INNOVATIONS JOURNALS

Quality Improvement Project

Enhancing Strategic Learning Through the Implementation of Robust Process Improvement in a Specialized Tertiary Care Hospital

Alliazer Abdulhamid,[1] **Ghiwa El Najjar**,[2] **Aljohara Alayesh**,[1] **Arwa Alghanmi**[1]

[1]Quality Management Department, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia
[2]Quality and Patient Experience Section, Organ Transplant Center of Excellence (OTCoE), King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia

Address correspondence to Alliazer Abdulhamid (aalliazer@kfshrc.edu.sa).

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ABSTRACT

Introduction: Performance improvement (PI) in healthcare is essential to improve health, patient experience, and reduce costs. PI projects became low, inconsistent and weakly-sustained in our hospital. The low number and low sustainability were scarcely in alignment with our strategic goal to become a high reliability organization (HRO). This was due to lack of standardized knowledge and ability to initiate and sustain PI projects. Therefore, a structured framework was developed, followed by the building of capacity and capability in the use of robust process improvement (RPI) amidst the COVID-19 pandemic. **Methods:** A team of healthcare quality professionals collaborated with Hospital Performance Improvement-Press Ganey for hospital-wide quality improvement project. The team received training on RPI from Press Ganey and created the framework to use . This framework is based on the Institute for Healthcare Improvement Model for Improvement, Lean, Six Sigma, and FOCUS-PDSA (Find-Organize-Clarify-Understand-Select-Plan-Do-Study-Act). Thereafter, the team of internal coaches organized an RPI training course that consisted of 6 sessions, for clinical and nonclinical staff , using classroom and virtual sessions during the pandemic. This course was increased to eight sessions to avoid information overload. Process measures were collected using a survey to obtain feedback, whereas outcome measures were from the number of completed projects and their effects related to costs, access to care, waiting time, number of harms, and compliance. **Results:** Participation and submission improved after three PDSA (Plan-Do-Study-Act) cycles. This resulted in an increased number of completed and sustained projects from 50 in 2019 to 94 in 2020 and continued to rise to 109 in 2021. There were 140 and 122 certified RPI coaches in 2020 and 2021, respectively. Although there was a decrease in the number of certified coaches in 2021, the number of completed projects was higher than in 2020. The overall effect of these completed projects by the third quarter of 2021 showed improvement in access to care by 39%, compliance to standards of care by 48%, satisfaction by 8%, and reduction in costs by 47,010 SAR, in waiting time of 170 hours, and in the number of harms by 89. **Conclusion:** This quality improvement project led to enhanced capacity of staff as seen in the increased number of certified RPI coaches, thereby increasing the submission and completion of projects in 1 year. Its sustainability during the 2 succeeding years continued to enhance project completion and maintenance, bringing quality improvement benefits to the organization and the patients.

Keywords: robust, performance improvement, certified coaches, HRO, capability

INTRODUCTION

One of the characteristics of a high reliability organization (HRO) is its ability to achieve safety, quality, and efficiency through the interplay between human factors and systems. Performance improvement (PI) is essential to improve health, achieve better patient experience, and reduce costs. It is a proactive and continuous assessment of processes to identify gaps and improvement opportunities aimed at eliminating or minimizing problems, and to test new approaches in solving the underlying causes of the identified problems in the system.[1] Lack of standardized knowledge and ability to initiate, implement, and sustain PI projects lead to a low number of PI projects and low sustainability rate of submitted projects in an organization; this scarcely aligns with the strategic goal toward becoming an HRO.

When the Institute for Healthcare Improvement (IHI) was founded in 1991, it became a key driver in the provision of quality improvement education and training to enhance knowledge to benefit health systems. Since then, the spotlight on quality improvement within health services has grown internationally.[2]. Robust process improvement (RPI) is one of the three domains of the framework proposed by Chassin and Loeb[3] to help in the gradual transformation of healthcare to HRO and zero harm. A study conducted by Nether et al.[4] concluded that the implementation of an RPI program to reduce harm resulted in significant and sustainable improvements in their activities. Findings by Hibbert[5] showed that a robust quality improvement methodology was an interacting component that led to successful execution of improvement activities and the overall program. Mortality from Healthcare-Associated infections (HAIs)[6] and medication-error–related costs[7] can benefit from RPI.

The RPI, conceived by The Joint Commission as a set of systematic and comprehensive strategies and tools to enhance processes and outcomes in healthcare,[8] became the basis for the creation of a structured framework of PI charter in a specialized tertiary hospital in Saudi Arabia. The mixture of Lean, Six Sigma[9] and formal change management in RPI can contribute to the reduction of patient harm and decreased costs of care.[8,10] Through the implementation of PI projects guided by this structured and systematic framework, the journey of this hospital toward zero harm can ultimately lead to its goal of becoming an HRO.

PI projects had become low, inconsistent, and weakly sustained in King Faisal Specialist Hospital and Research Centre (KFSH&RC)-Riyadh. This was relative to lack of standardized know-how on project initiation and sustainability. Before 2020, PI project submission was not mandated, thus there was a low degree of participation, and quality improvement programs were insufficiently contributing to the six domains, namely safety, effectiveness, patient-centeredness, timeliness, efficiency, and equitability. There were only 50 completed projects in 2019, which was a significant drop from 91 and 99 projects in 2017 and 2018, respectively. Although projects in previous years were high, these were poorly sustained. The development of a standardized and structured framework was therefore initiated in 2019 as a quality improvement plan, followed by the building of the organizational capacity and capability in RPI use.

METHODS

This is a quality project that was exempt from ethical approval. The fundamental aim was to use evidence-based methodologies in the implementation of quality improvement projects. This project was conducted with support from the administration at KFSH&RC - Riyadh.

The last quarter of 2017 marked the beginning of the HRO journey of KFSH&RC - Riyadh in collaboration with Hospital Performance Improvement-Press Ganey (HPI-PG) (Fig. 1). Underpinning this strategy was the administrative directive, support, and commitment of executive management to strengthen the following three domains: zero harm, culture of safety, and RPI. An improvement team composed of hospital executive leaders, middle managers, and quality professionals from the PI section was then assembled. After the HPI-PG conducted the diagnostic and assessment phase, they recommended a structured framework based on RPI. Construction and validation of the KFSH&RC Framework took place during planning and designing in 2019. The design of this framework was based on an intensive literature review and evidence-based practice (EBP). It involved the amalgamation of different methodologies, including the IHI Model for Improvement, Lean, Six Sigma, and Find-Organize-Clarify-Understand-Select (FOCUS)-Plan-Do-Study-Act (PDSA) (i.e., FOCUS-PDSA), to produce two improvement methods: Identify, Act, Change and Transform (IACT) Charter and the Just-Do-It (JDI) for long-term and short-term improvement projects, respectively. Building capacity and capability occurred throughout 2019, in addition to the blueprint development of the training materials.

