

## Original Research Article

## Knowledges and Attitudes of Health Workers on Antibiotic Prophylaxis in a Surgical Environment in Niamey

Nanzir Sanoussi M<sup>1\*</sup>, Gagara M<sup>1</sup>, Ali ML<sup>2</sup>, Chaibou MS<sup>1</sup>, Daddy H<sup>1</sup>, Saidou A<sup>3</sup><sup>1</sup>Department of Anaesthesiology and Intensive Care, Niamey National Hospital (HNN) – Niger<sup>2</sup>Department of Internal Medicine, Niamey National Hospital (HNN) – Niger<sup>3</sup>Department of Surgery, Niamey National Hospital (HNN) – Niger**Article History**

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**Abstract: Objectives:** To study antibiotic prophylaxis in Niamey. **Patients and Methods:** A cross-sectional multicenter study conducted in five hospitals in Niamey over a period of four months from 16<sup>th</sup> June, to 15<sup>th</sup>, October, 2021. The study included anaesthetists, anaesthesia nurses, surgeons, surgeon nurses and surgical unit supervisor, who agreed to complete the survey supports. The variables studied were: age, profession, experience of practitioners, knowledges of surgery requiring antibiotic prophylaxis and duration, choice and prescription of antibiotics, need for post degree training. **Results:** Were been included 146 practitioners: 53 anaesthesia nurses, 31 surgeons, 30 surgeons nurses, 22 surgical unit supervisor and 10 anaesthetists. Their average age of practitioners was 40.85 years, ranging from 24 to 59 years. The study found that preventing infection was the goal of antibiotic prophylaxis for 91.78% of practitioners. Surgeries requiring antibiotic prophylaxis were clean and contaminated surgeries according to 64.38% and 56.84% of staff, respectively. The prescriber of antibiotic prophylaxis should be the anaesthetist according to 61.64% of respondents. The antibiotic should be administered 30 minutes before the incision for 56.85% of practitioners. Ceftriaxone was the most proposed antibiotic in 43.15%. Eighty-three percent of staff had not received after degree training on antibiotic prophylaxis. **Conclusion:** this study reveals the inadequacies of surgical antibiotic prophylaxis in Niamey hospitals. The difficulties are related to the unavailability of recommended antibiotics, the lack of protocol and the lack of training.

**Keywords:** Antibiotic prophylaxis, surgery, Niamey.

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## INTRODUCTION

Antibiotic prophylaxis is a technique that aims to help reduce the frequency and severity of the real and statistically proven risk of infection associated with surgery. Surgical site infections account for 20% of nosocomial infections and are an important cause of morbidity and an increase in postoperative mortality and length of hospital stay. Although the principles of antibiotic prophylaxis have been well codified, inappropriate use is still frequently observed. The aim of our work was to assess the knowledges and attitudes of staff on antibiotic prophylaxis in surgical staff in Niamey hospitals [1- 3].

## PATIENTS AND METHODS

A cross-sectional multicenter study conducted in five hospitals in Niamey over a period of four months from 16<sup>th</sup> June, to 15<sup>th</sup>, October, 2021. The study

included anaesthetists, anaesthesia nurses, surgeons, surgeon nurses and surgical unit supervisor, who agreed to complete the survey supports. The variables studied were: age, profession, experience of practitioners, knowledges of surgery requiring antibiotic prophylaxis and duration, choice and prescription of antibiotics, need for continuing training. Data were analyzed with Epi Info 7™ (Centers for Disease Control and Prevention, Atlanta, GA).

## RESULTS

The study included 146 practitioners : 53 anaesthesia nurses (36.30%), 31 surgeons (21.23%), 30 surgeons nurses (20.55%), 22 head nurses (15.07%) and 10 anaesthetists (6.85%) (Table 1). Their average age of practitioners was 40.85 years, ranging from 24 to 59 years. 37.70% had an age between 35-45 years. Of the

\*Corresponding Author: Nanzir Sanoussi M

Department of Anaesthesiology and Intensive Care, Niamey National Hospital (HNN) – Niger

146 practitioners who responded, 41.78% had 10-15 practice years in the health field.

