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Quality Improvement Competency Development for Correctional Nursing Leaders

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Abstract

Nurse leaders are often promoted with little to no leadership development. Lack of development is a leading cause of turnover. Leadership development is crucial to retaining qualified leaders and the National Academy of Medicine identified that quality improvement (QI) competency development for nursing leaders is critical to improved healthcare. To invest in leader development and improve QI competence, a structured, weekly, coaching intervention was used for four consecutive weeks to reinforce QI concepts and assist in development of a QI project plan for nursing leaders. The Beliefs, Attitudes, Skills, and Confidence in Quality Improvement (BASiC- QI) instrument was used before and after the intervention, and findings were compared to a region that did not receive the coaching intervention. There were minimal to no statistically significant findings when comparing the two regions. The Quality Improvement Knowledge Application Tool- Revised (QIKAT-R) was utilized to examine each nurse leaders QI project plan. Results indicate participants were challenged the most when attempting to identify a change for their QI project. Practice implications include providing leaders the opportunity to come together to learn new information, but also to network with their peers, hear each other's ideas, and have the opportunity to ask questions and get clarification on a complex subject that may contribute positively to their future QI efforts.

Quality Improvement Competency Development for Correctional Nursing Leaders

Intention to leave, a measure examining the intention to leave a current role and considered an indirect measure of anticipated turnover, among nurse leaders is very high, approximately 50% (Warden et al., 2021). Top reasons for nurse leader intent to leave are burnout, lack of work-life balance or job satisfaction, incongruence with organizational culture, and lack of professional development (Warden et al., 2021). This suggests that increasing opportunities for development of leadership competency could contribute to decreased intention to leave in nursing leaders. Research indicates that nurse leaders are often promoted to roles based on longevity in their role or competent clinical skills, rather than factors specifically related to leadership competency (Warshawsky & Cramer, 2019; Gunawan et al., 2018). They are also often promoted without initial or ongoing leadership competency development (Warshawsky & Cramer, 2019; Gunawan et al., 2018).

Quality improvement (QI) competency development for nursing has been identified by the National Academy of Medicine (formerly the Institute of Medicine) in their 2011 report, *The Future of Nursing: Leading Change, Advancing Health*, as critical to the improvement of healthcare (National Academy of Medicine, 2011). Quality is mentioned 587 times in the report. Research has established a positive relationship between nurse leadership competency and quality of patient care outcomes, such as medication errors, length of stay, and patient mortality (Wong et al., 2013). Research also demonstrates that competency development for nursing leaders makes them more able to implement evidence-based practices that contribute to

improved quality patient outcomes (McGarity, 2020). One aspect of competency development for nursing leaders that also satisfies the call for QI in nursing from the National Academy of Medicine is learning quality improvement concepts and how to implement quality improvement projects.

Correctional healthcare is complex. Healthcare is delivered within the constrained context of an environment with limited resources where the primary intention is safety and control; healthcare of patients is the second most important intention. Thus, quality of healthcare can be negatively impacted by these same constraints. The recognized accrediting body for standards of correctional healthcare, the National Commission on Correctional Health Care (NCCHC), has also demonstrated a commitment to quality of care in correctional healthcare by including QI in their requirement to meet the standards for accreditation (National Commission on Correctional Health Care, n.d.). An initiative is underway in a correctional healthcare company, headquartered in the midwestern United States, to improve quality of correctional patient care by increasing the QI competency level of all correctional healthcare staff by education and implementation of concepts of Lean Six Sigma. Lean Six Sigma is a combination method use to promote QI thru the reduction of variation and the reduction of waste. The method provides tools used to identify and quantify a problem, uses a series of small tests of change to implement an intervention to impact the problem, and promotes the use of data to measure the outcome of the intervention, all to increase efficiencies and decrease non-value-added processes (American Society for Quality [ASQ], 2021).

Co-occurring with this initiative is a stark need for correctional nursing

leadership competency development, more specifically front-line nurse leaders such as directors of nursing and health service registered nurse administrator roles, within this same midwestern-based, correctional healthcare company. Just as the turnover intentions of nursing leaders in community-based healthcare is high, approximately 50 percent, the turnover percent of nursing leaders of this correctional healthcare company is also high, around 40 percent and rising. This is the highest turnover rate of nursing leaders this company has ever seen. Nursing leaders in this company leave for the same reasons identified previously. Therefore, any effort to develop their competency, thereby potentially improving their job satisfaction and confidence in their roles is in order. To improve nurse leaders' competency in their role, while also aligning with company initiatives to improve quality of care thru QI competency development, a QI project was formed.

Although nurse leaders are often the closest leadership level to patient care and are considered an important factor contributing to patient outcomes, there is limited evidence available for understanding the contributors that influence nurse leader competence (Gunawan, 2018). Literature supports the use of ongoing coaching as a useful strategy in development of nursing leaders', and specifically with QI competency (Udod, et al.,2020). After initial education for nursing leaders on concepts of QI and Lean/Six Sigma, follow-up coaching allows the learner to examine QI concepts more deeply, such as identifying current problems and envisioning solutions. Learning incrementally thru periodic coaching interventions provides time to apply the QI concepts in a more meaningful way and may encourage engagement in and sustainability of a QI project. Therefore, the purpose of this project was to evaluate the

effect of a coaching intervention on the level of QI competency development for correctional nurse leaders working in jails in the northeastern region and southeastern region of the United States, regions served by this correctional healthcare company. The two aims of this project were to increase nurse leaders objectively measured application of QI processes and increase nurse leaders self-perceived QI competency. The primary outcome measure for this project is objectively measured application of QI processes and was measured using the Quality Improvement Knowledge Application Tool Revised (QIKAT-R), which uses a rubric to allow the rater to objectively score the participants responses (Singh et al., 2014). A secondary outcome measure for the project is self-perceived QI competency and was measured using the Beliefs, Attitudes, Skills, and Confidence in Quality Improvement (BASiC-QI) scale, a 30-question scale (Brown et al., 2019). The study question for this project is: What is the effect of a coaching intervention on objectively measured and self-perceived QI competency development for jail correctional front-line nursing leaders in northeastern and southeastern United States?

Review of Literature

Two different literature reviews were conducted for this project. The first literature review sought to gain insight into themes surrounding nursing leadership competency development as a strategy to improve work-life satisfaction. The second review focused specifically on QI competency development for nursing leaders, for which the literature is very limited. Following is a description of these literature searches. Both reviews used the term nurse manager as it more closely aligned with the population of focus for this project. In this correctional company, the director of

nursing role and health service registered nurse administrator are considered to be front-line nursing manager roles. In the literature, nurse manager seemed to correlate with a front-line nurse manager role most often, hence it was more appropriate and relatable to these identified roles in this organization.

The nursing leadership competency development literature review was conducted using CINAHL, Academic Search Complete, and OVID Journals. Key search terms included *nurse leader, nurse manager, leadership development, leadership training, competence, turnover, retention, intent to leave, intent to stay,* and *job satisfaction.* Boolean operators utilized were AND and OR. There were 269 publications initially generated. Search limiting criteria consisted of scholarly and peer-reviewed, journal articles from 2016 thru 2021, published in English with full text available. Inclusion criteria consisted of a population focus of nurse leaders, and a topic focus of leadership competency development strategies. Exclusion criteria were articles not focused on nursing leaders or leadership competency development. The number of publications generated after refining the search for the inclusion and exclusion criteria where 87. These abstracts were reviewed for content, population of focus, setting, generalizability to alternative healthcare settings, and suitability, and 10 were selected for inclusion in the review.

The second literature review was conducted using CINAHL, Academic Search Complete, and MEDLINE. Key search terms included *quality improvement* and *nurse manager*, *nurse leader*, and *competency*. The Boolean operators utilized were AND and OR. There were 544 journal articles remaining after limiting the search to articles from 2016 thru 2021, published in scholarly, peer-reviewed, academic journals in

English with full text available. Inclusion criteria were articles with a population focus of nursing managers and a topic focus of QI training, education, or competency development at the nurse manager level. Exclusion criteria were articles without a population focus of nurse managers that did not include a topic focus of QI training, education, or competency development. After reviewing abstracts more closely based on the inclusion and exclusion criteria, the remaining number of publications was 34. The remaining articles were fully reviewed for content, population of focus, setting, generalizability to alternative healthcare settings, and suitability, and 8 were selected for inclusion in the review. A total of 18 articles were used in this literature review (Appendix A).

Although there is an abundance of information in the literature about competency development in nursing, there is limited research on these topics specifically for nurse leadership competency development. Additionally, there are wide and varying definitions in the literature of what roles or titles are considered to be nurse leaders versus nurse managers, depending on the context of healthcare delivery, and there is no consensus in the literature for what constitutes as an all-inclusive list of topics or strategies for leadership development required for success in a nurse leader role. However, some key themes regarding nurse leadership competency development strategies were detected and these included variety of content, variety of delivery strategies, and use of mentoring or coaching as a strong predictor of success. Following is a description of those key themes.

Content chosen for leadership development was wide and varied. Three articles focused on leadership style to examine types of leadership that contributed to increased

leadership competency or success (Frasier, 2019; Frias et al, 2021; Moon, 2019). Frasier (2019) describes authentic leadership style, while two other publications focused on transformational leadership style (Frias et al., 2021; Moon, 2019). Two articles focused only on increasing nursing leadership competency for specific skills, such as emotional intelligence or structural empowerment (Frias et al, 2021; Sisk et al., 2021). Emotional intelligence influences a leader's ability to bring about transformational change thru effective communication, building trust, and inspiration among staff, thus improving teamwork and productivity. (Frias et al., 2021). Structural empowerment is a concept based upon the premise that successful leadership comes from ability to access and use resources. Sisk et al. (2021), focused on impacting structural empowerment by implementing interventions for leaders that enhanced their ability to identify and use resources. Four articles aligned chosen content for leadership development with the Nurse Manager Leadership Partnership competencies (NMLP) developed by the American Association of Critical-Care Nurses (AACN) and the American Organization of Nurse Leaders (AONL) which describes skills or competencies needed for successful nurse leaders (Flatekval, 2019; McGarity et al., 2020; Ramseur et al., 2018; Warshawsky & Cramer, 2019). A selection of the competencies includes budgeting, performance coaching, conflict resolution, customer service, workforce generational differences, patient safety or quality improvement, diversity, time management, change management, communication, team building, and career planning. Content chosen for nursing leadership development is wide and varied, which may suggest that all identified content is useful to varying degrees, but any development content could increase nurse leadership competency level.

