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Implementation of a Nurse-Led Preoperative Clinic to Reduce Surgical Cancellation Rates in Saudi Arabia

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I. Introduction

The aims of the Saudi vision 2030 is to optimize and better utilize the capacity of Saudi hospitals and healthcare centers, and enhance the quality of Saudi preventive and therapeutic healthcare services (Saudi vision 2030, 2019). Thus, it is the sole responsibility of the Saudi Arabian Government to provide their people with health facilities that are well equipped and readily available. All of Saudi's facilities from primary health institutions to tertiary hospitals are supervised and controlled by the Ministry of Health (Dhafar, et al., 2015). It is imperative for a well-equipped health institution to have an operation room (OR) which is closely monitored and maintained by the institution's administrator in collaboration with the government. The ORs have been recognized as one of the most vital healthcare services as over 310 million surgeries are conducted worldwide every year (Turunen et al., 2018). Surgical procedures heavily contribute to an institution's income as patient pay for their surgical service. Governments usually offer a helping hand in equipping and maintaining the ORs as the cost of setting up an operating room is continuously rising thus putting immense pressure on the Saudi Arabia's health systems (Fayed et al., 2016). Therefore, the maximal utilization of the ORs should be one of the major goals and quality improvement aspect of any hospital. Most importantly, this project aims to reduce the number of surgical cancellations in Saudi Arabia by applying/introducing an evidence-based nursing intervention that aligns with the Saudi vision 2030.

Cancellations on the day of surgery is a global challenge that is facing the delivery of quality care in a healthcare organization. Likewise, in the Saudi healthcare institutions, elective surgical cancellations are a widely recognized dilemma. Surgery cancellations is one of the vital quality indicators when evaluating the perioperative care (Dhafar et al., 2015; Fayed et al., 2016). Studies define elective surgical cancellation as any scheduled surgical procedure that is not performed on the intended day (Desta et al., 2018; Gillies et al., 2018). Surgical cancellations and rescheduling is a documented issue "ranging from 0.37–28% in developed and from 11% to 44% in developing countries" as noted by Desta et al. (2018, p. 2). For instance, a prospective epidemiological study over a 14-day period in one the UK hospitals found a cancellation rate of between 10% and 14% (Gillies et al., 2018). Likewise, in Saudi Arabia, the incidences of cancellation of surgery were recorded and reported in different institutions ranging from as low as 3.9% to an exorbitant 40% (Fayed et al., 2016, p. 68). Consequently, various surgical specialties, hospitals, patients and caregivers continue to suffer differentially from the cancellation of elective surgery. Evidence showed that last minute cancellation is discouraged as they lead to a waste of the institution's resources, time, inefficient utilization of ORs, psychological repercussions and patient dissatisfaction with the healthcare service (Abeeleh et al., 2017; Turunen et al., 2019). First off, surgical cancellation greatly affects medical logistics and creates financial burden. The OR has specialized equipment that is used during certain procedures. Cancellation of a case would mean that unused or the newly acquired equipment can go to waste (Gillies et al., 2018). This, in turn, fosters OR inefficiency. Moreover, case cancellations in the OR greatly increases the general cost of operation. A longitudinal study conducted in the USA showed that "the mean cost of one minute of operation room time is approximately 36-37 US dollars" (Turunen et al., 2018, p. 30). Patient care may be also compromised. For instance, a cancelled case means that the patient would have to extend his/her stay in the hospital causing an inconvenience to the patient and their family and increasing the financial burden (Gillies et al., 2018). In the US, a study on the financial cost of surgical cancellations showed that the average cost of a cancelled operation is about 5,000 to 8,000 US dollars (Turunen et al., 2018, p.31). Hence, an evidence-based solution is needed to reduce cancellation of planned elective surgeries and their costs.

Furthermore, elective cancellation on the day of surgery can have a psychological and social impact on the patients as well as their families. Al Talalwah and McIltrot (2019) is keen in pointing out the negative

effects case cancellations have on the mental health of patients. Short notice cancellation causes a noteworthy dissatisfaction and frustration for patients and their relatives after waiting a long time for their operations. According to research, it takes time and patience for a patient to be prepared for surgery, arranging for absence from work, childcare or a post-surgery escort, all of which may be problematic to rearrange. Therefore, cancellation of surgery may harm patients, influence their quality of life, and increase stress for the patient, families, and staff. Turunen et al. (2018) confirm that there is a significant correlation between the elective day of surgery cancellation and adverse psychological concerns. Most of perioperative patients become anxious time and continuously need their nurses to be close to provide emotional support and guidance for them. A case cancellation may spark high anxiety levels thus attracting or causing undesired patient outcomes. Last but not least, case cancellation automatically leads to dissatisfaction not only on the part of the patient, but also on the part of their concerned family members. The delay of surgery has an impact on staff morale, therefore handling the unsatisfied and stressed patient who has waited for surgery, can become difficult for the healthcare worker (Fayed et al., 2016). Most importantly, negative patient experiences prevent one from visiting the institution again as highlighted by Davidson et al. (2016). Patients prefer institutions that provide top-notch quality of services with little or no complications (Da'ar and Al-Mutairi, 2018). Surgical procedures directly affect individuals' lives as it is one of their most vulnerable moments. It is therefore consequential that their experience during care is positive. Thus, identifying evidence-based interventions to improve patient satisfaction with their surgical experience is a core responsibility for all healthcare providers.

Worldwide, there are several factors involved in case cancellations in the hospital setting. Reasons for cancellations vary between countries, hospitals, type of surgery and characteristics of the population served (Hänninen-Khoda et al., 2018). These factors have been traditionally divided into two subcategories; unavoidable and potentially avoidable cancellation factors. With regards to unavoidable cancellations, a change in a patient's medical status may lead to the cancellation of elective surgery (Aust, et al., 2018). This is because insufficient patient preparation and planning of surgery compromise the surgeon's ability to provide safe care. Another factor is the occurrence of an emergency case that supersedes the elective surgery schedule (Hänninen-Khoda et al., 2018). This problem mostly occurs in institutions with few surgeons. Lack of time to access the operating room has also been recognized by numerous scholars. Fayed, et al. (2016) indicate that some cases may take longer than expected, hence hindering another scheduled operation from taking place. Lack of enough intensive care unit (ICU) beds may at times hinder a surgery from occurring. Because the patient would need to go to the ICU for specialized care following the surgery; in particular, complex cases such as open heart or transplant surgeries. This may be due to overcrowding incidences where a lot of individuals who are severely injured need ICU care beds.

