

Original Research

Approach to Latent, Organizational, Managerial, and Professional Factors in the Management of Risks Associated with Perioperative Care: Case of Touboro District Hospital

Approche des Facteurs Latents Organisationnels, Managériaux et Professionnels des Risques Associés aux Soins : Cas de l'Hôpital de District de Touboro

Tekourchok MJ¹, Tsague MV¹, Nodem SF², Djibrilla Y¹, Fanya LM¹, Nemnlack VB¹, Chebou DD¹, Rougayatou¹, Ze Minkande Jacqueline³

Affiliations

1. Department of Biomedical Sciences, Faculty of Sciences, University of Ngaoundere, Ngaoundere, Cameroon
2. Department of Food Engineering and Quality Control, UIT, University of Ngaoundere, Ngaoundere, Cameroon
3. Department of Surgery and Specialities, Faculty of Medicine and Biomedical Sciences, University of Yaoundé I

Auteur correspondant

Tsague Marthe Valentine

Email : tsague.marthe@yahoo.fr

Mots clés : Évaluation- facteurs latents- organisationnels- managériaux- professionnels- gestion des risques- soins, périopératoire- Hôpital de District de Touboro.

Key words: Assessment,- organizational- managerial- professional factors- management of risks- care- perioperative- Touboro District Hospital

RÉSUMÉ

Introduction. The management of risk factors in healthcare facilities should be based on two approaches: retrospective and predictive. The aim of our study is to evaluate the approach of latent, organizational, managerial, and professional factors in the management of risks associated with perioperative care at Touboro District Hospital. **Methods.** This was a prospective, descriptive, cross-sectional study conducted from May to August 2023. Data were collected by direct observation and direct interviews. **Results.** The study revealed that the major risks were organizational, professional and associated with perioperative care, highlighting the absence of warning tools (62.7%), the non-existence of the recovery room (88.1%), the waiting room (83%), and failure to check the patient's skin condition (81.4%); operating room instructions (76.3%), patient serological tests (72.9%); non-existence of a vacuum cleaner (69.5%); hair removal (67.8%); check-list (66.1%); non-observance of operating room staffing levels (52.5%) and difficulties with waste disposal (62.7%). **Conclusion.** These non-conformities are the direct consequences of all other forms of risk. From this study, it emerges that the failings identified in the perioperative phase are of a general, politico-managerial nature in risk management, the quality of which seems almost non-existent. The organizational work culture is outdated, with the result that poor risk management is a daily occurrence in perioperative care.

ABSTRACT

Introduction. la gestion des facteurs de risque dans les établissements de santé doit reposer sur deux approches : rétrospective et prédictive. Le but de ce travail est d'évaluer l'approche des facteurs latents, organisationnels, managériaux et professionnels dans la gestion des risques associés aux soins périopératoires à l'Hôpital de District de Touboro. **Méthodologie.** Il s'agissait d'une étude prospective, descriptive, transversale menée de mai à août 2023. Les données ont été recueillies par une observation et les entretiens directs. **Résultats.** Sur cette période L'étude a révélé que les principaux risques étaient organisationnels, professionnels et associés aux soins périopératoires, mettant en évidence l'absence d'outils d'alerte (62,7%), l'inexistence de la salle de réveil (88,1%), de la salle d'attente (83%), et l'absence de vérification de l'état cutané du patient (81,4%) ; les instructions de la salle d'opération (76,3%), les tests sérologiques du patient (72,9%) ; l'absence d'aspirateur (69,5%) ; l'épilation (67,8%) ; la check-list (66,1%) ; le non-respect des effectifs de la salle d'opération (52,5%) et les difficultés liées à l'élimination des déchets (62,7%). **Conclusion.** Ces non-conformités sont les conséquences directes de toutes les autres formes de risques. Il ressort de cette étude que les défaillances identifiées dans la phase périopératoire sont d'ordre général, politico-managérial, dans la gestion des risques dont la qualité semble quasi inexistante. La culture de travail de l'organisation est dépassée, ce qui fait que la mauvaise gestion des risques est quotidienne dans les soins périopératoires.