The IACT Charter has four steps. The first step, "Identify" (Fig. 2), is the identification of a problem as an opportunity to improve. The next step, "Analyze" (Fig. 3), delves into the possible causes of the problem using driver diagram and five whys. "Change" (Fig. 3) is when certain quality tools are applied to produce the desired outcome using the solution to the problem. The PDSA, Rapid Improvement Event, Kaizen, and 5S Model are quality tools that can be used individually or complementarily to one another at this stage. Last, "Transform" (Fig. 4) concentrates on the effort to creating a sustainability plan and sharing success among peers. The acronym IACT represents a two-word phrase "I act," with "I" connoting ownership. JDI is the second major tool. Designed for small projects that require less rigorous data collection, this tool helps to easily come up with solutions to problems using a simple root-cause analysis called five whys. The projects created using this

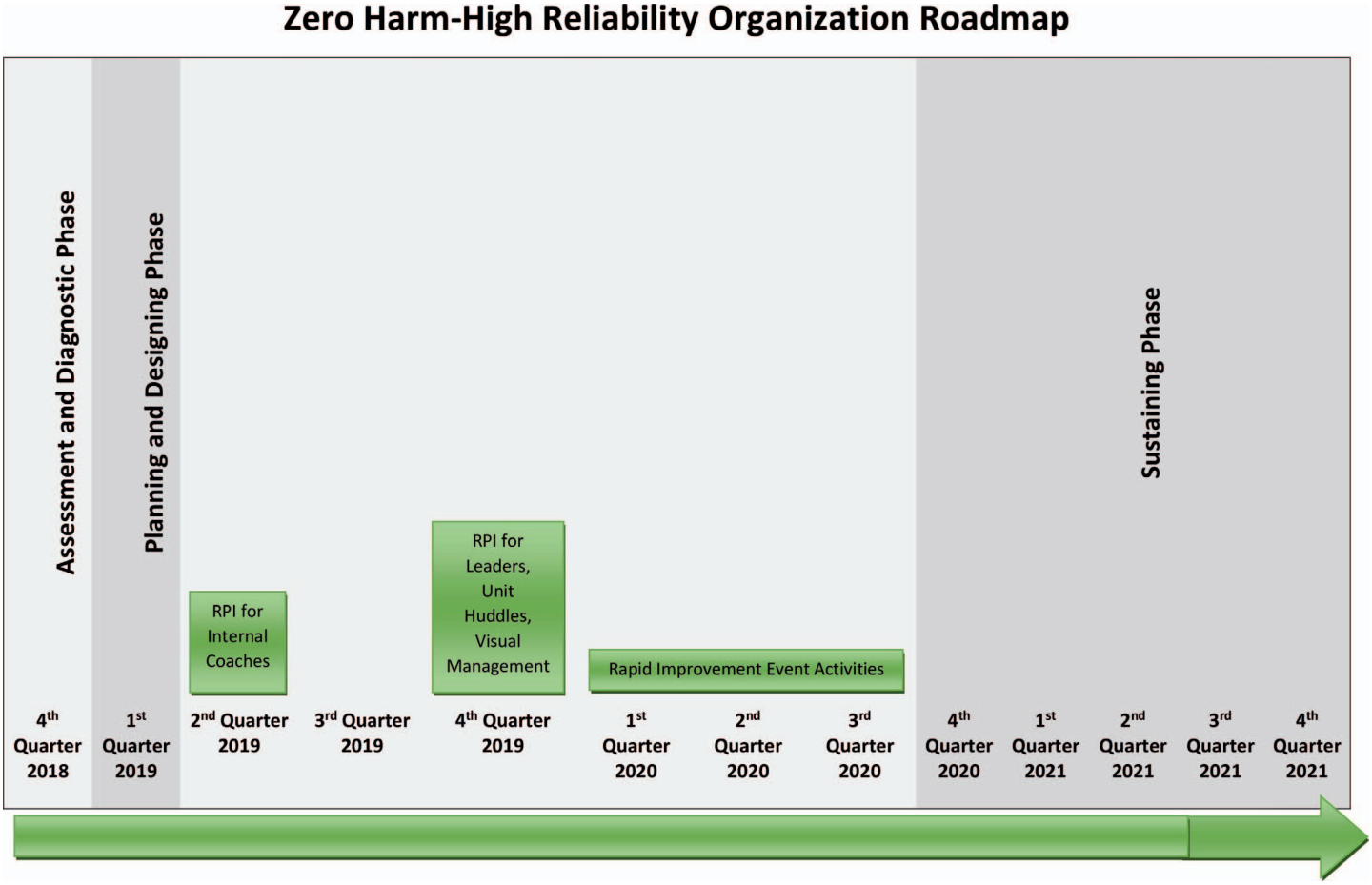
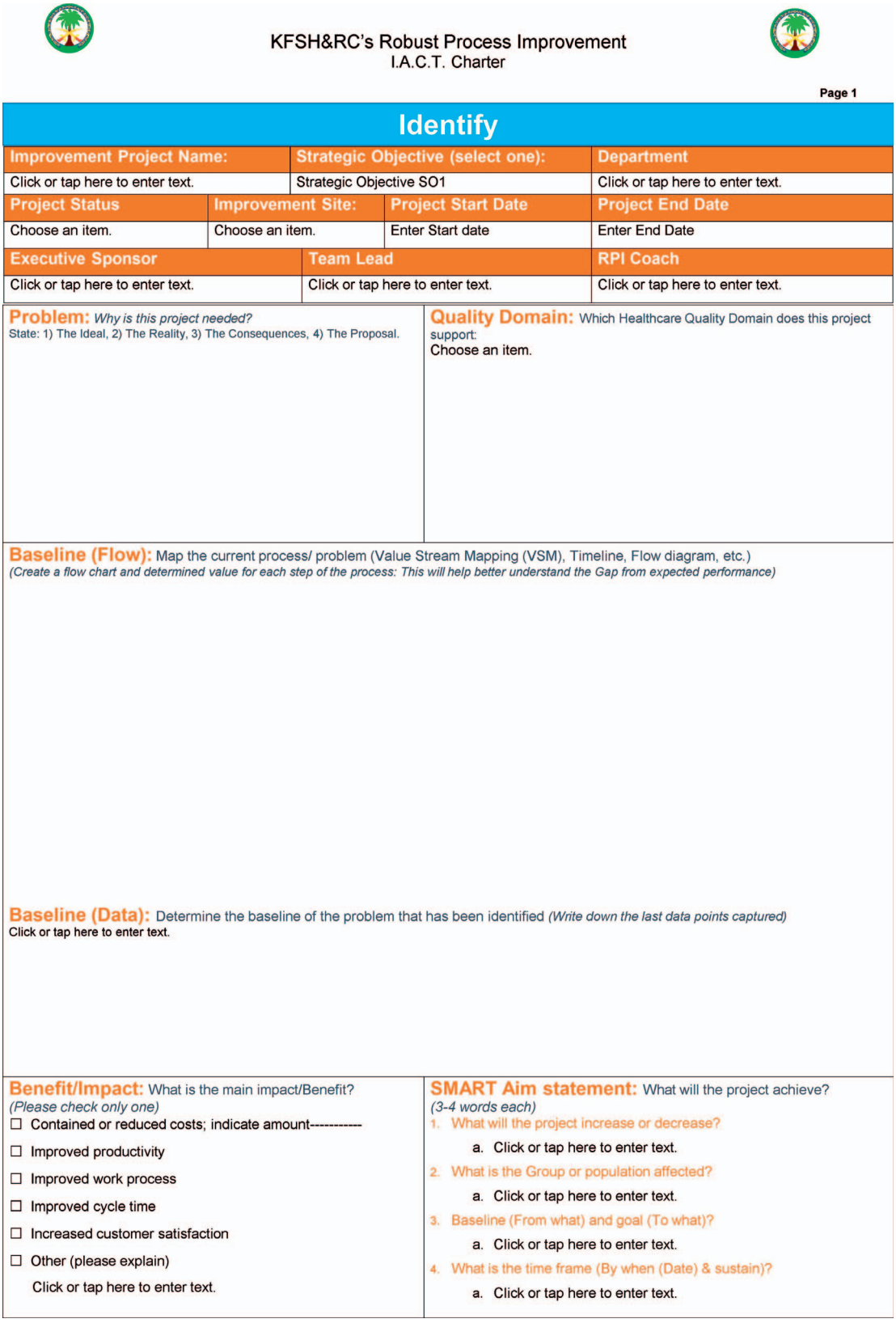


