Impact of a Newly Implemented Leadership and Management Course on Knowledge, Attitude, and Satisfaction of Fourth-Year Medical Students at Ain Shams University

تأثير مقرر دراسى مدرج حديثا عن القيادة والإدارة على معرفة واتجاه ورضاء طلاب الفرقة الرابعة بكلية الطب جامعة عين شمس

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Abstract:

Background: Internationally recognized medical schools assign great efforts towards introducing Leadership courses for their undergraduates. The impact of such courses is usually associated with positive outcomes. **Objective:** This study aimed to assess the impact of a newly launched leadership and management course on fourth-year medical students at Ain Shams University on their knowledge, attitude, and satisfaction. **Methods:** one arm intervention trial was conducted on 410 students who completed the course and its final exam. Pre and post-tests were used to assess students' leadership knowledge and attitude. A satisfaction survey was delivered at the end of the course. All material was delivered to students through their E-learning Moodle platform. Students' exam results were analyzed as an indicator of students' achievement. **Results:** 102 students responded to pre and post-tests and satisfaction surveys. There was a significant improvement in their knowledge and attitude after attending the course. Eighty-nine of them (87.3%) highly rated the course as "excellent - very good". Eighty students (78.4%) agreed that the course was well organized. Seventy-seven students (75.5%) appreciated the course structure and content. Students appraised their professors' performances, teaching ways, course design, and coordination. Some students suggested the introduction of face-to-face sessions for discussions and role-play. Students' success percentage in the final exam was 92.4%. **Conclusion:** Students' knowledge and attitude were improved and were satisfied with various aspects in the course.

Keywords: Medical education - leadership – students' satisfaction

المستخلص:

الخلفية: تبذل كليات الطب المعترف بها دوليًا جهودًا كبيرة لتقديم مقررات دراسية تدريبية عن القيادة لطلابها ويرتبط تأثير مثل هذه المقررات بنتائج إيجابية. الاهداف: تهدف هذه الدراسة إلى تقييم تأثير مقرر القيادة والإدارة الذي تم إطلاقه حديثًا لطلاب الفرقة الرابعة بكلية الطب في جامعة عين شمس لتقييم معرفتهم واتجاهاتهم فى مجال القيادة ورضاهم عن المقرر. طرق البحث: تم إجراء تجربة تداخلية ذات ذراع واحد على 410 طالب وهم الذين أتمموا الدورة وامتحانها النهائي. تم استخدام: اختبار تمهيدى قبل المقرر واخر بعده لتقييم معرفة الطلاب واتجاهاتهم القيادية خلال المقرر الدراسى. كما تم استطلاع رضائهم فى نهاية المقرر. تم بث جميع المواد والاستبيانات للطلاب من خلال منصة التعلم الإلكتروني الخاصة بهم. كما تم تحليل نتائج امتحانات الطلاب كمؤشر للتحصيل الأكاديمى. النتائج: استجاب 102 طالبًا إلى الاختبارات قبل وبعد المقرر واستطلاع الرضاء. كان هناك تحسن كبير في معرفتهم واتجاهاتهم القيادية بعد حضور المقرر. كما قام تسعة وثمانون طالبا (87.3٪) بتقدير المقرر بتقديرات عالية. بينما وافق ثمانون طالبًا (78.4٪) على أن المقرر كان جيد التنظيم. استحسن سبعة وسبعون طالبًا (75.5٪) محتوى المقرر. كما اشاد الطلاب بأداء الاساتذة وطرق التدريس وجودة تصميم المقرر وتنسيقه. في حين اقترح بعض الطلاب وجود بعض الجلسات تدرس وجهًا لوجه وذلك لاتاحة الفرصة للمناقشات وكذلك لعمل نموذج تبادل الأدوار. بلغت نسبة نجاح الطلاب الاكاديمى 92.4٪. الخلاصة: تحسنت معرفة الطلاب واتجاهاتهم القيادية بعد حضور المقرر الدراسى الذي نال رضائهم.

