

Antibiotic use in the City: A Pharmacy Survey about 150 Cases

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| Received: 09.10.2023 | Accepted: 16.11.2023 | Published: 30.11.2023

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Abstract**Original Research Article**

In 15 years, global antibiotic use has increased by 65%. It has been exponentially spiked in low and middle-income countries. Bacterial resistance to antibiotics is now one of the most serious threats to global health. In 2016, the World Health Organization (WHO) published its action plan against antibiotic resistance and encouraged each state to develop its own national action plan. The survey conducted at the counter of a pharmacy in Rabat was based on the interview of patients using a questionnaire. It aimed to describe the practices of patients in terms of antibiotic consumption in the city. Our descriptive study involved 150 cases. It included any patient wishing to obtain one or more antibiotics either by medical prescription, officinal medication, or self-medication. As expected, the beta-lactam family represented the most consumed family by 28%. In terms of the assessment of the modality of antibiotic consumption, 57.33% of the antibiotics dispensed were dispensed by medical prescription, 37.33% by self-medication and only 5.33% of the antibiotics consumed by the study population were dispensed by officinal medication. To improve the use of antibiotics, it is important to stress the importance of compliance with the recommendations relating to the prescription and delivering of antibiotics, and in this sense the contribution of the pharmacist is crucial.

Keywords: Bacterial infection, antibiotic, pharmacy, survey, patient.

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INTRODUCTION

Antibiotics constitute one of the main therapeutic classes used in community medicine and hospitals. They represent a large number of prescriptions and prescribers and a larger number of molecules and associations.

It is, moreover, the only class whose pharmacological effectiveness is inconsistent for an identical target (the bacteria): variable depending on the time, the infected site and the geographical location [1].

Global consumption of antibiotics represented 42.3 billion doses per day in 2015 compared to 21.1 billion in 2000. Boosted by exploding consumption in low- and middle-income countries, global consumption of antibiotics increased by 65 % in 15 years. This is the result of a study carried out in 76 countries, published in March 2018 in the American journal PNAS, and which

showed that “antibiotics remain a growing threat to global health”.

The largest consumers of antibiotics in the world are high-income countries: the United States, France and Italy. In 2015, 4 low-income countries were among the largest consumers: Turkey, Tunisia, Algeria and Romania [2].

Bacterial resistance to antibiotics today constitutes one of the most serious threats to global health and which all healthcare system stakeholders face on a daily basis [3]. It can affect anyone, at any age and in any country [4].

Antibiotic resistance is increasing exponentially and therapeutic options are decreasing and fewer and fewer new antibiotics are coming onto the market. It therefore becomes important to protect the therapeutic effectiveness of currently used antibiotics [5].

In 2016, the World Health Organization (WHO) published its action plan to combat antimicrobial resistance which includes antibiotic resistance. At the same time, it encourages each Member State to develop its own national action plan, in accordance with the objectives of its global action plan which defines various strategic objectives [3].

In Morocco, some steps have been taken towards the fight against infection and resistance, also towards the design and deployment of surveillance of the use of antibiotics, but no surveillance of the use and community consumption of antibiotics, nor its evaluation is currently carried out. It is currently impossible to describe the community use of antibiotics in our country, to identify priority problems and to assess the impact of possible interventions on antibiotic use and, ultimately, antibiotic resistance [5].

In this context, the objective of this study was to describe the practices of a sample of patients in terms of antibiotic consumption.

MATERIAL AND METHOD

This is a cross-sectional, descriptive study carried out at the counter of a pharmacy in the city of Rabat in Morocco.

It was spread over a period of 3 months, from January 12, 2023 to April 8, 2023 using an anonymous questionnaire (Appendix 1) among patients presenting to the pharmacy to purchase (with or without a prescription) an antibiotic. after obtaining their free and informed consent.

The collected data was entered and statistically analyzed using Microsoft Excel 2013 spreadsheet. The results were reported in tables and diagrams.

RESULTS

As part of our survey, the sample was made up of 150 individuals. Although the participants were chosen randomly, the male/female proportion is almost

identical, with a very slight predominance of men ($n = 79$; 52.67%). Data processing showed that the consumption of antibiotics (ATB) concerned all age groups with a more dominant percentage for the group between 32-41 years old (22.37%). The average age of patients participating in the study is 39 years (+/- 19.89). The youngest is 2 years old and the oldest is 81 years old. Participants with penicillin allergy represented 11.33% of the study population.