Figure 1. Timeline of zero-harm-high reliability organization roadmap. RPI: robust process improvement.

framework are guided by the organization's strategic objectives and the six domains.

Although this quality improvement project introduced a new program with the use of new standardized RPI framework in 2020, this was not considered as a new initiative in its entirety. This was to enhance the tools of the existing "All Commit/Committed to improve initiatives" already implemented between 2018 and 2019. HPI-PG trained the Quality Management Department (QMD) staff, then these internal coaches trained the clinical and nonclinical staff from multiple settings within the hospital. Materials for RPI training were developed to closely resemble the actual components of the KFSH&RC Framework, so that the participants could easily adapt. The training was initially six sets of 4-hour class for 1 day each week spread out over 6 weeks, but this duration was challenged by the immense volume and complexity of the teaching materials. Hence, the training was stretched to an 8-week course, meeting for eight sets of 4-hour class per day per week over an 8-week period. The RPI course comprised lectures of methods and tools to use in improvement projects, comprehensively explaining each of the four steps of the I.A.C.T. Charter and the process of JDI, with homework to facilitate hands-on training. Furthermore, this 8-week course had four parallel sessions in 2020, with each set of parallel sessions consisting of two sessions of 8-week training overlapping each other. Sustainability phase began at the end of 2020 and start of 2021. It included three activities: First, an application called Service Hub on the hospital intranet site is accessible 24-7 for end users to request project initiation and consultation in PI services to facilitate continuous updates and follow-up. Second, Gemba Walk, conducted by the QMD bi-monthly, lets the leaders and managers observe the actual work process and interact with workers.[11] Different units are visited, and unit staff participate, providing updates on their current or potential projects. Celebration of success is the third activity, wherein an annual awarding event for the top three ranks is overseen by a committee of leaders and quality professionals. The number of winners varies every year because two or more projects may tie in the same rank, according to the tabulated score based on established criteria.

Three cycles of the PDSA were applied to test the intervention (Fig. 5).



KFSH&RC's Robust Process Improvement
I.A.C.T. Charter

Page 1

Identify

Improvement Project Name:	Strategic Objective (select one):	Department
Click or tap here to enter text.	Strategic Objective SO1	Click or tap here to enter text.

Project Status	Improvement Site:	Project Start Date	Project End Date
Choose an item.	Choose an item.	Enter Start date	Enter End Date

Executive Sponsor	Team Lead	RPI Coach
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.

Problem: *Why is this project needed?*
State: 1) The Ideal, 2) The Reality, 3) The Consequences, 4) The Proposal.

Quality Domain: Which Healthcare Quality Domain does this project support:
Choose an item.

Baseline (Flow): Map the current process/ problem (Value Stream Mapping (VSM), Timeline, Flow diagram, etc.)
(Create a flow chart and determined value for each step of the process: This will help better understand the Gap from expected performance)

Baseline (Data): Determine the baseline of the problem that has been identified *(Write down the last data points captured)*
Click or tap here to enter text.

Benefit/Impact: What is the main impact/Benefit?
(Please check only one)

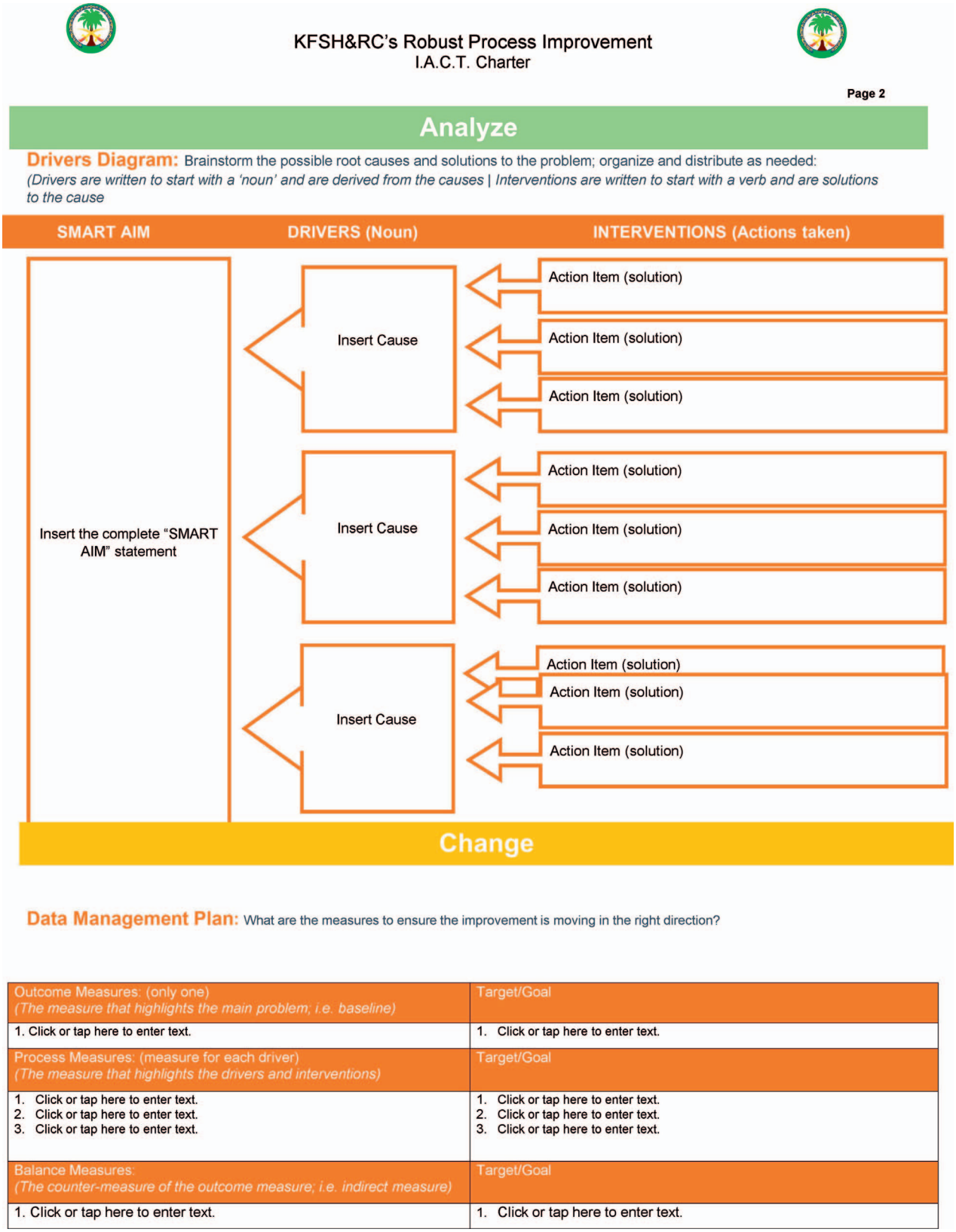
- ☐ Contained or reduced costs; indicate amount----------
- ☐ Improved productivity
- ☐ Improved work process
- ☐ Improved cycle time
- ☐ Increased customer satisfaction
- ☐ Other (please explain)

