



# OPERATING ROOM (OR) UTILIZATION AND EFFICIENCY; A STUDY TO FIND OUT METHODS FOR IMPROVEMENT.

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**ABSTRACT... Introduction:** Operating room (OR) is a key department in any institution and it runs with heavy resources. Improper running carries not only loss of revenue but it also effects patient care. Delays in operating room are deleterious and methods to decrease these delays are important not only for patient care, but to maximize operating room resource utilization. **Objective:** To determine the causes effecting the OR utilization and efficiency and to find out ways to overcome it. **Study Design:** Observational Study. **Period:** 15-01-2011 to 08-06-2011. **Setting:** King Khalid Hospital, KSA. **Patients and Methods:** Operating room baseline data was collected for one month and it was compared with historical data of the last six month. Operating room utilization was found to be 41% overall and 34% for elective cases (benchmark 85%). In patient pathway, on average 17 min were required from call to ward to enter in operating room. First incision time was 11%=8-8:30, 31% = 8:30-9 and 58%= 9+. Cancellation was 9%. Various improvement projects were started including surgical list management, OR rescheduling, start on time dashboard, pre-anesthesia clinic and reinforcement of day surgery program. **Results:** The results showed 47% improvement in elective OR utilization and OR utilization reaching 69%. There was 76% improvement in emergency case booking and 18% improvement in pre/post-op process time. There was 64% improvement in 1st cases before 9 am **Conclusion:** Integrated management working can improve the working and outcome of the operating room resulting in high efficiency and best patient satisfaction.

**Key words:** OR efficiency, OR utilization, OR improvement

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## INTRODUCTION

Operating room is one of the key departments of any hospital. Its carries high cost. All the measures must be taken to make it highly efficient. Multidisciplinary approaches improves the OR efficiency and reduces the cancellation.<sup>1-4</sup> Specialty based time distribution and their underutilization affects and if it can be predicted then it also improves the working of the OR.<sup>5</sup>

Operating room working can be improved by many ways like reducing the duration of the cases, anesthesia techniques and making a better surgery schedule. The entire staff holders should be involved in the improvement process and everything should be task oriented. Results of the new OR processes should evaluated and re-enforced. New developments can be practiced. Anesthesia clinics and proper facilities improve the outcome. Senior must support the OR team

with good managerial skills.<sup>6</sup>

Significant improvements can be achieved by OR data analysis of the reasons for delays, developing the culture of answerable, clear working policy and procedures and supporting attitudes.<sup>7</sup>

So in this study we focused on factors that affects the OR efficiency.

## PATIENTS AND METHODS

After getting the institutional permission, we did Value Stream Mapping (VSM) with purpose of understanding current situation, to identify value added and non-value added time, expose sources of waste and to develop and prioritize action plan for waste removal. In the outcome we observed the OR processes and followed the patient journey from Ward to OR and Recovery, facilitated the VSM with 20+ participants, identified opportunities

along the surgical patient pathway and engaged multidisciplinary stakeholders across the hospital

Five Quick Wins (QW) projects were established;

**QW1: Surgical list Manager:** with the objectives of a single point of contact regarding surgical patients, better Pre Op management of surgical patient, pre-admission calling to patients to lower no shows.

**QW2: Pre-Anesthesia Clinic (PAC):** to screen elective surgical patients , introduction of forms, templates and standards for anesthetists, re-alignment of patient pathway to lower hospital length of stay and medical fitness cancellations

**QW3: OR schedule reassessment:** New OR schedule based on actual specialty utilization and waiting lists that is reflective to patients needs better resource utilization, particularly anesthetists, introduction of accountability for allocated surgical time

**QW4: Start on time dashboards:** 6 surgical dashboards introduced in wards and operating rooms, clear visibility about all surgical patients at any time during the day with clear patient ranking, introduction of patient time accountability practice and introduction of Delays forms and cancellations forms.