INTRODUCTION

As in industry, the management of risk factors in healthcare facilities should be based on two approaches: retrospective and predictive [1, 2]. In the context of our

study, only the retrospective approach will be considered. The notion of risk remains a necessary key in the daily life of every human being, especially in a complex field such as health [3, 4].

FOR QUICK READERS**What is known of the subject**

In Cameroon, given the frequency and degree of incidents and accidents, managing the safety of patients, their families, staff, and equipment is becoming a necessity in hospital facilities.

The question addressed in this study

Approach to latent, organizational, managerial, and professional factors in the management of risks associated with perioperative care in Touboro.

What this study brings as new

1. The failings identified in the perioperative phase were of a general, politico-managerial nature in risk management
2. The study highlighted the absence of warning tools (62.7%), the non-existence of the recovery room (88.1%), the waiting room (83%), and failure to check the patient's skin condition (81.4%); operating room instructions (76.3%), patient serological tests (72.9%); non-existence of a vacuum cleaner (69.5%); hair removal (67.8%); check-list (66.1%); non-observance of operating room staffing levels (52.5%) and difficulties with waste disposal (62.7%).

Implications for practice, policies or future research.

Ongoing training, awareness-raising, and audits could be implemented to solve the issue.

Hospital risk is an undesirable situation with negative consequences resulting from the occurrence of one or more problems within a hospital structure, which disrupt the achievement of its primary objectives, namely quality of care and patient safety [5]. Risk management in hospitals is still a topical area of interest. The hospital is still a place of care, so exposure to risks is always present [3]. Risks may involve the patient and those around him/her (diagnostic errors, nosocomial infections, equipment malfunctions, complications, patient falls on the operating table, errors in administering medication to the patient), but also staff (airborne contamination, occupational and environmental risks, state of health, unavailability of the specialist) and equipment (fires, breakdowns, deterioration of equipment, flooding of premises, absence, failure, etc.) [2].

Nowadays, given the frequency and degree of incidents and accidents, managing the safety of patients, their families, staff, and equipment is becoming a necessity in hospital facilities. Zero risk remains a buzzword, it just needs to be reduced or controlled [2]. The general objective of this study is to evaluate the approach to latent, organizational, managerial, and professional factors in perioperative care in the case of Touboro District Hospital. More specifically, to identify non-conformities and their causes, and to map latent factors associated with care.

PATIENTS AND METHODS

This was a prospective, descriptive, cross-sectional study. From May 25 to August 31, 2023, we included all surgical staff (surgeons, anesthetists, operating room nurses, orderlies, etc.) over 15 years of age and willing to take part in the study. We excluded from the study all

persons under 15 years of age and those aged 15 and over who had not consented to participate in the study.

Our sampling was non-probabilistic consecutive and exhaustive. This work was carried out in two stages. In the first stage, a self-administered questionnaire was used to assess the healthcare staff. In the second stage, a non-participatory direct observation technique was used to collect data on professional practices. Our variables were socio-demographic characteristics such as gender, age, specialty, matrimonial status, level of education, profession, and religion among nursing staff; risk typology variables among surgeons, anesthetists, and operating theatre nurses. The Ishikawa or fishbone diagrams was used to identify the main causes of a problem, by classifying and visualizing causes into major families and ensuring that no cause is forgotten [6,7]. To draw the Ishikawa diagram: we first of all defined the problem in terms of the effect observed, then we determined the possible causes of the problem, using a common thread based on 5 families: Manpower or human resources: professionals, problems of skill, organization, management, etc...; Material: equipment, machines, small equipment, premises; Medium/Material: everything that can be consumed, or the element that is transformed by the process (this may be the patient, with his or her own risk); Method: corresponds to the way of doing things, procedures, instructions, etc...; Milieu: physical and human environment, working conditions, relational aspects...