Click or tap here to enter text.

SMART Aim statement: What will the project achieve?
(3-4 words each)

1. What will the project increase or decrease?
   a. Click or tap here to enter text.
2. What is the Group or population affected?
   a. Click or tap here to enter text.
3. Baseline (From what) and goal (To what)?
   a. Click or tap here to enter text.
4. What is the time frame (By when (Date) & sustain)?
   a. Click or tap here to enter text.

Figure 2. KFSH&RC IACT Charter identifciation form. IACT: identify, act, change, and transform; KFSH&RC: King Faisal Specialist Hospital and Research Centre; SMART: specific, measurable, attainable, relevant, timely.



Outcome Measures: (only one) *(The measure that highlights the main problem; i.e. baseline)*	Target/Goal
1. Click or tap here to enter text.	1. Click or tap here to enter text.
Process Measures: (measure for each driver) *(The measure that highlights the drivers and interventions)*	Target/Goal
1. Click or tap here to enter text. 2. Click or tap here to enter text. 3. Click or tap here to enter text.	1. Click or tap here to enter text. 2. Click or tap here to enter text. 3. Click or tap here to enter text.
Balance Measures: *(The counter-measure of the outcome measure; i.e. indirect measure)*	Target/Goal
1. Click or tap here to enter text.	1. Click or tap here to enter text.

Figure 3. KFSH&RC IACT Charter analysis and change. IACT: identify, act, change, and transform; KFSH&RC: King Faisal Specialist Hospital and Research Centre; SMART: specific, measurable, attainable, relevant, timely.

KFSH&RC's Robust Process Improvement
I.A.C.T. Charter

Page 3

Transform

Results: Insert relevant graphs and charts to illustrate improvement over time.
(Insert relevant graphs, data, charts, etc. | Include the baseline and final outcome measure | include at least one process and balance measure)

Monitoring methods *(monitoring method to ensure the improvement work is fixed)*	**Sustainment plan** *(How will the work continue to be governed? What is the plan if outcome measure returns?)*
☐ New developed indicator (please specify KPI title) Click or tap here to enter text. ☐ Tracking on the local 'Daily Huddle Board' ☐ Other (please Specify Click or tap here to enter text.	Click or tap here to enter text.
Lessons learned *(lessons learned that others can benefit from this type of project)*	**Team members** *(Please specify team members)*
1. Click or tap here to enter text. 2. Click or tap here to enter text. 3. Click or tap here to enter text. 4. Click or tap here to enter text. 5. Click or tap here to enter text. 6. Click or tap here to enter text.	1. Click or tap here to enter text. 2. Click or tap here to enter text. 3. Click or tap here to enter text. 4. Click or tap here to enter text. 5. Click or tap here to enter text. 6. Click or tap here to enter text.

***Note:** When starting new project, please complete page 1 (The identification phase) then e-mail it to: PIQMDR@kfshrc.edu.sa*

Thank You

Figure 4. KFSH&RC IACT Charter transformation results. IACT: identify, act, change, and transform; KFSH&RC: King Faisal Specialist Hospital and Research Centre; KPI: key performance indicator; SMART: specific, measurable, attainable, relevant, timely.

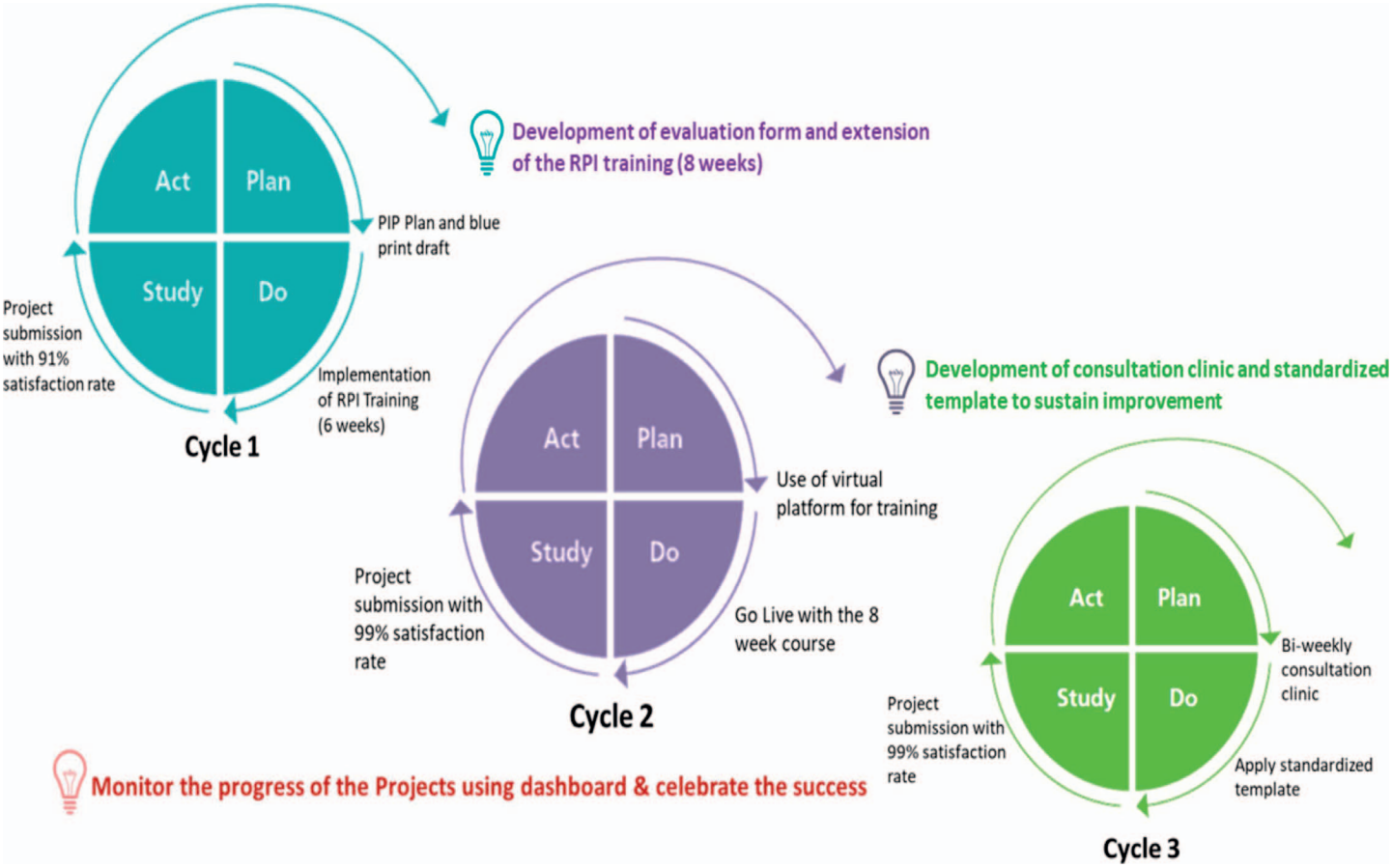


Figure 5. Three PDSA cycles used in this project. RPI: robust process improvement.

