

Factors for Postponement or Cancellation of Operating Programs Set in the Orthopedics-Traumatology Department of Yalgado Ouédraogo University Teaching Hospital in Ouagadougou (Burkina Faso)

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Abstract

Objective: The purpose of this work was to study the factors of cancellations or postponement of regulated operating programs of the Orthopedic-Traumatology unit of Yalgado Ouédraogo University Teaching Hospital. **Materials and Methods:** This was a prospective descriptive study over a period of six months. All interventions postponed or canceled during the study period were included. Patients who died or were lost to follow-up before surgery were not included. **Results and Comments:** the postponement/ cancellation rate was 24.5%. Out of 83 operations cancelled, 72.3% of patients were under 50 years old [extreme 15 and 88 years old]. ASA classes I and II were dominant with 57% and 37% of patients canceled, respectively. There were more postponed interventions (67.5%) than definitive cancellations (32.5%). The causes found were avoidable in 68.7% of cases. The most common was the unavailability of labile blood products (57%), the lack of financial means (36%) and the absence of the patient (28%). The results of our study show that 53% of the causes of cancellations were related to the organization of the hospital. **Conclusion:** the cancellation rate of orthopedic surgeries remains high at Yalgado Ouédraogo University Teaching Hospital. Most of the causes of cancellations are potentially preventable and the vast majority of them are related to the organization of the hospital. Financial accessibility to care plays an important role in cancellations.

Keywords

Postponement, Cancellation, Settled Surgery, Orthopedics-Traumatology, Causes

1. Introduction

The operating theater is one of the areas that make a hospital famous. Beyond the high cost in financial, human and material resources that it mobilizes, it is the theater where highly technical activities are carried out, and also one of the services that bring in the largest share of the hospital [1] [2]. It is, therefore, imperative that it works optimally. This optimal operation depends on the operating program set. Indeed, the operating program is the central device for the organization of the operating room. But sometimes, various factors can hinder the normal execution of the set operating program, leading to the postponement or even the cancellation of certain surgical procedures. Several studies have identified these postponement or cancellation factors around the world [3]-[16]. These causes are preventable in most cases [17] [18]. If in developed countries, postponements and cancellations are increasingly rare due to better organization of services [8] [11] [16] [19], in Africa, there are still high rates that vary between 23% and 40% [9] [18] [15]. In Burkina Faso, the phenomenon seems even more accentuated with rates reaching 46% [14]. These cancellations are not without economic, psychological and medical consequences for patients. In order to minimize these delays, we undertook to determine precisely the factors that were the cause in the orthopedic operating room of the CHUYO of Ouagadougou in Burkina Faso.

2. Methodology

This was a descriptive cross-sectional observational study with the prospective collection over six months from January 1 to June 31, 2022. The study population consisted of all patients scheduled for surgery during the period. The patients were of two types: either hospitalized in the service and waiting to be operated or ambulatory and having to be programmed externally. In all cases, a preoperative assessment was carried out, including a clinical examination and a paraclinical assessment with rhesus blood grouping, glycaemia, uremia, creatinine, prothrombin level, activated partial thromboplastin time, and in the over 50 s, an electrocardiogram and a pulmonary x-ray. Sampling was exhaustive, covering all patient files scheduled for surgery but which were postponed or cancelled. Patients who died or were lost to follow-up before the operation were not included. The data was collected on collection sheets from the patient's clinical files, programming registers, operating reports, pre-anesthetic consultation sheets, hospitalization registers and patient interviews. The study variables were age, sex, occupation, socio-economic level and data from the pre-anesthetic consultation (PAC), including the patient's pathological history, the ASA's score

(American Society of Anesthesiologist) [20], and the existence of a pre-anesthetic visit. The socio-economic level was classified into three categories: low, monthly income below the Guaranteed Minimum Interprofessional Wage (GMIW), which is 33,139 CFA francs (US\$50); medium, monthly income between one and three times the GMIW; high, monthly income greater than or equal to four times the GMIW.

The study variables also related to the cancellation factors, which are said to be:

- Organizational, when they concern the organization of the hospital: administration or hospital services;
- Related to personnel, if they come under surgical nursing staff: anesthetist, surgical team, or staff from the sterilization unit;
- Related to the patient, if they concern any responsibility attributable to the patient outside his state of health: lack of financial means, absence, discharge against medical advice, non-observance of preoperative fasting, etc.;
- Medical, if it concerns the patient's state of health (intercurrent affection, decompensation of tare, etc.).