**QW5: Reinforcement of day surgery:** Development of list of Day Surgeries, planning a workshop for communication of day surgery, it's benefits and policies, incorporating Day Surgeries into the new surgical booking process, review and development of DSU forms and establishment of Day Surgery Committee which meets regularly.

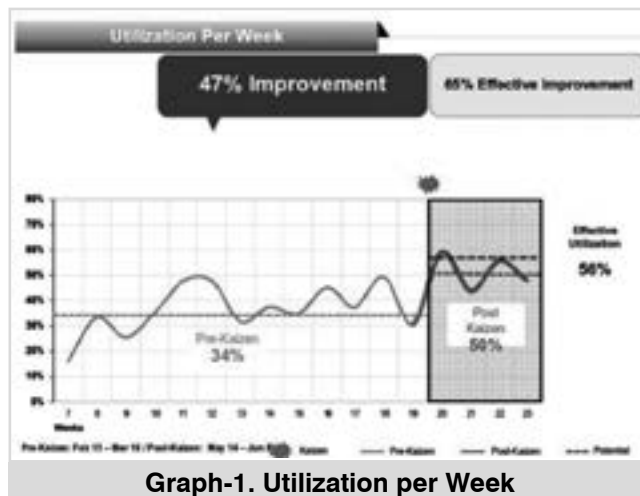
Data was collected for one month as base line. Quick Win projects were placed and again data was collected to see the impact of changes.

**STATISTICAL ANALYSIS**

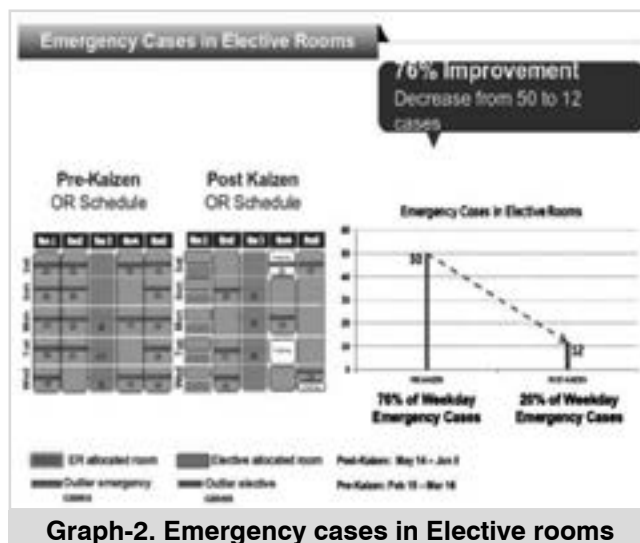
Chi square test was used to compare the data that was collected during one month and historical data of the last six month,

**RESULTS**

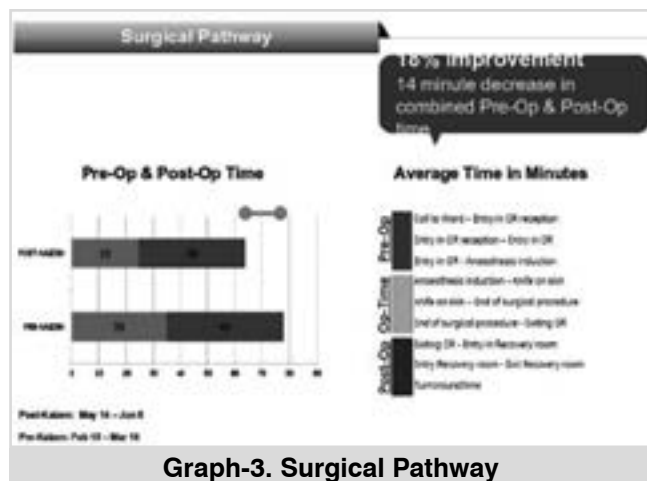
OR utilization before study was on average 34 % in all operating room and it improved to 50 %. Individually this change remained variable in different OR as per specialty.



