IRB in 2016 through expedited review for research with minimal risk to human subjects.
Population Inclusion Criteria	USF SELECT Class of 2019 and Class of 2020
Population Exclusion Criteria	USF CORE students
Sample Size	Approximately 120
Quantitative Measures	Mindfulness: Mindful Attention Awareness Scale (MAAS), Five Facet Mindfulness Questionnaire (FFMQ) Empathy: Jefferson Scale of Empathy(JSE)
Qualitative Measures	Focus groups at the end of 1st year and 3rd year

Results

Mindfulness Attention Awareness Survey Data
- Both classes of medical students started with non-significant differences in scores prior to beginning MS1.
- Class of 2019 maintained similar scores throughout their education, with no significant mean difference calculated.
- Class of 2020 experienced a significant decrease between the beginning of MS2 and MS3 (mean difference 4.690 [95% CI 0.594-9.787]), and between beginning of MS2 and MS4 (mean difference 5.800 [95% CI .487-11.113]). Class of 2020 did not experience a significant change in mean between MS1 and MS4.
- Differences were not significant between year-matched Class of 2019 and 2020.

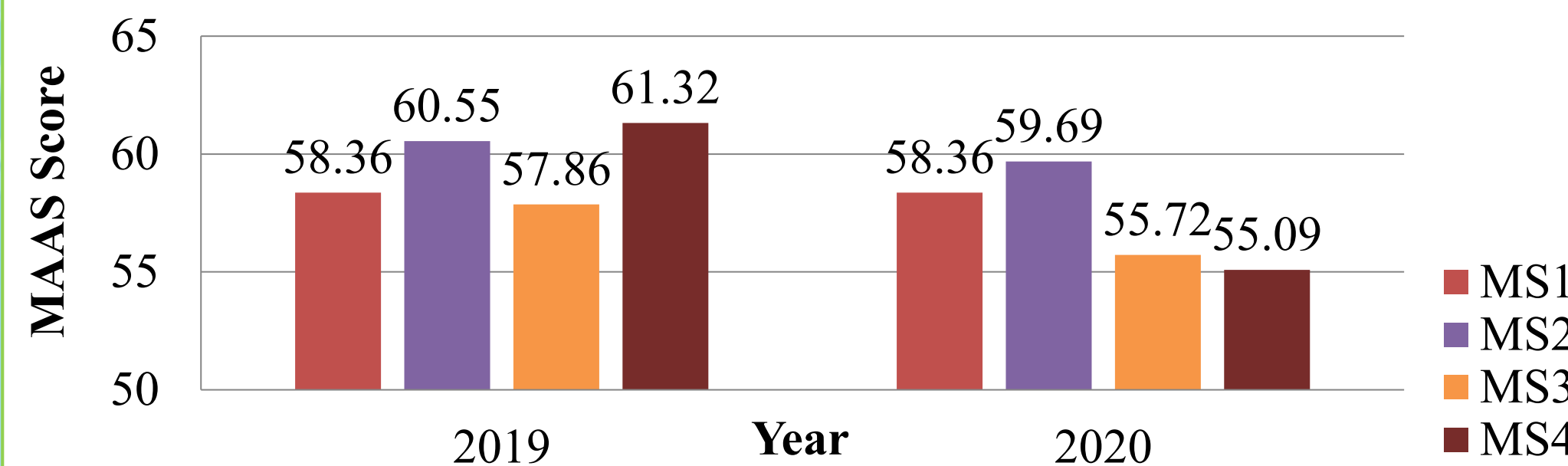Figure 3: MAAS, Mean, By Class and Year

Table 2: MAAS Paired Differences

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
2019 MS1 & 2019 MS2	-3.211	13.672	2.218	-7.704	1.283	-1.448	37	.156
2019 MS1 & 2019 MS3	-.194	14.108	2.534	-5.368	4.981	-.076	30	.940
2019 MS1 & 2019 MS4	-2.730	13.101	2.154	-7.098	1.639	-1.267	36	.213
2019 MS2 & 2019 MS3	2.714	16.776	2.836	-3.049	8.477	.957	34	.345
2019 MS2 & 2019 MS4	-1.195	13.280	2.074	-5.387	2.997	-.576	40	.568
2019 MS3 & 2019 MS4	-4.343	16.104	2.722	-9.875	1.189	-1.595	34	.120
2020 MS1 & 2020 MS2	-3.474	12.502	2.028	-7.583	.636	-1.713	37	.095
2020 MS1 & 2020 MS3	3.244	14.083	2.099	-.986	7.475	1.545	44	.129
2020 MS1 & 2020 MS4	4.182	17.107	2.978	-1.884	10.248	1.404	32	.170
2020 MS2 & 2020 MS3	4.690	13.146	2.028	.594	8.787	2.312	41	**.026**
2020 MS2 & 2020 MS4	5.800	12.871	2.574	.487	11.113	2.253	24	**.034**
2020 MS3 & 2020 MS4	1.233	14.066	2.568	-4.019	6.486	.480	29	.635
2019 MS2 & 2020 MS2	-.132	14.800	2.401	-4.996	4.733	-.055	37	.957
2019 MS3 & 2020 MS3	2.943	16.419	2.775	-2.697	8.583	1.060	34	.296
2019 MS4 & 2020 MS4	1.500	15.323	3.128	-4.970	7.970	.480	23	.636