The data collected was analyzed with EPI Info version 7.2.4.0 software. The Microsoft Office 2019 Excel spreadsheet was used for the graphics. A description of the quantitative variables was made in terms of medians and interquartile ranges or mean and standard deviation, while the qualitative variables were expressed in the form of numbers and percentages.

The study was carried out in accordance with bioethical and deontological laws and with respect for confidentiality.

3. Results

During the study period, 338 patients were scheduled for surgery. Eighty-three (83) interventions were postponed or canceled (24.5%) in fifty-five hospitalized patients and 28 were scheduled on an outpatient basis.

The average age was 40.1 years with extremes of 15 and 88 years. The under-50s represented 72.3% of the workforce. The sex ratio was 2.4. The breakdown by age group is shown in **Figure 1**.

Workers in the informal sector were the most represented with 22 patients (26.5%), followed by farmers, 18.1% (n = 15). These two socio-professional categories represented the low socio-economic level, *i.e.*, 44.6% of cases (**Figure 2**).

Regarding the PAC data, the significant medical history found were seven cases of high blood pressure, seven cases of sickle cell disease and three cases of renal failure. In addition, 37 patients, or 44.6% of the workforce, consumed toxic substances, including alcohol in 21 cases, tobacco in 12 cases and drugs in four cases.

The pathologies and indications for which the patients had been programmed are shown in **Table 1**.

Osteosyntheses was indicated in 60 cases (72.3%), including 52 in the pelvic limb. Twenty-two (22) patients or 26.5%, were to benefit from two concurrent

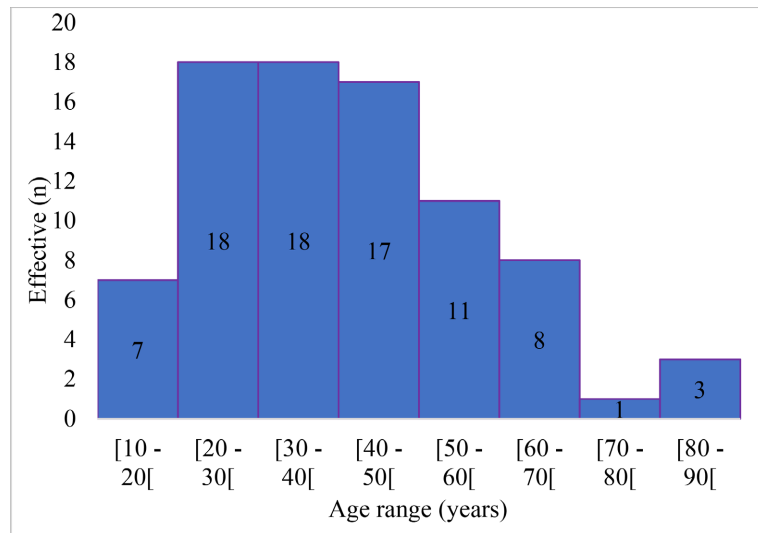


Figure 1. Distribution of patients by age group.

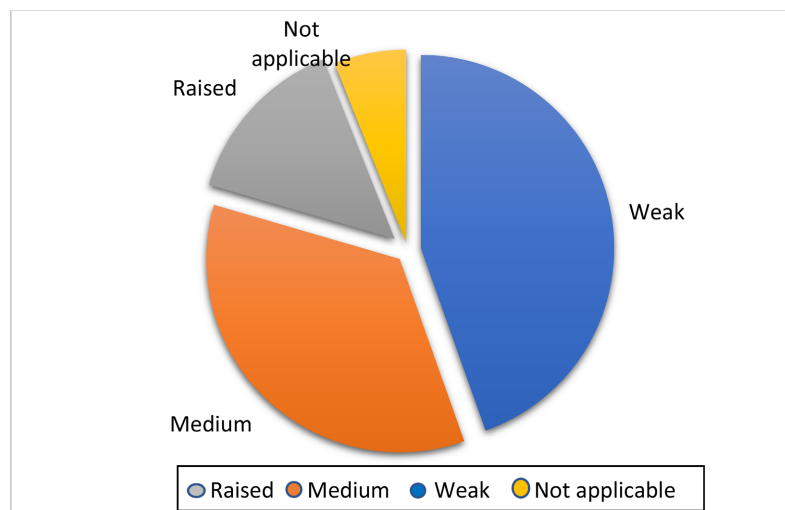


Figure 2. Distribution of patients according to socio-economic level.