Pareto diagram is a graphical representation of the classified frequency counts of the values for the different levels of a categorical or nominal variable. This diagram highlights the most important causes of the total number of effects, enabling targeted measures to be taken to improve a situation. The diagram is based on the "80/20 rule". This rule states that around 80% of problems are the result of 20% of causes. Les causes les plus importantes sur le nombre total d'effet et ainsi de prendre des mesures ciblées pour la sécurité des patients [6,8,9]. The experimental procedures used in this study were approved by authorization of the Department of Biomedical Sciences of the Faculty of Sciences of the University of Ngaoundere N° 2023/0758/UN/R/DFS/C-DASR/CD-SBM from May 12 2023 and the Touboro District Hospital to recruit participants for this study. Sphinx plus2 V5 was the survey and data analysis software. It assisted in each of the four main stages involved in carrying out a survey (excluding the data collection phase): creating the questionnaire, entering responses, quantitative data processing, and qualitative data analysis quantitative data processing and qualitative data analysis. Given the very short time available for data collection, this study did not take into account all aspects of risk covering all perioperative periods, whether for patients, their families, operating room staff, or equipment.

RESULTS

We surveyed a total of 59 staff at Touboro District Hospital. Among the nursing staff, the most representative age range was 25-30 years (42.4%); the

majority were male (69.5%), with an M/F sex ratio of 2.27; 61% were Unmarried; 96.6% had secondary education; 94.9% had the grade of nursing orderly; and 84.8% were Christian. (Table 1)

Table I : Socio-demographic characteristics of participants

Variable	Modalities	N	%
Age			
	[15-20[	1	1,7
	[20-25[	8	13,6
	[25-30[	25	42,4
	[30-35[	12	20,3
	[35-40[	5	8,5
	+65	8	13,6
Marital status			
	Unmarried	36	61
	Married	22	37,3
	Divorced	1	1,7
Level of Study			
	Secondary	57	96,6
	Superior	2	3,4
Grade			
	General practitioner	1	1,7
	Nurse anesthetist	1	1,7
	Midwife	1	1,7
	Orderlies	56	94,9
Religion			
	Christian	50	84,8
	Muslim	9	15,3
Gender			
	Female	18	30,5
	Male	41	69,5

There were non-compliance with the operating room charter (45.8%), the checklist (66.1%), the vacuum cleaner (69.5%), the absence of an operating room council (40.7%), information on changes to the operating schedule (39%), the recovery room (88.1%), existence of the induction room (84%), lack of knowledge of the normal number of operating room staff (52.5%) and the presence of 78% for the oxygenator, 91.5% for the sterilizer and 67.8% for the post-op patient care protocol.(Table 2)

Table II : Distribution by organizational factors

Variables	Modalities	N	%
Setting up an operating theater council			
	Yes	23	39
	No	24	40,7
	I don't know	12	20,3
Existence of an operating theatre charter			
	Yes	17	28,8
	No	27	45,8
	I don't know	15	25,4
Sterilization of equipment after surgery			
	Yes	54	91,5
	No	0	0
	Not adapted	5	8,5
Oxygenator available			
	Yes	46	78
	No	11	18,7
	Not adapted	2	3,4

Table II : Distribution by organizational factors

Variables	Modalities	N	%
Protocol for patient care after surgery			
	Yes	40	67,8
	No	17	28,9
	Not adapted	2	3,4
Recovery room available			
	Yes	3	5,1
	No	52	88,1
	I do not know	4	6,8
Existence of the induction room			
	Yes	2	3,4
	No	49	83
	Not adapted	8	13,6
Transmission of the patient's complete file to the operating room team			
	Yes	45	76,3
	No	6	10,2
	Not adapted	8	13,5
Vacuum cleaner available			
	Yes	13	22
	No	5	8,5
	Not adapted	41	69,5
Existence of check-list			
	Yes	4	6,8
	No	39	66,1
	I do not know	16	27,1
Total number of operating theater staff			
	2	0	0
	3	9	15,3
	4	31	52,5
	5	14	23,7
	7	1	1,7
	8	4	6,8
Modification of the operating theatre program			
	Yes	23	39
	No	28	47,5
	I do not know	2	3,4
	Not adapted	6	10,2