With regards to avoidable cancellations, these usually occur because patients do not turn up for the surgery, lack of adequate preoperative knowledge, inadequate pre-assessment/preparation. According to extensive research, there is a dire need for nurses to look out for patients and be able to effectively prepare them for surgery (Turunen et al., 2017). Hospitals in the UK lost approximately $88 million for cancellations of planned operations due to reasons that are hospital-related; lack of preoperative evaluation (Al Talalwah and McIltrot, 2019, p.86). Patients seeking surgical services are advised to visit the pre-operative clinic so that they can be fully informed about the procedures and all that is expected of them. Preoperative clinics play a vital role in instilling confidence to patients waiting for surgery. Arguably, nurse- led preoperative clinics have proven to help patients to prepare physically, psychologically and thus reduce cases of preoperative dissatisfaction and anxiety (Davidson et al., 2016). Patients require great attention and care as they prepare for surgery and practitioners are advised to be sensitive to their needs. For this reason, it is important for nurses to create close relationships with their patients as this fosters a sense of belonging (Sau-Man Conny and Wan-Yim, 2016). Another issue in cancellations is equipment shortages (Abeeleh, 2017). Surgeons may lack proper tools to effectively carry out certain operations, thus they are forced to reschedule. Scheduling errors have also been noted to contribute to case cancellations. However, some institutions heavily rely on the use of artificial intelligence which automatically notifies surgeons concerning their schedules in a timely manner. Evidence confirms that 86.5 % of the surgical cancellations are related to avoidable reasons and 13. 5% are unavoidable reasons (Dhafar, et al., 2015; Kaddoum et al., 2016). The majority of elective cancellations factors contribute to avoidable reasons in Saudi Arabia as well and were considered to be preventable. Therefore, prioritizing future improvement efforts and determining evidence-based nursing interventions to address surgical cancellation issues and minimize occurrences are vital within the Saudi healthcare system.

Objective of Quality Improvement

The primary objective of this quality improvement initiative project is to reduce surgical cancellation rates through the implementation of nurse-led preoperative clinics in the Saudi healthcare institute, particularly in some tertiary care hospitals where is the cancellation rate is high.

II. Literature Review

For this review of the literature, CINAHL, Cochrane and MEDLINE via PubMed databases were accessed using the keywords 'surgery cancellation', 'elective surgery', 'nurse-led clinic', 'pre-operative assessment clinic', 'pre-admission clinic' and 'preoperative evaluation clinic'. The search yielded 30 peer reviewed articles that were published between 2013-2019. A total of 12 articles were found to be the most relevant to support this quality improvement project; of which 11 are quantitative research and one is a qualitative study. The review of the literature will be classified into two categories; factors contributing to surgical cancellation and impact of nurse-led preoperative clinic on patient undergoing elective procedures.

Surgical Cancellation Factors

The cancellation of elective surgery has a negative impact on operating room time, resources, patients, and families. Looking for the primary cause of these cancellations was vital. This literature review provided evidence for the reasons of cancellations from various countries and hospital perspectives.

Elective surgery is not emergent and has been scheduled in advance for a specific day and time. Elective case cancellation describes an elective case that was included in a surgery schedule, but was cancelled prior to the surgery taking place (Desta et al., 2018). Among the many disadvantages of surgical cancellations are the psychological sufferings to patients and their families. In a cross-sectional study conducted with surgeons, nurses and anesthetists (N=146), Desta et al., (2018) explored the reasons for the causes of cancellations in a tertiary referral academic medical centre in Ethiopia. The authors reported 146 cancellations out of 462 elective surgeries - almost one third of the cases. The most reasons for cancellation was found to be surgeon related, translating to 35.8%, while 28.7% was patient-related and 21.2% factors were anesthesia related. The authors concluded that most of the cancellation were preventable with proper preoperative assessment, surgeon availability, proper scheduling, and achieving the required operation room equipment. They also suggest that clear communication should be established within the operation teamspace (Desta et al., 2018).

A retrospective study that employed secondary data extraction from the database of a public hospital in Sao Paulo categorized reasons for elective surgery cancellations as clinical or non-clinical (Santos and Bocchi, 2017). The authors discussed clinical reasons (upper respiratory tract infection, urinary tract infection), and non-clinical reasons for cancellations (surgical scheduling errors, lack of surgical equipment, unavailability of preoperative tests or test results such as laboratory or medical imaging. The result showed that out of the 8443 surgeries scheduled, 573 were cancelled translating to 6.79%. It was also determined that, 48.33% of cancellations were due to clinical reasons while 46.40% were due to non-clinical. The most common of the non-clinical reasons for cancellation of operations was avoidable by 80% (Santos and Bocchi, 2017).

One of the most devastating consequences of plastic surgical cancellations is direct and indirect costs for a hospital and economic and emotional stress for patients. The average cancellation rates in plastic surgery cancellations ranged from 4% to 14% because of patient-related factors; the patient unfit for operation/anesthesia, the patient failed to attend hospital; the patient refused surgery or the patients had acute infection (Hänninen-Khoda et al., 2018). Hänninen-Khoda et al. (2018) conducted a retrospective study that primarily aimed at examining patient-related reasons for the cancellation of plastic surgery. The secondary aim of the study was to optimize the operating theatre efficiency by improving knowledge of the causes of cancellations and propose a strategic algorithm to avoid plastic surgery cancellations. The study was conducted in Finland's Helsinki Hospital from 2013 to 2014, and the result showed that out of the 327 surgeries scheduled, 148 were cancelled. Patient-related factors caused 45.3% of these. The most common of these reasons was due to acute infections and a change in a patient's condition that was not recognized prior to the beginning of the operation. The other reason was that it was found that the patient did not indeed require surgery. These factors constituted 63.5% of the patient related issues. Failure in communication between patient and doctor was also found to be a major reason for cancellation. The authors emphasized, that with proper communication and precise multi-professional planning of the theatre list, most of these reasons can be prevented (Hänninen-Khoda et al., 2018).