PDSA Cycle 1

Plan: (1) to lay out the process improvement plan, and (2) to print the draft and provide training in six sessions over 6 weeks.

Do: Classroom training was conducted. The situation surrounding the pandemic forced the cancellation of the third and fourth sessions.

Study: Based on this PDSA cycle, there was a 91% satisfaction rate; however, low volume of attendees and lack of commitment to submitting the final project were discovered.

Act: (1) Develop an evaluation form to assess training effectiveness, (2) extend the training to 8 weeks, and (3) add two extra specialized training sessions for quality management and allied staff to compensate for the two cancelled sessions.

PDSA Cycle 2

Plan: (1) Explore and implement a suitable virtual platform for training. (2) Modify the course content to suit the virtual platform and to maintain staff engagement and to overcome the lack of physical interaction with the instructor.

Do: The 8-week training course went virtual, but there was resistance to virtual classes among the participants.

Study: Although satisfaction rate was at 99%, project submission was not optimal. More follow-up was needed to encourage project submission and to get the necessary leadership support to assist the potential future coaches to finalize their PI projects.

Act: (1) Develop biweekly virtual consultation clinics to help charter-filling and the project's completion. (2) Provide ongoing statistical report updates to department leaders on the status of their PI projects and certified coaches.

PDSA Cycle 3

Plan: (1) To conduct a biweekly virtual consultation clinic using the certified coaches to cover, and (2) to use a standardized template to help the participants complete their homework in parallel with their project charter without redundancy.

Do: A standardized template was used. The disruption caused by another surge in COVID shifted the priority from PI projects to clinical duties. Delays and project cancellations were experienced.

Study: (1) Continuously provided statistical reports on project status updates to executive leaders and middle managers to get their support on project achievement and attendance of sessions. (2) Building capacity by

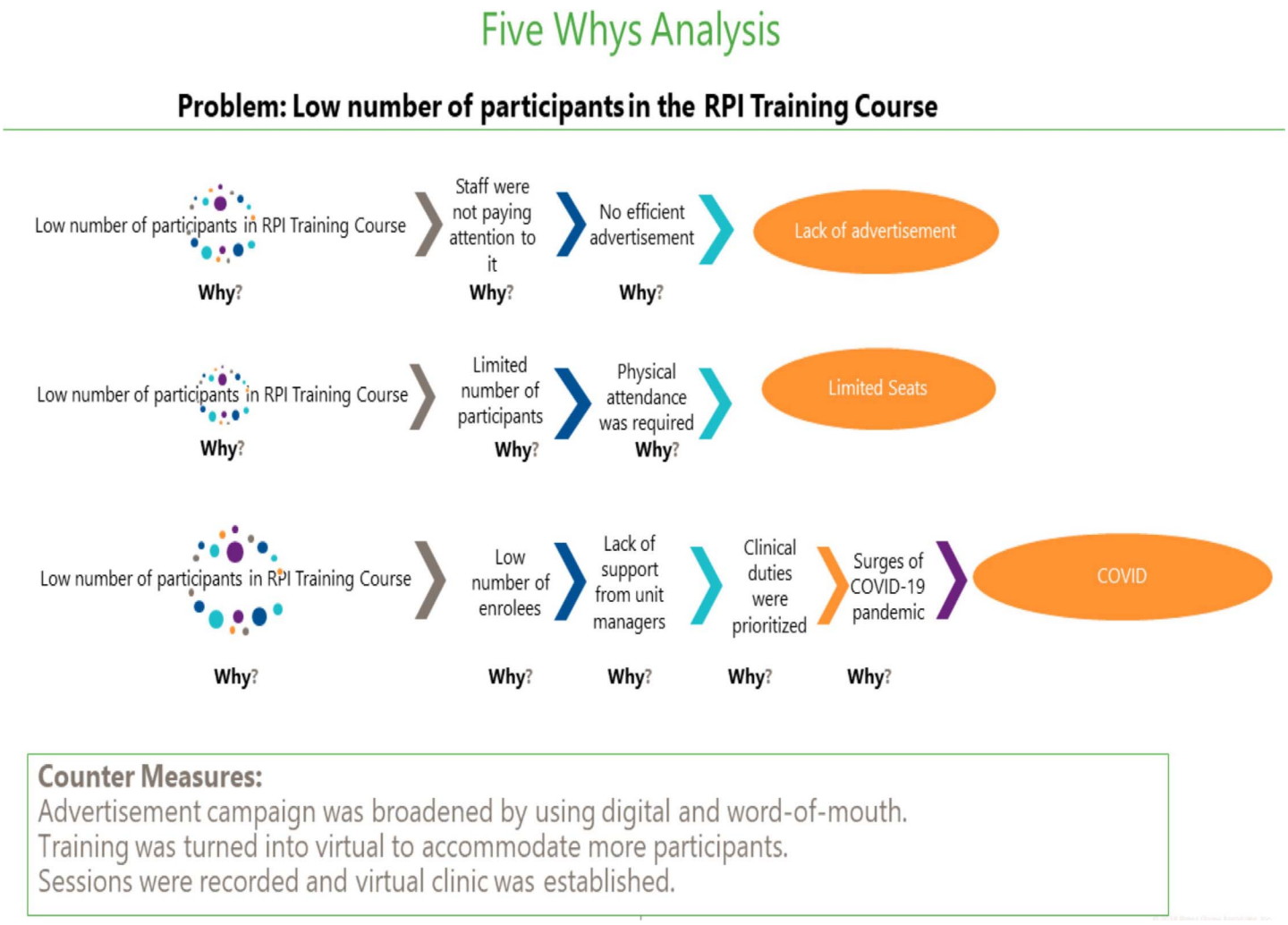


Figure 6. Five-whys analysis for low number of participants in the RPI training course. RPI: robust process improvement.

engaging more certified RPI coaches in facilitating training sessions.

Act: Monitor the progress of the PI projects using dashboards.