88.1% of participants were wearing regulated operating theatre uniforms and had mastered dressing and undressing practices (89.8%); 62.7% were familiar with the implementation of Blood Exposure Accident follow-up procedures, 62.7% used the telephone as a signaling tool, and 62.7% had problems with waste disposal. (Table 3)

Table III : Distribution according to infectious factors caused by operating room professionals

Variables	Modalities	N	%
Regulated dress for the operating room			
	Yes	52	88,1
	No	7	11,9
Mastering dressing and undressing practices			
	Yes	53	89,8
	No	6	10,2
Waste disposal problems			
	Yes	37	62,7
	No	22	37,3
Signaling tools			
	Phone	37	62,7
	Whatsapp	3	5,1
	Poster	19	32,2
Setting up blood exposure accident follow-up			
	Yes	37	62,7
	No	14	5,1
	I don't know	8	32,2

Non-compliances were as follows: compliance with instructions for access to the operating theatre (76.3%) and presence of the Post-Interventional Care Room (49.2%); compliance with bio cleaning time (50.9%); verification of the patient's skin condition (81.4%); depilation of the patient before the operating theatre (67.8%); serological examination of the patient before surgery (72.9%); bleeding of the patient after surgery (72.9%); taking of the patient's vital parameters before surgery (76.9%); compliance with the "zero jewelry" rule (86.4%); hygiene instructions on entering the surgery (84.8%). (Table 4)

Table IV : Distribution according to healthcare-associated infectious factors

Variables	Modalities	N	%
Compliance with operating room access regulations			
	Yes	14	23,7
	No	45	76,3
Compliance with hygiene instructions at the entrance to the operating theatre			
	Yes	50	84,8
	No	9	15,3
Compliance with zero jewelry			
	Yes	51	86,4
	No	8	13,6
Awakening the patient in the post-operative care room			
	Yes	29	49,2
	No	16	27,1
	i do not know	14	23,7
Compliance with biocleaning time			
	Yes	26	44,1
	No	30	50,9
	i do not know	3	5,1
Patient bleeding after the operation			
	Yes	7	11,9
	No	43	72,9
	I do not know	2	3,4
	Not adapted	7	11,9
Checking the patient's skin condition prior to surgery			
	Yes	9	15,2
	No	48	81,4
	I do not know	2	3,4
Shaving the patient before surgery			
	Yes	9	15,2
	No	40	67,8
	I do not know	4	6,8
	Not adapted	6	10,2
Taking patient vital parameters before surgery			
	Yes	45	76,3
	No	12	20,3
	Not adapted	2	3,4
Patient serological tests before surgery			
	Yes	8	13,5
	No	43	72,9
	I do not know	3	5,1
	Not adapted	5	8,5

The Ishikawa or fishbone diagram, or the 5M diagram: material, manpower, methods, environment, and means showed:

At the material level, we note non-conformities such as the absence of a vacuum cleaner, the lack of signage ("phone"), and the lack of posters. In terms of milieu, we

note non-conformities such as the absence of an induction room, the absence of a recovery room, the absence of an operating room charter, the absence of operating room advice, and the absence of a surgical schedule. In terms of medium, we note the absence of patient hair removal, the absence of bio-cleaning, the absence of serological examinations, and the absence of skin condition checks. In terms of methods, we reported the absence of a checklist, difficulties in waste disposal, and non-compliance with operating theatre instructions. In terms of manpower, we reported the absence of a surgeon, the absence of an operating room nurse specialist, the absence of a risk manager, and the lack of a master operating room staffing plan. Once the most important causes have been identified and prioritized, these frequencies can be used to plot the Pareto diagram. This diagram is based on the "80/20 rule". (Figure 1)