In the Kingdom of Saudi Arabia (KSA), cancellation of operations is a documented problem, particularly in the countryside where resources are limited A retrospective assessment of the rate of surgery cancellation was conducted in 25 hospitals in the Makkah region from January to December 2013. The aim of the study was to identify the frequency and reasons for operation cancellations. In the 120 operating rooms within the hospitals, 16,211 surgeries were scheduled with 1,238 cancelled. This translated to 7.6%, and the highest cancellation was reported from the orthopedic being 33.8%. General surgery was cancelled at a rate of 27.5% while obstetrics was cancelled at a rate of 7.7% and ENT 5.2%. Based on these specialties cancellation number, 42.81% was patient related and 20.03% was facility associated. It was also realized that the improper organization, meaning scheduling, caused 9.45% cancellations. Other recorded reasons were related to anesthesia 1.45%, 7.19% to surgeons and failure of the patients to attend 20.76%. The findings were that the three leading causes of cancellations were patient-related, facility, and disorganization of the processes. It is

necessary to decrease these surgery cancellations for efficient control and management of both resources and time (Dhafar et al., 2015).

Low cancellation rates are one of the excellent quality indicators in hospitals and one of the critical aspects of improving operating room productivity. A retrospective study was done in Ibri Regional Hospital in Oman between January to December 2014. It aimed at determining and reporting burden of surgical cancellation, frequency, reasons, and no-show's incidence in a large regional hospital in Oman (Appavu et al.,2016). The result indicated that a total of 4,814 procedures were scheduled with 1,235 being cancelled representing 26%. The patient failing to turn-up for surgery was the most prevalent reason at a 63% rate. However, operating room related reasons were minimal at only 2%. According to specialty, general surgery was cancelled. the highest at 65% while ENT procedures recorded the cancellation rates at 42%. The majority of surgical cancellations at the Ibri Regional Hospital were attributed to patient no-shows which is different than causes reported from the international literature (predominantly administration related) . The authors propose measures such as regular audits, having a dedicated booking coordinator for the procedures and effective management of the projects, as the solutions to better utilize the operating rooms. Consequently, these methods may work to save funds and resources and reduce the burden of cancellations spelling (Appavu et al., 2016).

Cancellation of surgery has been intensively investigated in all healthcare services to find out its causes, consequences, and potential solutions. A study was conducted in a Tertiary Hospital in Saudi Arabia aimed to investigate the cancellation. of surgery in terms of their reasons and rates (Fayed et al.,2016). From January 2009 to December 2012, monthly cancellation. rates were analyzed. The investigators managed to evaluate a total of 1813 cases cancelled over the year 2012. The result found an average cancellation rate of 11.1%, which then dropped to 9.0% attributing to the launch of a new OR. Of the three reasons found to be the most prevalent, patients not showing up (27 %) was the most common. Need for additional optimization or investigation also had an impact at 24.3% while the third reason for cancellation at 19.5%, was due to facility-related factors including lack of OR time and no availability of elective or ICU beds. Unavailability of equipment, staff, and implants contributed slightly to 0.7%. (Fayed et al., 2016).

The cancellation of elective scheduled operations results in inefficiency of OR time, leading to a waste of resources. These cancellations also result in the inconvenience of both patients and their families. It forces financial and logistical burdens, such as an extended stay in the hospital and even the repetition of pre-surgery preparations (Kaddoum et al., 2016). Prospective auditing was carried out at a Tertiary Teaching Hospital in Beirut, Lebanon, to investigate the rate of cancellation of elective surgeries. The study ran for a period of eight months from January 2013-August, 2013. The result showed that 261 cases were cancelled on the day of surgery out of the 5929 scheduled surgeries. From the cancelled cases, 187 were found out to be avoidable and 74 unavoidable. Some of the reasons identified for cancellations were lack of financial clearance (n = 43), conducting an incomplete preoperative evaluation (n = 34), and a change in the patient's medical status (n = 31). The study concludes that determining the major avoidable contributory factors is an essential step to developing appropriate interventions to promote patient safety and improve operating theater efficiency (Kaddoum et al., 2016).

Summary

The studies established the major causes of surgical cancellations, the outcomes of these cancellations and the possible solutions to curb them or reduce their prevalence. They also used valid data to back up their evidence. However, they differ in the sense that all studies show that the reasons for cancellations vary from hospital to hospital or from country to country. The research conducted in Saudi Arabia has similar reasons for cancellation of elective surgery to the studies that were done internationally.

Impact of Nurse- Led Preoperative Clinics

The importance of the nurse-led preoperative clinic is being widely understood and highly recommended. The second part of the literature review will demonstrate the positive outcome of the nurse-led preoperative clinics on cancellation rates and surgeries such as, orthopedic and gynecological surgery.

In an integrative review, Turunen et al., (2017) explored the part played by a preoperative nurse and described the outcomes of a preoperative nursing care structure prior to a patient arriving for surgery. Literature from PubMed and CINAHL databases were selected in the period between 1st January 2004 and 20th September 2014. A total of 41 articles were extracted and analyzed using qualitative inductive content. A total of seven tasks and responsibilities were identified for the preoperative nurse; tools that can be used to support the process as well as structured nursing care can have a positive impact. These roles have been found to be key in setting in motion every requirement and checks that are needed on the day of operation (Turunen et al., 2017).

Likewise, a systematic review of quantitative research was done by using Joanna Briggs Institute (JBI) approach evidence based practice database. The primary purpose of the review was to analyze the important roles played by advanced practice nurses in preoperative assessment clinics (POAC) on elective surgery

outcomes (Sau-Man Conny and Wan-Yim, 2016). The second purpose was to identify the best available evidence to inform current clinical practice, guide healthcare decision making and promote better surgical patient experience. The studies focused mainly on adult patients requiring elective orthopedic surgery such as knee or hip replacement and reconstruction or reduction surgery. The patients that were selected had attended a POAC led by a nurse. In total, ten studies were reviewed and it showed that in addition to POACs practices reducing surgery cancellations, it also reduced hospital stays as well as reducing postoperative mortality (Sau-Man Conny and Wan-Yim, 2016).