الكلمات المفتاحية: التعليم الطبى – القيادة – الرضاء الطلابى.

Introduction (including objectives):

Leaders are made not born, and leadership attitude is an important mechanism to overcome various challenges that face any institution, including health institutions. Healthcare has high priority in any country; graduated physicians must deliver high quality clinical service with leadership responsibility in health team, and in their community.[1]

In Egypt, there is a serious breach in teaching leadership competencies to physicians. In the growing health sector, it is crucial to introduce leadership to undergraduates to achieve NARS competencies, being a requirement for quality assurance.

The mission of the faculty of medicine, Ain Shams University, is to develop physicians that improve healthcare sector in Egypt, and therefore launched a novel leadership and management course for fourth-year medical students, in the academic year 2021-2022 by Medical Education Department. The course is intended to enhance students' leadership knowledge and attitude and to prepare them for better healthcare practice.

It is a core course delivered online, focusing on 8 leadership competencies, namely: leadership styles, emotional intelligence, negotiation, conflict resolution, decision making, positive feedback, delegation and managing change. Each competency was discussed in a separate session. The course includes leadership competencies from domains of the Medical Leadership Competency Framework (MLCF): leadership style, giving and receiving feedback, delegating responsibilities, and setting direction. [2,3]

Being a new course, evaluation is highly indicated with the cycle: plan, do, check, adjust (PDCA) framework [4]. In this study, we evaluated the course based on student feedback according to Kirkpatrick assessment model (level 1 and 2: reaction and learning). We also highlighted lessons that can improve the course in the upcoming years. Kirkpatrick level 1 is important for decision making for courses; if students' reactions were negative, they would not be motivated to learn[5].

The objective of the present study is to assess the change in leadership knowledge and attitude of fourth-year medical students after attending the course, assess students' satisfaction with the course and highlight areas for improvement.

Methods:

The present study is a one arm intervention trial which was applied on fourth-year medical students at Ain Shams University—(ASU), Cairo, Egypt.-Approval of Council of Medical Education Department and ethical committee (with Federal Wide Assurance number: 000017585) were taken as well as an informed consent which was obtained from students before participation, during the orientation session. Measures were taken to ensure respondent anonymity.

410 fourth-year medical students were enrolled in the course. It was delivered online on the undergraduate e-learning Moodle during the period from November 2021 till January 2022. It included 9 sessions. First session discussed main differences between leadership and management. Next 8 sessions discussed leadership competencies with an average of one session per week, for 8 successive weeks. Sessions included interactive videos, about 50 minutes each, with embedded MCQ questions using H5p plugin to answer within the video. Questions had to be answered correctly to reach the next part of the lecture, otherwise the previous part of the video related to that question would be repeated to ensure deep understanding.

Sessions were prepared by medical education faculty. Material uploaded for students included resources as PowerPoint presentations as well as other resources for further information including articles. Lectures were open to students on weekly basis and discussions were held in discussion forum on Moodle.

Pre-and post tests were delivered immediately before and after the course to assess knowledge gained and attitude change. Both tests included three sections:

The first section included demographic data: Student's gender, nationality, program type: Mainstream or extended modular program (EMP) and whether students had taken similar courses or not. The second section included questions about students' leadership attitude self-perception on 5-point Likert scale. The third section included single best answer questions on course topics to assess knowledge. Questions were categorized into domains; each represented one topic. Also, student satisfaction survey was delivered immediately after the course, including Likert scale questions and open-ended questions. Questions assessed satisfaction with course content, organization, and teaching techniques. The content of satisfaction survey and pre- and post-tests were validated by two experts in the field of medical education.

Final course exam was held in February 2022 including single best answer questions for a total of 16 marks as objective indicators of students' achievement and knowledge acquisition. Students' marks were recorded, and all collected data were analyzed using the statistical package for social sciences, version 23.0 (SPSS Inc., Chicago, Illinois, USA).