By examining the dispensing methods, 5.33% of the antibiotics consumed by the population studied are dispensed following medicinal medication while 37.33% were delivered by self-medication (either by verbal request, by presenting the packaging of the medication, or by message written or vocal) and finally, 57.33% of ATBs were dispensed on medical prescription (by directly presenting the prescription on paper, or on a smartphone).

The distribution of antibiotic consumption according to the infectious site is described in Figure 1. Among all skin infections, the main reasons for antibiotic consumption ranged from a simple wound, whitlow, acne, to skin cancer. As for otolaryngology and pulmonary infections : angina, sinusitis, ear infections and COVID-19 were the most common.

The consumed antibiotics distributions according to the therapeutic family and the international nonproprietary name (INN) are described respectively in Figures 2 and 3. The antibiotics dispensed total number was 166. These are 10 therapeutic families of ATB and 3 ATB family associations. Among the families of antibiotics consumed, beta-lactams represent the most sold family (28%). The consumed ATB were classified into 31 INNs including associations of molecules. Among beta-lactams, amoxicillin and protected amoxicillin are the most frequently used antibiotics. In 11% of cases, amoxicillin is combined with clavulanic acid. While the most dominant INN is fusidic acid with a rate of 16%. The oral route was the route most used by the population studied (64%). Also, 42% of antibiotics consumed were tablets.