On the other hand, a conflicting finding was reported on a systematic review that focused on establishing the effectiveness and effects of nurse-led preoperative assessment clinics (POACs) on the patient's outcome (Hines et al., 2015). The review mainly focused on randomized controlled trials (RCTs) ; however other designs were included. Articles were validated by two reviewers before including them as part of the review. The Joanna Briggs Institute-Meta Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) was used and data extracted from the studies used the same tool. The findings were presented narratively due to the fact that statistical pooling was not possible owing to the studies being heterogenic. The authors deduced that evidence is weak pertaining to nurse-led POACs services can be effective in reducing surgical cancellation, hospital stay or even morbidity from the surgeries. The evidence is also weak on ascertaining that nurse-led POAC services can improve patient surgery preparedness, help the patient in recognizing postoperative needs or even improve patient satisfaction (Hines et al.,2015).

The primary role of the preoperative assessment clinic is to evaluate surgical patients prior to surgery. A first quality improvement study was done in Bronx Lebanon Hospital Center, USA to discuss and increase awareness about the usefulness of preoperative risk assessments; preoperative clinics and nurse-led pre admission services. The roles of various individuals in the running and management of the clinics was also discussed by Tariq et al. (2016). The authors also discuss the benefits and challenges of the preoperative assessment clinics and try to propose solutions to the best practices that would make the clinics effective in reducing surgical cancellations. The result of the paper showed that the setting up of the preoperative clinics should be based on the individual needs, culture, and resources of the organization. Undoubtedly, medical optimization of surgical patients significantly lowers the probability that a surgical operation will be postponed for a medical reason (Tariq et al., 2016).

It is well documented that surgery is the most effective and preferred mode of treatment among gynecologic cancer patients. A quality improvement project was conducted in the Gynaecological Oncology Department at the KK Women's and Children's Hospital in Singapore, from December 2014 to February 2015. It utilized a descriptive design to identify the effectiveness of an advanced practice registered nurse–led preoperative assessment and education clinic especially with women undergoing surgery for gynecologic cancer (Huang et al., 2015). Many factors contributed to the success of these surgeries; however inadequate preoperative assessment and preparation are found to increase surgical complications and add to the distress of women with gynecologic cancer (Huang et al., 2015). These inadequacies can be attributed to preoperative caregivers failing to identify factors such as the physical, psychological and the financial state of the patient which can affect the outcome of the surgery as well as increase the hospital length-of-stay. Inadequacies may be a result of the staff not adequately assisting the patient to understand the diagnosis and treatment of their conditions. To address these issues, Huang, et al. (2015). recommend to tailor a risk assessment and preoperative preparation plan to meet the needs of the individual patients. Preferably, this plan should be set up at the time of the initial diagnosis of cancer in the outpatient setting. Finally, the authors claim that preoperative assessments and patient education clinics run by registered nurses, have been successful in improving the outcomes of preoperative and postoperative patient concerns. The outcome of the study supports previous studies that highlighted the role of nurse-led preoperative clinics in improving surgical experience and services (Huang, et al. 2015).

Summary

From the literature above, many of the studies have clearly illustrated the effectiveness of nurse-led preoperative clinics assessment/evaluation on in the entire surgical process, albeit weak supporting evidence reported by Hines et al. (2015). The studies also try to determine the role of nurse-led preoperative clinics and recommend factors needing attention to improve surgical outcomes and reduce, or preferably eliminate, surgery cancellation. Despite the fact that some nurse-led preoperative clinics specialized in several areas; gynecological surgeries or orthopedic surgeries, nurse-led clinics are highly recommended in many surgical specialties as one of the best management strategies. A gap in knowledge relating to the implementation of nurse-led preoperative clinics in Saudi Arabia was noted. However, from reviewing the literature and following the recommendations, it is believed that when a nurse-led preoperative clinic is strategically set up within the Saudi healthcare system, it will facilitate adequately addressing each patient's needs. Consequently, the surgical outcomes can be

improved upon and the surgical cancellation rate can be reduced in Saudi hospitals. The nurses and the staff should be well educated and the setup of the clinic well informed, in order for these outcomes to be realized.

Quality Improvement Framework

Identifying any gaps in hospital service and developing effective/ efficient action plans for improving the quality of nursing care of surgical patients are essential. Thereby, this process of improvement will apply the PDSA framework to guide the evidence-based nurse-led preoperative clinic initiative. The PDSA abbreviations stand for Plan, Do, Study and Act. PDSA as an idea originates from Doctor Edwards Deming`s a management consultant, who is considered by several individuals to be the father of modern quality control (Taylor et al., 2014). The benefits of the plan, do, study and act are that it directs an organization to design a feat, do it and eventually check whether the designed feat acts in conformity with their intended initially plan (Christoff, 2018). Any healthcare provider may develop a hypothesis about what the issues might be, and decide on which set of issues to be handled (plan). Secondly, the prospective modification is tested, as well as the possible solution (do). Thirdly, the change is revised, and the outcomes scrutinized. Its effectiveness is measured, and the decision on whether to support the hypothesis chosen earlier or not is thus made (study). Lastly, an action is taken, that is in agreement with what was intended before (act). The project will be implemented under the direction of the PDSA. PDSA as a method has been chosen since it is increasingly recommended as an endless improvement method in any field of research, study, or projects. PDSA techniques are highly recommended for efficient systems improvement in preoperative patient assessment, education, and counseling. It is a clinical improvement process, useful in adopting or implementing research-based interventions — especially where its integration into everyday care is a dominant practice (Christoff, 2018; Taylor et al., 2014). Accordingly, this project will employ the PDSA framework.

In the (plan) stage, the quality team and stockholders will work together to set up and implement an effective plan for the nurse-led preoperative pilot clinic with a goal of reducing the surgical cancellation rate in one Saudi healthcare organization. They will also determine the site of the clinic, practical considerations, and the role of policy, guidelines, and protocols that are needed. In the (Do) stage, the qualified and experienced nurse will run the nurse-led preoperative clinic and carry out all activities/changes that have been agreed during the previous phase. The (study) stage will reflect the progression of the clinic. It is observing and evaluating the effectiveness (or not) of the clinic during the selected period. Based on that in the (Act) stage, a possible modification will be decided on in line with the goal of the project as needed. If the goal of setting up the clinic were achieved, the clinic would be spared it and implemented in other healthcare organization.