The following is included in the appendix:
- Pre-test, post-test and satisfaction survey and their scoring methods
- Table a: Leadership and management course sessions.
- Table b, c, d: satisfaction tables.

Results:

The final analysis included 102/410 students who completed pre and post-tests as well as a satisfaction survey with a response rate of 24.8%. The ratio of female to male respondents was roughly 2:1; the ratio of mainstream to EMP was nearly 4:1; and the ratio of respondents who had previously attended a comparable course to others was approximately 1:4. There was a statistically significant difference in students' self-perceptions of leadership attitude before and after the course, with attitude improvement after the course; the largest significance was in leadership and management, as well as constructive feedback. **(Table1)**.

There were also statistically significant differences in students' leadership knowledge with improvement of overall knowledge after the course; highest significance being in leadership styles, Negotiation, delegation and managing change (**Table 2**).

There was no statistically significant difference between male and female students regarding leadership attitude or knowledge in pre- and post-tests.

There was also no statistical significance between Mainstream and EMP students regarding leadership attitude in pre- and post-tests, except in decision making **(Table 3)**.

There was no statistical significance between Mainstream and EMP students in leadership knowledge in pre- and post-tests, except in conflict resolution in pretest and in leadership and management knowledge in post-test **(Table 4)**.

There was no significant difference in leadership attitude, and knowledge acquisition after the course between students who had previously attended similar courses and those who did not **(Table 5)**.

Course satisfaction survey:

Eighty-nine students (respondents) (87.3%) highly rated leadership and management course: 46 students (45.1%) rated excellent, 43 students (42.2%) rated very good, However, 11 students (10.8%) rated fair, and only 2 students (2%) rated poor.

Students were satisfied with course organization; eighty students (78.4%) agreed that the course was well organized. 65 students (64%) agreed that the course learning objectives and navigation details were clearly outlined at the beginning of the course. 71 students (70%) agreed that the course assessment details were clearly outlined. 76

students (74.5%) approved instructor guide was given when needed, and that technical problems were minimal.

Fifty-nine students (58%) agreed that the course design was attractive, 65 students (64%) admitted that the course topics and content are well organized, and 79 students (78%) agreed that the course material and lectures were timely available and well organized. 77 students (75.5%) agreed that learning materials were consistent with course learning outcomes and that they enhanced their knowledge. 78 students (76.5%) agreed that course time range was appropriate. 69 participants (67.6%) agreed that video lectures were enjoyable, 71 participants (69.6 %) approved those questions embedded in videos were engaging and the course motivated them to learn more about leadership. 72 participants (70.5%) agreed that they would apply what they learned in the future, 66 participants (64.5%) admitted that the course changed their attitude positively; the course met the expectations and educational needs of 71 participants (69.6 %). As recommendation for improving the course in the future, 62 students (60.8%) agreed on increasing interactive techniques in the course, 71 students (69.6 %) found the course beneficial as part of the medical curriculum.

Comments by students in open ended questions concerning course satisfaction showed that:

Twenty-four students (24.5%) liked their coordinator help, 21 students (21.4%) liked course organization. Fifteen students (15.3%) liked teaching methods, appraising staff performance, 14 students liked lectures describing; useful, interesting, and knowledgeable, describing the course;" skills for life" and 12 students (12.24%) liked videos design. 10 students (10.2%) said the course saved time, and 6 students (6.12%) liked it being online. However, challenges reported: Eighteen students (18.3%) found the course less interactive with less case scenarios and group discussions than expected, while 10 students (10.2%) dislike the course being totally online and 9 students (9.18%) admitted information are huge regarding time.

Areas of improvement suggested by students:

Eleven students (11.22%) suggested interactive live activities to enhance learning, and practice role play real-life situations. Eight students (8.16%) recommended more cases and activities. Eight students (8.16%) suggested live group discussions and synchronous lectures. Five students (5.1%) suggested increasing course duration and 4 students (4.1%) suggested more topics related to work.

