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Prevalence and causes of gynecological surgery cancellations at Shariati Bandar Abbas hospital

Banafsheh Tehranineshat[1], Nasim Zaman Samghabadi[2], Zahra Shahryarpanah[3], Zahra Eydizadeh[3], Roya Raeisi Jaski[4], Zahra Ziaadini[5], Farzaneh Barkhordari Ahmadi[6], Majid Vatankhah[7], Jahanbakhsh Vahdatnejad[8], Hossein Mardanparvar[1], Najmeh Parsai[1*]

[1]Mother and Child Welfare Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran
[2]Department of Infectious Diseases, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran
[3]Student Research Committee, Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran
[4]Student Research Committee, Rajaei Cardiovascular, Medical, and Research Center, Tehran, Iran
[5]Department of Anesthesia, Medical University of Kerman, Kerman, Iran
[6]Department of Anesthesiology, Faculty of Nursing and Midwifery, Hormozgan University of Medical Sciences, Bandar Abbas, Iran
[7]Anesthesiology, Critical Care and Pain Management Research Center, Hormozgan University of Medical Sciences Bandar Abbas, Iran
[8]Clinical Research Development Unit, Imamsajad Hospital, Yasuj University of Medical Sciences, Yasuj, Iran

Correspondence to:
Najmeh Parsai,
Email: n.parsaei@hums.ac.ir

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Abstract

Introduction: Surgery cancellation causes complications such as disrupting the daily schedule of surgery in the operating room, delays in patient care, and potential financial losses for the hospital or surgical center.
Objectives: This study aimed to investigate the prevalence and causes of gynecological surgery cancellations at Shariati Bandar Abbas hospital.
Patients and Methods: This descriptive-analytical study was conducted on 212 patients in the Shariati hospital of Bandar Abbas, Iran, from April to November 2023. Data were collected through a demographic questionnaire and a researcher-made checklist, including clinical data. To analyze data SPSS version 27 and analytical tests were used.
Results: Out of 212 studied patients, the surgery for 67 was canceled, resulting in a surgery canceling prevalence rate of 31.6%. Surgery type, age, history of diabetes mellitus, thyroid disease, and other diseases were not risk factors for surgery cancelation ($P>0.05$); however, cardiovascular disease history, not being nil per os (NPO), and not having surgery consent were independent risk factors ($P<0.05$).
Conclusion: In conclusion, the high prevalence of surgery cancellations in Iran's educational hospitals necessitates a comprehensive and systematic investigation of the factors involved, including patient evaluation, anesthesiologist approval, patient readiness, and the impact on patients' overall health and well-being.

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Introduction

Hospitals are considered one of the most important and expensive organizations, as 42% of the government's expenses are spent on medical care (1). The operating room is a critical component of the hospital that requires significant financial allocation to ensure optimal patient care, surgical efficiency, and resource utilization (2), and includes nearly 40% of all hospital costs (3). Hospital managers strive to perform surgeries at the expected time to prevent costs and establish order; however, canceling surgeries the minutes before the surgery can lead to a reduction in efficiency (4). The surgery cancellation rate in an operating room with good performance is estimated to be less than 5% (5); however, previous studies have reported a rate of 5% to 20% for surgery cancellations in different hospitals (2); and in our country reported between 10.9% to 18.6% (6-8). One of the significant issues caused by the cancellation of surgeries on the day of surgery is that the manpower, surgical instruments, and space necessary for the planned surgery are not used, which leads to the wastage of hospital resources; additionally, canceled surgeries lead to backlogs and reduce the number of patients who could otherwise undergo scheduled surgeries and then be discharged in a timely manner, thereby limiting the number of new patient admissions (3). Canceling surgery can cause complications such as stress for the patient and their loved ones, taking up hospital beds, wasting time and energy for

Key point

In a descriptive-analytical study, we found that the operative cancelation rate was 31.6%, and cardiovascular disease history, not being NPO, and not having surgery consent were independent risk factors. Based on these findings, it is crucial for healthcare providers to carefully assess patients' cardiovascular disease history, NPO status, and surgery consent to mitigate the risk of operative cancellations. Implementing targeted interventions and protocols to address these risk factors could potentially reduce the overall cancellation rate and improve the efficiency of surgical procedures. Additionally, further research and analysis are warranted to explore the underlying reasons for the observed associations and to develop evidence-based strategies for minimizing operative cancellations in this context.

the surgeon and operating room staff, spending a lot of money on medical centers, and leaving equipment already prepared for the patient unused (9). Overall, the surgery cancellation has negative effects on both hospitals and patients; therefore, efficient management of operating rooms to reduce the number of canceled surgeries is very important for the efficient surgery of hospitals and for a positive experience for patients (10).