**Table 1: Distribution of practitioners by the function**

Function	Number	Percentage (%)
Anaesthesia nurses	53	36.30
Surgeons	31	21.23
Surgeon nurses	30	20.55
Surgical unit supervisor	22	15.07
Anaesthetists	10	6.85
<b>Total</b>	<b>146</b>	<b>100.00</b>

The aim of antibiotic prophylaxis was to prevent infection for 91.78% of practitioners. Surgeries requiring antibiotic prophylaxis were clean and contaminated surgeries according to the practitioners surveyed. Among the respondents, 61.64% said that the

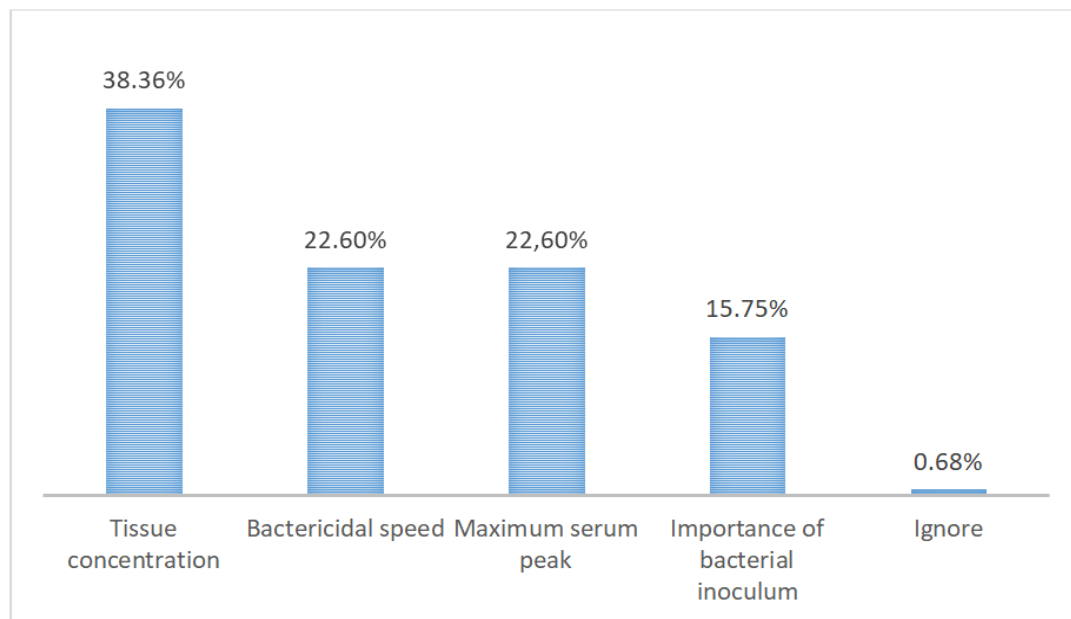
prescription of antibiotic prophylaxis should be made by anaesthetist. Antibiotic prophylaxis should be administered 30 minutes before the incision for 56.85% of practitioners and for 33.56%, the maximum duration of administration was 48 hours (Table 2).

**Table 2: Distribution of practitioner responses by knowledge of beginning of antibiotic prophylaxis**

Beginning of antibiotic prophylaxis	Number	Percentage (%)
24 hours before	14	9.6
1h hour before	25	17.12
30 mn before	83	56.85
At the incision	11	7.53
During the operation	13	8.9
<b>Total</b>	<b>146</b>	<b>100.00</b>

The pharmacological and bacteriological determining factors in antibiotic prophylaxis were tissue

concentration and bactericidal speed with 38.36% and 22.60% respectively.



**Figure 1: Determining factors the type of antibiotic used**

72.62% of practitioners practiced routine antibiotic prophylaxis while 21.92% did not routinely administer antibiotics. There was no antibiotic

prophylactic protocol in the ward according to 55% of practitioners. Knowledge about antibiotics and ecology were the guidelines for prescription (Table 3).

**Table 3: Determinants of antibiotic choice according to practitioners**

Practitioners	Antibiotic prophylaxis knowledge, n(%)	Knowledge about ecology, n(%)	Indication of an antibiotic, n(%)	Antibiotic Cost, n(%)	Ignore, n(%)
Surgeon nurses	20(66.66)	16(53.33)	2(6.66)	3(10)	2(6.66)
Surgeons	20(64.51)	24(77.41)	3(9.67)	3(9.67)	0
Surgical unit supervisor	11(50)	9(40.90)	1(4.54)	2(9.09)	3(13.63)
Anaesthetists	7(70)	8(80)	0	5(50)	0
Anaesthesia nurses	28(52.83)	27(50.94)	4(7.54)	10(18.86)	0

Ceftriaxone was the most widely used antibiotic in 43.15%. The monitoring of the bacterial ecology of the unity was not ensured for 63.70% of the staff. Eighty-three percent (83%) of practitioners had not received post degree training on antibiotic prophylaxis and would like to have.