Students' final exam scores:
 (Total enrolled students) showed high success rate (92.4%); 379 students / 410 got scores ≥9.6/16 **figure (1)**.
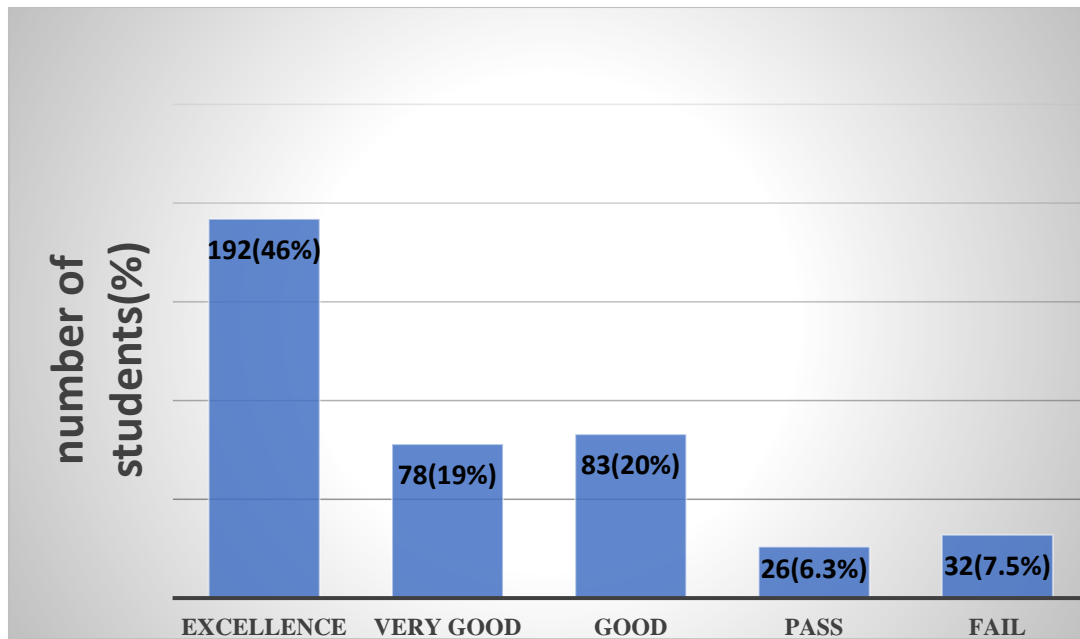
Figure (1): All Enrolled Students' Scores in the Final Exam.

Discussion:

Leadership and management course was launched for undergraduate fourth-year medical students to teach them how to lead and implement change. The course was delivered asynchronously online. Interactive lectures enhance students' engagement. This study included 102 fourth-year medical students from a total of 410 students (response rate: 25%), who completed the pre-test, post-test, and satisfaction survey. Such response rate is higher, compared to a previous study done on UK medical students to assess their perception, attitude, and interest toward medical leadership where the response rate was (4.9%).[6]

There was a statistically significant improvement in **leadership attitude** in all measured leadership competencies, with less improvement in: negotiation, decision making and delegation which could be difficult topics to practice and need more training. In a previous study in India, a statistically significant difference was observed for all measured leadership competencies. In contrast to this study, Indianian participants were of higher age group, fresh graduates.[7] In this study, students' overall **leadership knowledge** showed significant improvement from 51% to 82.35% in pre-and post-tests, with highest increase in leadership styles. These results agreed with study done at Massachusetts Medical School on leadership course of 6 sessions, depending on students' self-perception about leadership knowledge, with an average of 4.4 on the 5-point Likert scale.[8] In contrast, present study depended on objective measure "single best answer questions" for scoring knowledge.