Table 1. Distribution of patients according to diagnosis.

Pathology	Frequency (n)	Percentage (%)
Femur fracture (osteosynthesis)	16	19.27
Leg fracture (osteosynthesis)	13	15.66
Infection* (curettage, debridement-washout, sequestrectomy)	9	10.84
Ankle fracture (osteosynthesis)	8	9.63
Fracture around the knee (osteosynthesis)	5	6.02
Consolidated fracture (removal of material)	5	6.02
Floating knee (osteosynthesis)	4	4.82
Pseudarthrosis** (Cure + osteosynthesis)	4	4.82
Foot fracture (osteosynthesis)	4	4.82

Continued

Dislocation (reduction)	3	3.61
Cutaneous wound (revision-skin graft)	3	3.61
Femur malunion (Osteotomy + osteosynthesis)	2	2.41
Coxarthrosis (arthroplasty)	2	2.41
Forearm fracture (osteosynthesis)	2	2.41
Pelvic fracture (osteosynthesis)	2	2.41
Rupture of the extensor hallucis longus (tenorrhaphy)	1	1.20
TOTAL	83	100.00

*Infection: osteitis and osteomyelitis, soft tissue infection, ulcer, surgical site infection. **Pseudarthrosis: clavicle, tibia, ulna.

surgeries and 10 were to benefit from three (12%). Femur and leg fractures accounted for 34.9% of postponements and cancellations.

Seven (7) patients required specialist advice in other disciplines (cardiology, pneumology, nephrology, internal medicine). Para clinically, the hemoglobin level was less than 10 g/dl in 59.8% (n = 49) of scheduled patients. Hypoplateletosis was noted in nine patients (11.3%). The distribution of patients according to ASA class was as follows: ASA class I, 47 patients (57%); ASA class II, 31 patients (37%); ASA class III, 5 patients (6%). The pre-anesthetic consultation (PAC) was carried out by an anesthesiologist only in 39 patients. Forty-one (41) patients were examined by residents in anesthesiology, before the PAC was validated by the incumbent anesthesiologist. Three (3) patients did not have an APC at the time of programming. No patient benefited from a pre-anesthetic visit (PAV). The type of anesthesia proposed was spinal anesthesia in 70 patients (84.3%), general anesthesia in 10 patients (12.1%), epidural in 4 (4.8%) and locoregional block in two cases (2.4%). The PAC recommended reservation and/or transfusion of red blood cells in 50 patients, *i.e.*, 62.5% of scheduled patients. The average time between obtaining the PAC and enrollment in the surgical program was 12.6 days. Regarding the terms of cancellation or postponement, 67.5% (n = 56) of the interventions were postponed and 32.5% (n = 27) were cancelled. Compared to the time of cancellation or postponement, 25 cases (30.1%) were canceled the day before the intervention and 58 cases (69.9%) the same day of the intervention before the start of anesthesia. No case of postponement after anesthesia has been reported. The frequency according to the day of the week on which the postponement/cancellation took place is illustrated in **Figure 3**.

The causes of postponement/cancellation were related to malfunctions in the administration and/or other hospital services in 25.3% of cases: unavailability of blood products at the transfusion center (12 cases), unavailability of the operating room in 9 cases. The causes were related to the surgical team in 19% of cases and the reasons mentioned were the unavailability of the operator in six cases

(37.5%), the discovery of infectious risk in five cases (31.2 %), the change of indication of the type of surgery in four cases (25%) and the lack of osteosynthesis material in one case (6.3%). In 15 patients, *i.e.*, 18% of cases, the occurrence of intercurrent diseases was the cause of the postponement. Causes related to the anesthesia team accounted for 8%, *i.e.*, seven patients: PAC not performed or misplaced 3 cases, incomplete paraclinical assessment 3 cases, instructions prescribed during the PAC and not carried out 1 case. In two cases (2%), there were no boxes of sterile instruments. In 25 cases (30%), the patient and/or his family were the cause of the postponement. The reasons found were lack of financial means in nine (9) patients, one patient absent (not showing up on the day of the operation or have left the hospital without the knowledge of the staff) in 11 cases, one patient not having observed the preoperative fast or having refused the blood transfusion or the intervention in five (5) cases.