Another theme detected in the literature related to nursing leadership development learning strategies. All studies used a combination of approaches to deliver content, suggesting that the complexity of information may be accepted more thoroughly by appealing to many learning styles and by incorporating material into activities that required use of the information to ensure comprehension. All studies included a component of didactic material, although some delivered the material via online modules (Flatekval, 2019; Ramseur et al., 2018), while most had in-person training (Frasier, 2019; Frias et al., 2021, McGarity et al., 2020; Sisk et al., 2021; Spencer et al., 2018). When content was delivered in online modules, there was always an additional in-person component to the program. This could suggest that an in-person component may be beneficial to foster relationships between peers to create a network of support from which to draw advice and strength when encountering future leadership challenges. McGarity et al. (2020) used a small peer group strategy to facilitate relationships and discussion, while Frasier (2019) incorporated reflective journaling as a learning technique into their program intervention. McGarity et al. (2020) also employed a unique strategy where participants had to develop and implement a quality improvement project and present the project and outcomes at the end of the program. There was a 25% individual improvement in QI competency after the program which may have resulted from using the learned competencies synthesized thru a quality improvement project. This was similar to the intervention employed by Sisk et al. (2021) whereby participants developed and implemented a capstone project over six months, which demonstrated knowledge obtained from the development program, but also verified comprehension and utilization for a practical purpose. This

theme may imply that using multiple types of content delivery strategies may appeal to many learning styles and could contribute to increased nursing leadership competency levels.

Mentoring and coaching were also major themes across all nursing leadership competency development publications. Almost all development programs included mentoring or coaching as a strategy. Flatekval (2019) incorporated a mentoring approach via lunch and learns where leadership concepts were more deeply explored with peers and instructors. Frasier (2019) reported part of their leadership development program was biweekly peer experiential encouragement partner (PEEP) discussions where participants were paired with experienced partners so they could discuss information learned and problems encountered. Ramseur et al. (2018) offered an optional mentoring component, although 96% of participants participated with their mentor and reported these discussions to be valuable. This implies that participants wanted mentoring and felt it would positively contribute to their success. McGarity et al. (2020) identified that the peer support component of their program contributed to its success by cultivating leaders who learned from others experiences or successes to gather ideas. They also highlighted this process helped leaders when sharing ideas on how to implement their evidence-based quality improvement project on their units. Sisk et al. (2021) also employed a peer support component in their program and participants met regularly with their peer supporter through the six months while working on their capstone project. Evaluations from participants reported the peer support was extremely valuable and helped participants better understand the goals of the organization. Gunawan et al. (2018) reported via systematic analysis that

organizational factors, such as a mentoring program, were identified in the literature as most associated with leadership competence.

When reviewing the literature for QI competency development for nursing leaders, key themes emerged that included leadership influence, engagement, and coaching. Following is a discussion of those themes.

Leadership strongly influences success of QI competency development, implementation, and sustainment (Blok et al, 2021; Fleiszer et al, 2016; Henderson et al, 2020; Udod et al, 2020). Fleiszer et al, (2016), identified that support for QI efforts must permeate all levels of leadership in an organization to be successful. Senior leaders may desire a focus on QI, but if front-line managers are not modeling that message, efforts fall short of expectation. Nursing leaders need to understand their important role in the success of QI initiatives and take responsibility for quality of care for patients in their units.

Engagement contributes to success of QI initiatives, but QI also contributes to the development of engagement, and nurse leaders influence engagement of their subordinates (Blok et al, 2021; Fleiszer et al, 2016; Henderson et al, 2020; Kirby & Good, 2020; Page et al, 2021; Sjølie et al, 2020; Udod et al, 2020). Engagement can be described as commitment. Henderson et al, (2020) reported that organizational trust results in positive organizational culture, which increases engagement and contributes to enhanced employee responsibility and accountability. Including employees at all levels of the QI initiative and giving them access to the data results improves their engagement in QI processes. Students involved in an educational curriculum that included QI reported that participating in the development of a QI project increased

their sense of empowerment, they felt their actions carried more meaning and were more confident in their ability to promote change, and because it felt more meaningful, they felt more engaged in the work (Kirby & Good, 2020).

The final key theme from the literature of QI competency in nurse leaders involves coaching. Almost all publications discussed coaching or mentoring as a strategic approach to the success of QI competency (Fleiszer et al, 2016; Gleason et al, 2019; Kirby & Good, 2020; Page et al, 2021; Sjølie et al, 2020; Udod et al, 2020). Participating in a collegial group fosters understanding and practical application of QI concepts and processes through a shared understanding of challenges, encourages a greater understanding of the nurse manager role and its influence on QI, increases development of competence and confidence to carry out QI, and helps participants identify opportunities for improvement thru supportive collaboration with peers (Sjølie et al, 2020). Evaluations from BSN students participating in a QI curriculum that included a mentoring and coaching strategy indicated mentoring and coaching contributed the most to their success and satisfaction with the curriculum and confidence in QI (Gleason et al, 2019). Coaching contributes to sustainability of QI efforts (Fleiszer et al, 2016), and lack of coaching strategy inhibits initial uptake of QI efforts (Udod et al, 2020).

In summary, the literature seems to point to a mix of concepts and strategies that contribute to QI competency development of nurse leaders. Strong leadership support improves the uptake and sustainability of QI initiatives and increasing the level of engagement in QI processes also increases the probability of success in QI competency development for nursing leaders. Using a mix of strategies to deliver QI

content that appeals to many different learning styles may promote a deeper understanding of the material presented. The most often identified theme across all the literature was the importance of a coaching or mentoring component, which was the strongest contributor to increased likelihood of success in QI initiatives.

The Iowa Model Revised was chosen as the model to guide this project. This model was chosen because it outlines the steps to identify a problem, search for and implement an evidence-based practice standard, and evaluate and sustain that standard (Buckwater, et al., 2017). In this project, the identified problem is QI competency for nursing leaders. The evidence-based practice identified to promote QI competency development is coaching. Two validated measurement tools were used to evaluate the effect of the intervention and its sustainability. Therefore, this project follows the steps of the Iowa Model Revised.

Methods

Design

The overall approach of this project is a quality improvement intervention that utilizes a pre- and post- intervention comparison design. Although not part of the actual project, a basic QI curriculum was delivered by the organization's QI training specialist to all leadership staff in the company. This project includes a QI intervention that builds on the QI curriculum to enhance QI competency for front-line nursing leaders. The QI intervention offered included four coaching sessions for front-line nursing leaders in one of the company's regions (referred to as the coaching region) that built on the QI curriculum. In addition to the four weekly coaching sessions to reinforce concepts presented in the curriculum, participants presented a

plan at the end of the final coaching session for a QI project to be implemented at their site. Front-line nursing leaders from another region, (referred to as the training-only region), participated in the company QI curriculum, but did not receive the coaching intervention. The project implementation date was February 2022 and the project completed in April 2022.

Setting

The project took place within a private, midwestern-based correctional healthcare company that provides care to more than 50,000 correctional patients, within approximately 50 government, correctional facilities, across 12 states. This company provides comprehensive healthcare that includes medical, dental, vision, maternal and women's health, and mental health care for acute and chronic conditions. The coaching region is located in a southeastern state of the United States and the training-only region is located in a northeastern state of the United States.

Sample

This project used a convenience sample of front-line correctional nursing leaders and included those with titles of Director of Nursing and Health Services Administrator- Registered Nurse in each of the two regions. Those excluded were all titles other than Director of Nursing and Health Services Administrator- Registered Nurse from each of the two regions. Participants were required to participate in the QI curriculum education, but participation by completing the survey tools and coaching session intervention with project implementation plan development was voluntary. A paragraph outlining the project with an indication that participation is voluntary was included in writing when the first survey tool was administered. The desired sample

size was six participants from each region for a total of 12 participants. The actual sample included 13 participants who completed the surveys, and six participants from the coaching region that participated in the coaching intervention and project plan.

Data Collection/Analysis

A unique alphanumeric identifier was generated for each participant for deidentification purposes. The identifier was a combination of the first initial of the participant's mother's first name, followed by the participant's number of siblings, followed by the first letter of the participant's high school mascot, followed by the two-digit year of the date the participant began living at their current address, generating a unique identifier for each participant. The last digit of the identifier was the number *1*, indicating the participant was from the coaching region, or *2*, indicating the participant was from the training-only region. These identifiers were assigned at the time participants completed the first survey tool and the same identifier was used when the second survey tool was administered to ensure a comparison of results could be measured. Three demographic questions were asked along with the first survey tool which included highest category of educational degree completed, range of years of experience in a leadership role, and range of years of experience participating in QI processes. The demographics were obtained to examine how they may contribute to a change in scores from the beginning of the intervention to the end.

Two instruments were used to measure the effect of the intervention. The Beliefs, Attitudes, Skills, and Competency in Quality Improvement Tool (BASiC-QI) (Appendix B) was used to evaluate the effect of the QI curriculum program and coaching intervention (Brown, et al., 2019). The BASiC-QI tool is divided into three

sections that measure the participants attitude, knowledge, and confidence in QI. Approval to utilize the BASiC-QI tool was obtained from the primary author of the publication. Both of the regions completed the BASiC-QI tool prior to delivery of the QI curriculum education and again five weeks later. The Quality Improvement Knowledge Application Tool Revised (QIKAT-R) (Appendix C), was used only by coaching region participants to document their proposed QI project plan at the completion of the coaching intervention (Singh et al., 2014). The Quality Improvement Knowledge Application Tool Revised Rubric (Appendix D) was used to evaluate the QIKAT-R tool participant submission. Permission to use the QIKAT-R tool and rubric in an adapted format was obtained from the primary author of the publication. The Results section includes a comparison of the pre- and post-BASiC-QI for both regions and a description of the results of the coaching region QIKAT-R tools and rubrics to evaluate the effect of the QI curriculum and the additional coaching intervention.