In this study, neither gender nor program type have significant impact on students' self-perception leadership attitude except in decision making which was higher in EMP students. Also, there was no significant difference between students of both programs in leadership knowledge before the course except in conflict resolution, leadership, and management. Previous knowledge about conflict resolution was higher in EMP students, and knowledge acquisition about leadership and management was higher after the course, compared to Mainstream students.

These findings could be linked to the problem-solving and interactive teaching methods used in the EMP system in general, as well as close monitoring of students by staff due to their small number in comparison

to the Mainstream. These findings were comparable to those of a study on the impact of a leadership development programme on 96 Indian physicians with various demographic data, which found no significant link, implying that participants' competence improved despite variable demographic variables.[7]

In terms of leadership experience, there was no significant difference in the improvement of leadership attitude or knowledge in students who had previously attended a comparable training course. However, prior to the course, a substantial association between students who had previously attended a comparable training course and previous leadership knowledge was discovered in leadership and management, leadership styles, decision making, and dispute resolution. These findings are consistent with those of a study conducted on Indian physicians following a 6-day leadership training, which found no association between leadership competency enhancement and previous year experience in healthcare. Later research was conducted on graduated physicians who had diverse leadership positions in the workplace[7].

Concerning students' satisfaction with the course, the study revealed a high overall satisfaction score. 46 students (45.1%) and 43 students (42.2%) evaluated the course as excellent and very good respectively, collectively 89/102 students (87.3%) were satisfied, indicating the course positive impact on students. These findings agree with a study done at King Abdulaziz University, Saudi Arabia [9]

Regarding course structure and content, this study showed 77 /102 students (75.5%) satisfied, with highest satisfaction about course lectures and materials organization 77.3% (79/102 students) and 75.5% (77/102 students) agreed upon the course learning materials enhancing students' knowledge. This was high satisfaction score compared to the study done on leadership course at Michigan University on first-year medical students, in which 21/70 students (30%)

agreed that leadership curriculum contributed to their learning, and 24/70 students (35%) agreed that the course improved their ability to assess and problem-solve common challenges in healthcare [10]

The high degree of students' satisfaction in the present study could be attributed to the way of delivering the course, being an online asynchronous course in which each student could learn at his/her own pace compared to the Michigan Study which was delivered totally face to face and students had to attend sessions at their scheduled time in which students might be unable to attend all sessions. Another factor for high students' satisfaction in the present study could be attributed to the academic level of the students, fourth year, being experienced in dealing with colleagues and patients in hospital settings. These students appreciated how course content enhanced their understanding and how applying what they learned is important in different contexts. This varies from the previous study, in which students were younger; in first year, and may not have previously dealt with patients and healthcare colleagues in a hospital setting, which influenced their grasp of the content and hence satisfaction with the course [10] Regarding students' satisfaction about applying what they learned in their future practice, this study showed that 72/102 students (70.6%) agreed to apply what they had learned in real life situations in the future. Also 66/102 students (64.7%) agreed that the course positively changed their attitude. Moreover 71/102 (69.6%) found the course beneficial in the medical curriculum. This contrasts with the study done at Michigan university on first-year medical students, in which 22/70 students (31%) agreed that the leadership course provided them with opportunities to apply basic principles of systems-based practice. Despite both courses being partly similar in their content, the authors admitted that the course might require revisions and that creating a robust curriculum for first year medical students is challenging and needs more interactive teaching [10]

By assessing the findings of the leadership course in the current study, the beneficial influence of the course is visible, with clear enhancements in students' knowledge and perception of their attitude, as well as their satisfaction. More research is needed to examine the course's impact on medical students' real practice of leadership abilities.

Acknowledgments:

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List of tables:

Results are expressed as mean ± standard deviation.
* Significance from pre-course test by paired sample test at P < 0.05.

Table (1): Students' self-perception of leadership attitudes in different domains in the pre- and post-course tests.

