



Epidemiological Study of Nosocomial Infections in the Kenitra Traumatology Department”, During the Period of Covid-19

*Meriem Sadoune*¹, *Yassine Chaib*², *Rachid El Zanati*³, *El Mahjoub Aouane*⁴, *Zouhair Sadoune*¹, *Abdelaziz Chaouch*¹

¹Department of Chemistry, Laboratory Organic Chemistry Catalysis and Environment Faculty of Science Ibn Tofail University, Kenitra, 14000, Morocco.

²Department of biology, laboratory biology and health Faculty of Science Ibn Tofail University, Kenitra, 14000, Morocco

³Orthopedic surgeon Idrissi Hospital, kenitra, 14000, Morocco.

⁴Department of Biology Laboratory Natural Resources and Sustainable Development Faculty of Science Ibn Tofail University, Kenitra, 14000, Morocco.

Abstract

The objective of this study is to determine the epidemiological profile of nosocomial infections in the CHP Kenitra Traumatology Service in Morocco. The study focused on patients admitted between 2020 and 2021. A questionnaire established for the study of the state of knowledge. The results show a prevalence of 9.09% out of 550 patients, including 47 episodes bacterial infections; several infectious sites have been identified those related to the pulmonary system and the urinary system and surgical site. The most common bacteria are *Escherichia coli* and *Pseudomonas aerogenosa* with incidences of 19% and 12% respectively. Regarding the state of knowledge, most of the respondents have no idea about IN and are not even informed of this infection. Nosocomial infections in the department dominated by bacteremia and are mainly due to Gram-negative bacilli. Despite the efforts undertaken, the authorities called upon to establish a firm and effective control system.

Keywords: nosocomial infections, prevalence, bacteremia, covid19

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*Corresponding Author, e-mail: Meriem.sadoune@uit.ac.ma

1. Introduction

Nosocomial infections affect different hospital structures. They constitute a major public health problem by their cost as well as by morbidity, mortality, and prolonged hospitalization as well as significant socioeconomic complications [1,2]. Infections are said to be nosocomial when they are acquired during a hospital stay and that they were not present or incubating at the time of admission to hospital [3-4].

According to the World Health Organization, more than 1.4 million people worldwide suffer from healthcare-induced infectious complications. These infections are among the main causes of death for patients of all ages, especially for the most vulnerable among them [5] In developed countries, such as the United States, one in 136 patients acquires an infection in hospital that makes them seriously ill. This equates to 2 million cases per year causing approximately 80,000 deaths. In England, healthcare-associated infections are the cause of 5,000 deaths a year [6-7]. On the other hand, in Morocco, there is a delay in the awareness of the importance of the surveillance and prevention of NI as well as their severity and impact on health

Sadoune et al. 2023

establishments as well as the population. At the national level, a single prevalence survey carried out in 1994, the results of which revealed a prevalence of 5% at the level of provincial hospitals, 10% at the level of regional hospitals, and reached 11% at the level of national hospital structures [8].

Due to their nature, these infections have multiple causes related to the procedures and systems implemented to deliver care and human behaviors and education, yet. These infections could be preventable, the global challenge highlighted in these guidelines that the The organization of control constitutes the basic measure to be applied to reduce the incidence of these infections and that observance of this measure constitutes a guarantee of success for any control action. As a result, and following the important role played by the prevention and monitoring of IN in order to control and minimize infectious risk factors. For the improvement of the quality of care as well as the strengthening of patient safety, it would be interesting to look at factors related to cultural and socioeconomic factors, factors related to patient behaviors and habits, institutional factors and the condition of hospitalized patients.

2. Materials and Methods

The present study aims to explore and describe the factors related to hospitalized patients favoring the attack by nosocomial infections at the level of the care units of the El Idrissi hospital of Kenitra, department of Traumatology-Orthopedics.

2.1. Study environment

This research is conducted at the level of the regional hospital El Idrissi (Kenitra), it serves a population estimated at 1,901,301 inhabitants. Its litter capacity is 416 beds spread over 25 departments comprising 12 medical specialties, 11 surgical specialties and 04 specialties medicotechnics. The Traumatology-Orthopedics department represents the places of the present study providing accommodation for hospitalized persons, and which ensure, through its staff, the reporting of IN.