Approval Processes

The correctional company executive leadership approved the project. The project was approved as an exempt protocol by the University of Missouri- St. Louis Institutional Review Board (IRB).

Procedures

Preliminary work to prepare for this project included site mentor and stakeholder meetings with the Clinical Education Specialist Team to ensure the QI curriculum aligns with all the items identified in the BASiC-QI Tool and the development of structured agendas for each QI coaching session that reinforces concepts from the curriculum surrounding problem identification, aims of project,

measures, and test of change to impact the identified problem. Project implementation began the fourth week of February 2022 with delivery of the QI curriculum to coaching region participants. The BASiC-QI tool was administered just prior to the eight-hour, one day long, in-person QI curriculum. Group coaching sessions were virtual, 45 minutes long, once a week, beginning two weeks after the in-person curriculum, continued for four consecutive weeks, and were led by the primary investigator (PI), and attended by the QI educator, and the QI department expert. The first coaching session for coaching region participants included an outline of the expectations of the coaching sessions, group discussion and identification of site-specific problems, and developing potentials aims of projects. Coaching session two content included group discussion about identification of measures that could be used to examine the problem and observe impact from interventions, and feedback from other participants and coaching facilitators. Coaching session three content included group discussion and feedback from others about identification of tests of change to impact the problem and an assignment to choose and develop their own site-specific QI project, documented by participants on the QIKAT-R tool and presented at the final coaching session one week later. The final coaching session included a short presentation by each participant outlining their documented project plan. The post-intervention BASiC-QI was administered again immediately after the fourth coaching session, which was five weeks after the QI curriculum. The QIKAT-R rubric (Appendix D) was utilized by the PI and applied to each of the documented project implementation plans to examine the effect of the additional coaching intervention on ability to apply QI concepts to identified site-specific problems. The QI curriculum

was delivered to the training-only region participants the first week of March 2022 with the first BASiC-QI tool being administered just prior to the QI curriculum. Five weeks later, in the first week of April 2022, allowing for a similar timeframe to pass as was allowed for the coaching region, the training-only region participants again completed the BASiC-QI tool. The project then closed at that time.

Results

There were a total of 13 nurse leader participants in the project. Nine participants were from the group that received the company training and the coaching sessions (referred to as the coaching group) and four participants were from the group that only completed the company training (referred to as the training-only group). Demographic information was obtained from all participants and included level of education, years of leadership experience, and years of experience participating in QI processes. The most frequently observed category of level of education for the entire sample was less than a baccalaureate degree (n = 6, 46.15%). The most frequently observed category of years of leadership experience was more than seven years (n = 5, 38.46%). The most frequently observed category of years of experience participating in QI processes was greater than 5 years of experience (n = 6, 46.15%). Frequencies and percentages for each group and the total sample are presented in Table 1. Kruskal-Wallis rank sum tests found no difference in the demographic items between the two groups, indicating the groups were similar in level of education, years of leadership experience, and years of experience participating in QI processes.

Table 1

Demographic Characteristics

Variable	Coaching		Training- Only		Total	
	n	%	n	%	n	%
Level of Education						
Less than Baccalaureate	5	55.56	1	25	6	46.15
Baccalaureate Degree	3	33.33	1	25	4	30.77
Master's degree	0	0	1	25	1	7.69
Doctoral Degree	0	0	1	25	1	7.69
Missing	1	11.11	0	25	1	7.69
Years of Leadership Experience						
1-3 years	3	33.33	0	0	3	23.08
3-7 years	2	22.22	2	50	4	30.77
More than 7 years	3	33.33	2	50	5	38.46
Missing	1	11.11	0	0	1	7.69
Years of Quality Improvement						
No QI experience	0	0	1	25	1	7.69
Less than 1 year	1	11.11	0	0	1	7.69
1-5 years	4	44.44	0	0	4	30.77
More than 5 years	3	33.33	3	75	6	46.15
Missing	1	11.11	0	0	1	7.69

Note. Due to rounding errors, percentages may not equal 100%.

Two-tailed *t*-tests were conducted for each of the 30 questions on the BASiC-QI instrument to examine the mean differences within and between the coaching and training-only groups. Results were examined by individual measure, subscale, and in total.

When one or more of the assumptions were violated in any independent sample *t*-test, a Mann-Whitney Test was included to supplement the results. When a Mann-Whitney was performed, the results were consistent with the independent sample *t*-test result for all occurrences. When one or more of the assumptions were violated in any paired sample *t*-test, a Wilcoxon Signed-Rank Test was included to supplement the

results. When a Wilcoxon was performed, the results were consistent with the paired samples *t*-test result for all occurrences.

When comparing BASiC-QI pre-survey results for the coaching group to the training-only group, there were no statistically significant differences on any individual measure, subscale, or total scale score (see Appendix E, Table E 1).

When comparing BASiC-QI pre-survey results to post-survey results for the coaching group, differences in two measures were found to be statistically significant, interest in QI, $t(4) = -3.16$, $p = .034$, and knowledge of Plan Do Study Act (PDSA) cycles, $t(4) = -3.09$, $p = .037$, were statistically significant. One additional measure, confidence in writing an AIM statement, approached significance, $t(4) = -2.75$, $p = .052$. There were no statistically significant differences on any subscale or total scale score. Results of the two-tailed paired samples *t*-tests from pre- to post-survey for the coaching group are presented in Appendix E, Table E2.

The BASiC-QI pre- to post-survey results were compared for the training-only group and one measure, knowledge of Plan Do Study Act (PDSA) cycles, $t(3) = -3.87$, $p = .030$, was statistically significant. There were no statistically significant differences on any subscale or total scale score. Results of the two-tailed paired samples *t*-tests from pre- to post-survey for the training-only group are presented in Appendix E, Table E3.

A two-tailed independent samples *t*-test was conducted to examine whether the mean of each of the 30 BASiC-QI post-survey questions was significantly different between the coaching and training-only groups. Differences in three were statistically significant and included enjoyment of QI, $t(8) = 2.39$, $p = .044$, recognizing the value of

QI, $t(8) = 3.20$, $p = .013$, and knowledgeable about systems thinking, $t(8) = 2.48$, $p = .038$. There were no statistically significant differences on any subscale or total scale score. Results of the two-tailed independent samples *t*-tests for post-survey measures for both groups are presented in Appendix E, Table 4.

Six nursing leader participants from the coaching group developed a QI project plan. The QIKAT-R rubric was used to evaluate each nursing leader's submitted QI project plan and to examine their application of QI knowledge in identifying and developing their own site-specific QI project. The results of the QIKAT-R were used to evaluate performance by individual criteria, by section, and in total, to gain more detailed understanding of how the coaching intervention may have affected the results, and to inform future coaching. The QIKAT-R rubric includes three different sections: the aim of the QI project, the measure chosen for the project, and the change idea to be used in the QI project. Each section includes three criteria, and one point is scored for each criterion that is met for a total possible score of nine for each participant. By section, with six participants, a total section score of three is possible for each participant, and all participants weighed together, a total score of 18 is possible for the section. In total, with six participants and across all three sections, there is a total possible score of 54.

The individual criterion with the highest percentage of participant achievement was M2, measures with data that are readily available so data can be measured over time, and the criterion with the lowest percentage of participant achievement was C3, sufficient amount of detail provided to justify the recommended change. The *Measure* section had the highest total number of criteria met at 16 out of 18, or 88.89%. The

Change section had the lowest total number of criteria met at 11 out of 18, or 61.11%. The total number of criteria met across all sections is 39 or 54, or 72.22%. Table 2 shows how many participants met each criterion and how many total criteria were met by subsection and in total across all sections.

Table 2

Number of Criteria Met on QIKAT-R

Criteria	Meet Criteria	
	n	%
Aim: Total Section Score	12	66.67
A1 Focused on the system-level of the problem presented	5	83.33
A2 Includes direction of change (increase or decrease)	3	50.00
A3 Includes at least one specific characteristic such as magnitude (% change) or time frame	4	66.67
Measure: Total Section Score	16	88.89
M1 Relevant to the aim	5	83.33
M2 Readily available so data can be analyzed over time	6	100.00
M3 Captures a key process or outcome	5	83.33
Change: Total Section Score	11	61.11
C1 Linked directly with the aim	4	66.67
C2 Proposes to use existing resources	5	83.33
C3 Provides sufficient details to initiate a test of change	2	33.33
TOTAL SCORE FOR ALL SECTIONS	39	72.22

Note. Due to rounding errors, percentages may not equal 100%.

Table 3 displays the number of criteria met by each participant in each section. The *Measure* section had the highest number of participants meeting all three criteria in the section. The *Change* section had the lowest number of participants meeting all three criteria.

Table 3

Number of Section Criteria Met by Each Participant on QIKAT- R

Variable	Meet Criteria	
	n	%
Aim		
Zero of three criteria met	1	16.67
One of three criteria met	1	16.67
Two of three criteria met	1	16.67
All three criteria met	3	50.00
Measure		
Zero of three criteria met	0	0.00
One of three criteria met	1	16.67
Two of three criteria met	0	0.00
All three criteria met	5	83.33
Change		
Zero of three criteria met	1	16.67
One of three criteria met	1	16.67
Two of three criteria met	2	33.33
All three criteria met	2	33.33

Note. Due to rounding errors, percentages may not equal 100%.

Regarding the total scores across all measures, two participants scored nine out of nine (100%) for all measures. One participant scored eight of nine (89%), one participant scored seven of nine (78%), one participant scored four of nine (44%), and one participant scored two of nine (22%).