Five Facet Mindfulness Questionnaire Data
- Baseline scores between both classes prior to beginning medical school were not significantly different.
- Class of 2019, a significant increase was seen between MS1 and MS4 scores (mean difference -13.850 [95% CI -22.350--5.350]) and between MS2 and MS4 scores (mean difference -9.884 [95% CI -17.347—2.420]).
- Class of 2020 had a significant increase in score between MS1 and MS2 (mean difference -8.667 [95% CI -17.194--0.139]) and a significant decrease between MS2 and MS3 (mean difference 9.400 [95% CI 1.367-17.433]). No significant difference in mean was noted between MS3 and MS4. There was no significant difference between MS1 and MS4 for Class of 2020.
- No difference was seen between the Class of 2019 and 2020 at the MS2 and MS4 level, but the Class of 2019 has a significantly higher score during MS3 (mean difference 10.735 [95% CI 4.861-0.845]).
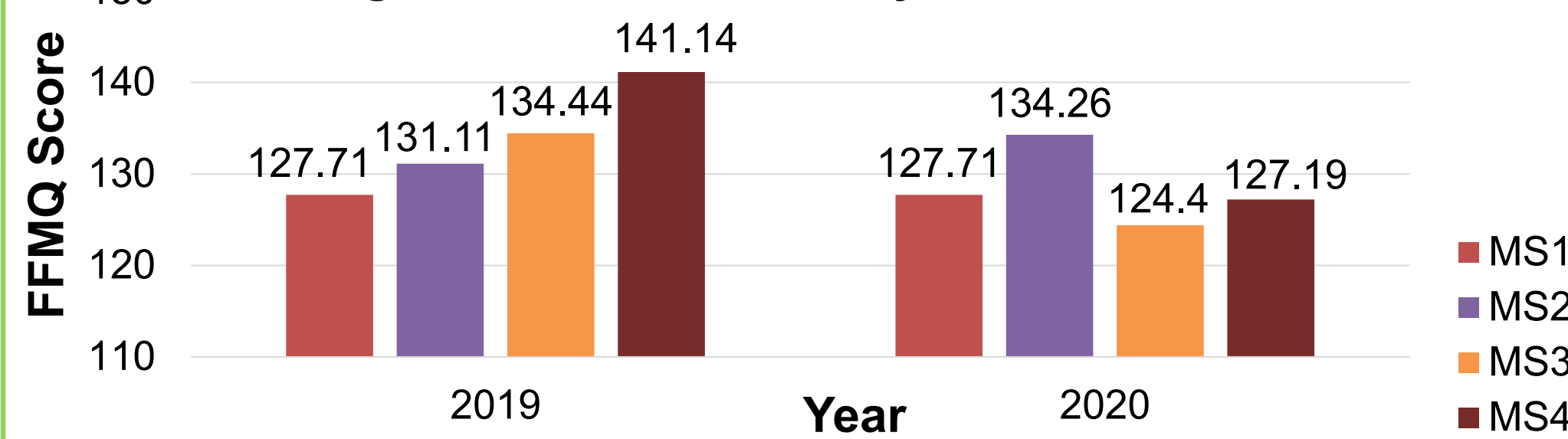