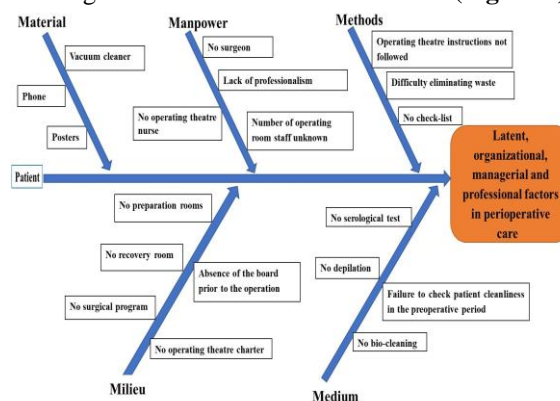


Fig 1: Modified Ishikawa diagram or 5 M diagram

According to the Pareto diagram, the focus should be on signaling tools (9.5%), recovery room (8.8%), waiting room (8.3%), patient's skin condition (8.1%), operating room instructions (7.6%), serological tests (7.3%), vacuum cleaner in good working order (6.9%), waxing of patients before placing them on the operating table (6.8%), check off the checklist as soon as the operating room opens (6.6%), waste disposal (6.3%), and staffing levels in the operating room (5.3%). (Figure 2)

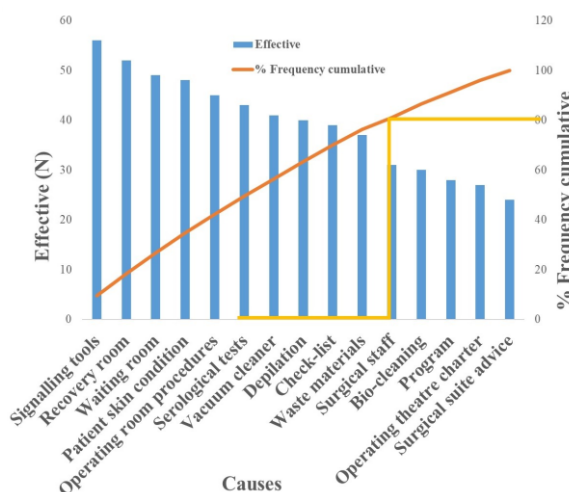


Fig 2: Modified Pareto diagram

DISCUSSION

From Table 1, the surveys revealed a predominance of 25-30 year-old, male, secondary-school level, unmarried, operating theatre nurses grade. This result is similar to the study carried out by Tsague et al [10] in Ngaoundéré, which reported a predominance of male gender and 50% nursing grade. Table 2 shows the distribution of organizational factors. Non-compliance with the operating room charter, the checklist, which was not always present during operations, the vacuum cleaner, which sometimes broke down, the absence of an operating room council, information on changes to the operating program, the recovery room, the existence of an induction room, lack of awareness of normal operating room staffing levels, and the presence of the oxygenator, sterilization, and postoperative patient care protocol. According to HAS [11], management in the operating theatre remains particularly complex, since it requires all the essential elements for the operation to be brought together at the right time: trained professionals present, patient reception prepared and informed, equipment sterilized in compliance with standards, suitable and functional equipment, drugs prescribed in compliance with good practice, external services in compliance. Kapasa et al. [12] noted a weakness in the organizational, management, and professional culture of perioperative care in an operating theatre in Casablanca. Table 3 shows the distribution of managerial factors. Non-compliance related to the wearing of operating theatre uniforms, the mastery of dressing and undressing practices, the knowledge and implementation of procedures for the follow-up of Blood Exposure Accidents, the signaling tool, and the disposal of waste. In 2016, Van Laer [13], a hospital hygienist and nurse, presented his work on EN 13795-compliant isolation gowns. According to the author, the most commonly used composition for isolation gowns is SMS (Spunbond + Meltblown + Spunbond). This is a non-woven gown made up of three layers, with a layer of meltblown forming the middle layer. Koseki et al. [14] have demonstrated that the operating theatre is still recognized as a very large point of contact between healthcare professionals and blood and body fluids. In 2021, Erwan d'Aranda et al. [15] noted that waste management in the operating theatre involves several aspects: awareness of current legislation, optimization of sorting protocols, investigation of recycling possibilities (cardboard; glass; metals; plastics), and a focus on reducing waste at source. The new Blondel and Brunel approach in risk and quality risk and quality in the healthcare environment 2004 identifies 31 dangerous situations, giving rise to 39 actions validated by the operating theatre council. Information reminding procedures to be implemented, ongoing training of operating theatre staff, drawing up or updating documents, auditing care practices including skin preparation and cleaning of premises, and organization by readjusting the profile of workstations in our healthcare establishments [16]. Figure 1 has enabled us to visualize and qualify the problem described above. We can see that the shortcomings identified in operating room activities