Compliance was used to measure the process as demonstrated in the timely submission and completion of projects, relative to having a comprehensive learning module via the virtual platform. Assessing its internal validity was reflected in the desirable behavior of the participants, who showed a high level of participation during the class and in accomplishing their weekly homework. On the other hand, the outcome was observed in the relationship between the RPI coaches and the PI projects. The more RPI coaches were trained, the more PI projects were submitted. As the pandemic worsened, some sessions had to be cancelled and some projects were delayed because of the understaffing situation in clinical areas (balancing measures), but to compensate for the cancelled sessions, two focused sessions were developed exclusively for the quality management and allied health staff. Generally, there was a positive effect from the overall PI projects in the hospital. These were not even the grand-scale projects of the organization; they were small-scale quality initiatives from frontline staff that resulted in cumulative effects improving, for instance, cost efficiency and patient services.

Variations noted included the dissimilarity in the level of support from middle management. Some units had complete attendance of the enrollees because their managers considered the RPI sessions as protected learning time, whereas other units placed priority on clinical hours so managers either did not allow their staff to enroll or withdrew their enrollees due to understaffing during the pandemic. The second variation was the level of participation. Classroom-based training accommodated a limited number of attendees, and personal commitment differed among the participants in terms of timely homework and attendance. Third, not all the staff were aware of the RPI course because of lack of effective advertisement. The 5-Whys tool was used to analyze these variations (Fig. 6). As countermeasures, a hospital-wide advertisement campaign was started using digital screens to inform where and how to enroll in the RPI

	BEFORE Quality Improvement using RPI		AFTER Quality Improvement using RPI	
	2018	2019	2020	2021
CERTIFIED COACH	*No Data*	*No Data*	*140*	*122*
INITIATED PROJECTS	*No Data*	*No Data*	*142*	*162*
COMPLETED PROJECTS	*99*	*50*	*94*	*109*

Figure 7. Results before and after performance improvement. RPI: robust process improvement.

course. An open line of communication was reestablished through multiple channels, such as e-mails, memos, and updates to multilevel committee meetings, in order to address leaders to provide their staff with time and resources to enroll, attend, and complete their projects. Training was turned to virtual out of necessity because of the pandemic, but this accommodated more participants. Finally, sessions were recorded, allowing the audience to watch and re-watch sessions to catch up on missed classes or to review the lectures. Accessing these learning video materials provided a convenient and reliable method of material presentation. Virtual clinics were established to facilitate the continuation of their progress by providing easily accessible digital support to the coaches undergoing training.

RESULTS

Before the quality improvement project, there were only 50 completed projects in 2019, which was a significant drop from 91 and 99 projects in 2017 and 2018, respectively. It increased to 94 in 2020 and to 109 in 2021, as shown in Figures 7 and 8. Although projects in the previous years were high, these were poorly sustained. The number of certified RPI coaches started with 140 in 2020 and 122 in 2021 (Fig. 7). In comparison with the average number of PI projects in the years before the launch of the RPI course, the completed projects in 2020 and 2021 doubled in number, which was after the implementation of the KFSH&RC Framework. There was no baseline to compare the number of the first batch of coaches who were certified in 2020 (because no training was done before 2020), but 140 is a high number to have been produced as RPI coaches in the first year. Although there was a slight decrease in certified coaches by 2021, it is worth noting that the total number of projects completed in 2021 was even higher than in 2020. The parallel sessions produced twice as many coaches as when only a single session was conducted.

Process measures were monitored according to the quality and effectiveness of the educational activities of the RPI course. Participants rated the training at 99%. The outcome of this quality project is observed in the relationship between the RPI coaches and the PI projects. The number of certified RPI coaches is calculated cumulatively; therefore, within 2 years, there was an exponential increase in the number of PI projects submitted (142 initiated projects in 2020 and 162 in 2021). Sixty-six percent (94 of 142) of initiated projects were completed in 2020 and 67% (109 of 162) in 2021. The more RPI coaches were trained in the succeeding

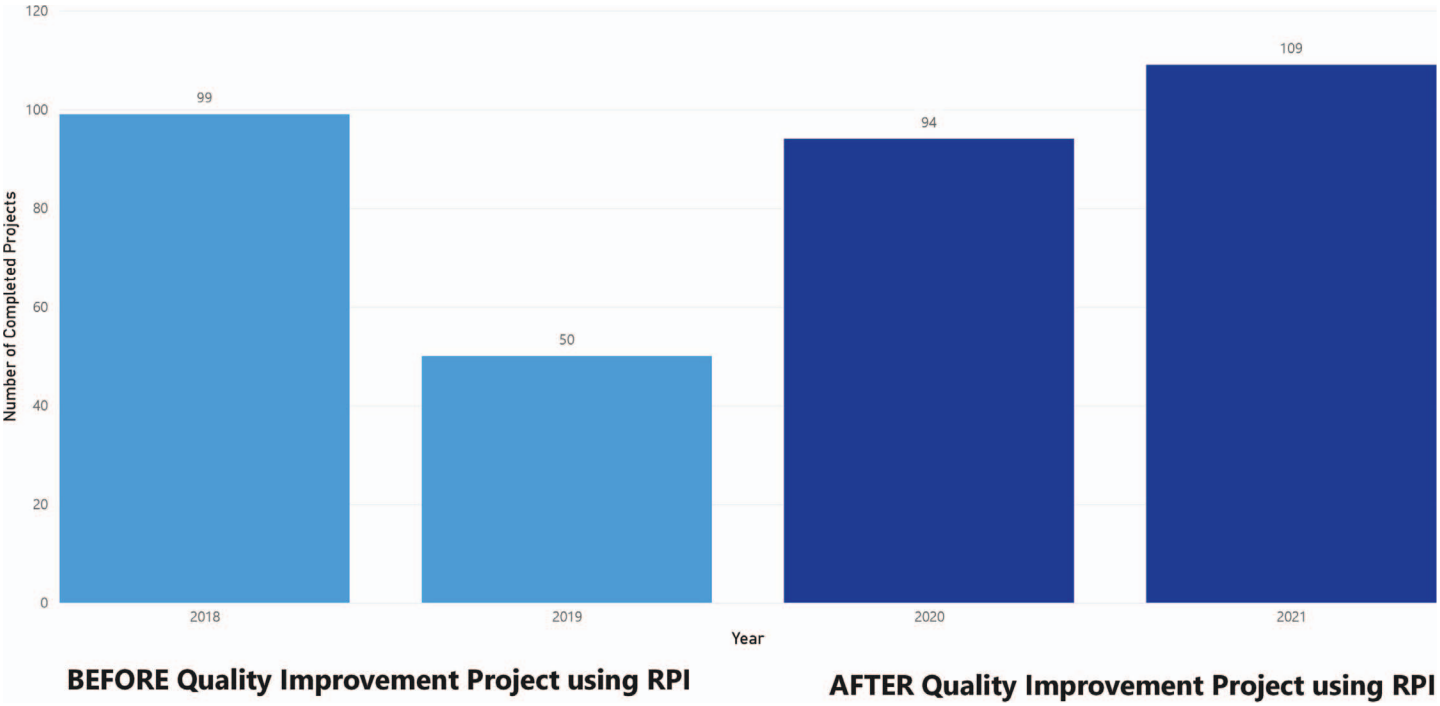


Figure 8. Completed projects before and after performance improvement. RPI: robust process improvement.

year, the more PI projects submitted. This outcome was observed as directly related to the implementation of RPI course.