2.2. Study population

The target population of the study corresponds to all patients hospitalized in the Traumatology-Orthopedics department between September 2020 and September 2021 (N=550 patients). The study is carried out on 47 patients having contracted a nosocomial infection of which 60% are female).

2.3. Data collection methods

The data collected based on a questionnaire sent to patients. Our survey combines two forms of questions: 1/ Closed questions used to obtain factual information, to judge whether or not to agree with a proposal, to know the position of the respondent concerning a range of judgments 2/ open questions, the richer we would be a tool for the improvement of the existing leaving the response of the interviewee free in its form and in its length.

2.4. Ethical considerations

To ensure the success of our study, the participants were not obliged to answer the various questions so they were made aware of the interest of the adopted confidentiality and the anonymity of the questionnaire. In this context, free and information from all participants is requested, after having explained the content and objective of the study, its advantages, and the possibility of withdrawing from the study at any time.

2.5. Statistical tool

The data collected is entered into Excel and then transferred to SPSS support (trial version). Qualitative characters are expressed in frequencies.

3. Results and Discussion

3.1. Participant characteristics

Table (1) presents the socio-demographic characteristics. It appears that 13% of the participants are under 20 years old, 63% are between 21 and 40 years old while 24% are over 40 years old. The breakdown by gender shows that 45% of patients are male and 55% are female. The educational level of the patients surveyed shows that 54% had no schooling, 29% had a primary level, and 17% had reached the secondary educational level. 39% of patients are from rural areas and 61% are from urban areas.

3.2. State of knowledge of the participants for an NI

The evaluation of the state of knowledge of patients hospitalized in the care units indicates that 77% of the participants do not know what the infections contracted in the hospital are called and have never heard of it; on the other hand, only 23% revealed the opposite. 87% of them have already heard about it through family members and acquaintances, while no one has heard about it through the media or health professionals. While 94% of respondents feel poorly informed about the extent of IN while only 6% feel well informed. 30% of patients believe that IN can cause death while 70% have no idea. From the same point of view, 45% of participants think that only patients can be affected by NIs, while 15% think that visitors can also run this risk, while 16% think that patients and caregivers can be affected. and 24% believe that anyone with access to the hospital can be infected. On the other hand, 83% of the participants confirmed that they were not informed by the managers and the nursing staff if they are affected by an IN, while 17% think the opposite (table 2)

3.3. Comorbidity

In addition, the above-mentioned comorbidities (diabetes, high blood pressure hypertension, renal failure, etc.) may constitute a risk factor favoring the attack by one or more IN. For our study, 47% of patients suffer from a chronic pathology (diabetes, hypertension, leukemia, etc.). We will retain as a risk factor people who often combine several pathologies, immune-compromised patients primary or secondary to immunosuppressive or corticosteroid treatment, patients with damaged skin covering, diabetics, respiratory failure, polytraumatized, malnourished. The presence of a central peripheral catheter, the presence of a urinary catheter. The Table represents the nature of the bacteria isolated and their distribution according to the infectious site. Indeed, the most frequent infections are urinary tract infections (20%) followed by surgical site infections (12%) as well as pulmonary infections (13%) all confirmed COVID. Gram-negative bacilli were the most frequently isolated bacteria such as *Escherichia coli* (19%) and Gram-positive bacilli such as *Staphylococcus aureus* (12%) then *Pseudomonas aeruginosa* and *Klebsiella*, with each 9 %.

3.4. Behavioral factors favoring NI

Our survey revealed that: 80% of patients have used another patient's personal objects and materials (spoon; blanket; glass, etc.), while 82% of patients do not wash their hands with soap after each trip to the toilet and 91% of respondents eat meals cooked outside the hospital, while not all hospitalized patients have a personal thermometer. A good diet is one of the important services in the context of health care, the quality and quantity of which are decisive factors during the recovery of the patient. Additional risks of infection may be incurred by the patient by consuming meals cooked outside the establishment. This practice may be authorized under strict conditions defined according to each situation. It is essential to check with the healthcare team.

4. Discussion

Our study was carried out on patients who had contracted a nosocomial infection in a CHP Kenitra Traumatology Service. It only concerned nosocomial infections of bacterial and viral origin.

