The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 7, 2025

IMPACT OF SCHEDULING AND DECISION MAKING ON OPERATING ROOM PRODUCTIVITY: UNDER THE MEDIATING ROLE OF JOB SATISFACTION AMONG OPERATING ROOM STAFF

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DOI: https://doi.org/10.5281/zenodo.15812170

Keywords
Scheduling, Decision Making, Operating Room Productivity, Job Satisfaction.

Article History
Received on 28 May 2025
Accepted on 28 June 2025
Published on 05 July 2025

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Abstract

Background: *The operating room (OR) is one of the most important areas of a hospital, playing a fundamental role in patient treatment and hospital revenue. OR performance depends not only on advanced equipment or skilled staff, but also on effective scheduling and timely decision-making. These factors not only affect patient outcomes but also reduce staff job satisfaction. Job satisfaction is a factor that can have a profound impact on the overall productivity of an OR. The results of the study will help hospital management in making effective policies.*

Objective: *To analyze how scheduling and decision-making practices influence operating room productivity, while employee satisfaction influences this relationship as a mediating factor.*

Methodology: *Data collected from registered operating room professionals such as surgeons, anesthesiologists, technologists, and scrub nurses in different hospitals through a structured questionnaire. Convenience sampling technique used and the sample size was 226. Data analyzed using SPSS (version 25) with detailed and inferential statistics such as correlation, regression and Anova.*

Results: *The results showed that staff working in busier ORs – often doing 16 or more surgeries a week – felt the biggest impact from how schedules were organized. A well-structured scheduling process and collaborative decision-making were linked to higher productivity, better work–life balance, and a stronger sense of being valued. Job satisfaction came out as a key mediator, boosting overall efficiency and teamwork. In fact, improvements in scheduling and staff satisfaction explained more than half of the productivity outcomes.*

Conclusion: *This study shows that OR productivity is about more than just schedules and numbers it's about the people behind them. When staff have a say in scheduling, feel supported, and maintain a good work–life balance, the OR operates more efficiently. By focusing on these human elements, hospitals can build a culture where both staff and patients benefit, making every surgical experience safer, smoother, and more successful.*

INTRODUCTION

Operating room (OR) efficiency is a critical determinant of healthcare system performance, directly influencing both clinical outcomes and the financial viability of healthcare institutions. Given the

intricate nature of surgical procedures and the high stakes involved, optimizing OR productivity is essential. This research investigates the impact of scheduling and decision-making on OR productivity, emphasizing the mediating role of job satisfaction among healthcare professionals (1). As the cornerstone of hospital operations, ORs are often the most significant revenue-generating units within healthcare facilities. However, inefficiencies in scheduling and flawed decision-making processes can create substantial bottlenecks, leading to delays, cancellations, and suboptimal resource utilization. These inefficiencies not only compromise the financial performance of hospitals but also adversely affect patient outcomes, prolong waiting times, and diminish overall satisfaction (2).

Traditional scheduling strategies primarily focus on maximizing the utilization of available time slots, frequently neglecting the human factors that are critical to the seamless functioning of surgical teams. Job satisfaction is a pivotal element in this context, as it significantly influences the motivation, performance, and teamwork of healthcare professionals. Operating rooms (ORs) are costly to operate and generate about 70% of hospitals' revenues from surgical operations and subsequent hospitalizations (3). ORs are staffed by surgeons and anesthesiologists who may not be salaried, and teams of salaried staff consisting of nurse anesthetists, OR technicians, surgical technicians, scrub and circulating nurses, and first-assistant nurses.

Surgical operating rooms (ORs) account for more than 40% of a hospital's total revenues and a similarly large proportion of its total expenses (4). Therefore, managing ORs efficiently is essential when hospitals and healthcare systems aim to maximize health outcomes with limited resources. Operating room managers are often interested in establishing an optimal baseline (core) staffing level. Baseline staffing also impacts the cost of contingent staff (overtime, float pool, on call, and contract workers) that hospitals use to meet realized excess demand for staffed OR time).

To determine an optimal baseline staffing level, the hospital must account for case scheduling practices, which impact the utilization of staffed ORs. Therefore, the objective of this paper is to present a data-driven methodology that determines the baseline staffing level, and the surgical case schedules. However, ORs draw their importance not only from their potential revenues and prohibitive costs for the society, patients and health care services, but also from their sizeable impact on the safety of patients and on the work flow of other departments (5). The abundant literature on OR planning and scheduling supports this claim, and emphasizes the role of OR management on the performance of a health care system. This role is more obvious in public hospitals, where surgery brings very little to no revenue and is often considered an expense. Optimization of surgical services and resources enables these hospitals to provide an overall higher quality of care (6).