III. Methodology/ Evidence Based Intervention

Quality Improvement (QI) is a methodical activity that aims at positive modifications in the health care provision in actual situations (Stiegler and Tung, 2017). The QI involvements are ideally characterized by the use of successful cycles like the PDSA that is being used for this project. Change in the healthcare sector is inevitable. In order for a healthcare sector to develop long term solutions to their drawbacks, their workers must embrace quality improvement - a culture that has yet to be developed in many instances. By adopting the PDSA quality improvement approach, a healthcare facility can enhance patient care and safety as well as improve revenue use and increase efficiency. The quality improvement strategy in a surgical setting involves efforts and inputs both from patients and staff as well as support for the initiative from the organization. This joint effort goes a long way to improving preoperative service delivery to the patient in the long run. Quality improvement serves to improve surgical patient care and safety through technological advancements, effectiveness and general care (Stiegler and Tung, 2017), in particular the effectiveness of educational strategies that is the focus of this initiative.

This quality improvement proposal will be presented to one of the largest tertiary care hospitals in Riyadh, Saudi Arabia. The hospital has a total capacity of 1,200 beds, 26 operating rooms with a high volume of complex operations being performed there every year. The hospital serves more than 19,171 inpatients along with over 238,404 outpatients per year and provides several surgical interventions for challenging conditions (King Fahad Medical City, 2019). The reason behind the chosen organization is because the hospital does not have a pre-assessment nursing clinic and rate of surgical cancellations is high, which are the main areas of concern to achieve the goal of the project.

Quality improvement activities significantly improve healthcare, but ought to be conducted ethically. Fiscella et al. (2015) confirmed that any QI project or activity that poses a risk of psychological or physical harm to a patient must have ethical consideration. A poorly designed QI project is itself an ethical issue because the project is unlikely to achieve valid and reliable assessment, and may not produce improvements in the quality or safety of patient care. Likewise, ethical issues arise in QI because attempts to improve quality may inadvertently cause harm, waste scarce resources, or affect some patients unfairly (Stiegler and Tung, 2017). Therefore, this project can begin after initial approval has been obtained from the hospital institutional review

board (IRB). Following the hospital policy and hospital organization chart, the quality team for this project will work collaboratively with the director of operating room services, director of ambulatory care, and other healthcare professionals. All the required forms will be submitted to ensure the success of the project and for further communication, as needed.

The initial steps to begin a quality improvement project is forming an active quality improvement team that possesses expertise in the quality of care problem, hospital leadership, and management as noted by Lawson and Hill (2018). Therefore, implementing the nurse-led preoperative clinic requires a multidisciplinary team approach and work across multiple departments. It may involve working with admission offices, ambulatory care, operating room administration, preoperative care services (if available), and quality department to ensure success and sustainability of the quality improvement project. The quality improvement team in this project is a group of qualified and multi-skilled healthcare worker charged with carrying out improvement efforts to optimize patients prior to surgery and operating room utilization. It includes a team leader who will take ownership of the quality improvement initiative and stakeholder. Silver et al. (2016) indicated that the fundamental characteristics of an effective stakeholder are interest in the project; commitment, respect, punctuality, critical thinking with leadership skills and technical expertise. Hence, the possible key stakeholders will involve nurses who will play an important role in identifying patients' needs or risk factors, that may influence the surgical outcome. They will also be responsible for understanding patients' expectations as well as alleviating their anxiety through sufficient education and effective communication. The anesthetists who work in the facility will be another key stakeholder to assist with the development of this project. Also, a request will be make for the anesthetist to collaborate with nurses to discuss the risks and benefits of anesthetic options and pain management methods for patients. Operating room utilization workers are another vital stakeholder. They provide resources and access to necessary data such as records of the number of electives sugary cases, date of admissions and number of possible cancellations. A senior nurse specialist, advanced nurse practitioner (ANP) (if available), consultant and perioperative administrative will be responsible for policy, procedure administration and quality assurance of the clinic. Last but not least, patients undergoing elective surgery engagement will be a particularly important component of project success as well. Silver et al. (2016) emphasized that the knowledge that patients/caregivers can offer as members of a quality improvement team should not be overlooked. Anyone who has an interest in the project and can influence its success should be included. After identifying all possible stakeholders, the role and responsibility of each will be presented in a project Gantt chart, and weekly meetings will be conducted on the progress of the program. To ensure effective communication with the GP, or district nurse, patient or any member in this project, good communication techniques and strategies will be obtained. The second steps to begin a quality improvement project is to understand the current cause of the problem. Therefore, the quality team for this project and stakeholders will meet to determine the root causes of elective surgical cancellation by using fishbone diagram. Then formulate a plan to address these causes. This will be explained in more detail in the data analysis section.

There are possible challenges in the implementation of this project that include the location/design of the clinic, budget estimation, timeline and obtaining accurate data collection to measure the rate of cancellation. Tariq et al. (2016) declared that the design of the clinic should be based on the needs, culture, and resources of the hospital setting. It should be accessible via the main entrance of the hospital and provide patients an easy access to initial vitals, examination rooms and facilities. In line with Tariq et al.'s (2016) recommendation, the proposal suggests that the clinic will be allocated at the outpatient surgical department and close to a registration area to receive and direct patient flow along the evaluation process. This means that from the time the patient enters the hospital to arrive at the clinic, navigation through the hospital will be made easy for them. The easy transition of patients to diagnostic facilities typically used in preoperative evaluation/assessment clinical for instance laboratory, cardiac testing and radiology services will be taken into consideration

In terms of the budget, the importance of value, understanding, and measuring the costs of quality improvement initiatives in healthcare settings is paramount (Chen et al., 2018). This will enable hospitals and perioperative administration to appropriately allocate and consume their limited resources for suitable quality improvement plans. It will also predict significant savings in healthcare utilization and maximizing operating room efficiency. Therefore, the estimated budget of this quality improvement initiative venue, salaries and allowances for the staff and the physicians will be determined by human resource management (HR). There are no foreseeable circumstances that will make the budget go beyond the control of the HR and collaboration. This QI pilot project will take about twelve months from planning to the end of the last quarter. This will give the probability to go through the PDSA Model for improvement effectively and efficiently over four quartets. A significant reduction in the rate of cancellations and the satisfaction rates of patients attending the clinic of the selected hospital will considerably determine the success of the project. Replicating the project at another facility in Saudi Arabia is an ambition of the author, who will no doubt learn from the first pilot project.