## DISCUSSION

Antibiotic prophylaxis is important for reducing the risk of infection associated with surgery. It must be combined with the other surgical aseptic measures in which it must be integrated. The modalities of the choice of molecules and their administration are the subject of validated recommendations [4, 5]. In our study 37.70% of our surveyed practitioners had an age between 35-45 years. Anaesthetists were the least represented with 6.85%. The high rate of anaesthesia nurses could be explained by the enthusiasm anaesthesia nurses to participate in the survey and the lack of anaesthetists in Low Income Countries and anaesthesia practitioners were anaesthesia nurses, 41.78% had 10 -15 years of work in field of health, this frequency differs from that of Ahounou E *et al.*, in Benin who had found 66% [6, 7]. The aim of antibiotic prophylaxis was to prevent infection for 91.78% of our practitioners, This result is similar of Traoré I *et al.*, in Burkina Faso (74.10%). This could be explained by the interest given today to the knowledge of antibiotic prophylaxis by health practitioners [8]. 61.64% of practitioners said that the prescription of antibiotic prophylaxis should be made by the anaesthetist, 38.36% said that it should be by the surgeon, Traoré I. *et al.*, reported 56.80% for the surgeon and 23.20% for the anaesthetist. In our study, for 56.85% of practitioners, antibiotic prophylaxis should be administered before the surgical incision, 8.9% after. Our result is same with Rebai L. *et al.*, in Tunisia and Krite A. *et al.*, in Morocco who had found 58% and 100% respectively [8-10]. The time of administration of the antibiotic influences the plasmatic concentration of antibiotics at the time of the incision and throughout the duration of the act [11]. It is well established that antibiotic prophylaxis should be initiated prior to the start of surgery in order to achieve effective tissue concentrations at the time of incision. For this, a delay of half an hour to an hour before the incision is required [12]. Our study showed that 39.04% of practitioners said that it was necessary to reinject the antibiotic if the intervention exceeded 4 hours. Based on the literature,

re-injections are performed during the operative period, every two half-lives of the antibiotic, at a dose either similar or half the initial dose [5]. The duration of antibiotic prophylaxis was 48 hours for 33.56% of our practitioners while it was greater than 48 hours in 66.90% of cases in the study of Mamane M. *et al.*, less than 48 hours in 99% of cases in Tunisia by Najjar *et al.*, [13,14]. The continuation of antibiotic prophylaxis is variable and ranges between 24 and 48 hours. Anaesthetists are more likely to be in favour of prolonged antibiotic prophylaxis beyond 24 hours. This attitude results from the confusion between antibiotic prophylaxis and antibiotic therapy. Also, the precarious conditions of asepsis in our operating theatres could explain this attitude. Duration of antibiotic prophylaxis should most often be limited to the intraoperative period, but never exceed 48 hours. Many studies show the absence of superiority of a prolongation of antibiotic prophylaxis while the emergence of bacteria that have acquired resistance during prophylactic treatments has been demonstrated [15, 16]. Determinants of antibiotic choice were mainly knowledge of the antibiotic and bacterial ecology for 58.9% and 57.53% of practitioners respectively. The interest of 3<sup>rd</sup> generation cephalosporins was accepted by 61.64% of practitioners. However, there is a tendency to offer cephalosporins for prophylaxis because of their long half-lives but especially because of their availability and practitioners' habits. These molecules are indeed poorly adapted to this indication because they act on germs rarely encountered in regulated surgery and their use leads to the emergence of mutants resistant to these drugs useful for curative treatments [17]. The most commonly used type of antibiotic was ceftriaxone (43.15%). This high of ceftriaxone prescription could be explained by the lack of knowledge of the recommendations on antibiotic prophylaxis but especially by the unavailability in Niger of recommended molecules, including cephalosporins. Among the pharmacological and bacteriological factors determining in antibiotic prophylaxis, tissue concentration was important, 38.36% of practitioners agree, the serum peak for only 22.60% and the speed of bactericidal is an argument for 22.60% of practitioners. In our study, 17% of practitioners reported receiving post degree training on antibiotic prophylaxis. In the literature, few studies had focused on assessing the level of knowledge of staff on antibiotic prophylaxis, in 2018 Ahounou E. *et al.*, had reported in their study that 24% of health workers, had reported having received

post degree training on antibiotic prophylaxis, in 2012 in Burkina Faso, Traoré I. *et al.*, reported that 2.5% of practitioners had received training on antibiotic prophylaxis. This result is much lower than ours. It must be noted that the insufficiency and lack of post degree training remains a general problem in Low Income Countries [7, 8].

## CONCLUSION

This study highlighted shortcomings in the knowledge and preventive use of antibiotics for prophylaxis in surgical units. These problem relate to all aspects of antibiotic prophylaxis. The shortcomings identified are due to the lack of protocols in the various surgical units, the unavailability of recommended antibiotics, the lack of training of practitioners. It is therefore necessary to train practitioners, to create nosocomial infection committees, to conduct studies on bacterial ecology in our operating rooms in order to identify bacteriological profile and propose adapted protocols.