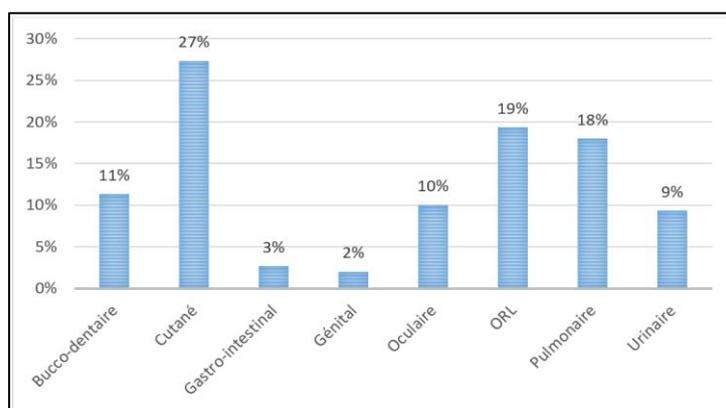


Figure 1: Population distribution according to infectious site

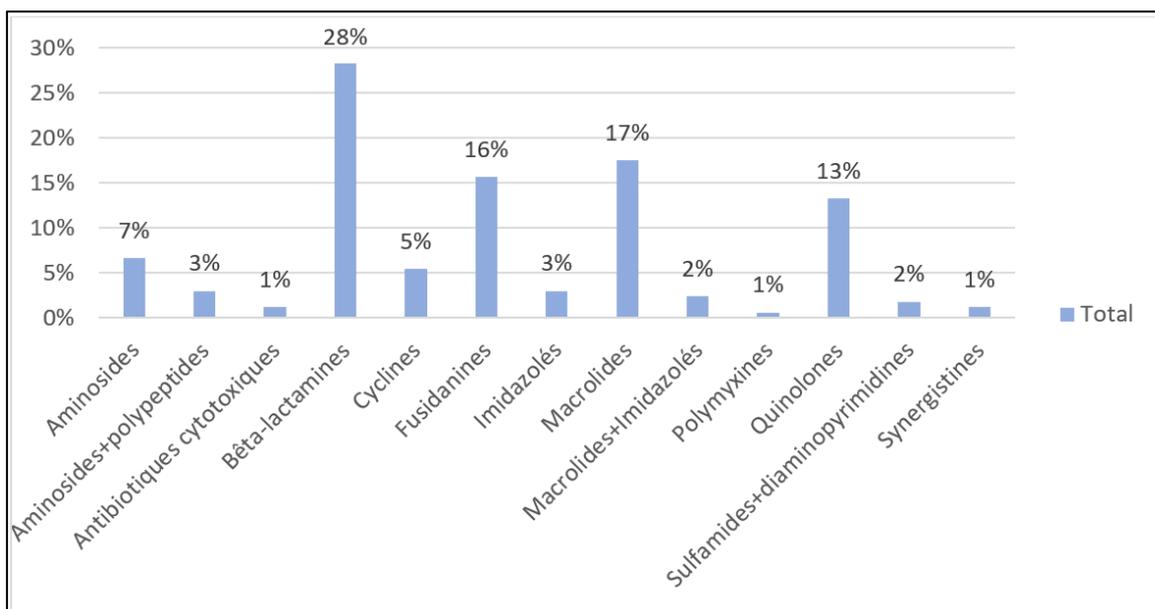


Figure 2 : Distribution of antibiotics consumed according to therapeutic family

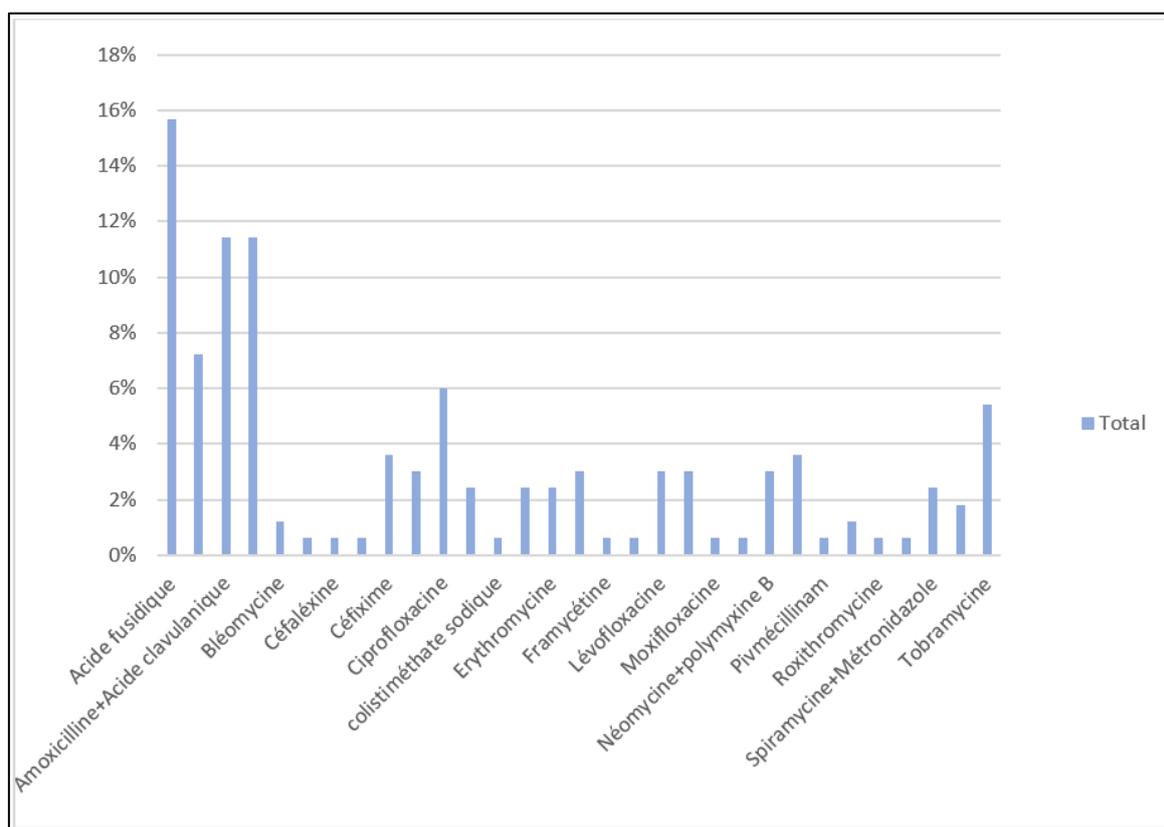


Figure 3 : Distribution according to international nonproprietary name

DISCUSSION

This study was carried out during the winter season when respiratory infections are at their peak. The results cannot therefore be inferred for the whole year due to seasonal fluctuations in infectious diseases. Furthermore, this prospective study could be influenced by the wave of COVID-19 which caused drugs including Azithromycin and other antibiotics to be used indiscriminately. In Morocco, few studies have been

identified on the subject of ATB consumption in the city. A similar result was reported in a study carried out in 2018 in Salé [6].

We can discuss the results of a French study carried out in 2016 on the knowledge and behavior of the general public regarding antibiotics in France. It reveals that the male/female proportion was almost identical with women representing 50.5% of the population

studied and men with a percentage of 49.5%. These data are inversely parallel to our study with 47.33% female compared to 52.67% male. It also reveals that the highest percentage of the sample (44.5%) is that which represents people aged 26 to 45, and this goes in the same direction as our study which demonstrates that 42.76% of the sample studied consisted of patients aged 22 to 41 years [7].