Objectives

Since surgery cancellation causes complications, such as disrupting the daily schedule of surgery in the operating room, and this is more important in educational centers, this study aimed to identify the prevalence and reasons for canceling surgeries and increasing operating room efficiency.

Patients and Methods

Study design

This study is a descriptive-analytical study conducted in Shariati Hospital in Bandar Abbas, Iran. The purpose of this study is to investigate the prevalence and reasons for canceling surgeries among the population visiting the hospital. The studied population was selected from among the patients who underwent surgery in Shariati Hospital between April and November 2023 or whose surgery was canceled. Patients with incomplete information in the clinical record were excluded from the study. The final sample consisted of 212 female patients, with an age of 40.66 years.

Data collection

The data collection tool in this study was a demographic questionnaire, including age and underlying disease, as well as a researcher-made checklist including clinical characteristics of patients such as the type of surgery, pre-operative measures such as being nil per os (NPO), obtaining written informed consent, and the final outcome of the surgery (performed or canceled). The demographic questionnaire also included information on the patients' medical history. The researcher-made checklist was used to ensure that all necessary pre-operative measures were taken and that the surgery was performed according to protocol. This data collection tool allowed for the comprehensive gathering of information related to the patients and their surgical procedures.

Statistical analysis

The Statistical Package for Social Science (SPSS) version 27 was used for data analysis. The Levine test was applied to evaluate the equality of variances, and the Kolmogorov-Smirnov test was used to check data normality. Data distribution between two groups of patients with canceled and done surgeries was compared using the Fisher's exact test, chi-square, and Independent *t* test. Univariate logistic regression was employed for crude analysis to explore the risk factors of canceling the surgery, and multivariate logistic regression was conducted to identify the independent risk factors. Statistical significance was determined at a threshold of 0.05 or lower.

Results

Results demonstrated that all 212 participants were female, with a mean age of 40.66 ± 11.71 years. The most common surgery types were hysterectomy, dilatation and curettage (D&C), and cesarean section. Diabetes mellitus, thyroid disease, and cardiovascular diseases were the most common underlying diseases. Most surgeries were successfully done, since 31.6% were canceled (Table 1).

In terms of the patients' characteristics distribution

Table 1. Demographic and clinical characteristics of studied patients

Variable	Sub-variable	Number	Percent
Surgery type	Hysterectomy	53	25
	Cesarean section	30	14.2
	Ectopic pregnancy	19	9
	Mole hydatiform	17	8
	Dilatation & curettage	49	23.1
	Abdomino-perineal resection	5	2.4
	Laparotomy	11	5.2
	Loop electrosurgical excision procedure	6	2.8
	Myomectomy	13	6.1
	LeFort colpocleisis	3	1.4
	Tubule ligation	2	0.9
	Cervical cerclage	4	1.9
	Total	212	100
Underlying diseases	Thyroid disease	20	9.4
	Cardiovascular	37	17.5
	Diabetes	18	8.5
	Other disease	33	15.6
Actions before surgery	Lack of NPO	23	10.8
	Lack of consent	16	7.5
Surgery outcomes	Done	145	68.4
	Cancel	67	31.6
Variable		**Mean (SD)**	**Min-Max**
Age (year)		40.66 (11.71)	18-74

SD, Standard Deviation; Min, Minimum; Max, Maximum.

according to the surgery operation outcomes, results indicated that the frequency distribution of surgery type, age, the history of diabetes mellitus, thyroid disease, and other diseases based on surgery outcomes (done/canceled) was not statistically significant ($P>0.05$). However, the distribution of other patients' characteristics such as cardiovascular diseases, not being NPO, and not having surgery consent between two groups of patients with canceled and done surgeries was significant ($P<0.05$; Table 2).

The crude analysis of data using univariate Binary regression to assess the effective risk factor on surgery outcome demonstrated that, out of the seven assessed risk factors, including age, not being NPO, not having surgery consent, a history of diabetes mellitus, thyroid disease, cardiovascular diseases, and other diseases, the risk factors such as cardiovascular diseases, NPO, and surgery consent were risk factors for surgery outcome. When we adjusted variables for confounders using multivariate regression, the results showed that cardiovascular diseases with an odds ratio of 2.82, not being NPO with an odds ratio of 3.63, and not having surgery consent with 3.92 were independent risk factors for canceling the surgery (Table 3).

Discussion

The cancellation of elective surgery is an important issue in healthcare systems, which is associated with adverse consequences such as resource waste, patient dissatisfaction, and increased healthcare costs (11). The cancellation of surgery can have negative mental and physical effects on patients and their families, with the patient's companions experiencing anxiety, fear, and tension due to their negative response to canceling the surgery (12). The purpose of this study was to investigate the reasons for the cancellation of surgery in women who were referred to Shariati hospital in Hormozgan province. According to the present study results, most surgeries was canceled due to cardiovascular diseases, patient dissatisfaction, and not being NPO.