Figure 4: FFMQ, Mean, By Class and Year

Table 3: FFMQ Paired Differences

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
2019 MS1 & 2019 MS2	-5.326	27.315	4.166	-13.732	3.081	-1.278	42	.208
2019 MS1 & 2019 MS3	-6.935	22.689	4.075	-15.258	1.387	-1.702	30	.099
2019 MS1 & 2019 MS4	-13.850	26.577	4.202	-22.350	-5.350	-3.296	39	**.002**
2019 MS2 & 2019 MS3	-2.735	22.891	3.926	-10.723	5.252	-.697	33	.491
2019 MS2 & 2019 MS4	-9.884	24.251	3.698	-17.347	-2.420	-2.673	42	**.011**
2019 MS3 & 2019 MS4	-6.206	26.570	4.557	-15.477	3.065	-1.362	33	.182
2020 MS1 & 2020 MS2	-8.667	26.307	4.213	-17.194	-.139	-2.057	38	**.047**
2020 MS1 & 2020 MS3	4.044	26.541	3.956	-3.929	12.018	1.022	44	.312
2020 MS1 & 2020 MS4	2.324	28.440	4.877	-7.600	12.247	.476	33	.637
2020 MS2 & 2020 MS3	9.400	25.119	3.972	1.367	17.433	2.367	39	**.023**
2020 MS3 & 2020 MS4	.778	21.366	4.112	-7.674	9.230	.189	26	.851
2020 MS3 & 2020 MS4	-4.103	21.571	4.006	-12.309	4.102	-1.024	28	.314
2019 MS2 & 2020 MS2	-3.146	26.067	4.071	-11.374	5.081	-.773	40	.444
2019 MS3 & 2020 MS3	10.735	28.345	4.861	.845	20.625	2.208	33	**.034**
2019 MS4 & 2020 MS4	7.800	27.830	5.566	-3.688	19.288	1.401	24	.174

Results

Focus Group Data
Significant trends from MS1 focus groups for Class of 2019 (N=13) and Class of 2020 (N=12)
- Prior exposure to mindfulness and EI (1/13 vs 6/12)
- Importance of EI/mindfulness/empathy in applying to medical school (1/13 vs 7/12)
- Participation in activities related to EI/mindfulness/empathy outside of school (8/13 vs 3/12)
- Changing opinions of the SELECT program throughout the year (13/13 vs 12/12)
- Recommend SELECT over the traditional medical curriculum (8/13 vs 12/12)

Discussion

General Discussion
- The trends seen in the MAAS and FFMQ data sets correlate well with one another.
- Class of 2019 showed preserved mindfulness throughout all four years, with a significant increase on the FFMQ between third year and fourth year and between first year and fourth year.
- Class of 2020 had preserved FFMQ and MAAS between first and second year and a significant decrease in both the FFMQ and MAAS between second and third year.
- There was no significant difference in both MAAS and FFMQ for class of 2020 between first and fourth years.
- Class of 2020 had more exposure to the concepts of EI, mindfulness, and empathy prior to beginning medical school compared to the Class of 2019, and both classes had similar self-reported opinions of the SELECT program and its curriculum.

Study Limitations
- Lack of control group (CORE medical students) is a missed opportunity to strengthen the significance of any findings.
- Test-retest bias
- Small sample sizes for each class with decreasing participation in final years of medical school compared to first year
- Decrease in participation in focus groups during 3rd year for both Class of 2019 and 2020

Relationship to SELECT
- This study relates to many SELECT topics, especially leadership, emotional intelligence and empathy by looking at how SELECT curriculum may have had an impact on its students
- Prior studies suggest that interventions targeted at improving mindfulness in healthcare professionals, show improvements in burnout, stress, anxiety and depression (Lamothe et al 2016)
- Prior studies also showed that teaching mindfulness strategies to healthcare professionals lead to increase in empathy and decrease in indicators of burnout (Moll et. al 2018)
- Furthermore, participants have self-reported increased ability to listen mindfully and to be more compassionate and to have better conflict management skills (Moll et. al 2018)
- Physicians who had higher mindfulness scores were rated higher on clinical communication and overall satisfaction by patients (Beach et. al 2013)

Conclusions

Longitudinal quantification mindfulness in medical students showed preservation or improvement across four years in one class and a decrease between the second and third year with preservation between first and final year in another class.

This study highlights the need for further longitudinal studies assessing the efficacy of experimental educational models on the emotional intelligence of medical students.

References

Rotenstein LS, Ramos MA, Torre M, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. Jama. 2016;316(21):2214-2236

Hojat M, Vergare MJ, Maxwell K, ... 2008;84(9):1182-1191.

USF Health. MD SELECT Program ... Accessed2020.

Quinn J, White BA. Cultivating L...

Lamothe M, Rondeau E, Malboeuf ... A systematic review with a focus...

Moll S, Frolic A, Key B. Investing... practice. Journal of Hospital Adm...

Beach MC, Roter D, Korthuis PT...