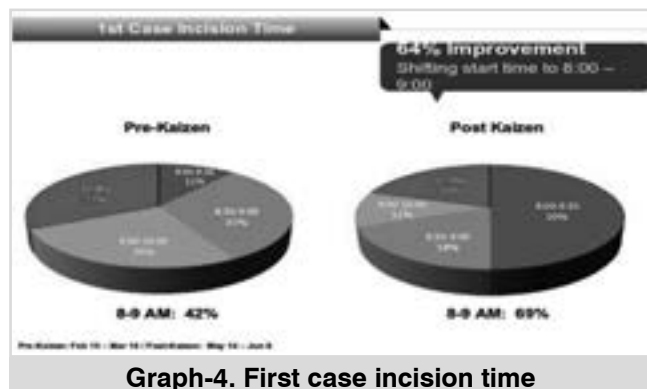
76% of emergency cases were operated in the elective surgery rooms instead of in allocated emergency room. It reduced to 20% after the implementation of OR rescheduling.



In the patient pathway there was 44% improvement in Pre-Op time, 9% improvement in Post-Op time, 20% improvement in Turnaround time and overall 18 % improvement in pre-op and post-op time.



First incision time improved from 11% to 50 % between 8:00 to 8:30 and overall improvement was 64 % between 8:00 to 9:00.



**DISCUSSION**

The results has shown that by making five quick win projects, there was improvement in OR utilization, reduction in patient pathway time and improvement in start on time.

Various studies have shown various methods for OR efficiency improvement. Weld LR<sup>8</sup> and et.al, studied that team work resulted in improvement in OR working and better patient safety. Porta CR<sup>9</sup> and et al, conducted a study to find out the reasons for delays. They found that OR utilization can be improved by post operative debrief tracking system that reduces the delay in operative work. O’Sullivan CT<sup>10</sup> studied that regional anesthetic blocks also take more time and results in over running of OR. Sokolovic E<sup>11</sup> also found that reducing anesthesia turnover time improves OR efficiency.

Start on time is very important and it improved 64% in our study. T.Koenig<sup>12</sup> showed that proper arrangement of timing between surgeons and anesthesiologists reducing waiting time for start on time. Luthra S<sup>13</sup> and et al, studied timing of surgery, length of procedure, shifting time and found that in cardiac surgery cases, procedure time was more important than just knife to skin. Pandit JJ<sup>14</sup> also found that start on time was not the only factor in improving OR quality work.

OR rescheduling is very important and if properly placed and followed, it can reduce the time wastage. Li F<sup>15</sup> studied the same in different way. They found that working hours can be fully used by doing manual bookings one or two days ahead of procedures. This method reduces the cost and makes the staff work efficient.

Minimum time should be used between the cases and a properly managed patient pathway plays a key role for it. In our study there was 18% overall improvement in pre and post operative time.

Pre-op anesthesia clinic reduces the cancellation and improves the patient care. Hofer J<sup>16</sup> reviewed the literature regarding impact of pre-anesthesia evaluation on patient care and he found that literature was supportive to it. Gupta A<sup>17</sup> also found and improvement in patient care by implementing practice of pre-anesthesia evaluation. He found that it was especially supportive to the high risk patient category.

Arshad Zafar and et al<sup>18</sup> described that load of cancellation of elective surgical cases can be reduced with proper management. Farrukh Afzal<sup>19</sup> found that rough time allocation for each operating table can reduce the cancellation at the end of the elective list.

**CONCLUSION**



Our study have shown that by improving list management, OR rescheduling, reducing patient pathway time, reinforcing Day Surgery Program and establishing Pre-anesthesia clinic, improves the overall OR efficiency.

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**AUTHORSHIP AND CONTRIBUTION DECLARATION**

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Muhammad Ahmad Khan	Primary researcher and data collection	
2	Dr. Motsim Sheraz	Data analysis and compiling research	
3	Dr. Shakeel Ahmad <sup>3</sup>	Reviewing and editing	