Discussion

To answer the initial study question, based on the data collected and analyzed, there was minimal to no statistical significance observed from the coaching session intervention on self-perceived QI competency development for correctional front-line nursing leaders. Both groups saw an increase in the mean BASiC-QI scores for many items from pre to post surveys, although very few were statistically significant. The

coaching group saw an increase in 19 of the 30 items, only two were statistically significant, and the training-only group saw an increase in 24 of the 30 items and only one was statistically significant. A comparison of the two groups post-survey score showed statistical difference on only three of 30 items. Two of the three statistically significant items on the post-survey comparison between the groups were from the *Attitudes and Beliefs* subsection of the BASiC-QI. This could suggest that the coaching intervention positively influenced the participants attitude about QI. When considering the paired-sample and independent-sample *t*- test results overall, the general lack in the total number of items with statistical significance from pre- to post-survey within the groups and between the groups on the post-survey result comparison, may suggest that the increased means were more likely impacted from the QI training, rather than the coaching intervention.

The increased number of higher means in the training-only group may also be due to increased depth of experience in QI within this group. Although the Kruskal-Wallis test showed the groups were similarly matched, the open text question on the BASiC-QI that asks participants to describe their past QI experience revealed that some participants in the training- only group had actually held a full-time QI or continuous quality improvement role in the past, rather than just having years of experience helping with QI processes. This may have influenced the pre-survey scores in the training-only group, causing a higher initial mean, thus a statistically significant difference could not be detected on the post-survey.

When examining the QIKAT-R results, participants scored the highest on the criteria evaluating chosen QI measures. This may suggest that the coaching facilitated

their understanding of choosing appropriate and meaningful ways to measure QI. Participants scored the lowest on the change section criteria, and more specifically, on the criteria examining the detail provided that justifies the chosen change. This may imply that the content of the coaching intervention did not adequately address how to choose a change, but also may be a limitation of the QIKAT-Rs ability to measure the concept of change in QI with individual indicators, as the QIKAT-R was originally meant to be examined only from the level of the total score for all sections together. The measure examining the detail provided to justify the change is also the most subjective measure on the tool, and subject to varied interpretation by the scorer. Rather than specifically evaluate the level of learner application of knowledge, the QIKAT-R may be more suited in this situation for informing future coaching needs.

Limitations

The most significant limitation in this project was sample size. Additionally, using an alternative to the QIKAT-R tool may have provided more specific information about the learner's ability to apply knowledge in identifying a problem and developing a site-specific QI project. Limited time to implement the intervention is also a limitation of this project. Not including an evaluation of the actual coaching intervention alone, which would have provided feedback, is also considered to be a limitation of this project.

Implications

Although there was limited data with statistical significance, there are other useful implications from the data and observations gained throughout the project. Although not part of this project, an opportunity to respond to a short evaluation of the

QI training and coaching sessions was extended to the participants after the close of the project. When coaching was discussed in the open-ended survey responses, comments included helpful suggestions, were most often positive, and implied that networking with peers was beneficial to understand how others implemented changes to address similar problems encountered by all. The QI training and coaching intervention also served to demonstrate this correctional healthcare company's organizational commitment to QI, but also to developing the competency level of front-line nursing leaders. It provided an opportunity for leaders to come together to learn new information, but also to network with their peers, hear each other's ideas, and have the opportunity to ask questions and get clarification on a complex subject. The pilot coaching intervention is a potential springboard to use this type of learning for future organization goals. Future projects that include coaching can include types of groups other than only nursing leaders, and different concepts of measure could be used to understand if the coaching adds to the quality of the outcomes.

Recommendations

It is recommended that future projects recruit a larger sample size and include other disciplines, such as physician and behavioral health professionals. Additionally, employing a longer timeframe to apply the intervention may improve the likelihood of success as QI competency development may be dependent on length of time to develop learned skills.

Conclusion

Overall, there was very limited measurable effect from coaching on front-line nursing leaders QI competency development. Although not statistically significant, the

most important practical implication was the benefit of putting leaders together to learn from each other's experience and skill which contributes to their overall development and increases their network on which to rely when encountering complex quality improvement problems.

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Appendix A

Evidence Table

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Blok, A. C., Anderson, E., Swamy, L., & Mohr, D. C. (2021). Comparing nurse leader and manager perceptions of and strategies for nurse engagement using a positive deviance approach: A qualitative analysis. *Journal of Nursing Management, 29*(6), 1476–1485. https://doi.o	Purpose: to understand perspectives of nurse leaders versus nurse managers on levels of engagement from participation in QI activities Primary Outcome Measure: identified themes in perception between both groups. Secondary Outcome Measure: identified differences between high-ranking and low-ranking employee engagement units.	Sample: 13 nurse leaders (directors, executives, chiefs) and 26 nurse managers (unit-level), for a total of 39 interviews from the 3 highest ranking units and 3 lowest ranking units on the employee engagement index tool, the entity's annual measure to examine engagement. Setting: Veteran Affairs New England Healthcare System.	Method: 30–45-minute interviews according to an interview guide with established questions Design: qualitative study Intervention: structured interviews	Results: nurse leaders and nurse managers differed in their definitions of engagement in QI. Leaders defined engagement as participating in QI efforts, while manager viewed engagement as participating in QI efforts or by striving to give excellent care. Both groups agreed that nurse managers set the tone of the QI culture on their units. Individual, unit-level, and organizational barriers exist that influence engagement in QI. Strengths: strong process for analysis of qualitative data Limitations: Setting limits generalizability to other healthcare environments. Recommendations: Future research could include staff perceptions of strategies to increase engagement and interview patients and families to identify their perceptions of engaged versus less-engaged staff and how it contributes to QI.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
rg/10.1111/jonm.13301				
Flatekval, A. M. (2019). Nurse manager self-reported competency levels: The impact of a leadership development program. *Nursing Management, 50*(2), 28–33. https://doi-org.ezproxy.umsl.edu/10.1097/01.NUMA.0000552739.87072.a5	Purpose: Improve the competency of nurse managers after a leadership development curriculum as measured by the Nurse Manager Skills Inventory (NMSI) tool Primary Outcome Measure: NMSI scores regarding competency before and after curriculum. Secondary Outcome Measure: None identified	Sample: A purposive sample of 8 nurse leaders in the hospital system who agreed to participate out of all 20 nurse leaders in the system, who were all invited to attend if desired. Setting: Safety-net hospital in northeast U.S. with a large population of vulnerable patients.	Method: The intervention was delivered in three parts: 12 weeks of online ENMO learning modules occurring simultaneously with weekly peer support meetings to more deeply review topics that were of high interest from the ENMO modules. After completion of the learning modules, a 2-day intensive instructor-led live course with content application activities. Design: Pilot study with a pre and post-test survey design. Although not specifically mentioned in the article, this is a quasi-experimental pre-post survey design. Intervention: ENMO modules, weekly peer sessions and 2-day intensive course.	Results: Both statistical analyses were statistically significant. The t test showed the program improved self-reported competency levels. The pre and post survey result correlation was (.898) and statistically significant (p<.001). Paired sample correlation for all 8 pre- and post-surveys shows a statistically significant difference in means before and after the intervention (t = -2.038, p<.05). Strengths: Multiple strategies for delivering curriculum (self-learning, peer learning/support, and instructor-led course with student application of concepts was a strength identified by the authors. Use of a validated instrument for measuring outcomes is another strength. Limitations: Small sample size which limited ability to compare possible different in tool scores based on age, gender, experience, cultural differences, years of experience, and educational backgrounds.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
				Recommendations: Measure long-term outcomes of training at 6-9 months after training and measure turnover of nurse leaders pre- and post- training
Fleiszer, A. R., Semenic, S. E., Ritchie, J. A., Richer, M.-C., & Denis, J.-L. (2016). Nursing unit leaders' influence on the long-term sustainability of evidence-based practice improvements. *Journal of Nursing Management*, 24(3), 309–318. https://doi.o	Purpose: to describe the influence of nursing unit leaders on sustainability of QI efforts over time Primary Outcome Measure: identified themes for strategies to improve the likelihood of sustainability of QI efforts Secondary Outcome Measure: Not specifically identified.	Sample: four units Setting: four different units of a large, urban, tertiary/quaternary, academic, acute care, healthcare organization in Canada	Method: Individual, semi-structured, guided interviews, with 39 informants, site visits to view documents to confirm order of events, infrastructure context, and communication patterns, and observations to assess unit characteristics and physical conditions. Design: qualitative, descriptive, comparative study Intervention: interviews, observations and document review with categorical organization and identification of emerging themes.	Results: Units with leaders that employed multiple, overlapping strategies were more likely to maintain sustainability of QI initiatives over time. Strategies for sustainability include maintaining priorities and reinforcing expectations. These units and managers also saw more teamwork and accountability. Strengths: rigor of study based on an established set of criteria for credibility, dependability, confirmability, and transferability. Limitations: retrospective investigation from only one perspective and small sample size. Recommendations: Selection of nurse leaders should include an assessment of capacity for vision and alignment with organization priorities and sustainability activities should be approached strategically.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
rg/10.1111/jonm.12320				
Frasier, N. (2019). Preparing nurse managers for authentic leadership: A pilot leadership development program. *JONA: The Journal of Nursing Administration*, *49*(2), 79–85. https://doi-org.ezproxy.umsl.edu/10.1097/NNA.0000000000000714	Purpose: Improve the use and perception of use of authentic leadership and self-awareness behaviors by nurse leaders and perceived by their direct reports. Primary Outcome Measure: Use and perceived use of authentic leadership and self-awareness behaviors as measured by the ALQ and ALQ-Rater. Secondary Outcome Measure: Demographic characteristics of the sample.	Sample: Initially a convenience sample size of 16 voluntary nurse leaders with 6 or more months of experience and a final sample size of 11 who completed all steps of the pilot program. Setting: Methodist Mansfield Medical Center, a Magnet recognized community hospital with Magnet status.	Method: The intervention was completion of the Authentic Leadership Development Program which included didactic sessions, peer support and reflective technique. The curriculum involved presenting the theory and components, plus a 1-day seminar, and biweekly journaling with peer discussions. It also included completion of the Authentic Leadership Questionnaire (ALQ) by leaders and the ALQ Rater by 5 direct reports of each nurse leader before and 60 days after the intervention. Design: Cross-sectional design pilot study Intervention: Authentic Leadership Development Program Intervention.	Results: Although the overall mean score on the ALQs increased from pre- to post-intervention, there was no statistical significance. Total ALQ Self mean scores increased from 53.77 (5.067) to 54.91 (5.629). Total ALQ-Rater scores for all questions increased from 54.02 (12.57) to 55.83 (11.30). Strengths: Strong, well- received participant response to program offering was a strength identified by the authors. Use of a validated instrument is another strength. Limitations: Small sample size and limited generalizability to other hospitals. Cross-sectional design limits the ability to measure outcomes across a longer time period to ensure behaviors are sustained. Recommendations: Integration of multiple types of learning strategies.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Frias, A., Hampton, D., Tharp-Barrie, K., & Thomas, J. (2021). The impact of an emotional intelligence training program on transformational leadership. *Nursing Management, 52*(2), 18–25. https://doi.org/10.1097/01.NUMA.0000731924.03153.df	Purpose: Determine if emotional intelligence development training increases expression of emotional intelligence (EI), and influences leadership styles of nurse leaders. Primary Outcome Measure: Level of EI, assessed with TEIQue-SF. Secondary Outcome Measure: Evaluation of leadership style, assessed with MLQ-5X.	Sample: Purposive sample of 75 nurse managers were chosen based on inclusion criteria of full-time status, bachelor's degree or higher, and employment in a hospital or outpatient cancer center. 45 nurse managers completed three pre-intervention survey and only 18 completed the post-intervention survey. Setting: Healthcare system with 5 hospitals and an outpatient	Method: The intervention was EI training with a pre-intervention survey and then a 4-month period where the techniques could be used or practiced, followed by a post-intervention survey. The pre- and post- surveys consisted of the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF), which measures EI, and the Multifactor Leadership Questionnaire (MLQ-5X) instrument, which measures leadership style. Design: Quasi-experimental with a pre- and post-intervention survey. Intervention: EI training.	Results: Analysis of the pre- and post-intervention TEIQue-SF and MLQ-5X resulted in increased overall means for both, although neither showed statistical significance. Strengths: Use of validated instruments. Limitations: Small ending sample, limited ability for interaction between investigator and participant, and inability to verify participants fully completed the intervention were identified as limitations. Recommendations: Pairing participants with peer colleague to encourage accountability is using EI was a recommendation identified by the authors.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
		facility in southeastern U.S.		
Gleason, K. T., Van Graafeiland, B., Commodore-Mensah, Y., Walrath, J., Immelt, S., Ray, E., & Dennison Himmelfarb, C. R. (2019). The impact of an innovative curriculum to introduce patient safety and quality improvement content. *BMC Medical Education, 19*(1), 156–156.	Purpose: Evaluation of the Fuld Fellows Program's impact on patient safety competence and systems thinking in pre-licensure nurses. Primary Outcome Measure: Evaluation of patient safety competence using the Health Professional Education in Patient Safety Survey(H-PEPSS) and systems thinking using the Systems Thinking Scale. Secondary Outcome Measure:	Sample:116 student nurses Setting: baccalaureate nursing program with a academic medical system with a Patient Safety Institute	Method: The Fuld Fellow's Program included 4 didactic courses, a 3-day interprofessional course, and experience working on QI project over 6 months. The program also included a mentor component during the 6 months. The H-PEPSS and Systems Thinking Scale was administered before and at the completion of the program. An evaluation of the mentor component was also performed. Design: program evaluation Intervention: Pre-and post-assessment using the H-PEPSS and Systems Thinking Scale	Results: There was statistically significant improvement in all categories of the H-PEPSS survey from pre- to post- assessment. These categories included teamwork, communication, managing risk, human environment, recognize and respond to risk, and culture. Scores continued to improve when reassessed 12 months after the program. Statistical significance was also achieved from the pre- to post-assessment of the Systems Thinking Scale. 90% of participants strongly agreed that the mentor component contributed to their success and development. Strengths: Length of program and use of a validated instrument. Limitations: Lack of objective measure of the student's actual learning or application of concepts. Recommendations: Offers an academic model by which to shape future educational programs for