Cancellations occurred on Thursdays in 28.9% (n = 24). Fourteen (14) patients had already been reported at least once (18.2%) as reported in **Table 2**.

The postponement has created an additional cost for patients. Seventeen (17) were able to estimate it, and it was 156,176.5 CFA Francs (US\$233.80) on average.

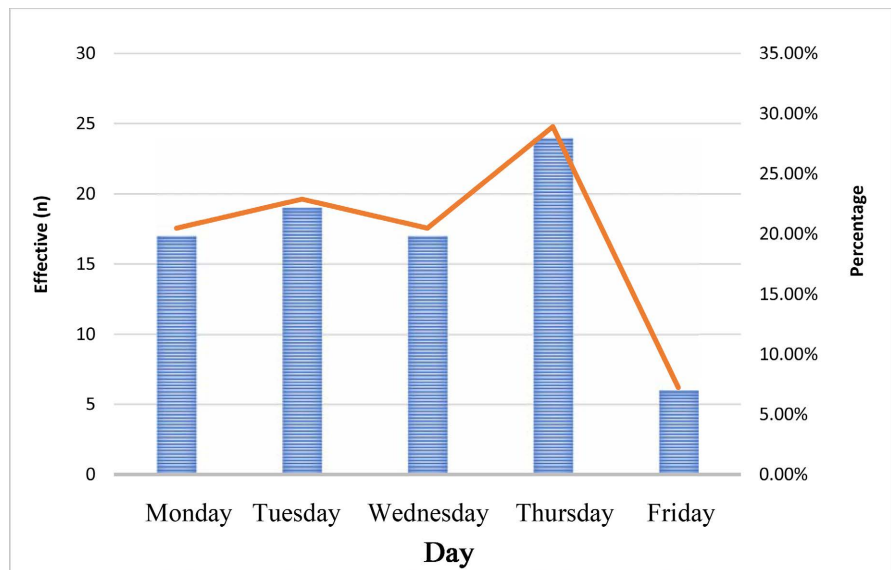


Figure 3. Distribution of patients by day of postponement/cancellation.

Table 2. Distribution of patients according to the number of postponements.

Number of postponements	Frequency (n)	Percentage (%)
1	69	83.13
2	8	9.64
3	4	4.82
4	2	2.41
Total	83	100

4. Discussion

From the point of view of socio-demographic characteristics, these are young patients with an average age of 40.1 years, which is similar to other African series and is explained by the youth of the population of the continent [4] [14] [15]. On the other hand, in developed countries, this average age is higher: 73 years for Dalton [8] in Ireland, and 61.5 years for Hori [11] in Japan. The sex ratio was 2.4 and is explained by the strong involvement of men in trauma. Patients of low socio-economic level were the most numerous with 44.6%, especially those working in the informal sector (22 patients, or 26.1% of the workforce). This class is the poorest, which does not allow patients to easily meet the costs necessary for their surgical care. Clinically, 25.3% of patients presented with a chronic pathology and 44.6% consumed toxic substances. Cho [5] in South Korea found a similar result with a rate of 28.3% of people with diabetes and/or hypertension. Certain situations such as an alcohol and tobacco withdrawal syndrome can lead to decompensation of defects, a source of deprogramming of scheduled surgery.

ASA class I patients accounted for 57% of postponements/cancellations. Other authors have also found this predominance, even in developed countries. This is the case with Koh [13] in Canada with 56.5% of ASA class I patients. The ASA score is a good indicator of patient operability. Most of our patients were potentially operable, and this underlines the hypothesis of mainly avoidable causes.

No patient benefited from a PAV at the time of programming, and this is due to the fact that there is only one anesthesiologist for the entire Orthopedics-Traumatology department. However, the PAC and the PAV make it possible to detect a high rate of cancellation factors and correct them in time. The absence of these steps is decisive in the occurrence of cancellations. The intervention was performed on average 12.6 days after the PAC. Only 49.4% of patients were scheduled rapidly in less than a week. This could be explained by the large number of patients waiting for surgery: there are only two operating rooms, one for emergencies and one for the scheduled programme, which lengthens waiting times sometimes leading to expiration of the PAC which is valid for one month. Postponements and cancellations mainly concerned osteosynthesis, 47% of cases. They are almost always performed with an open hearth on fractures that are often aged and therefore hemorrhagic. In anticipation of a transfusion, almost all PACs include a request for blood products, the unavailability of which frequently leads to postponements. In six months, we recorded 83 cases of postponement or cancellation out of a set of 338 scheduled interventions, corresponding to a cancellation rate of 24.6%. Previous studies in Burkina Faso reported rates of 20% - 40% [14]. These results are similar to those of other African authors such as Chalya [4] in Tanzania, Mbonicura [18] in Burundi, Haile and Nega [21] in Ethiopia, who found rates of 21%, 22.95% and 23%, respectively. On the other hand, they are much higher than those of authors from more developed countries such as Coudane [7] in France, Karnalkar [12] in India, and Dhafar [10] in Saudi Arabia, who respectively reported 5.6%, 6.5%, and 7.6%. In addition, 67.5%