For the purpose of this quality improvement project and prior to the initiation of the project, the sample characteristics will be identified and analyzed in the data analysis section. The rate of surgical cancellations will

be collected from electronic hospital database (medical records) and compared with extracted data from the monthly/annually reports of cancelled listed operations for back-up routine to help assure, rigor and feasibility data quality within the projects. All possible influential factors in cancelling surgical operations will be reviewed such as physical, psychological and economic factors etc. The data will be collected and measured on the consecutive variables: the number of intended elective surgeries, the number of cancelled elective surgeries as well as the reasons for cancellations. Microsoft excel sheet will be used to organize and manage the collected data as needed. Undoubtedly, utilizing accurate data collection in quality improvement projects is crucial as it may influence the future of the healthcare institution, decision making, safety and quality of patient care, and manipulate expected results (Berman et al., 2018).

IV. Data analysis

Data analysis is the process of collecting, tracking, interpreting, and acting on the outcome in order to achieve a specific measurable goal (Creswell, 2014). In quality improvement, data analysis is very important as it is an essential part of performance improvement. Accurate methods of collecting and analysing data can give a project a lot of legitimacy and accuracy (Berman et al., 2018). Therefore, descriptive statistics as applicable will be used to identify the existence of a quality problem and to analyze the root cause of the cancellation along with PDSA steps. Any other numerical data will be organized, managed, and evaluated in relation to the aim of the project and plan. The data analysis and evaluation will be conducted within the time farm of the pilot project as well. It will also be used to determine the changes in the rates of cancellations before and after the clinical intervention. The changes will be expressed in percentage and will be based on the number of elective surgery cancellations for the 12 months of the pilot project. As the data will be collected from the electronic hospital database/medical records, the sample characteristics will not be limited to any age, gender, educational level or social, economic status (if any). All patients who underwent an elective surgery cancellation will be involved in the pre-intervention test, and those undergoing elective surgery will be included in the post-intervention analysis. Using PDSA methods, a series of interventional tools will be developed and implemented over a 12 months' period based on the projected reduction in elective surgery cancellation rates and feedback from patients and healthcare providers. Before any changes are made to the project, evaluation will be carried out on a small scale.

The data analysis section in this project will be divided into two parts. In the first part, preventable causes of case cancellation and the effect will be identified. It will be an essential step to recognize who and what is involved in the elective surgery cancellation and where or when it occurs. Thereby identifying any opportunities for improvement, develop or test solutions as well as redesign processes. For instance, if the unavailability of hospital admission beds was one of the common reasons for cancellations, possible expanding bed capacity and avoiding unnecessary admissions can be recommended. Weekes et al. (2018) stated when data is tabulated and analyzed using the various tools such as pareto chart, fishbone or scatter diagram, the results are used to inform decision making and, in this case, can help in formulating the quality improvement measures. Accordingly, a fishbone diagram will be used to understand the root cause of the current issues; elective day of surgery cancellation. Phillips and Simmonds (2013) declared that the fishbone diagram is an example of a visualization model that is used to help in classifying all the possible causes of a problem. This will then be focused to identify the specific and concise the root cause of the problem. In a brainstorming session, the fishbone model is useful in concentrating the discussions and the conversations. After brainstorming on all the possible causes, the group can then begin to rate them in order of importance and give them a hierarchical level in the diagram. The diagram gets its name because its design resembles that of a fish skeleton. In any problem-solving approach, the fishbone diagram is used in the analysis phase. According to the institute for healthcare improvement (2019), to create a fishbone diagram, a quality team of the project needs to define the problem which is to be studied/improve; this forms the head of the fish. It is also important to have at least four causes from the initial brainstorming and connect them to the spine using arrows. The causes may group naturally under the categories of environment, equipment, patient, methods or policy. By thorough brainstorming and conversations, the fishbone will determine the most common contributing factors to surgical cancellation in the selected hospital in Saudi Arabia. Figure 1 shows an example of a fishbone diagram for our project and all possible causes for current quality problems. After that, a potential solution will be decided on in line with the PDSA cycle. For instance, if one of the root causes of elective surgical cancellation were inadequate patient preparation prior surgery (method), the solution would be one that tries to streamline the pathway for elective surgery patients as well as the earlier clinical assessment of patient and planning by a nurse-led preoperative clinic.

In the second part of the data analysis, it is critical to be able to monitor/view and interpret data of the improvement initiatives in real time. Hence, the project will be reviewing the process of cancellation over the 12 months' period using run charts. It is an analytical tool commonly used in quality improvement initiatives in healthcare to illustrate the descriptive statistic (Silver et al., 2016). Run charts are graphs that are developed

from the data that has been taken in a long period of time. These charts are very important, especially in assessing whether the change that has been affected over time is effective (Perla et al., 2011). Run charts help the project team in formulating aims by portraying the performance of the process. The charts also help to gauge whether the changes being run are truly leading to improvements as the patterns can be seen as the changes are being affected. Another benefit of the charts is that they help in directing the process of improvement in that when the changes are not effective, the team may decide to redirect the project in other ways in order to get results as noted by Silver et al. (2016). During the project time frames, data will be analyzed quarterly and visual presentation; the run chart will be created accordingly. In this project, the run charts will be used to compare the surgical cancellations during the selected period with those of the previous year. Figure 2 shows an example of a run chart for this project in which the process measure percentage of elective surgery suspension/cancellation reduction over a selected 1-year period divided into four quarters.

Evaluation

To understand whether the clinical intervention is indeed effective and to address the 'study' part of the PDSA cycle, there is a need for an evaluation. Process evaluation is an essential tool that can precisely give insight into the actual exposure to the QI intervention, and the experience of those involved in the quality improvement (Chen et al., 2018; Taylor et al., 2014). Evaluations require auditing on the system to ensure that the interventions have integrated well and are working to sustain the project's aims. In this pilot project, three essential elements will be measured quarterly. First, the number of cancellations of elective scheduled operations as a ratio against the total elective scheduled surgery. Next, the percentage of patients attending the nurse-led preoperative clinic. Lastly, patient and family satisfaction with clinic will be measured. Subsequently, clinical audits will be done to ascertain that the nurse-led preoperative clinic is working to reduce the number of surgical cancellations in a sustainable manner. Using run charts quarterly will provide a snapshot view of surgical cancellations, patterns that are displayed can assist in monitoring and effectively understanding the state of the project (Esposito, 2014).