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
https://doi.org/10.1186/s12909-019-1604-0	evaluations of mentor component in program			nursing which can be adapted to various settings.
Gunawan, J., Aungsuroch, Y., & Fisher, M. L. (2018). Factors contributing to managerial competence of first-line nurse managers: A systematic review. *International Journal of Nursing Practice*, *24*(1), e12611. https://doi.org/10.1111/ijn.12611	Purpose: Determine what factors contribute to competence in the First Line Nurse Manager (FLNM) role from a review of the current literature. Primary Outcome Measure: Themed groups and factor consistencies across studies Secondary Outcome: Appraisal of quality.	Sample: Purposive sample of 18 articles, 10 quantitative and 8 qualitative met the inclusion criteria of peer-reviewed, measuring nurse manager competence, English language, and included any determinants or predictors of competence. Setting: The setting is not applicable as this was a systematic review.	Method: Search strategy of 6 databases for articles that examined various factors that contribute to nurse manager competency, then organizing them using content analysis into themed groups which included organizational factors, characteristics and personality traits, and role factors. Articles were appraised using CASP. Design: systematic review. Intervention: Systematic review and content analysis with appraisal.	Results: Factors were identified and aligned in themed groups which included organizational factors, characteristics and personality traits, and role factors. Strengths: Systematic review study design. Limitations: Limited number of studies met criteria for inclusion. Recommendations: Examine how different factors may be statistically related/influencing each other.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Henderson, J. M., O'Mara, C. S., Bishop, P., Arnold, P., & Whitfield, C. (2020). The university of Mississippi medical center's path for quality improvement. *Archives of Pathology & Laboratory Medicine (1976), 144*(1), 34–41.	Purpose: describes the 4-year approach to implementing a quality improvement program at University of Mississippi Medical Center (UMMC) Primary Outcome Measure: description of implementation of the QI program at UMMC Secondary Outcome Measure: not specifically identified	Sample: all units at UMMC Setting: UMMC academic medical center	Method: examination of the implementation process of a QI program thru identifying key steps, defining critical concepts that contributed to success, exploring barriers to implementation, and reporting results of program implementation. Design: descriptive, program evaluation Intervention: program evaluation	Results: A QI initiative requires strong infrastructure and key leadership support to be successful. Leadership, culture, and performance improvement were identified as three critical requirements for a strong program foundation. Clear, simple, easily accessible information on results of QI initiatives is provided at all levels to foster trust and transparency and encourage communication and engagement. Strengths: Length of project and strategic alignment with vision and mission of the healthcare organization. Limitations: Quality metrics before and after the program implementation were compared but without meaningful discussion of presence or lack of statistical significance. Recommendations: Program expansion to other key areas in healthcare organizations, such as finance and customer service.
Kirby, K. F., & Good, B. (2020). From	Purpose: to describe the implementation of a QI	Sample: baccalaureate nursing program	Method: Freshmen years students begin with fundamentals of QI, sophomore students utilize QI	Results: After the curriculum, feedback revealed students felt empowered with the ability to positively impact quality, the

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
education to practice: Incorporating quality improvement projects into a baccalaureate nursing curriculum. *AORN Journal*, *111*(5), 527–535. https://doi.org/10.1002/aorn.13015	curriculum with a practicum into a baccalaureate nursing program Primary Outcome Measure: description of the QI curriculum Secondary Outcome Measure: description of benefits and challenges of implementing a QI curriculum	undergraduate students Setting: Purdue University School of Nursing	tools to measure a problem, junior students collect data to analyze, and seniors complete a semester long project with a community organization. Design: descriptive Intervention: Implementation of a progressive QI curriculum in a BSN nursing program	curriculum also increased their confidence, and fostered leadership skills. A mentoring component reinforced learning material. Strengths: Practical application (QI project) allowed more objectivity when determining results. Limitations: Limited timeframe for project implementation to address complex problems. Recommendations: Faculty leading QI curriculum or projects must be fully trained and experienced in QI.
McGarity, T., Reed, C., Monahan, L., & Zhao, M. (2020). Innovative frontline nurse leader professional development program.	Purpose: Evaluate the difference in pre- and post-intervention surveys that measure nurse leadership competency level after attending a professional development program.	Sample: Purposive samples of two cohorts of nurse managers that were in good standing, 20 in the first cohort and 18 in the second cohort.	Method: The intervention was twelve 4-hour classes of curriculum designed around the competencies identified in the NMLP, with a pre- and post-intervention survey using the Nurse Manager Inventory Tool (NMIT). Design: Quasi-experimental with a pre- and post-intervention survey	Results: Competency scores increased by 25%, which was statistically significant. Strengths: Use of a validated instrument. Limitations: Time constraints. Recommendations: Baseline competency assessment with NMIT for all new nurse leaders.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Journal for Nurses in Professional Development, 36(5), 277–282. https://doi.org/10.1097/NND.0000000000000628	Primary Outcome Measure: Competency scores on the NMIT. Secondary Outcome Measure: Descriptive statistics of years of experience as a nurse, years of experience as a nurse manager, and highest level of education.	Setting: Large urban hospital.	Intervention: Leadership development program	
Moon, S. E., Van Dam, P. J., & Kitsos, A. (2019). Measuring transformational leadership in establishing nursing care excellence.	Purpose: Investigate the type of leadership styles exhibited by nurse mangers (NMs) and then compare them to the Magnet expectation of Transformational Leadership (TL) style to determine what makes an	Sample: Convenience sampling identified 183 NMs who were not temporary in their roles and qualified a middle or senior managers. A total of 78 nurse managers	Method: Self-reported, anonymous, voluntary electronic survey using the Multifactor Leadership Questionnaire (MLQ) and demographic questions developed by the authors that measured leadership style and other qualities. Design: Quantitative survey design	Results: The findings showed that TL was the major leadership style. There was a positive relationship with statistical significance between higher education and stronger TL style. There is also statistical significance for NMs with TL style, who were more likely to have higher education levels and older age. Strengths: Although strengths were not specifically identified by the authors, use of a validated instrument