Patients' absence, financial problems, clinical problems, insufficient assessments before surgery, and failure to obtain consent before surgery were the most common reasons for canceling surgery, as reported by Al Talalwah and McIltrot (11). The study by Adugna et al revealed

Table 2. Frequency distribution of patients' characteristics based on the surgery operation outcomes

Variable	Sub-variable	Surgery Outcomes				*P* value
		Done		Cancel		
		No.	%	No.	%	
Surgery Type	Hysterectomy	38	71.7	15	28.3	0.970*
	Cesarean section	21	70	9	30	
	Ectopic pregnancy	14	73.7	5	26.3	
	Mole Hydatidiform	12	70.6	5	29.4	
	Dilatation & Curettage	33	67.3	16	32.7	
	Abdomino-perineal resection	2	40	3	60	
	Laparotomy	7	63.6	4	36.4	
	Loop electrosurgical excision procedure	4	66.7	2	33.3	
	Myomectomy	9	69.2	4	30.8	
	LeFort colpocleisis	2	66.7	1	33.3	
	Tubule ligation	1	50	1	50	
	Cervical cerclage	2	50	2	50	
Thyroid disease	No	132	68.8	60	31.2	0.731**
	Yes	13	65	7	35	
Cardiovascular	No	128	73.1	47	26.9	0.001**
	Yes	17	45.9	20	54.1	
Diabetes	No	134	69.1	60	30.9	0.487**
	Yes	11	61.1	7	38.9	
Other disease	No	119	66.5	60	33.5	0.162**
	Yes	26	78.8	7	21.2	
NPO	Yes	136	72	53	28	0.001**
	No	9	39.1	14	60.9	
Surgery consent	Yes	140	71.4	56	28.6	<0.001**
	No	5	31.3	11	68.7	
Variable		**Mean**	**SD**	**Mean**	**SD**	
Age (y)		41.12	11.68	39.67	11.79	402***

SD, standard deviation.

*Fisher's exact test, **Chi-square, ***Independent t test.

Table 3. The association of patients' baseline characteristics with surgery outcome (done/canceled) using univariate and multivariate regression

Variable		Unadjusted				Adjusted			
		OR	*P*	95% CI		OR	*P*	95% CI	
				Lower	Upper			Lower	Upper
Thyroid	No (Ref) Yes	1.18	0.732	0.45	3.11	1.68	0.331	0.58	4.81
Cardiovascular	No (Ref) Yes	3.20	0.002	1.54	6.63	2.82	0.009	1.29	6.15
Diabetes	No (Ref) Yes	1.42	0.489	0.52	3.84	1.41	0.541	0.46	4.32
Other disease	No (Ref) Yes	0.53	0.167	0.21	1.30	0.52	0.182	0.20	1.35
NPO	Yes (Ref) No	3.99	0.002	1.63	9.77	3.63	0.011	1.34	9.86
Consent	Yes (Ref) No	5.50	0.003	1.82	16.55	3.92	0.024	1.19	12.85
Age (y)		0.98	0.401	0.96	1.01	0.98	0.258	0.95	1.01

OR, Odds ratio; CI, Confidence interval; Ref, reference; NPO, nil per os.

that administrative factors were the most common cause (42.6%) for the cancellation of elective surgery, followed by patient-related factors (40%). Among the important management reasons for canceling elective surgery, including not providing blood (11.1%), not performing laboratory tests (7.5%), and power outage (5.3%), were reported. Reasons related to the patient included patient refusal (13.5%), absenteeism (9%), and uncontrolled hypertension (16.5%). Female participants had a 2.46 times higher cancellation rate for elective surgery than male participants. Patients with high blood pressure had a 5.09 times higher chance of canceling surgery than those without high blood pressure (13). An study in Singapore reported that elective surgery cancellation rates in people with high blood pressure were higher than in normal people (14).

Surgery cancellations can be caused by a variety of factors, including both clinical and non-clinical issues. Patients have reported non-clinical problems such as dissatisfaction with the procedure, feeling unprepared for surgery, and NPO instructions. Clinical problems like high blood sugar, hypertension, heart disorders, and infections have also been reported as reasons for surgery cancellation (15,16). The findings of another study also showed that underlying diseases such as high blood pressure, cardiovascular diseases, and changes in the patient's clinical condition can cause the surgery to be canceled (17). Given the importance of anesthesia evaluations before surgery, it can be concluded that timely pre-surgery evaluations in hospitals can avoid postponement or cancellation of surgeries.