Leadership attitude domains	Pre-course (n=102)	Post-course (n=102)	Paired Sample t-test		
			Mean	t-test	P value
Leadership and Management	2.43±0.78	3.99±0.72	1.558	14.794	<0.001*
Negotiation/Conflict Resolution	2.63±0.66	3.48±0.59	0.850	2.914	0.026*
Decision Making	2.64±0.71	3.34±0.71	0.705	2.122	0.019*
Constructive Feedback	2.56±1.11	4.08±0.76	1.526	11.436	<0.001*
Delegation Skills	2.58±0.67	3.49±0.65	0.914	2.970	0.027*
Emotional Intelligence	2.61±0.92	3.67±0.72	1.058	9.122	<0.001*
Managing Change	2.76±0.85	3.83±0.65	1.066	10.109	<0.001*
Overall Leadership Attitude Score	**2.60±0.57**	**3.70±0.52**	**1.097**	**14.357**	**<0.001***

Table (2): Students' leadership knowledge in different domains, pre- and post-course.

Leadership Knowledge domains	Pre-course (n=102)	Post-course (n=102)	Paired Sample t-test		
			Mean	t-test	p-value
Leadership and Management	56.86±25.89	71.81±17.47	14.951	2.079	0.019*
Emotional Intelligence	64.95±28.85	88.97±19.77	24.020	2.982	0.027*
Leadership Styles	34.56±23.08	71.81±25.29	37.255	10.990	<0.001*
Negotiation	38.56±29.95	86.28±23.62	47.721	12.635	<0.001*
Decision Making	69.12±37.92	89.71±23.69	20.588	2.000	0.018*
Conflict Resolution	57.52±32.90	86.28±22.18	28.760	3.148	0.028*
Constructive Feedback	76.47±31.23	96.08±15.23	19.608	2.451	0.022*
Delegation	42.48±32.22	82.69±27.24	40.203	9.623	<0.001*
Managing Change	19.27±21.72	67.65±33.33	48.378	12.284	<0.001*
Overall score	**51.09±16.22**	**82.35±16.80**	**31.266**	**13.522**	**<0.001***

Table (3): Effect of type of learning programs (Mainstream or EMP) on students' leadership attitude pre- and post-course.

Leadership attitude domains	Type of learning program		Independent t-test	p-value
	EMP (n=21)	Mainstream (n=81)		
	Mean±SD	Mean±SD		
Pre-course				
Leadership and Management	2.33±0.72	2.45 ±0.80	-0.622	0.535
Negotiation/Conflict Resolution	2.54±0.51	2.66±0.69	-0.754	0.453
Decision Making	2.70±0.45	2.62±0.77	0.437	0.663
Constructive Feedback	2.44±1.00	2.59±1.14	-0.527	0.599
Delegation Skills	2.38±0.76	2.63±0.64	-1.513	0.134
Emotional Intelligence	2.40±0.81	2.67±0.95	-1.198	0.234
Managing Change	2.52±0.80	2.82±0.85	-1.457	0.148
Overall Leadership Attitude Score	2.47±0.49	2.63±0.59	-1.153	0.252
Post-Course				
Leadership and Management	4.06±0.60	3.97±0.75	0.538	0.592
Negotiation/Conflict Resolution	3.69±0.52	3.43±0.60	1.827	0.071
Decision Making	3.76±0.71	3.23±0.68	3.151	0.002*
Constructive Feedback	4.14±0.49	4.07±0.82	0.385	0.701
Delegation Skills	3.67±0.61	3.44±0.66	1.400	0.165
Emotional Intelligence	3.78±0.73	3.64±0.72	0.774	0.441
Managing Change	3.97±0.66	3.79±0.64	1.130	0.261
Overall Leadership Attitude Score	**3.87±0.50**	**3.65±0.52**	**1.689**	**0.094**

Table (4): Effect of students' learning programs (Mainstream and EMP) and their leadership knowledge pre- and post-course.