do not generally qualify the politico-managerial order of risk management associated with perioperative care. All these data enabled us to determine the causes of the main problems, using the 5M method to draw up the Ishikawa diagram. The results show that the poor management of risks associated with perioperative care has a number of causes [17, 18, 19]. Organizational mismanagement such as setting up an operating theatre council, existence of an operating theatre charter, sterilization of equipment after surgery, oxygenator available, protocol for patient care after surgery, recovery room available, patient preparation room available, transmission of the patient's complete file to the operating room team, vacuum cleaner available, existence of check-list, total number of operating theatre staff and modification of the operating theatre program. Ngaroua et al. [20] have demonstrated that the Check-list is one of the means of preventing and/or managing undesirable errors in the context of surgical patient safety. Infectious factors caused by operating room professionals such as regulated dress for the operating room, mastering dressing and undressing practices, waste disposal problems, signaling tools, and setting up blood exposure accident follow-up [21]. Care-related infectious risks such as compliance with operating room access regulations, compliance with hygiene instructions at the entrance to the operating theatre, compliance with zero jewelry, awakening the patient in the post-operative care room, compliance with biocleaning time, patient bleeding after the operation, checking the patient's skin condition prior to surgery, shaving the patient before surgery, taking patient vital parameters before surgery and patient serological tests before surgery [22]. Once the most important causes have been identified and prioritized, these frequencies can be used to plot the Pareto diagram. This diagram is based on the "80/20 rule" [23]. These eleven categorical variables are the 20% of effects that produce 80% of results in other words, they are the most important causes of the total number of effects, enabling targeted measures to be taken to improve patient safety [24,25]. These results are in line with those of Fanya [26], who worked on his dissertation on risk prevention and management in operating theatres in Ngaoundere. The author was able to demonstrate that in the intraoperative period, risk management, organizational culture, checklists, reporting tools, and awareness/training are the 20% of effects that will cause 80% of patient safety problems.

CONCLUSION

At the end of this cross-sectional, prospective, and descriptive study, the aim was to evaluate the approach of latent, organizational, managerial, and professional factors in the management of risks related to perioperative care in the Touboro District Hospital operating theatre. The results are as follows: Operating theatre staff are predominantly male, aged [25-30], single, and of Christian faith. The shortcomings identified within the operating theatre organization are of a general nature, with the risk management and quality management policy virtually non-existent. Organizational factors were almost non-existent, as evidenced by the lack of board meetings,

the block charter, uncontrolled operating room staffing levels, and the absence of checklists. At the managerial level, the risks of healthcare-associated infections are highlighted by uncontrolled access to the operating theatre, non-compliance with instructions at the entrance to the operating theatre, non-compliance with biocleaning times, patients' serology was not systematically checked, patient hair removal before surgery is inappropriate when it is carried out, and patient skin checks were not always carried out. Finally, in terms of professional factors, the survey noted the absence of specialist doctors and the absence of an operating theatre nurse. Indeed, to live with risk, hospitals need to implement a risk identification and management approach, aimed at reducing to an acceptable level, in particular, the risk of adverse events associated with care, while relying on new tools such as risk mapping. If we can change the condition of patients, their visitors, and staff, we need to change the conditions in which human beings operate. Actions to be implemented include ongoing training, awareness-raising, and audits.

ACKNOWLEDGEMENTS

Doctor Nodem Sohanang Francky Steve, despite your many preoccupations, you are always ready to listen to our problems.