of interventions were postponed to a later date and 32.5% were definitively cancelled, compared to 13.9% cancellations for Coudane [7] in France. Postponements of scheduled surgery in Africa therefore remain very numerous and are explained by the low socioeconomic level of the populations, the absence of health insurance, the precariousness of technical platforms, poor management and administrative failures. The definitive cancellations are linked to the fact that some patients were looking for financial means for a possible rescheduling; others resorted to traditional treatment or were treated elsewhere. Cancellations were decided on the same day of the intervention, but before any anesthesia in 69.9%. However, Coudane [7] in France and Hori [11] in Japan found high rates of cancellations after anesthesia: 56.5% and 40%. Our high rate of cancellations on the day of the operation could be explained by the lack of PAV, which means that the anesthetists only see patients on the day of the operation in the corridors of the operating room. However, the PAV is the moment when the anesthesiologist re-examines the patient's file, and checks the results of the additional examinations and any specialist opinions requested during the consultation. He finds out about new events that may have occurred since the PAC and the effectiveness of any preparation. It is also during this visit that the anesthesiologist ensures that the patient has been informed of the nature of the anesthesia that he must undergo and the modalities of its management. Cancellation after anesthesia is serious and could be justified by an absence of the safety checklist. The "patient safety in the operating room" checklist is a tool developed to reduce the risks associated with the operation. It allows the sharing of information and the cross-checking of criteria considered essential before, during and after any surgical intervention. Mandated in 2010, through the certification procedure for healthcare establishments, this checklist has largely demonstrated its effectiveness in significantly reducing perioperative morbidity and mortality [22]. However, it is not yet in common use in our context. The day of the week when the peak of cancellations was noted was Thursday with a rate of 28.9%. For Cho [5] in South Korea, Monday had the highest rate at 22.6%. In our operating room, Thursday is the day when the most difficult patients and those with incomplete check-ups are scheduled in order to allow the finalization of the check-ups and to take specialist opinions during the first days of the week.

The cancellation decision was taken 44.6% by the surgeons and 32.5% by the anesthesiologists. Coudane [7] in France found 75.2% for the surgeon and 19.8% for the anesthetists. During daily visits, surgeons sometimes detect anomalies that may hinder the operation. Cancellations by anesthesiologists are almost always due to the absence of labile blood products, the supply of which is very limited. In 7.2% of cases, the patient was postponed at least twice. Caesar [3] in Sweden reports a 14% higher rate for a longer study period of 5 years. In our context, the absence of a checklist contributes to perpetuating the same factors that will cause new postponements. The average time between the postponement and the actual performance of the intervention was 17.9 days. Karnalkar [12] in