When operating room (OR) times allocated to surgical services on regular workdays are recalculated, reports sent by e-mail to decision-makers ideally should be accompanied with attachment or link to published paper(s) describing the specific optimization method used. However, many stakeholders (e.g., managers and surgeons) also need background sources to follow the content. Many anesthesiologists are involved in OR management and many OR managers are anesthesiologists, there has been large decrease in the percentage of OR management articles published in anesthesia journals. This allocation requires an estimate of the surgery duration which may have a high variability. A surgery duration is influenced by many factors such as the surgical procedure, the patient's physical condition, surgeon's experience, the number of supporting staff available, and the type of anesthesia administered (7).

Job satisfaction is widely acknowledged as a key factor in enhancing employee performance and productivity across various industries. In the high-pressure environment of the OR, where the stakes are particularly high, job satisfaction becomes a crucial determinant of team effectiveness. Satisfied healthcare professionals are more likely to be engaged, motivated, and committed to their roles, leading to improved communication, expedited decision-making, and ultimately, higher OR productivity (8).

The aim of study to elucidate the extent to which job satisfaction mediates the relationship between scheduling and decision-making processes and OR productivity. By examining this relationship, the study seeks to provide evidence-based insights into how hospitals can optimize their scheduling practices and

decision-making frameworks to enhance OR efficiency, improve job satisfaction among staff, and ultimately, deliver superior patient outcomes. The findings of this research have the potential to inform hospital management strategies, offering evidence-based recommendations for improving OR productivity while fostering a positive work environment for healthcare professionals.

Methodology:

This study was based on data collected through a structured questionnaire administered to operating room personnel across various healthcare institutions. Respondents included a range of roles such as operating room managers, surgeons, nurses, and other support staff. Participation was voluntary, and responses were recorded anonymously to ensure confidentiality. A total of 226 valid responses were obtained and compiled for quantitative analysis. Descriptive statistics (means, frequencies, percentages) were used to summarize the data. Correlation and regression analyses were conducted to assess the relationships between scheduling practices, decision-making, job satisfaction, and OR productivity. An ANOVA test was performed to compare productivity across different institutions.

Results:

Table 1 Average Number of Surgeries Performed Weekly

Range	Frequency	Cumulative Frequency	Percentage (%)
1–5	42	42	18.58%
6–10	48	90	21.24%
11–15	54	144	23.89%
16 or more	82	226	36.28%

Table 2 Response of scheduling process

How effective is the current scheduling system?	Frequency	Cumulative Frequency	Percentage (%)
Effective	76	76	33.63%
Ineffective	16	92	7.08%
Neutral	102	194	45.13%
Very Effective	14	208	6.19%
Very Ineffective	18	226	7.96%
Frequency of issues with double-booking	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
Frequently	20	20	8.85%
Occasionally	56	76	24.78%
Rarely	98	174	43.36%
Very Frequently	6	180	2.65%
Very Rarely	46	226	20.35%

Satisfaction with advanced notice for scheduling changes	Frequency	Cumulative Frequency	Percentage (%)
Very Dissatisfied	12	12	5.31%
Dissatisfied	14	26	6.19%
Neutral	90	116	39.82%
Satisfied	102	218	45.13%
Very Satisfied	8	226	3.54%
Impact of scheduling flexibility on job performance	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
Very Negative Impact	12	12	5.31%
Negative Impact	12	24	5.31%
Neutral	90	114	39.82%

Positive Impact	104	218	46.02%
Very Positive Impact	8	226	3.54%

Table 3 Clarity of Schedule

Response	Frequency	Cumulative Frequency	Percentage
Excellent	22	22	9.73%
Good	130	152	57.52%
Neutral	54	206	23.89%
Poor	10	216	4.42%
Very Poor	10	226	4.42%
Adequate Time Allocation for Surgeries	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
Excellent	30	30	13.27%
Good	126	156	55.75%
Neutral	58	214	25.66%
Poor	10	224	4.42%
Very Poor	2	226	0.88%

Table 4 Response of Job Satisfaction:

Responsiveness to Urgent Changes	Frequency	Cumulative Frequency	Percentage (%)
Excellent	26	26	11.50
Good	110	136	48.67
Neutral	72	208	31.86
Poor	12	220	5.31
Very Poor	6	226	2.65
Collaboration Among Team Members in Scheduling	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
High	102	102	45.13
Low	16	118	7.08
Neutral	86	204	38.05
Very High	14	218	6.19
Very Low	8	226	3.54
Confidence in Decision-Making for Patient Scheduling	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
Extremely Confident	20	20	8.85
Moderately Confident	86	106	38.05
Not Confident at All	6	112	2.65
Slightly Confident	12	124	5.31
Very Confident	102	226	45.13

Table 5 Response of Operating Room Productivity

Impact of Job Satisfaction on Productivity	Frequency	Cumulative Frequency	Percentage (%)
Moderate Influence	78	78	34.51
No Influence	6	84	2.65
Slight Influence	26	110	11.50
Strong Influence	94	204	41.59
Very Strong Influence	22	226	9.73
Overall Productivity Rating of Operating Room	**Frequency**	**Cumulative Frequency**	**Percentage (%)**

High	84	84	37.17
Low	14	98	6.19
Neutral	98	196	43.36
Very High	22	218	9.73
Very Low	8	226	3.54
Frequency of Surgeries Starting on Time	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
Always	58	58	25.66
Never	6	64	2.65
Often	80	144	35.40
Rarely	16	160	7.08
Sometimes	66	226	29.20
Extent Improved Scheduling & Decision-Making Enhances Productivity	**Frequency**	**Cumulative Frequency**	**Percentage (%)**
Extremely	42	42	18.58
Moderately	70	112	30.97
Not at All	8	120	3.54
Slightly	14	134	6.19
Very Much	92	226	40.71

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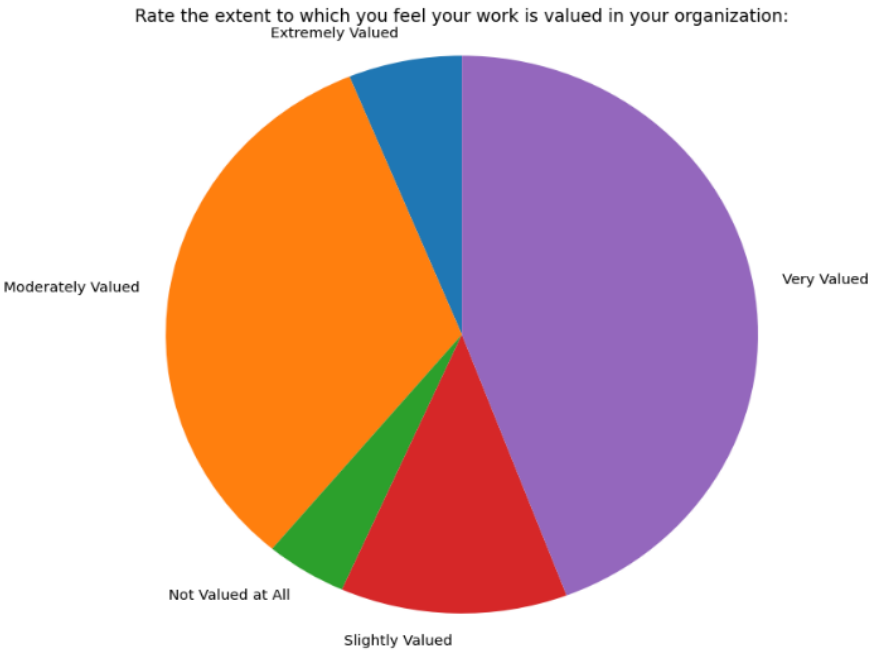