Table 1: Sociodemographic characteristics of patients

| Variable | Mode | NI | Frequency |
|---------------------|-----------------|-----|-----------|
| Gender | women | 55% | 55% |
| | mean | 45% | 45% |
| Age | >20 Years | 13% | 13% |
| | 21<>40 Years | 63% | 63% |
| | >40 Years | 24% | 24% |
| School level | Unschoolled | 54% | 54% |
| | Primary Level | 29% | 29% |
| | Secondary Level | 17% | 17% |
| residence | Rural | 39% | 39% |
| | Urban | 61% | 61% |

NI: Absolute frequency

Table 2: Frequency of responses to the different items

| Code | Question | Yes |
|-------|---|---------------|
| Item1 | Do you know what to call infections acquired in the hospital ? | 23% (n=12) |
| Item2 | <u>Have you heard through?</u> | 87% (n=44) |
| | • Family | |
| | • personal knowledge | 13% (n=6) |
| | • Media | 0%(n=0) |
| Item3 | <u>How are you infomed about the extent of the NI?</u> | 94% (n=47) |
| | Misinformed | |
| | Well informed | 6% (n=3) |
| Item4 | Do you think that NI cause death? | 30% (15) |
| Item5 | <u>Do you think that the NI touch?</u> | 45%(n=23) |
| | The ill | 15% (n=8) |
| | The visitors | 16% (n=8) |
| | Patients and nursing staff | 24% (n=11) |
| | Anyone with access to the hospital | |
| Item6 | Are you informed of your infection by the IN | |
| | yes | 17% |
| | No | 83% |

Table 3: Site of infection and identified germ

| Infection Type | Frequency in % |
|---|-----------------------|
| Surgical site infection | 12% |
| Sepsis | 0,5 % |
| Skin necrosis | 02% |
| Lung infection (covid confirmed) | 13% |
| Urinary infection | 20% |
| Pressure ulcer superinfection | 0,1% |
| <u>Germs frequently isolated</u> | |
| <i>Escherichia coli</i> | 19% |
| <i>Staphylococcus aureus</i> | 12% |
| <i>Pseudomonas aeruginosa</i> | 09% |
| <i>Klebsiella</i> | 09% |

The incidence of IN was 9.09% (for 360 days of hospitalization), this rate only concerns the infectious sites of the urinary and pulmonary systems and of the operating sites. This result is almost consistent with that found by [9]. According to the WHO (2022) [13], More than 24% of patients with hospital-acquired sepsis and 52.3% of patients cared for in an intensive care unit die each year. Deaths are multiplied by two or three if the patients have infections resistant to antimicrobials. According to studies carried out in France (2017 and 2019), the prevalence of patients infected in 2017 is 4.98%, while the survey in 2001 showed that 2,939 of the 21,010 patients who presented with a nosocomial infection had acquired it in another establishment [10].

Frequenting several establishments and care units increases the risk of attack by an IN given the vulnerability of the immune system of patients and the diversity of microorganisms that exist at the level of its care structures [11]. Identified infections are pulmonary or urinary with an incidence of 47%. In France, chronic diseases are long-lasting conditions and progressive diseases [12]. Among these pathologies, we can cite diabetes, arterial hypertension that affects 66% of over 50s, obesity that affects 34% of 18-74 year olds, or even cardiovascular diseases [13]. Bacteria are the main germs responsible for nosocomial infections with mainly *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* [14-15]. Bacteria transmitted from patient to patient in several ways:

- By direct contact between patients (hands, droplets of saliva or other biological fluids);
- Through the air (droplets or dust contaminated by a patient's bacteria);

by personnel contaminated during patient care (hands, clothing, nose, throat), who become temporary or permanent carriers and then transmit the bacteria to other patients through contact bacteria to other patients through direct contact during care; by objects contaminated by the patient (including medical equipment), the hands of staff, visitors or

other environmental sources (water, other liquids, food). Note that in our study, which took place during the COVID period, all lung infections were due to the COVID 19 virus confirmed by PCR.

5. Conclusions

The fight against nosocomial infections must be a priority for healthcare establishments, with a calm and serene awareness by medical and paramedical staff; issues and harms can be generated both on the health of patients as well as on their socio-economic and physical status. The importance of permanent training and information work for practitioners and users in order to obtain a complementary approach to preventive actions.

Statements and declarations

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Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by [Meriem Sadoune], [Yassine Chaib], [Rachid El Zanati], [El Mahjoub Aouane], [Zouhair Sadoune] and [Abdelaziz Chaouch]. The first draft of the manuscript was written by [full name] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval

The study did not require ethics approval.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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