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Healthcare, 7(4), 132. https://doi.org/10.3390/healthcare7040132	NM more likely to exhibit transformational leadership style. Primary Outcome Measure: MLQ results showing type of leadership style Secondary Outcome Measure: Relationships between MLQ scores and NMs demographic data and TL style.	completed the survey. Setting: Healthcare service organization in Australia that has started the process of seeking Magnet status.	Intervention: Implementation of the MLQ survey with investigator developed demographic questions.	and appropriate statistical testing promote high internal validity of results. Limitations: Small sample limits generalizability and survey design limits the ability to gather additional detail. Recommendations: Future studies to reassess progress toward increasing use of TL, thus toward Magnet status. Future studies to examine outcomes related to nursing and patient care based on number of NMs with TL style.
Page, A., Halcomb, E., & Sim, J. (2021). The impact of nurse leadership education on clinical practice: An integrative	Purpose: to evaluate the literature investigating the impact of nurse leader education on clinical practice Primary Outcome Measure:	Sample: 10 articles were identified as appropriate for the review Setting: The setting is not applicable as this was an integrative	Method: Search strategy that included 5 databases for peer-reviewed, original research articles that examined leadership programs that related to clinical practice. Design: integrative literature review according to the Preferred Reporting Items for Systematic Reviews and Meta-	Results: Two themes were identified, impact on self and impact on others. Self-impact included an increase in self-awareness of the capabilities and influence of nurse leaders, an increase in perceived empowerment, and an increase in job satisfaction of nurse leaders after nurse leader education. Impact on others included nurse leaders' impact on their healthcare team thru more involvement in

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
review. *Journal of Nursing Management*, 29(6), 1385–1397. https://doi.org/10.1111/jonm.13393	identification of themes to examine the impact of nurse leader education on clinical practice Secondary Outcome Measure: not identified	literature review.	Analyses (PRISMA) guidelines. Intervention: examination of the literature to identify emerging themes.	problem-solving, conflict resolution, and team communication. Impact on others also included patient outcomes such as improved patient flow, increased patient satisfaction and implementation of new patient care practices. Strengths: use of PRISMA guidelines to evaluate articles Limitations: Small number of identified articles and limited detail in types of leader education programs, delivery details, and levels of participant engagement limited conclusions. Recommendations: Due to the limited research to understand impact from nurse leader education and its impact on clinical outcomes, incorporate an evaluation strategy into each nurse leader program development that can be tied to outcomes in clinical practice
Ramseur, P., Fuchs, M. A., Edwards, P., & Humphreys,	Purpose: Implement a nursing leadership development program to	Sample: Purposive sample of 41 participants were chosen from various	Method: A pre and post intervention survey design was used to measure competency (using the Nurse Manager Inventory Tool (NMIT) before the implementation of the	Results: Statistically significant increase in competency and the satisfaction survey revealed 100% of participants reported their knowledge of leadership skills increased.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
J. (2018). The implementation of a structured nursing leadership development program for succession planning in a health system. JONA: The Journal of Nursing Administration, 48(1), 25–30. https://doi-org.ezproxy.umsl.edu/10.1097/NNA.0000000000000566	improve leadership competencies of nurse leaders and support succession planning. Primary Outcome Measure: Competency levels as measured by the NMIT. Secondary Outcome Measure: Post-program satisfaction survey.	roles and 40 took part in the NLDP, but only 33 participants completed both the pre-and post-survey. Setting: Large, academic health system in Southeastern U.S.	Nursing Leader Development Program (NLDP) and after. The Program consisted of web-based, asynchronous, learning modules from the Essentials of Nurse Manager Orientation (ENMO) program and three 90- minute monthly leadership sessions to discuss module content. In addition, each participant was assigned a mentor. Additionally, a NLDP program satisfaction survey was conducted on all participants who completed the program. Design: Quasi-experimental Intervention: NLDP Program parts: ENMO modules, 90-minute sessions and mentoring	Strengths: Use of a validated instrument to promote internal validity of results. Limitations: Lack of clarity in communicating program purpose and process and difficulty in accessing education modules. Recommendations: Incorporate more leadership sessions and provide more thorough communication of program purpose.
Sisk, B. W., Mosier, S. S., Williams, M. D.,	Purpose: Measure structural empowerment (SE) for senior nurse leaders	Sample: Purposive and selected via nominations from Chief	Method: SE was measured using the Conditions for Work Effectiveness Questionnaire-II (CWEQ II) before and after the	Results: Perceptions of structural empowerment improved after the intervention, although the authors reported means, they did not mention if statistical significance was

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Coppin, J. D., & Robinson, D. (2021). Developing effective senior Nurse leaders: The impact of an advanced leadership initiative. JONA: The Journal of Nursing Administration, 51(5), 271–278. https://doi-org.ezproxy.umsl.edu/10.1097/NNA.0000000000001012	before and after an Advanced Leadership Program (ALP) for leadership development. Primary Outcome Measure: SE perceptions as measured by the CWEQ II. Secondary Outcome Measure: Survey assessing perceived value of the ALP.	Nursing Executives, chosen from a pool of high-performing senior nurse leaders with less than 2 years in their current positions and who had not had any formal leadership development. Setting: Large, national, hospital system	intervention. The ALP consisted of 3 parts, a three-day live course on advancing leadership competency, an online communication course, and a capstone project over 5 months, with peer group support along the way. Post-program survey assessing perceived value of the ALP. Design: Quasi-experimental pre- and post-intervention design Intervention: Advanced Leadership Program	established. Post-program surveys from all participants scored the highest possible score for perceived value and satisfaction of the program. Strengths: Use of a validated instrument and identified theory aligned closely with study purpose and intent. Limitations: Small sample size Recommendations: Expand the participant pool and track outcomes over a longer period
Sjølie, B. M., Hartviksen, T. A., & Bondas, T. (2020).	Purpose: to understand the experiences of nurse managers when participating in a	Sample: 16 participants of a 54 person QIC, divided into three focus groups.	Method: Interpretive analysis thru group interviews via focus groups after participation in a QIC	Results: Three themes emerged which included participation in the QIC increased participants ability to critically think and prioritize the patient, QIC participation allowed

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
"Navigation to prioritizing the patient" - First-line nurse managers' experiences of participating in a quality improvement collaborative. *BMC Health Services Research*, 20(1), 55-55. https://doi.org/10.1186/s12913-020-4918-z	quality improvement collaborative (QIC) and its impact on their ability to carry out QI projects. Primary Outcome Measure: Themes to describe the QIC and its impact on nurse managers ability to perform QI. Secondary Outcome Measure: not specifically identified.	Setting: local hospital, nursing home, and homecare service in rural Norway.	Design: qualitative and exploratory Intervention: three focus group interviews	nurse managers to master QI concepts, and the complexities of leadership. Strengths: process of analysis of data Limitations: Limited perspectives of only three focus groups rather than interviewing each person individually. Recommendations: participation in a QIC that involves leaders from all levels of the organization contributes to knowledge development in QI.
Spencer, S., Bianchi, A., & Buckner, E. (2018). Association developmen	Purpose: Determine if nurse leader behavior and satisfaction with leadership	Sample: Convenience sample of volunteers-11 novice nurse leaders and 11	Method: The Leadership Practices Inventory-Self (LPI-S) assessment was performed before attending the ADAPT workshop. Participants were paired with mentors for two	Results: The post-test inventory scores increased but were not statistically significant. All 5 subscales of the inventory were scored separately, and each showed an increase, but none were statistically significant.

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
t and professional transformation model for nurse leaders. Journal of Nursing Management (John Wiley & Sons, Inc.), 26(8), 1100–1107. https://doi-org.ezproxy.umsl.edu/10.1111/jonm.12642	competency is influenced by leadership development via Association Development and Professional Transformation (ADAPT) workshop. Primary Outcome Measure: Increase in post-inventory score totals and subscale scores. Secondary Outcome Measure: Post-Satisfaction Analysis after ADAPT workshop to evaluation satisfaction with the workshop	experienced nurse leaders recruited from a chapter of a national professional nursing association. Setting: USA, mid-sized southern university conference room.	months after the workshop to encourage use of the learned information. The LPI-S was again surveyed at the end of the study period. Design: Quasi-experimental with pre-test and post-test evaluation. Intervention: ADAPT Workshop participation.	Strength: None were identified in the article, however there was use of a validated measuring instrument. Limitations: Small sample size with limited cultural variability limiting the generalizability of the findings. Recommendations: All nurse leaders participate in developing and promoting curriculums to develop nurse leaders.
Udod, S. A., Duchscher, J. B., Goodridge,	Purpose: understand perceptions and experiences of	Sample: purposive	Method: structured phone interviews Design: qualitative exploratory	Results: An overall negative influence of Lean was identified, and six themes emerged: Lack of coordinated training limited the implementation of

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
D., Rotter, T., McGrath, P., & Hewitt, A. D. (2020). Nurse managers implementing the Lean management system: A qualitative study in Western Canada. *Journal of Nursing Management*, 28(2), 221–228. https://doi.org/10.1111/jonm.12898	nurse managers due implementation of a Lean QI program. Primary Outcome Measure: theme identification regarding perceptions and experiences Secondary Outcome Measure: none identified	Setting: publicly funded healthcare system in Canada just after implementation of the Lean QI system, with various types of service settings, such as community health, ER, and home care, in urban and rural settings.	Intervention: interviews with 14 nurse managers	concepts, lack of time to consider and employ Lean strategies, limited financial resources, hesitancy about the value of Lean worked, fragmented implementation of the program, and lack of understanding how relationship building enhances Lean implementation. Strengths: None specifically identified in the article, although there was strong consistency in results, and generalizability is higher based on setting and sample. Limitations: small sample size and lack of use of a validated instrument to measure results Recommendations: Adequate training and resources, along with consideration of impact on the context of care should be examined before implementing Lean to increase the likelihood of success.
Warshawsky, N., & Cramer, E. (2019). Describing nurse	Purpose: Describe the role preparation and competency development of nurse managers	Sample: Convenience/ purposive sample of 647 nurse managers	Method: A 27-item electronic survey was developed according to the main themes of the Nurse Manager Competencies developed by the AONE. The survey	Results: 62% of NMs were BSN or higher averaged 45 years of age. The average time in their current leadership role was just over 4 years and 59% had 4 years or less experience in a NM role. Most leave