Moreover, evaluating patient satisfaction and experience is another important method to evaluate and sustain this QI pilot project. Patient satisfaction surveys with preoperative service will identify any possible barriers for the provision of the services. Evidence showed that patient satisfaction is one of the important pillars of quality outcome indicators in healthcare (Rajguru, 2018). It will ensure whether Saudi local health services are meeting patients' needs. It will also assist healthcare professionals in measuring the success of the services delivery system. Patient evaluation of preoperative care is vital not only to provide an opportunity for improvement but also to meet patient expectations of elective surgery and to benchmark across healthcare settings (Fregene et al., 2017). Thereby, patient satisfaction will be measured thought out this quality improvement project and along with the PDSA cycle. A simple way of measuring patient satisfaction will include online ratings, small questionnaires after receiving care from clinic or feedback, and complaints cards.

Sustainability

Maintaining the clinic year after year is crucial. Sustainability is paramount to support the consistent performance of the first clinic and to enable its replication in another site. Ensuring the success and long-term sustainability of the nurse-led clinic outcomes requires economic, social and environmental resilience (Silver et al.,2016). Hence, some strategies that can be adapted to sustain this QI project includes regular meetings with stakeholders, transparent feedback systems, proper communication skills, resources availability, building leadership commitment, and a sense of engagement. Besides, ongoing clinic auditing and updating clinical practice guidelines based on patient needs are essential for sustaining this QI intervention (Lawson et al., 2018). Furthermore, successfully sustaining QI intervention in a healthcare setting required cost-effectiveness methods. Accordingly, the nurse-led preoperative clinic has a positive impact on improving hospital resources, OR rescheduling, time, and minimizing the substantial financial effects that may occur due to the cancellation surgeries (Gillies et al., 2018). Additionally, maintaining continuing professional development (CPD) is one of the critical methods to sustain QI initiatives in a patient safety context within a healthcare organization. Sargeant et al. (2017) state the importance and value of CPD in any quality improvement activities. It maintains and enhances the knowledge and skills needed to deliver a professional service to patients and the community. It improves the outcome of the patient and increases service capacity. It assists healthcare providers to manage their learning and growth throughout their careers; the delivery of safe, and patient-centered care. It keeps healthcare professionals' knowledge and skills up to date in the workplace. Moreover, toward the optimization and sustainability of QI, evidence-based nursing intervention projects require cultural awareness, professionalism, compassion, critical thinking, reflection, time management, communication, and leadership skills. Therefore, nurses and ANPs (if any) involved in this QI project should be competent and adhere to national competency standard for registered nurse and code of ethics. There are also many nurse practitioner competency standards, including, but not limited to clinical decision making, knowledge, and cognitive

competencies, communication and interpersonal competencies, management, and team competencies, leadership and professional scholarship competences (Nursing and Midwifery Board of Ireland, 2017). To provide efficient and proficient patient care, obtaining feedback and engaging clinical nurses' knowledge, skills, and expertise in QI initiatives are valuable in the sustainability of this pilot project.

V. Discussions

Globally, cases of surgical cancellations are common in the hospital setting and they often lead to a waste of resources, time and inefficient utilization of the ORs. The rate of OR cancellation in Saudi Arabia is rising each year (Dhafar, et al., 2015). Therefore, reducing surgical cancellation rates through the implementation of nurse-led pre-operative clinic is crucial and it has been effective in many ways. Besides, a number of scholars have done research recommending intervention strategies (Hines et al., 2015; Tariq et al., 2016; Turunen et al., 2017). This QI initiative provides an overview of the possible cancellation causes, understanding the surgical patient needs and use of outpatient surgical care services effectively. It covers any issues arising before surgery and only electing to clear those patients who have passed the preoperative steps and fulfilled all requirements including their consents. This QI initiative is primarily valuable for individuals with non-communicable diseases such as hypertension and diabetes. It will aid to identify and avoid any risk factors that might be associated with increased intraoperative and postoperative impediments in patients with such conditions. Tariq et al. (2016) emphasized that medical optimization can lead to significant reduction in pre, intra and postoperative mortality and morbidity.

This QI initiative is also particularly important for improving the utilization of OR resources, time, and cost. This is due to the fact that the OR has a major part of the hospital budget (Turunen et al., 2018). Another project outcome includes reducing unnecessary costly preoperative diagnostic testing, referrals, hospital stays, which ultimately will ease the pressure on the available resources (Sau-Man Conny and Wan-Yim, 2016). This QI project will promote a therapeutic nurse-patient relationship and enhance patient's education about their surgery. Thereby demonstrating nurses' commitment to provide patient-centered care and best patient satisfaction with surgical care services. The application of this QI initiative has a significant impact on registered nurses' (RNs) education. Working closely with ANP will enable the provision of adequate, efficient, and timely surgical care services. The opportunity of working collaboratively with allied health professions will allow RNs to create a holistic management plan to assist in reaching operational patient goals that may prevent cancellation or secondary issues. Implementation of this QI intervention is also beneficial in the Saudi hospital setting. It will allow for improvement in current surgical service guidelines, policies, and develop evidence-based protocols or strategies to curb the rising case of cost and cancellation of scheduled surgeries. It is expected that the nurse-led preoperative clinic will significantly improve surgery cancellations. Conversely, there are inadequate RCTs done for this QI intervention to confidently describe it as an efficient best practice (Tariq et al., 2016). Therefore, standardization of preoperative nursing care performance or nurse-led preoperative clinic process and roles substantial further research are required. Developing the culture of answerable, clear working protocols for assessment, agreed on support from consultation; anesthetists and communication channels and guidelines for the management of individuals with specific conditions, for example, cardiovascular diseases must be in place.