AUTHOR'S CONTRIBUTIONS

Tsague MV, Tekourchok Mineo J, Nodem Sohanang FS: Methodology; Tsague MV, Tekourchok Mineo J, Bebeton Nemnlack V, Chebou Dawag DV, Fanya Lonang MP, Djibrilla Yaouba: Analysis and interpretation of data; Tsague MV, Tekourchok Mineo J, Rougayatou: Manuscript writing; Tsague MV Critical: revision; Tsague MV, Tekourchok Mineo J: Statistical analysis; Ze Minkande J: Study supervision

CONFLICT OF INTEREST

The authors have no conflict of interest.

REFERENCES

- 1- Vanura D, Marmet E, Donjon A. Modèle de gestion des risques en établissements de Santé : organisation, méthodes et outils. Direction de l'Hospitalisation et de l'Organisation de Soins / Ministère de l'Emploi et de la Solidarité, 2002. https://sante.gouv.fr/IMG/pdf/capg_etude-2.pdf
- 2- Imen BK, Touil BK, Touil. Gestion des risques et aide à la décision dans la chaîne logistique hospitalière : cas des blocs opératoires du CHU Sahloul. Autre. Ecole Centrale de Lille; Institut Supérieur de Gestion de Sousse, 2011. <https://theses.hal.science/tel-00714925/document>
- 3- Chaabita R. et elalaoui H. La cartographie des risques un outil de gestion des risques en milieu hospitalier (Cas Centre Hospitalier Provincial Prince Moulay El Hassan de Nouaceur), Revue Française d'Economie et de Gestion. 2021 ; 2(3) : 53-70. <https://journals.indexcopernicus.com/api/file/viewByFileId/1180953.pdf>
- 4- Chaabane Sondès. Gestion prédictive des blocs opératoires. Sciences de l'ingénieur [physics]. INSA de Lyon, 2004.
- 5- Ministère de la Santé, de la Famille et des Personnes Handicapées. Direction de l'Organisation des Soins. Sous Direction de la Qualité et du Fonctionnement des Etablissements de santé, Mars 2004. https://www.utc.fr/~farges/textes_off/guides/gestion_risques_etab_sante.pdf
- 6- Risque au bloc opératoire : cartographie et gestion. Direction régionale des affaires sanitaires et sociale de Midi-Pyrénées, commission de coordination régionale de vigilance https://www.sf2h.net/k-stock/data/uploads/2012/04/ISO_cartographie-du-risque-infectieux-au-bloc-operatoire.pdf
- 7- Ishikawa K, Loftus JH. (Eds)1990 Introduction to quality control, Tokyo Japan: 3A Corporation. [https://www.scirp.org/\(S\(i43dyn45teexjx455qlt3d2q\)\)/reference/References](https://www.scirp.org/(S(i43dyn45teexjx455qlt3d2q))/reference/References)
- 8- Alkiayat M. A Practical Guide to Creating a Pareto Chart as a Quality Improvement Tool. Glob J Qual Saf Healthc. 2021 Apr 28;4(2):83-84. <https://doi.org/10.36401/JQSH-21-X1>.
- 9- Macluskey M, Durham J, Renton T. Competency based surgery. Br Dent J. 2006; 201(7):415. <https://doi.org/10.1038/sj.bdj.4814127>.
- 10- Tsague MV, Nguimbou RM, Ngaha Damndja W, Sineche Ngunte R, Modjo GA, Ngadjui Ngodjoum DR, Ze Minkande J. Evaluation of caloric intake, knowledge, and practices on postoperative refeeding in digestive surgery in Ngaoundere Hospitals, Adamawa Region, Cameroon. Universal Journal of Pharmaceutical Research 2023; 8(4):31-38. DOI: <https://doi.org/10.22270/ujpr.v8i4.973>
- 11- HAS 2010. Document informatif pour la visite du bloc opératoire dans un établissement de santé Procédure V2010
- 12- Kapasa RL, Belabbes S, Hannoun A, Belouali R, Taybi Bt. Evaluation of Risk and Quality Management in a Casablanca Operating Theatre, Health Sciences. 2020; (1)1, Article 5. <https://doi.org/10.15342/hs.1.164>
- 13- Van Laer Frank. Blouses d'isolation conformes aux normes EN 13795, EN 14126, AATCC 42 ou ASTM F 1670 ? Noso-info. 2016; XX(2), https://www.researchgate.net/publication/305331145_Blouses_d_isolation_conformes
- 14- Koseki H, Sunagawa S, Imai C, Yonekura A, Matsumura U, Yokoo S, Watanabe K, Nishiyama Y, Osaki M. Visualization of Airborne Particles as a Risk for Microbial Contamination in Orthopedic Surgery. Front Surg. 2021; 22;8:754785. <https://doi.org/10.3389/fsurg.2021.754785>.
- 15- Erwan d'Aranda, Garnier Jérémie, Marcantoni Juliette. Management of waste related to care in the operating room. *Le Praticien en Anesthésie Réanimation*. 2021; 25 (5) :223-232. <https://doi.org/10.1016/j.pratan.2021.09.004>
- 16- Haute Autorité de Santé. La sécurité des patients Mettre en œuvre la gestion des risques associés aux soins en établissement de santé HAS 2011
- 17- Luca L(a). Study on the determination and classification of the causes that determine the faulty operation of a vehicle fuel pump. Recent Researches in Manufacturing Engineering. 3- rd WSEAS International Conference On Manufacturing Engineering, Quality and Production System (MEQAPS'11). Published by WSEAS Press ISBN 978-960-474-294-3. 2011; 21-24. https://www.utgjiu.ro/rev_mec/mecanica/pdf/2016-02/12
- 18- Luca L (b). Study on Identification and Classification of Causes which Generate Welds Defects. Applied