In 2020, five projects improved access to care by 39% by enhancing virtual clinic consultations and encouraging discharge. Eleven projects decreased several types of harm (a total of 89 harms), including but not limited to central line-associated bloodstream infection, catheter-associated urinary tract infection, and pressure injury. Two projects saved 47,010 SAR by minimizing food waste and improving the eligibility criteria for human leukocyte antigen test appropriateness. Nine projects improved compliance to standard of care by 48% in terms of venous thromboembolism, severe acute respiratory illness screening, and medication reconciliation. Nine projects decreased waiting time by 170 hours by lessening patient time to provision of care and improving troponin turnaround time in the Department of Emergency Medicine. Two projects reduced waste by decreasing laboratory sample cancellations (12%) and eliminating unnecessary use of red swabs (72%) in microbiology. These data were assessed for accuracy and completeness using internal data validation.

The pandemic played a critical role in this intervention. The transition of classes from classroom to virtual contributed to more convenient educational sessions because the organizers no longer needed to book classrooms and prepare materials needed for face-to-face interaction. Although it was true that middle-management support was poor in some units relative to understaffing, the skeletal schedule applied in other units (wherein the staff were divided into two groups to report alternately every other week) became an advantage. Having more time contributed to increased compliance with attendance and homework from some participants, but it was altogether different for others who had to pause their classes to be floated to different clinical areas. Work from home was imposed on nonclinical departments, and therefore, the focused sessions undertaken by quality management and allied personnel showed excellent commitment and compliance. They attended these classes as protected learning time while working from home.

Unexpected benefits during the pandemic included more time to attend virtual classes where it was mandatory to work from home and where flexible timings were observed. Unexpected problems were not entirely avoided. Manpower reassignments to clinical areas and budget reallocation to personal protective equipment, laboratory test kits, and vaccines were done. Although financial costs did not directly affect the implementation of this quality project, budget reallocation affected PI projects that required monetary expenses to implement them, such as automation in the hospital system. The variation in attendance and project submission and completion because of understaffing was considered an unexpected failure in this intervention.

DISCUSSION

This quality improvement project is a milestone for our organization. Its purpose was primarily aligned with the HRO journey. Before its implementation, PI initiatives were neither properly progressing nor submitted on

time, resulting in a low number. This created dissatisfaction among the leaders, leading to a desire to disrupt the status quo and make changes[12] through the RPI training. Over its 2-year journey, this quality project has achieved its aim. It is currently being sustained, with 2022 marking its third year. It has produced an excellent number of RPI coaches, trained well with capabilities to spearhead PI projects in their own units and guide their own teams. The organization has seen organizational benefits relative to patient care and cost-effectiveness using the KFSH&RC Framework.

Amidst the contextual challenges, this quality project demonstrated its strengths, because this intervention consistently adapted its techniques in the delivery of RPI course. The low participation during the surges of COVID-19 improved after countermeasures were implemented, resulting in a favorably high number of certified coaches. PI projects were submitted and implemented in a timely manner and are sustained.

Introducing a new concept to an organization that involves a change in behavior and practice is challenging.[13] The essence of this quality project was to teach and use KFSH&RC Framework effective 2020 as a tool in initiation and sustainment of PI projects. It started as classroom based, and then shifted to virtual classes because of the need for social distancing. The teaching approach was influential in how effective the participants were learning and retaining lessons, so both the appropriateness of answers to assigned homework and the responses of participants to feedback surveys were constantly taken into consideration. Sets of homework that had been answered correctly were positive indicators that lectures were effective. However, when participants did not do their homework as expected, this indicated that there was variation in the process, and this negative indicator was equally important. The causes of this negative point could be twofold: objectively from the teaching methods or subjectively from the participants' degree of attention span and comprehension during these interactive online lectures.[14] To understand this, feedback was used. Honest responses from participants stating that they were inundated with information in a short period of time contributed to a less-than-ideal environment for learning. This feedback helped the organizers decide to extend the training sessions from 6 to 8 weeks and to record the classes. These extension and session recordings subsequently eased the participants through smoother and less stressful modular classes as they met deadlines for their homework and transitioned to implementing their PI projects.

The inference between the intervention and outcome is their direct association. When RPI training succeeded in certifying a large number of RPI coaches, which was counted cumulatively, the implementation and sustainment of PI projects also increased. RPI proved to be an effective quality tool to benefit a healthcare organization by improving the quality of patient care, reducing costs, and preventing harm,[15] and enhancing employee engagement, which then contributes to employee satisfaction.[16]

There are quality projects in other healthcare organizations that use comparable methods. An integrated healthcare system in the United States succeeded in trimming costs that resulted from clinical improvement efforts and concluded that robust quality improvement efforts are a preventive strategy.[17] In addition, a report was published by the National Health Service to apply systematic quality tools to combat the rising healthcare costs and poor quality care.[18] Although the approach used in the former project and proposed by the latter were not RPI per se, the key principle is similar to our own project. Projects that use RPI have demonstrated that systematic and data-driven quality tools yield positive results. Seven leading hospitals in the United States used RPI to reduce colorectal surgical site infections.[19] A similar project succeeded in developing and applying solutions that improved the rate of sepsis recognition and diagnosis.[20] A "cross-continents" collaboration improved hand hygiene culture using RPI.[21] In India, use of the RPI toolkit reduced the incidence of needle-stick injuries and thus minimized the costs of postexposure prophylaxis.[22]

The effect of this quality project on the organization members and the systems is in two stages, training and deployment, where capacity and capability building were intertwined. RPI course determined the knowledge mobilization[23] among the manpower. Training benefited the organization members. By the time they acted as certified coaches, the benefits of PI projects were observed across the systems of the organization. With hospital-wide positive results, leaders strengthened their support. Practicing a type of leadership that instills inspiration and motivation to staff to follow an ideal or course of action,[24] leaders and managers used a unified language related to quality. During operational meetings of hospital leaders, improvements in patient care and expenditures were attributed to the PI projects using the KFSH&RC Framework, thus building confidence in the RPI course. Because transformational leaders appreciated the contribution of their members,[25] an awards ceremony was held in recognition of the winners in PI projects. The enthusiasm of the members to act on PI projects using the KFSH&RC Framework was heightened in pursuit of the highest quality of patient care, embodying the values of the organization. The members now demonstrated a proactive attitude in signing up for RPI training as opposed to the QMD contacting unit managers for enrollment previously. This helped quality professionals establish a culture in which RPI was an everyday item. As numbers and figures showed significant improvement across departments, these results helped further the hospital's reputation in the region. The RPI program contributed to the HRO journey of the hospital.

From the beginning of this project, it was already anticipated that a structured framework would streamline the process and yield positive and measurable outcomes such as an increased number of certified coaches and PI projects. This intervention began before the COVID-19 outbreak, so pandemic-related difficulties were not anticipated. The entire world depended on guidelines mandated or recommended by the World Health Organization and the Centers for Disease Control and Prevention.[26] Healthcare institutions experienced insurmountable challenges in the shortage of resources, both in manpower and material.[27] As the global crisis on COVID-19 worsened, the project progressed, taking steps to counteract every blow of the pandemic.