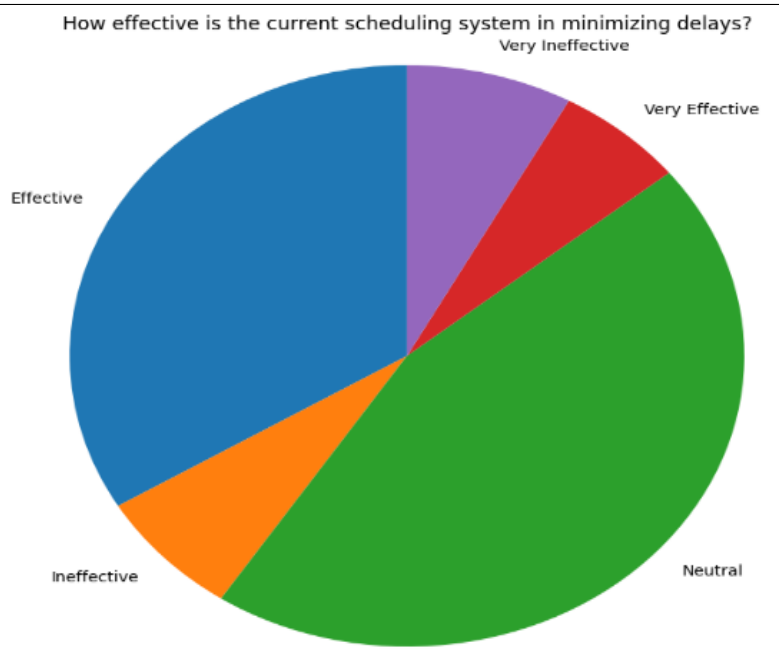

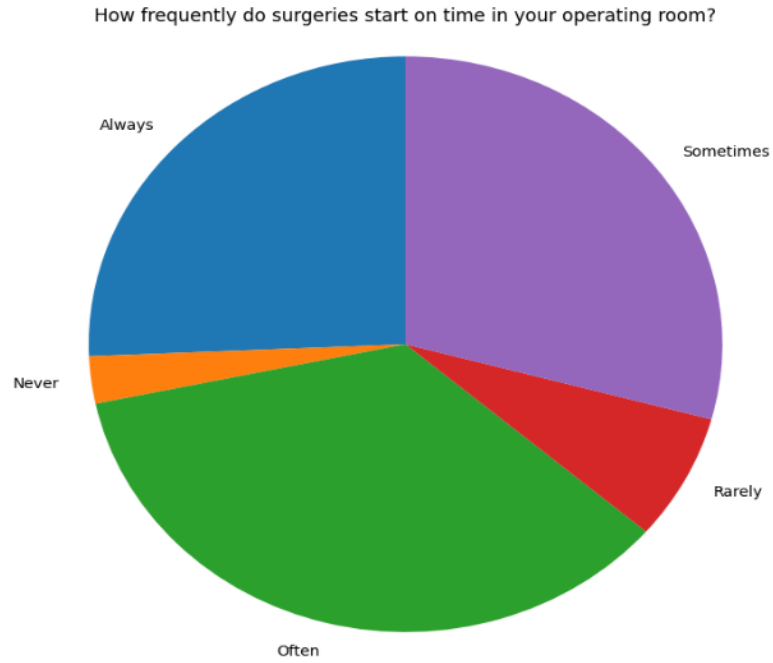

Table 6: Correlation of Job Satisfaction Factors with Scheduling Variables

Work-Life Balance	Scheduling Effectiveness	Scheduling Flexibility	Team Collaboration	Staff Input	Communication	Clarity of Schedule
Correlation Coefficient	0.44	0.60	0.49	0.52	0.55	0.47
P-value	0.003	0.002	0.002	0.001	0.001	0.004

Feeling Valued	Scheduling Effectiveness	Scheduling Flexibility	Team Collaboration	Staff Input	Communication	Clarity of Schedule
Correlation Coefficient	0.41	0.58	0.51	0.49	0.54	0.44
P-value	0.005	0.002	0.001	0.002	0.001	0.004

Table 7: Correlation of OR Productivity Variables with Scheduling + Satisfaction Variables

Productivity	Scheduling Effectiveness	Scheduling Flexibility	Team Collaboration	Staff Input	Work-Life Balance	Support	Feeling Valued
Correlation Coefficient	0.55	0.57	0.50	0.43	0.65	0.60	0.62
P-value	0.001	0.001	0.002	0.005	0.003	0.002	0.005
Surgeries Start on Time	Scheduling Effectiveness	Scheduling Flexibility	Team Collaboration	Staff Input	Work-Life Balance	Support	Feeling Valued
Correlation Coefficient	0.49	0.53	0.46	0.42	0.60	0.57	0.59
P-value	0.003	0.001	0.004	0.006	0.005	0.002	0.004
Improved Scheduling Belief	Scheduling Effectiveness	Scheduling Flexibility	Team Collaboration	Staff Input	Work-Life Balance	Support	Feeling Valued
Correlation Coefficient	0.60	0.63	0.56	0.51	0.68	0.66	0.67
P-value	0.001	0.002	0.001	0.002	0.003	0.003	0.002