- Mechanics and Materials ISSN: 1662-7482 Vol. 657 Trans Tech Publications (Switzerland). 2014; 256-260.
- 19-** Luca L(c). The Study of Applying a Quality Management Tool for Solving Non-Conformities in an Automotive. Applied Mechanics and Materials ISSN: 1662-7482 Vols. 809-810 Trans Tech Publications (Switzerland). 2015; 1257-1262. [https://www.utgjiu.ro/rev_mec/mecanica/pdf/2017-01/39_Liliana%](https://www.utgjiu.ro/rev_mec/mecanica/pdf/2017-01/39_Liliana%20Luca.pdf)
- 20-** Ngaroua, Djibrilla Yaouba, Danghoua Dieudonné, Eloundou N. Joseph. Surgical practice and security of the patient at the Regional Hospital and the Protestant Hospital of Ngaoundere. Health Sci. Dis: 19 (1) January–February–March 2018.
- 21-** Société française d'hygiène hospitalière (SFHH). Conférence de consensus. Gestion préopératoire du risque infectieux 2004. http://www.sfh.net/téléchargement/cc-risque_infectieux-pdf_14_noveber2023
- 22-** Yaouba, D. Surveillance clinique des infections du site opératoire à l'hôpital régional de Ngaoundéré (Cameroun) Mémoire de Master en Sciences Infirmières, Université de Ngaoundéré 2014.
- 23-** The 80/20 Rule And How It Can Change Your Life. Accessed Feb 16, 2021. www.forbes.com/sites/kevinkruse/2016/03/07/80-20-rule/?sh=18274bb13814
- 24-** Wilkinson L. Statistical computing and graphics: revising the Pareto chart. Am Stat. 2006; 60: 332-334.
- 25-** Alkiayat M. A Practical Guide to Creating a Pareto Chart as a Quality Improvement Tool. Glob J Qual Saf Healthc. 2021, 28;4(2):83-84. [https://doi: 10.36401/JQSH-21-X1](https://doi.org/10.36401/JQSH-21-X1).
- 26-** Fanya Lounang MP. Risk prevention and management in operating theatres: Case of Ngaoundere Regional Hospital. Master's thesis in Nursing, University of Ngaoundere 2022.