Leadership Knowledge domains	Type of learning program		Independent t-test	p-value
	EMP (n=21)	Mainstream (n=81)		
	Mean±SD	Mean±SD		
Pre-Course				
Leadership and Management	59.52±29.02	56.17±25.17	0.527	0.600
Emotional Intelligence	69.05±19.21	63.89±30.87	0.728	0.468
Leadership Styles	39.29±21.75	33.33±23.39	1.054	0.295
Negotiation	39.67±25.00	38.27±31.24	0.190	0.850
Decision Making	69.05±37.00	69.14±38.38	-0.009	0.992
Conflict Resolution	74.61±29.64	53.09±32.41	2.757	0.007*
Constructive Feedback	83.33±32.91	74.69±30.74	1.131	0.261
Delegation	46.03±34.13	41.56±31.87	0.565	0.574
Managing Change	12.69±19.65	20.98±22.01	-1.570	0.120
Overall Leadership Knowledge	54.80±15.49	50.12±16.36	1.181	0.240
Post-Course				
Leadership and Management	78.57±16.37	70.06±17.42	2.019	0.046*
Emotional Intelligence	95.24±12.79	87.35±20.96	1.644	0.103
Leadership Styles	78.57±25.35	70.06±25.13	1.380	0.171
Negotiation	87.30±22.30	86.01±24.07	0.222	0.825
Decision Making	92.86±17.93	88.89±25.00	0.682	0.497
Conflict Resolution	88.90±19.24	85.60±22.93	0.604	0.547
Constructive Feedback	97.62±10.91	95.68±16.20	0.518	0.605
Delegation	82.55±30.94	82.72±26.41	-0.026	0.979
Managing Change	68.25±32.46	67.49±33.74	0.093	0.926
Overall Leadership Knowledge	**85.53±13.11**	**81.53±17.61**	**0.973**	**0.333**

Table (5): Effect of students attending a training course previously on their leadership knowledge acquisition pre- and post-course.

Leadership Knowledge domains	Have you taken a leadership course or any other human developmental courses before?		t-test	p-value
	Yes (n=21)	No (n=81)		
	Mean±SD	Mean±SD		
Pre-Course				
Leadership and Management	72.62±17.51	52.78±26.22	3.277	0.001*
Emotional Intelligence	73.81±26.78	62.65±29.08	1.591	0.115
Leadership Styles	44.05±20.77	32.10±23.13	2.152	0.034*
Negotiation/Conflict Resolution)	38.09±30.35	38.68±30.04	-0.081	0.936
Decision Making	88.10±26.95	64.20±38.92	2.649	0.009*
Conflict Resolution	74.62±29.63	53.09±32.41	2.759	0.007*
Constructive Feedback	88.10±21.82	73.46±32.68	1.940	0.055
Delegation	41.27±25.63	42.80±33.85	-0.192	0.848
Managing Change	22.20±19.24	18.51±22.36	0.693	0.490
Overall Leadership Knowledge	60.31±8.14	48.70±16.95	3.043	0.003*
Post-Course				
Leadership and Management	72.62±13.47	71.60±18.44	0.236	0.814
Emotional Intelligence	92.86±17.93	87.96±20.20	1.011	0.314
Leadership Styles	77.38±24.88	70.37±25.34	1.134	0.260
Negotiation	92.07±17.96	84.78±24.75	1.264	0.209
Decision Making	92.86±23.90	88.89±23.72	0.682	0.497
Conflict Resolution	90.48±18.68	85.19±22.97	0.974	0.332
Constructive Feedback	97.62±10.91	95.68±16.20	0.518	0.605
Delegation	82.54±32.69	82.72±25.88	-0.027	0.979
Managing Change	77.78±28.56	65.02±34.12	1.574	0.119
Overall Leadership Knowledge	86.24±15.31	81.35±17.11	1.191	0.236