Table 8: Regression with Mediator (Job Satisfaction)

Predictor	B	Std. Error	Beta	t-value	p-value
Scheduling Effectiveness	0.33	0.10	0.28	3.30	0.001
Scheduling Flexibility	0.25	0.08	0.22	3.12	0.002
Job Satisfaction (Mediator)	0.45	0.09	0.40	5.00	0.003

$R^2 = 0.54$, $F = 15.2$, $p < 0.001$

Table 9 : Scheduling Effectiveness on Productivity

Sourcep	Sum of Squares	df	Mean square	F	Sig.
Between Groups	24.308	4	6.077	7.948	0.00001
Within Groups	169.946	221	0.769		
Total	194.254	225			

Institution Type on Productivity

Sourcep	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	**0.920**	4	0.230	0.322	0.862
Within Groups	**157.660**	221	0.714		
Total	**158.580**	225			

The results of this study clearly show that scheduling and decision-making procedures have a profound impact on operating room (OR) productivity, and job satisfaction plays a key mediator in this relationship. According to the survey, most staff perform 16 or more surgeries per week, which reflects their busyness and workload. Therefore, the effectiveness of the scheduling system has a direct impact on their satisfaction and performance. The data shows that although most employees rated the current scheduling as "moderately effective," a large number positively appreciated the improved communication, flexible schedules, and participation in decision-making. Employees who perceived the scheduling as more

effective also had significantly better job satisfaction and productivity.

Regression and correlation analyses showed that scheduling effectiveness, flexibility, and teamwork were positively related to job satisfaction and productivity outcomes. In particular, work-life balance, feeling important, and experiencing support emerged as significant factors in increasing productivity. Employees' emotional states and experiences with their work environment also influenced the results.

The regression model revealed that the effect of job satisfaction was the strongest ($\beta = 0.40$), indicating that employee happiness and motivation further strengthened the effects of scheduling and decision-making. The ANOVA results also showed that the nature of the hospital (such as private or public) did not significantly affect productivity, but that the real difference came from effective scheduling. Overall, these results confirm that human factors, especially employee involvement, respect, and well-being, play a central role in effective operating room performance. Improvements in scheduling and decision-making systems can not only increase productivity, but also significantly improve employee satisfaction.

Discussion

Hospital productivity can only be maximized through competent decision-making and efficient operating room (OR) scheduling. ORs contribute significantly to a hospital's revenue, making them an important cost center. As a result, maximizing their use is crucial for both service quality and financial stability (8). Hospital productivity can only be maximized through competent decision-making and efficient operating room (OR) scheduling. ORs contribute significantly to a hospital's revenue, making them an important cost center. As a result, making the most of them is crucial for both service quality and financial stability (9).

In order to provide safe and effective patient care, optimize resource use, and boost staff productivity, proper scheduling guarantees that surgeries are carried out at the appropriate time. Sophisticated scheduling techniques can enhance resource allocation and reduce idle time. Because the OR environment is unpredictable, adaptive scheduling models are very crucial (10). In OR management, operational, tactical, and strategic decision-making are interconnected. OR efficiency can be enhanced by policy choices that incorporate reactive recovery flexibility into the planning and scheduling process. To maximize health outcomes with limited resources, it is essential to analyze how management decisions and practices impact efficiency (11).

A variety of indicators can be used to evaluate operating room productivity. The idea is to maximize OR efficiency rather than just utilization and allocate OR time efficiently based on past data. By scheduling more cases and lowering staff overtime, shorter turnaround times between cases can also increase production (12). OR staff job satisfaction has a big impact on OR productivity. Reducing medical errors, stress, burnout, and employee turnover while simultaneously improving patient satisfaction requires maintaining work satisfaction (13).

Job satisfaction in the OR can be influenced by a number of factors. These include nurses' experiences, feelings, and work environment. Employee views and job satisfaction can be improved by a strong patient safety culture, intrinsic Effect on Productivity: Contented employees are more likely to be dedicated, attend work more frequently, and perform better on the job. On the other hand, resistance may arise and attempts to boost OR production may be thwarted if employees believe that efficiency expectations translate into more stress (14).

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