Koushan et al found that 60% of surgeries canceled in an educational hospital in the United States were due to implementation problems, specifically the failure of patients to sign informed consent forms because urgent decisions about their surgery were made due to their critical conditions and they did not have the opportunity to consult with their family or trusted doctor (15). A recent study by Koh et al in 2021 revealed that out of 2933 procedures, 14% of them were canceled. The majority of cancellations (83.5%) were due to operational or structural issues such as a shortage of beds and lack of informed consent. Additionally, gynecological and urological surgeries had a higher cancellation rate compared to other types of surgeries (18). The perception of elective surgery by women may contribute to a higher likelihood of surgery cancellation compared to men. Female patients are more prone to experiencing anxiety before surgery, while social pressure on male patients may lead them to act bravely and conceal their fear and fragility, potentially resulting in fewer cancellations of elective surgery in men (19). As a result, it is important for healthcare providers to recognize and address these gender differences in the perception of elective surgery. By providing adequate support and education to female patients to help manage their anxiety, and by creating an environment where patients feel comfortable expressing their concerns, healthcare providers can work towards reducing the likelihood of surgery cancellations and ensuring the successful completion of elective surgeries for all patients.

According to the study conducted by Feleke et al, patient-related factors (31.2%) were found to be the most common reasons for cancelling elective surgeries, followed by executive factors (26.5%). The study revealed that the most important patient-related factor for surgery cancellation was not fasting (eating), while the most significant executive factor for surgery cancellation was the lack of surgical equipment (20). Therefore, providing educational and social services for these patients can facilitate faster decision-making. The current study, like the previous one, suggests that most cancellations are caused by administrative processes or patient-related problems that

could be prevented. Appropriate measures and planning to control and manage these processes may help reduce surgical cancellations, improve economic efficiency, and reduce adverse patient outcomes. It is crucial for healthcare facilities to invest in resources and training to address these issues effectively. By implementing strategies to streamline administrative processes and provide support for patients, hospitals can minimize the risk of surgical cancellations and ensure smoother operations. Additionally, ongoing research and data analysis can help identify trends and patterns in cancellations, leading to targeted interventions and continuous improvement in patient care. Ultimately, a proactive approach to addressing the root causes of surgical cancellations is essential for enhancing the overall quality and efficiency of healthcare services.

Conclusion

Canceling or delaying surgical operations in Iran's educational hospitals should be investigated as a group and systematically, not limited to measuring a few influential factors. Before preparing the operating room list and planning for surgery, it's crucial to verify the patient's evaluation and examination results and obtain approval from the anesthesiologist to perform anesthesia. In addition, it is necessary to ensure the patient's readiness for surgery by obtaining informed consent, ensuring the presence of the patient in the hospital, and assessing the condition of the operating room in terms of personnel, equipment, and capacity. It is suggested that in future studies of other surgeries, male patients, structural and management factors, and the psychological and physical consequences of canceling surgery should be investigated. It is also important to consider the impact of canceling or delaying surgery on the patient's overall health and well-being, as well as the potential financial and emotional burden it may place on the individual and their family. By taking a comprehensive and systematic approach to investigating the factors contributing to the cancelation or delay of surgical operations, healthcare professionals can work towards implementing measures to minimize these occurrences and ensure the timely and effective delivery of surgical care to patients in need.

Limitations of the study

One of the limitations of the present study was data collection in an educational hospital and only surgical procedures were performed on women. Additionally, other factors that can cause surgery cancellations include structural problems and management obstacles in the hospital and operating room. Furthermore, the psychological and physical consequences of canceling surgery were not investigated. These limitations may have impacted the generalizability of the findings to other types of hospitals and medical procedures. Future research should aim to address these limitations by including a more diverse range of medical settings and procedures, as well as investigating the broader impact of surgery cancellations on patients' well-being.

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Authors' contribution

Conceptualization: Banafsheh Tehranineshat, Zahra Eydizadeh, and Zahra Shahryarpanah.
Data curation: Najmeh Parsai, Hossein Mardanparvar, and Farzaneh Barkhordari Ahmadi.
Formal analysis: Nasim Zaman Samghabadi and Jahanbakhsh Vahdatnejad.
Investigation: Roya Raeisi Jaski, and Zahra Ziaadini.
Methodology: Nasim Zaman Samghabadi and Jahanbakhsh Vahdatnejad.
Project management: Najmeh Parsai.
Resources: All authors.
Supervision: Banafsheh Tehranineshat.
Validation: Majid Vatankhah.
Visualization: Hossein Mardanparvar.
Writing–original draft: All authors.
Writing–reviewing and editing: All authors.

Conflicts of interest

The authors declare that they have no competing interests.

Ethical issues

The research adhered to the principles of the Declaration of Helsinki. Additionally, the study protocol was registered on the Research Registry website (Unique Identifying Number (UIN): researchregistry9820). This study was extracted from a research project at Hormozgan University of Medical Sciences. Besides, the authors have observed ethical issues (including plagiarism, data fabrication, and double publication).

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