CITATION	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
manager role preparation and competency: Findings from a national study. The Journal of Nursing Administration, 49(5), 249-255. https://doi.org/10.1097/NNA.0000000000000746	(NM) and understand how other factors such as level of experience and education relate to level of competence. Primary Outcome Measure: Level of comfort with each competency based on demographic factors such as gender, level of education, age, level of experience, and role preparation. Secondary Outcome Measure: None identified	Setting: Electronic survey sent to 300 hundred hospitals who participate in the National Database of Nursing Quality Indicators Annual RN Survey	assessed each participant's level of comfort with each competency using a 5-point scale based on Benner's stages of competency development. Design: Cross-sectional design Intervention: Survey	their 1st leadership role after only 2 years. Competencies with the lowest scores are important for healthcare improvement. A noted concern is those that scored themselves as proficient on the competencies had an average of about 7 years of experience as an NM, implying it takes that long to get to proficient status. If new managers are most often leaving after 2 years of leadership, then the majority won't reach 7 years where proficiency is achieved, thus a gap in competent NM is inevitable. Strengths: Large sample Limitations: Limited ability to draw inferences due to cross-sectional design. Recommendations: Professional development increases the competency of NMs and they need advanced education beyond the BSN which is the expectation of a staff nurse. NM expectations regarding education should be higher.

Appendix B

The Beliefs, Attitudes, Skills and Confidence in Quality Improvement Scale (BASiC-QI)

By participating in the following survey, you are consenting to participation in a voluntary, investigational project to understand the effect of quality improvement education and interventional coaching sessions on competency in quality improvement.

Thank you for participating in the following survey.

Use the following prompts to create a unique identifier and enter the combination of numbers and letters into the *Assigned Identifier* field below.

1) First initial of mother's first name
2) Total number of siblings, excluding participant
3) First letter of high school mascot, ie. Tigers= T
4) Two-digit year of the date you began living at your current address, ie. 2001= 01
5) Last digit is a number 1 if region one and number 2 if region two

Assigned Identifier: _____

Date (dd/mm/yyyy): _____

1) Do you have any prior experience in quality improvement? (Circle one)

Yes No

If yes, please describe below the extent of your experience, training, and QI activities:

_____
_____
_____
_____
_____
_____
_____
_____

2. Please select the response which best reflects how you feel about each statement relating to Quality Improvement (QI)							
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**
a) I enjoy QI		c	c	c	c	c	c
b) I am interested in QI	c	c	c	c	c	c	c
c) I understand the role QI plays in the health care system	c	c	c	c	c	c	c
d) QI plays an important role in strengthening systems, such as health care	c	c	c	c	c	c	c
e) I value QI training as part of my professional development	c	c	c	c	c	c	c
f) I want to participate in QI initiatives as a health professional	c	c	c	c	c	c	c
g) Applications of QI theory and methodologies can help make change to a system	c	c	c	c	c	c	c
h) Using QI in the real world will make improvements	c	c	c	c	c	c	c
i) I understand the rationale for QI in the real world	c	c	c	c	c	c	c

3. I believe I am knowledgeable in the following:							
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**
a) QI theory	c	c	c	c	c	c	c
b) How QI is different than research	c	c	c	c	c	c	c
c) Systems thinking	c	c	c	c	c	c	c

d) 6 dimensions of Quality	c	c	c	c	c	c	c
e) Understanding processes within a system	c	c	c	c	c	c	c
f) The Model for Improvement	c	c	c	c	c	c	c
g) PDSA Cycles	c	c	c	c	c	c	c
h) How to measure the impact of a change	c	c	c	c	c	c	c
i) How Change links to Improvement	c	c	c	c	c	c	c

4. I feel confident in my <u>skills</u> to do the following:							
	Not confident whatsoever		**Moderately confident**		**Very confident**		**Extremely Confident**
a) Understanding quality issues	c	c	c	c	c	c	c
b) Identifying quality gaps	c	c	c	c	c	c	c
c) Approach quality improvement projects	c	c	c	c	c	c	c
d) Understand root causes of quality gaps	c	c	c	c	c	c	c
e) Identifying an area for improvement	c	c	c	c	c	c	c
f) Application of evidence and best practices to the real world	c	c	c	c	c	c	c
g) Writing an aim statement	c	c	c	c	c	c	c
h) Using tools to identify areas for improvement	c	c	c	c	c	c	c

i) Using the Model for Improvement	c	c	c	c	c	c	c
j) Using PDSA cycles to plan and test a change concept	c	c	c	c	c	c	c
k) Designing an intervention or change	c	c	c	c	c	c	c
l) Use a family of measures to evaluate the impact of a change	c	c	c	c	c	c	c

Appendix C

Quality Improvement Knowledge Application Tool Revised (QIKAT-R)

Identifier: _____

Please answer each of the following questions about your proposed QI project.

Please describe the problem identified in your unit and why it is important.

_____

_____

_____

_____

1. What is the aim of your project?

   _____

   _____

   _____

2. What would you measure to assess the situation?

   _____

   _____

   _____

   _____

3. Identify one change that might be worth testing.

   _____

   _____

   _____

   _____

Appendix D

Quality Improvement Knowledge Application Tool Revised (QIKAT-R) Scoring Rubric

Each item receives one point if the response adequately addresses the item and zero points if it does not. The total possible score is 9 points.

Identifier: _____

3 possible points for the AIM. The AIM …		Points Scored
A1	is focused on the system-level of the problem presented.	
A2	includes direction of change (increase or decrease).	
A3	includes at least one specific characteristic such as magnitude (% change) or time frame.	
3 possible points for the MEASURE. The MEASURE…		
M1	is relevant to the aim.	
M2	is readily available so data can be analyzed over time.	
M3	captures a key process or outcome.	
3 possible points for the CHANGE. The CHANGE…		
C1	is linked directly with the aim.	
C2	proposes to use existing resources.	
C3	provides sufficient details to initiate a test of change.	

February 1, 2014

Appendix E

Data Tables

Table E1

Two-Tailed Independent Samples t-Test Comparing Pre-Survey Results for Coaching and Training-Only Group

	Coaching		Training				
Measure	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
Subscale 1: Attitudes and Beliefs	*53.25*	*3.33*	*49.00*	*9.66*	*1.16*	*.273*	*0.59*
Enjoy QI	4.50	2.07	4.75	0.96	-0.23	.826	0.16
Interest in QI	5.12	1.13	5.00	1.15	0.18	.861	0.11
Understand QI	6.38	0.74	5.75	1.89	0.84	.418	0.43
Importance of QI	6.62	0.52	6.00	1.41	1.15	.277	0.59
Value QI	6.50	0.53	5.75	1.26	1.49	.167	0.78
Desire to participate in QI	6.12	0.99	4.50	1.73	2.11	.061	1.15
Applying QI theory	6.38	0.52	6.00	1.41	0.69	.506	0.35
QI and improvement	6.25	0.71	5.75	1.26	0.90	.390	0.49
QI rationale	5.38	1.30	5.50	1.73	-0.14	.890	0.08
Subscale 2: Knowledge of QI	*43.75*	*8.81*	*37.00*	*10.20*	*1.19*	*.261*	*0.71*
Knowledge QI theory	5.50	1.07	5.00	1.41	0.69	.506	0.40
QI vs research	5.25	1.75	5.25	1.71	0.00	1.000	0.00
Systems thinking	5.00	1.41	3.50	2.08	1.49	.167	0.84
Quality dimensions	4.50	1.69	3.25	1.89	1.16	.271	0.70
System processes	5.00	1.69	5.25	1.50	-0.25	.808	0.16
Know Model for Improvement	4.50	1.51	3.25	2.06	1.20	.256	0.69
Know PDSA cycle	3.50	1.41	2.25	1.50	1.42	.187	0.86
Know change measures	4.88	1.25	4.25	2.06	0.66	.522	0.37
Linking change	5.62	1.19	5.00	1.83	0.72	.486	0.41
Subscale 3: QI Skills	*31.75*	*12.93*	*27.75*	*11.09*	*0.53*	*.610*	*0.33*
Confidence in quality issues	3.12	1.13	2.50	1.29	0.87	.407	0.52
Identify quality gaps	2.88	1.25	2.75	1.26	0.16	.874	0.10
Confident project participation	3.00	1.31	2.75	1.26	0.32	.759	0.19
Understand root cause	2.75	1.39	2.75	1.26	0.00	1.000	0.00
Identify improvement	3.75	1.04	3.00	1.41	1.05	.317	0.61
Applying evidence	2.88	0.99	2.75	1.26	0.19	.854	0.11
Aims statement	2.00	1.20	1.75	0.96	0.36	.725	0.23
Using QI tools	2.62	1.30	2.50	1.00	0.17	.870	0.11
Use Model for Improvement	2.25	1.04	1.50	1.00	1.20	.260	0.74
Confidence with PDSA	1.88	1.36	1.25	0.50	0.87	.402	0.61
Confident to design change	2.50	1.20	2.75	1.26	-0.34	.744	0.20
Measuring change impact	2.12	1.36	1.50	1.00	0.81	.437	0.52

	Coaching		Training				
Measure	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
TOTAL SCORE	128.75	18.11	113.75	29.10	1.11	.291	0.62

Note. N = 12. Degrees of Freedom for the *t*-statistic = 10. *d* represents Cohen's *d.*

Table E2

Two-Tailed Paired Samples t-Test Comparing Pre- to Post- Survey Results for Coaching Group