At the national level, the results of the study carried out in 2008 in Kenitra on the outpatient prescription of ATB carried out on 505 cases demonstrate that the means of obtaining ATB with the highest % of 66.34% concerned medical prescription of ATB followed by 14.06% for self-medication. In the same sense, it was reported in our study that the frequency of the modality of ATB consumption under medical prescription is the most frequent with a percentage of 57.33% followed by 37.33% of self-medication [8]. Self-medication percentages similar to those identified in the Kenitra study were reported in international studies (14%; 18% respectively) [7-9]. This can be explained by the favorable impact of frequent awareness campaigns [10].

The high frequency of otolaryngology and pulmonary infection sites (37%) in our study is also reported in the thesis on the prescription of ATB in the city of Kenitra which showed that 39.6% of consumption concerned respiratory sites. As for the high percentage of cutaneous infectious sites (27%) reported in our study, this is not parallel to the percentage revealed by the other study (10.69%) [8].

The analysis of ATB consumed in our study shows the importance of beta-lactams (28%). Remarkably, we found that fusidic acid was the molecule most consumed by our population studied with a percentage of 16%. Amoxicillin represents 7% and the amoxicillin-clavulanic acid combination represents 11%. Quinolones represent 13% of ATB consumption. And the use of Colistin remains very low and represents 1%. This observation has also been made in several countries with some variations. Thus in France and following the report produced by the ANSM (French national agency for the safety of medicines and health products), in November 2015 on the consumption and resistance to antibiotics, it turned out that in human health in town, beta-lactams are among the most consumed molecules with amoxicillin which represents 37.6% of antibiotic consumption, and the amoxicillin-clavulanic acid combination which represents 24.1%. The share of fluoroquinolones which represents 5.3% of consumption in the city : almost half of what was revealed by our survey. The share of colistin is very low and represents 0.1% [11].

According to a cross-sectional survey carried out at pharmacy counters in five different regions of Morocco, much more than half of prescribed antibiotics

(93.6%) are used orally. This is consistent with our work which shows a percentage of 67% concerning the oral route of administration. The local route takes 2nd place with a frequency of 15% as opposed to the study carried out in Kenitra which indicates a percentage of 2.16% of ATB used dermally [8, 12, 13]. In addition, the results of our work show a consumption of 43% of antibiotic tablets. This can be compared with the study on the consumption of antibiotics in outpatient settings carried out in Kenitra which reveals that less than half (46.87%) of the ATB consumed were tablets [8].

Strengths and Limitations of the Study

La principale force de cette étude est qu'elle décrit les comportements d'une partie de la population marocaine, si petite qu'elle soit, envers la consommation des antibiotiques en se basant sur des données valides collectées dans une officine de ville.

The main strength of this study is that it describes the behavior of a part of the Moroccan population, however small, towards the consumption of antibiotics based on valid data collected in a city pharmacy.

The main limitations of this study are :

- Limiting the location of the study to a single pharmacy
- The particular location of the pharmacy which makes it a predominantly transient pharmacy
- The duration of the survey which means that the sample size is relatively small (150 patients)

CONCLUSION

According to the WHO : "In the future we risk no longer having antibiotics to treat common bacterial infections." She warns that dying from a seemingly "trivial" infection, because it is usually easily treated, is today possible when a bacteria that has become multi-resistant to antibiotics is involved [14].

Today, if we want to escape the nightmare of a return to the pre-antibiotic era, we must above all become aware (whoever we are : health professionals, media, politicians or public) of the real risk of seeing the one of the wonders of medical science of the 20th century to become an object of memory belonging to the past [15].

The community pharmacist is essential to ensure the proper use of medications in outpatient settings and especially that of ATBs.

He must realize that he has a vital rôle in providing advice, correcting incorrect medical prescriptions and in the fight against the misuse of medications.