India found a shorter period of five days. This rather long delay in our context sometimes leads to the expiration of the PAC which must be resumed. The causes of postponement were related to patients in 29% of cases: lack of financial means (36%), absence of the patient (34%), refusal of transfusion or intervention (12%) and non-compliance with preoperative fasting (8%). The same patient-related causes were found in the work of Mesmar [23] in Jordan with 31.4%. The causes of postponement were related to administrative malfunctions and other hospital services in 24%, to medical reasons in 18% and to theater staff in 29% (including 19% to surgeons, 8% to anesthesiologists and 2% to sterilization). The problem could be explained by the high cost of surgical procedures, the depletion of financial means due to expenses for preoperative check-ups, care, long hospital stays, and the lack of health insurance. Sometimes the patient does not show up on the day of the program. This could be explained by the use of private care or discouragement after several postponements. Non-compliance with preoperative fasting and patient refusal could be justified by forgetfulness, lack of communication, and refusal to have surgery on certain days of the week for cultural reasons. In short, in our context, there is no psychological preparation of the patient and the family for the programming of the intervention, which is most often done without their opinion. The causes of postponement/cancellation were attributable to the teams (surgical, anesthetic and sterilization) in 29% of cases. Karnalkar [12] in India found 42.3%. The absence or abnormalities of the PAC was the main reason for cancellation attributable to the anesthesia team with a rate of 42.9%. This could be explained by the non-respect for the normal programming procedure. With regard to the surgical team, the unavailability of surgeons on the day of the intervention, the appearance of an intercurrent infectious risk and the change of surgical indication constituted the major causes of cancellation with respective rates of 37.5%, 31.3% and 25%. There were sometimes cases of illnesses of certain surgeons, interference with poorly coordinated academic activities, and lack of preoperative preparation. On the side of the anesthesia team, the refusal to install the patient, an incomplete preoperative assessment and the non-execution of the instructions of the PAC occupied respectively 28.6%, 14.3% and 14.3% of the cases. This could be justified by the absence or non-application of a block charter and the difficult working conditions of the staff. The lack of surgical implants represented 6.3% and is explained by a lack of preoperative preparation. The lack of sterilization represented 2.4% of the cases of cancellations and is due to a very limited staff who are unable to ensure the permanence of this service. However, sterile equipment is essential for carrying out surgical procedures. Its unavailability automatically leads to the postponement of the operation. In addition, the implants and ancillaries are not available at the hospital, which therefore uses an external service provider with delivery times that are often not respected. In our study, 24% of the factors were attributable to administration and other hospital services. Mesmar [22] in Jordan, Karnalkar [12] in India and Gonzalez [24] in Spain reported rates ranging

from 25% to 44.9%. The unavailability of labile blood products was found in 57.1% of cases. Indeed, the lack of blood is a recurring and complex problem in our context, linked in particular to the lack of voluntary donors. The unavailability of certain blood groups, especially Rhesus negative, the waste of blood due to unconsumed demand and the absence of a reliable reservation mechanism contribute to perpetuating this deficit in our context. The unavailability of operating rooms, responsible for 23.8% of postponements/cancellations, was mainly due to their occupation by emergencies, the length of previous interventions, or the late start of the first intervention. We do not have an emergency operating room. Emergency surgeries are given priority to the detriment of scheduled ones, which contributes to carryovers. Hardware failures accounted for 9.5% of cases and were due to outdated hardware and lack of maintenance. Medical causes were responsible for 18% of postponement/cancellation cases. Chiu [19] in Hong Kong and Cousin [17] in France found similar proportions of 17% and 19%, respectively. The medical causes (hematological causes, abnormal preoperative assessment, decompensation of pre-existing chronic pathology such as arterial hypertension, renal insufficiency, diabetes, an affection of intercurrent appearance) could be the result of a lack of patient preparation at the hospitalization unit. Indeed, the effective respect of the stages of care, in particular the realization of the PAV visit of the patients scheduled for surgery, makes it possible to better appreciate the physiological state of the patients within a reasonable time before the day of surgery. In total, we listed 68.7% of avoidable causes including organizational factors (53%) and certain patient-related factors such as lack of financial resources (10.8%), non-compliance with preoperative fasting (2, 4%) and refusal of blood transfusion for religious reasons (2.4%). Mbonicura [18] in Burundi reported similar results. On the other hand, Trentman [16] in the United States found only 47% of preventable causes. This high rate in Africa compared to America could be justified by the poor organization and the absence of legal proceedings favoring laxity among the staff. The consequences of these postponements and cancellations are significant with 1.2% of deaths.

This study revealed many dysfunctions within the hospital even if it had limits and constraints, which are among others the small size of the sample, the relatively short duration and the failure to take into account the interventions carried out in emergency. We were also confronted with the loss of data in registers and CPA sheets, incomplete files, and the unavailability of certain patients.

5. Conclusion

The cancellation of a set operating program demonstrates the quality of the organization of patient care and is a major cause of loss of financial resources. The factors are multiple in our context but dominated by the lack of organization. Most of these factors are preventable. These postponements are sources of significant complications and even death. If in Europe, these cancellations are the subject of legal action, in our context, no prosecution has been noted. This can-

not delay the awakening of the consciences of the populations. It is, therefore, imperative to reorganize the services of the operating theaters more rigorously.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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