	Pre-Survey		Post-Survey				
Measure	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
Subscale 1: Attitude and Beliefs	*54.00*	*3.74*	*56.40*	*4.28*	*-1.99*	*.118*	*0.89*
Enjoy QI	4.80	2.28	5.60	0.55	-0.93	.405	0.42
Interest in QI	5.00	1.00	6.00	0.71	-3.16	.034	1.41
Understand QI	6.60	0.49	6.60	0.49	NA	NA	NA
Importance of QI	6.80	0.45	6.80	0.45	0.00	1.000	0.00
Value QI	6.40	0.55	6.40	0.55	0.00	1.000	0.00
Desire to participate in QI	6.44	0.55	5.80	1.64	0.69	.529	0.31
Applying QI theory	6.40	0.55	6.80	0.45	-1.63	.178	0.73
QI and improvement	6.20	0.84	6.20	0.84	0.00	1.000	0.00
QI rationale	5.40	1.52	6.20	0.84	-1.37	.242	0.61
Subscale 2: Knowledge of QI	*46.40*	*5.77*	*48.60*	*7.70*	*-0.72*	*.514*	*0.32*
Knowledge QI theory	5.40	1.34	5.60	0.55	-0.41	.704	0.18
QI vs research	5.60	1.52	5.80	0.84	-0.41	.704	0.18
Systems thinking	5.60	0.55	5.40	0.89	1.00	.374	0.45
Quality dimensions	5.00	1.41	5.20	1.48	-0.34	.749	0.15
System processes	5.80	0.84	5.40	0.89	0.78	.477	0.35
Know Model for Improvement	5.00	1.00	5.00	1.22	0.00	1.000	0.00
Know PDSA cycle	3.20	1.30	5.00	1.22	-3.09	.037	1.38
Know change measures	5.20	1.30	5.60	0.55	-0.59	.587	0.26
Linking change	5.60	1.52	5.60	0.55	0.00	1.000	0.00
Subscale 3: QI Skills	*29.80*	*10.78*	*38.20*	*11.10*	*-1.71*	*.163*	*0.76*
Confidence in quality issues	3.20	0.84	3.20	0.84	0.00	1.000	0.00
Identify quality gaps	3.00	0.71	3.20	0.84	-0.53	.621	0.24
Confident project participation	2.80	0.84	3.40	0.89	-1.50	.208	0.67
Understand root cause	2.40	0.89	3.20	0.84	-1.37	.242	0.61
Identify improvement	3.60	1.14	3.60	0.89	0.00	1.000	0.00
Applying evidence	2.60	0.89	3.40	0.89	-2.14	.099	0.96
Aims statement	1.80	1.30	3.20	1.10	-2.75	.052	1.23
Using QI tools	2.40	0.89	3.20	1.10	-1.63	.178	0.73
Use Model for Improvement	2.20	1.10	3.00	1.00	-1.37	.242	0.61
Confidence with PDSA	1.60	1.34	2.80	1.30	-1.50	.208	0.67
Confident to design change	2.40	1.14	3.00	1.41	-1.18	.305	0.53
Measuring change impact	1.80	1.30	3.00	1.00	-1.81	.145	0.81
TOTAL SCORE	130.20	14.89	143.20	17.74	-1.88	.134	0.84

Note. N = 12. Degrees of Freedom for the *t*-statistic = 10. *d* represents Cohen's *d.* No t-test is possible for measure Understanding QI because means from pre- to post-survey are identical.

Table E3

Two-Tailed Paired Samples t-Test Comparing Pre- to Post- Survey Results for Training-Only Group

	Pre-Survey		Post-Survey				
Measure	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
Subscale 1: Attitudes and Beliefs	*49.00*	*9.66*	*49.00*	*7.07*	*0.00*	*1.000*	*0.00*
Enjoy QI	4.75	0.96	4.00	1.63	1.00	.391	0.50
Interest in QI	5.00	1.15	4.50	1.91	0.52	.638	0.26
Understand QI	5.75	1.89	6.50	0.58	-0.88	.444	0.44
Importance of QI	6.00	1.41	6.50	0.58	-0.77	.495	0.39
Value QI	5.75	1.26	5.00	0.82	3.00	.058	1.50
Desire to participate in QI	4.50	1.73	4.25	1.71	0.16	.882	0.08
Applying QI theory	6.00	1.41	6.25	0.50	-0.40	.718	0.20
QI and improvement	5.75	1.26	6.00	0.82	-0.40	.718	0.20
QI rationale	5.50	1.73	6.00	0.82	-0.58	.604	0.29
Subscale 2: Knowledge of QI	*37.00*	*10.20*	*48.00*	*5.48*	*-1.89*	*.155*	*0.95*
Knowledge QI theory	5.00	1.41	4.75	1.26	0.20	.854	0.10
QI vs research	5.25	1.71	5.50	0.58	-0.26	.809	0.13
Systems thinking	3.50	2.08	3.50	1.73	0.00	1.000	0.00
Quality dimensions	3.25	1.89	5.50	1.00	-2.63	.078	1.32
System processes	5.25	1.50	6.50	0.58	-1.99	.141	0.99
Know Model for Improvement	3.25	2.06	5.50	1.00	-3.00	.058	1.50
Know PDSA cycle	2.25	1.50	4.75	1.89	-3.87	.030	1.94
Know change measures	4.25	2.06	6.25	0.50	-1.63	.201	0.82
Linking change	5.00	1.83	5.75	0.50	-0.68	.547	0.34
Subscale 3: QI Skills	*27.75*	*11.09*	*39.50*	*5.74*	*-1.40*	*.256*	*0.70*
Confidence in quality issues	2.50	1.29	4.00	0.82	-.232	.103	1.16
Identify quality gaps	2.75	1.26	3.75	0.96	-1.41	.252	0.71
Confident project participation	2.75	1.26	3.00	0.82	-.26	.809	0.13
Understand root cause	2.75	1.26	3.50	0.58	-0.88	.444	0.44
Identify improvement	3.00	1.41	3.75	0.96	-0.88	.444	0.44
Applying evidence	2.75	1.26	3.25	1.71	-0.38	.731	0.19
Aims statement	1.75	0.96	3.00	0.82	-1.99	.141	0.99
Using QI tools	2.50	1.00	3.25	0.50	-1.00	.391	0.50
Use Model for Improvement	1.50	1.00	3.00	0.82	-2.32	.103	1.16
Confidence with PDSA	1.25	0.50	2.50	1.29	-1.99	.141	0.99
Confident to design change	2.75	1.26	3.25	0.50	-0.58	.604	0.29
Measuring change impact	1.50	1.00	3.25	0.50	-2.78	.069	1.39
TOTAL SCORE	113.75	29.10	136.50	4.12	-1.41	.252	0.71

Note. N = 12. Degrees of Freedom for the *t*-statistic = 10. *d* represents Cohen's *d.*

Table E4

Two-Tailed Independent Samples t-Test Comparing Post-Survey Results for Group One and Two

	Coaching		Training				
Measure	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
Subscale 1: Attitudes and Beliefs	*56.00*	*3.95*	*49.00*	*7.07*	*2.03*	*.077*	*1.22*
Enjoy QI	5.67	0.52	4.00	1.63	2.39	.044	1.38
Interest in QI	6.00	0.63	4.50	1.91	1.51	.216	1.05
Understand QI	6.50	0.55	6.50	0.58	0.00	1.000	0.00
Importance of QI	6.67	0.52	6.50	0.58	0.48	.645	0.30
Value QI	6.33	0.52	5.00	0.82	3.20	.013	1.95
Desire to participate in QI	5.83	1.47	4.25	1.71	1.57	.156	0.99
Applying QI theory	6.67	0.52	6.25	0.50	1.26	.242	0.82
QI and improvement	6.17	0.75	6.00	0.82	0.33	.748	0.21
QI rationale	6.17	0.75	6.00	0.82	0.33	.748	0.21
Subscale 2: Knowledge of QI	*49.50*	*7.23*	*48.00*	*5.48*	*0.35*	*.735*	*0.23*
Knowledge QI theory	5.67	0.52	4.75	1.26	1.63	.142	0.95
QI vs research	5.83	0.75	5.50	0.58	0.75	.477	0.50
Systems thinking	5.50	0.84	3.50	1.73	2.48	.038	1.47
Quality dimensions	5.33	1.37	5.50	1.00	-0.21	.840	0.14
System processes	5.50	0.84	6.50	0.58	-2.07	.073	1.39
Know Model for Improvement	5.17	1.17	5.50	1.00	-0.47	.654	0.31
Know PDSA cycle	5.17	1.17	4.75	1.89	0.44	.675	0.26
Know change measures	5.67	0.52	6.25	0.50	-1.77	.115	1.15
Linking change	5.67	0.52	5.75	0.50	-0.25	.807	0.16
Subscale 3: QI Skills	*38.83*	*10.05*	*39.50*	*5.74*	*-0.12*	*.908*	*0.08*
Confidence in quality issues	3.17	0.75	4.00	0.82	-1.66	.135	1.06
Identify quality gaps	3.17	0.75	3.75	0.96	-1.08	.311	0.68
Confident project participation	3.50	0.84	3.00	0.82	0.93	.378	0.60
Understand root cause	3.33	0.82	3.50	0.58	-0.35	.735	0.24
Identify improvement	3.67	0.82	3.75	0.96	-0.15	.886	0.09
Applying evidence	3.50	0.84	3.25	1.71	0.31	.762	0.19
Aims statement	3.17	0.98	3.00	0.82	0.28	.787	0.18
Using QI tools	3.33	1.03	3.25	0.50	0.15	.886	0.10
Use Model for Improvement	3.17	0.98	3.00	0.82	0.28	.787	0.18
Confidence with PDSA	2.83	1.17	2.50	1.29	0.42	.682	0.27
Confident to design change	3.00	1.26	3.25	0.50	-0.37	.721	0.26
Measuring change impact	3.00	0.89	3.25	0.50	-0.50	.629	0.35
TOTAL SCORE	144.33	16.11	136.50	4.12	0.93	.377	0.67

Note. N = 10. Degrees of Freedom for the *t*-statistic = 8. *d* represents Cohen's *d.*