## REFERENCES

1. Charlotte, D. (2007). Antibioprophylaxie et infections du site opératoire : applications et évaluation des mesures mises en place dans un hôpital de gynéco-obstétrique. *Thèse pharmacie, Nancy*, 59.
2. Shapiro, M., Townsend, T. R., Rosner, B., & Kass, E. H. (1979). Use of antimicrobial drugs in general hospitals: patterns of prophylaxis. *New England Journal of Medicine*, 301(7), 351-355.
3. Crossley, K., & Gardner, L. C. (1981). Antimicrobial prophylaxis in surgical patients. *JAMA*, 245(7), 722-726.
4. Gorbach, S. L., Condon, R. E., Conte, J. E., Kaiser, A. B., Ledger, W. J., & Nichols, R. L. (1992). General guidelines for the evaluation of new anti-infective drugs for prophylaxis of surgical infections. *Clin Infect Dis*, 15(Suppl 1), S313-S338.
5. Martin, C. (1994). Antimicrobial prophylaxis in surgery : general concepts and clinical guidelines. French Study Group Antimicrobial Prophylaxis in Surgery. French Society of Anaesthesia and Intensive Care. *Infect Control Hosp Epidemiol*, 15, 463-71.
6. Adnet, P., Diallo, A., Sanou, J., Chobli, M., Murat, I., & Fian, E. (1999, June). Anesthesia practice by nurse anesthetists in French speaking sub-Saharan Africa. In *Annales Francaises D'anesthesie et de Reanimation* (Vol. 18, No. 6, pp. 636-641).
7. Ahounou, E., Hounkpè, P. C., & Akodjenou, J. (2018). Connaissances et attitudes des professionnels de la santé en matière d'antibioprophylaxie péri opératoire au Centre Hospitalier Universitaire et Departemental de l'Ouémé et du Plateau en 2018. <https://bec.uac.bj/publication/7519/Article consulté le 07 décembre 2021>.
8. Traore, I. A., Dakouré, P. W. H., & Zaré, C. (2012). Evaluation des connaissances et des pratiques sur l'antibioprophylaxie chirurgicale dans la ville de Bobo-Dioulasso (Burkina-Faso). *Rev, Afr. Med. Urg. Réa*, 17(3), 56-61.
9. Rebai, L., Boussaidi, I., & Fitouhi, N. (2019). Evaluation de la pratique de l'antibioprophylaxie chirurgicale dans 6 centres universitaires. *Revue Tunisienne d'Infectiologie*, 13(1), S1 - S216.
10. Krite, A., Marfi, A., Chafik, H., Abid, H., Elidrissi, M., Elibrahimi, A., & Elmrini, A. Evaluation de l'antibioprophylaxie au Service de Chirurgie Traumatolo-Orthopédie B4 CHU Hassan II Fès Maroc. <https://www.iosrjournals.org/iosr-jdms/papers/Vol19-issue1/Series 10/J1901104860.pdf>
11. Lizan-Garcia, M., Garcia-Caballero, J., & Asensio-Vegas, A. (1997). Risk factors for surgical-wound infection in general surgery: a prospective study. *Infect Control Hosp Epidemiol*, 18, 310-5.
12. Martin, C., & Pourriat, J. L. (1997). Pratique de l'antibioprophylaxie périopératoire par les anesthésistes-réanimateurs français : résultat d'une enquête nationale. *Ann Fr Anesth Réanim*, 16, 913-7.
13. Maikassoua, M., Abdoulaye, M. B., Adakal, O., Kimso, O., Mounkaila, I., Rouga, M., & Chaibou, M. S. (2021). Evaluating the Use of Preoperative Antibiotic Prophylaxis in Scheduled Surgeries at the Regional Hospital (RH) of Maradi. *EAS J Anesthesiol Crit Care*, 3(6), 105-109. DOI: 10.36349/easjacc. 2021.v03i06.001
14. Naijar, W., Farhat, I., & Chemchikh, H. (2009). Evaluation des pratiques de l'antibioprophylaxie dans la chirurgie de la prothèse totale de hanche. *Tun Ortho*, 2, 2.
15. Kernodle, D. S., Barg, N. L., & Kaiser, A. B. (1988). Low-level colonization of hospitalized patients with methicillin-resistant coagulase-negative staphylococci and emergence of the organisms during surgical antimicrobial prophylaxis. *Antimicrob Agents Chemother*, 32(2), 202-8. doi : 10.1128/AAC.32.2.202.
16. Yunus, A., Lim, C. H., & Subhita, P. (2005). Appropriate antibiotic administration in elective surgical procedures: still missing the message. *Asian J Surg.*, 28(2), 104-8.
17. Martin, C., & Pourriat, J. L. (1998). Quality of perioperative antibiotic administration by French anaesthetists. *J Hosp Infect*, 40, 47-53. [https://doi.org/10.1016/s0195-6701\(98\)90024-x](https://doi.org/10.1016/s0195-6701(98)90024-x).

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