From an advanced nursing student perspective, there are still several barriers to the implementation of the nurse-led clinic on a wider scale in Saudi Arabia as it is still in an early phase, and more effort, training and studies are needed to review its effects in detail. Furthermore, with the growing number of patients with multiple serious chronic conditions scheduled for complex elective surgery, optimizing their care and nursing clinical performance is a challenge in itself. Financial constraints may present another barrier to the implementation of the clinic because the extra clinic services required additional resources. The other limitation is the recruitment of staff, involving ANPs, RNs, IT personnel for the development of electronic medical records templates, social work, and anesthetists. Nevertheless, with increasing awareness about the usefulness of the clinic facilities and a growing body of literature and evidence-based nursing intervention, patients will visit the nurse-led preoperative clinic accordingly.

VI. Conclusions

The primary goal of this QI proposal aims to implement a nurse-led preoperative clinic to help reduce surgical cancellations in the Saudi healthcare institute, starting in one tertiary care hospital where is the cancellation incidence is high. Surgical cancellations are undesirable for both patients and healthcare providers as they waste of both human and economic resources. Therefore, setting up a clear plan for the nurse-led preoperative clinic with a multidisciplinary approach is vital in addressing the many reasons for cancellations that include hospital and patient-related factors. The PDSA framework was chosen since it is highly recommended as an endless improvement method in any field of the healthcare system. It is the hope that the average cancellations will decrease over the 12 months of the intervention. Building a culture of preoperative

patient safety and sustainability requires the best evidence-based intervention strategies. Therefore, it is up to the Saudi healthcare leaders to step up and overcome the challenge in the surgical care services and improve Saudi patient and caregiver satisfaction with services provided.

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Appendices

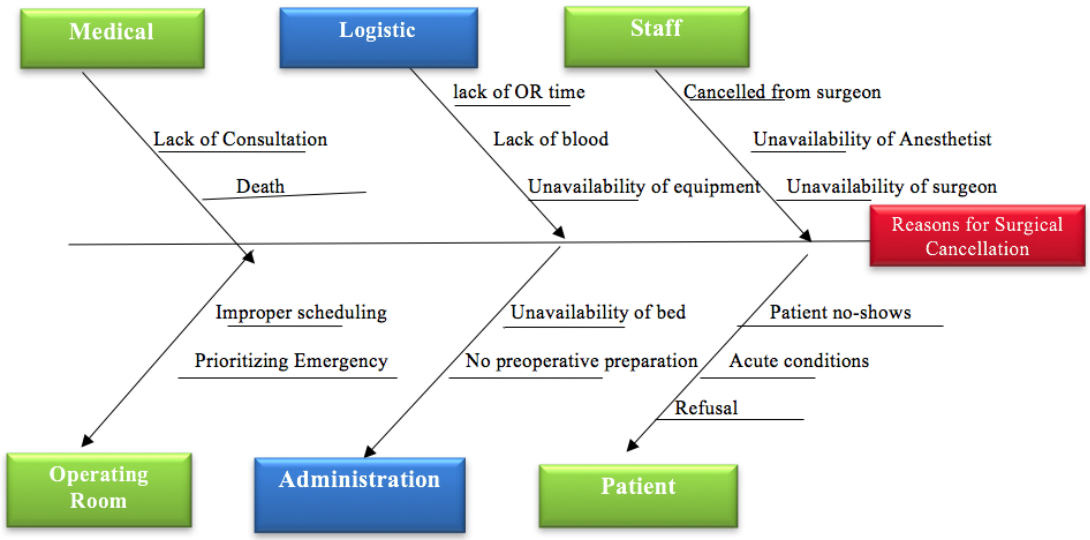

Figure 1: Fishbone diagram; Most Possible Causes for Surgical Cancellations in Saudi Arabia

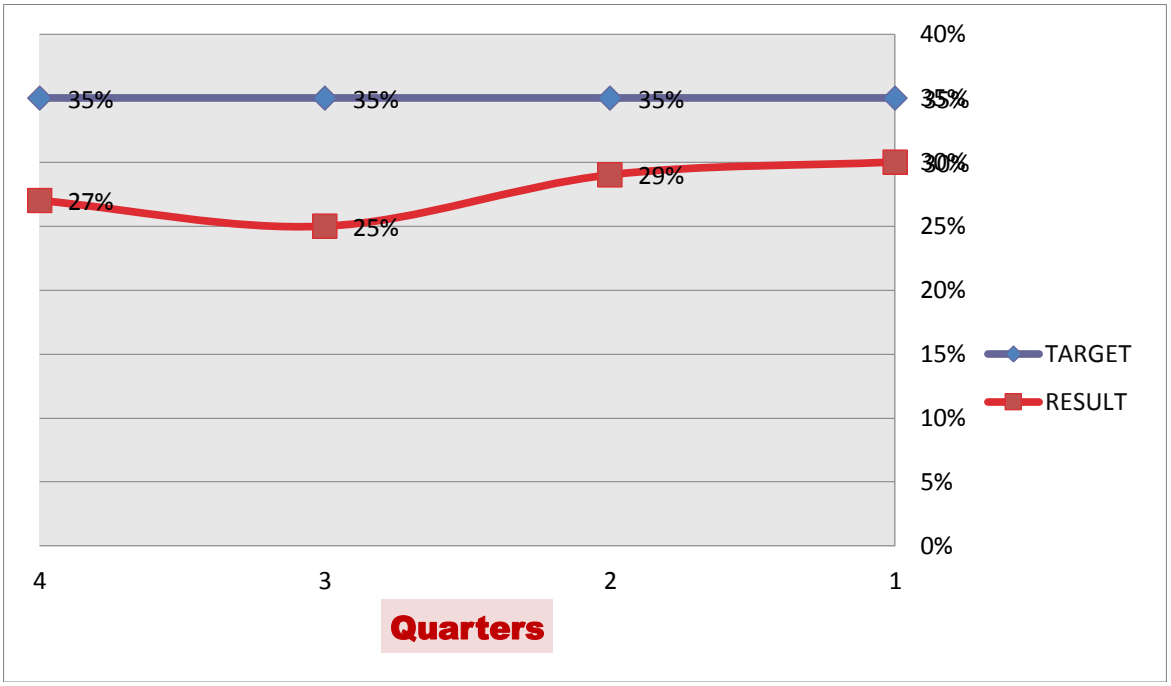

Figure 2: Run chart; Percentage of Elective Surgery Cancellation Reduction Over a Selected 1-Year Period Divided into Four Quarters.

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