Our hospital is a not-for-profit organization. Expenditures for implementation of this quality project were allocated within the departmental budget. Although a portion of the organizational budget had to be shifted to medical supplies during the implementation because of the pandemic, it was not a significant amount to warrant strategic trade-offs. In fact, the amount of money saved collectively by small-scale PI projects helped the organization regain its spending on non–RPI-related plans.

Limitations

The lack of generalizability is a limitation of this quality project. This intervention was also applied in the KFSH&RC-Jeddah, but modifications were made to suit their own healthcare setting. The RPI course content was the same, but the method of delivery was changed. Instead of meeting 4 hours per day per week for 8 days over 8 weeks, the counterpart provided eight sets of 1-day workshops per quarter until the third quarter of 2022 and 6 full days in the last quarter. Classes were further reduced to four full-day classes per quarter in 2021. Both branches experienced the same positive improvement in the number of certified RPI coaches and completed RPI projects.

CONCLUSION

Lack of standardized knowledge and tools produced a low number of PI projects, which was contrary to the aim of our hospital to become an HRO, so it catalyzed the creation of a standardized and structured framework based on RPI, with the crucial role of comprehensive RPI training course to build capacity as seen on the high number of certified coaches. PI projects doubled in number in the first year after the quality improvement project and further increased in the second year because more certified coaches initiated and implemented PI projects. More importantly, they are being sustained through follow-up, huddle board, and staff recognition. This project yielded similar positive results in KFSH&RC-Jeddah, signifying its potential applicability in a different healthcare setting. Monitoring feedback from participants and keeping updated with RPI maintain the relevance of the KFSH&RC Framework and RPI training, thereby producing new batches of certified coaches in high number to implement more PI projects. Benefits from these PI projects are critical for the hospital to continue its journey to zero harm.

References

1. Centers for Medicare and Medicaid Services. QAPI: a step by step guide in implementing quality assurance and performance improvement (QAPI) in your nursing home. *QAPI Resources*. Accessed Jul 15, 2022. cms.gov/Medicare/Provider-Enrollment-and-Certification/QAPI/qapi resources
2. Academy of Medical Royal Colleges, Quality improvement – training for better outcomes. March 2016. Accessed Jul 15, 2022. www.aomrc.org.uk/reports-guidance/quality-improvement-training-better-outcomes/
3. Chassin M, Loeb J. High reliability health care: getting there from here. *Milbank Q*. 2013;91:459–490.
4. Nether KG, Thomas EJ, Khan A, et al. Implementing a robust process improvement program in the neonatal intensive care unit to reduce harm. *J Healthc Qual*. 2022;44:23–30.
5. Hibbert P. How to sustainably build capacity in quality improvement within a healthcare organisation: a deep-dive, focused qualitative analysis. *BMC Health Serv Res*. 2021;21:558.
6. World Health Organization. WHO launches first ever global report on infection prevention and control. *WHO News*. May 6, 2022. Accessed Jul 15, 2022. www.who.int/news/item/06-05-2022-who-launches-first-ever-global-report-on-infection-prevention-and-control
7. World Health Organization. WHO launches effort to halve medication-related errors in 5 years. *WHO News*. 2017. Accessed Jul 15, 2022. www.who.int/news/item/29-03-2017-who-launches-global-effort-to-halve-medication-related-errors-in-5-years
8. The Joint Commission. High reliability healthcare maturity model. Joint Commission Center for Transforming Healthcare. 2019. Accessed Jul 16, 2022. www.centerfortransforminghealthcare.org/high-reliability-in-health-care/
9. Pellietier L, Beaudin C. *HQ Solutions Resource for the Healthcare Quality Professional*. 4th ed. National Association for Healthcare Quality. 2018:154–157.
10. Bossert J. Implementing healthcare quality. *J Qual Participation*. 2019;44:39–40.
11. Dalton J. Gemba walks. In: *Great Big Agile*. Apress; 2019.
12. Hussain S, Lei S, Akram T, et al. Kurt Lewin's change model: a critical review of the role of leadership and employee involvement in organizational change. *J Innov Knowl*. 2018;3:123–127.
13. Johnson MJ, May CR. Promoting professional behaviour change in healthcare: what interventions work, and why? A theory-led overview of systematic reviews *BMJ Open*. 2015;5:e008592. doi: 10.1136/bmjopen-2015-008592
14. Geri N, Winer A, Zaks B. Probing the effect of interactivity in online video lectures on the attention span of students: a learning analytics approach. In: *Proceedings of the 12th Chais Conference for the Study of Innovation and Learning Technologies: Learning in the Technological Era*. 2017;38E–42E
15. Veazie S, Peterson K, Bourne D. *Evidence Brief: Implementation of High Reliability Organization Principles*. U.S. Department of Veterans Affairs. May 2019.

16. Brajer-Marczak R. Employee engagement in continuous improvement of processes. *Management*. 2014;18:88–103.
17. James BC, Savitz LA. (2011). How Intermountain trimmed health care costs through robust quality improvement efforts. *Health Affairs*,2011;30:1185–1191.
18. Alderwick H, Charles A, Jones B, Walburton W. Making the case for quality improvement: lessons for NHS boards and leaders. In: *The King's Fund*. The Health Foundation, 2017.
19. Grand-Clement S, Smith C, Musheno D. Reducing colorectal surgical site infections through robust process improvement. *Am J Infect Control*. 2013;41(6 Suppl):S133.
20. Blanchard E, Musheno D. Breakthrough reduction in sepsis mortality with national collaborative utilizing robust process improvement methodology. *Am J Infect Control*. 2014;42(6 Suppl):S17–S18.
21. Grand-Clément S, Karam Z. Using robust process improvement to transform the hand hygiene culture and performance. *Am J Infect Control*. 2013;41(6 Suppl):S134.
22. Jaggi N, Nirwan P, Chakraborty M. Process improvement to effectively manage and reduce sharps injuries in a Tertiary Hospital in Northern India. *J Healthc Qual Res*. 2020:35:141–148.
23. Kislov R, Waterman H, Harvey G, Boaden R. Rethinking capacity building for knowledge mobilisation: developing multilevel capabilities in healthcare organisations. *Implement Sci*. 2014;9:166.
24. Aarons G, Ehrhart M, Farahnak L, Sklar M. Aligning leadership across systems and organizations to develop a strategic climate for evidence-based practice implementation. *Ann Rev Public Health*. 2014;35:255–274.
25. Loon M, Mee Lim Y, Heang Lee T, Lian Tam C. Transformational leadership and job-related learning. *Manage Res Rev*. 2012;35:192–205.
26. CDC 2020 in review. *CDC Newsroom*. Centers for Disease Control and Prevention. Dec 29, 2020. Accessed Aug 12, 2022. www.cdc.gov/media/releases/2020/p1229-cdc-2020-review.html#print
27. Myers LC, Liu VX. The COVID-19 pandemic strikes again and again and again. *JAMA Netw Open*. 2022;5:e221760.