REFERENCES

- [OMS | Le monde risque de sombrer dans une ère post-antibiotiques: le moment est venu de prendre des mesures énergiques [Internet]. WHO. [cited 2023 Aug 31]. Available from: <http://www.who.int/mediacentre/commentaries/antibiotic-resistance/fr/>
- Planetoscope - Statistiques: La consommation mondiale d'antibiotiques [Internet]. [Cited 2023 Aug 31]. Available from: <https://www.planetoscope.com/Sante-autre/2025-la-consommation-mondiale-d-antibiotiques.html>
- Lorcy A, Ouakki M, Dubé E. Institut national de santé publique du Québec, Direction des risques biologiques et de la santé au travail. Étude sur les connaissances, attitudes et perceptions de la population québécoise sur l'utilisation des antibiotiques: 2019: rapport d'étude [Internet]. Juillet 2020 [cited 2023 Aug 31]. Available from: <http://collections.banq.qc.ca/ark:/52327/4163035>
- Résistance aux antibiotiques [Internet]. [cited 2023 Aug 31]. Available from: <https://www.who.int/fr/news-room/factsheets/detail/antibiotic-resistance>
- 2511_utilisations_communautaire_antibiotiques.pdf [Internet]. [cited 2023 Aug 31]. Available from: https://www.inspq.qc.ca/sites/default/files/publications/2511_utilisations_communautaire_antibiotiques.pdf
- Jazouli FZ. La prescription des antibiotiques dans le milieu ambulatoire, étude réalisée à l'arrondissement de bab lamrissa à salé à propos de 311 cas. Thèse Pharmacie N° P0692019. Faculté de Médecine et de Pharmacie de Rabat. [cited 2023 Aug 31]. Available from: http://bib-fmp.um5.ac.ma/opac_fmp/index.php?lvl=author_see&id=28823.
- Mangin L. Antibiotiques et résistances : enquête sur les connaissances et les comportements du grand public (p 125). [Internet]. [cited 2023 Aug 31]. Available from: <https://hal.univ-lorraine.fr/hal-01734015/document>.
- El Alj Y. La prescription des antibiotiques en ambulatoire, Etude réalisée à la circonscription d'ouled oujih à kenitra à propos de 505 cas. Thèse Pharmacie N° P0282008. Faculté de Médecine et de Pharmacie de Rabat. [cited 2023 Aug 31]. Available from: http://bib-fmp.um5.ac.ma/opac_fmp/index.php?lvl=author_see&id=10104.
- Collomb-Gery A. Evolution des connaissances et habitudes des patients liées à l'antibiothérapie Arguments pour améliorer la prescription en médecine générale. [Faculté de Médecin] : Grenoble ; 2012.
- Eurobaromètre spécial 407. La résistance aux antimicrobiens. [Internet]. [cited 2023 Aug 31]. Available from: http://ec.europa.eu/public_opinion/archives/ebs/ebs_407_fr.pdf
- Plaquette_consommation_antibiotiques_resistance_antibiotiques_France2016.pdf [Internet]. [cited 2023 Aug 31]. Available from: https://www.anses.fr/fr/system/files/Plaquette_consommation_antibiotiques_resistance_antibiotiques_France2016.pdf
- NAJI W. Prescription des antibiotiques au maroc : enquete nationale en officines. Thèse Pharmacie N° P0692008. Faculté de Médecine et de Pharmacie de Rabat. [cited 2023 Aug 31]. Available from: http://biblio.medramo.ac.ma/opac_fmp/index.php?lvl=author_see&id=11084.
- Serragui S, Derraji S, Mahassine F, Cherrah Y. Bacterial resistance : state of play in Morocco. Maroc Médical, tome 35 n°3 (199-205), Septembre 2013.
- Antibiotiques : quand les bactéries font de la résistance [Internet]. Institut Pasteur. 2018 [cited 2023 Aug 31]. Available from: <https://www.pasteur.fr/fr/journal-recherche/dossiers/antibiotiques-quand-bacteries-font-resistance>.
- Trémolières F. Quand le miracle antibiotique vire au cauchemar. Med Sci (Paris). 1 nov 2010; 26(11):925-9.

Appendix 1

This questionnaire is anonymous, participants are free to join or not join the study.

1- Patient information :

Sexe : M F Age :

Patient Nature : From the neighborhood/regular
Passing through

2- Prescription information :

Medical prescription : yes no

Known allergy to ATB : yes no I don't know

3- Infection information

The infection type :

- Pulmonary
- ENT
- Urological
- Genital
- Abdominal
- Other (s).....

Diagnosis, given by the doctor to the patient :

- No response
- Sinusitis
- Bronchitis
- Nasopharyngitis
- Angina/sore throat
- Urinary infection (cystitis)
- Gynecological infection
- Otitis
- Tooth abscess
- Tooth extraction (preventative)

- Acne
- Flu
- Pneumonitis
- Pyelonephritis
- Others.....

4- Antibiotherapy data

Antibiotic dispensing:

- On prescription/medical prescription
- By pharmaceutical opinion
- By self-medication

If self-medication,

1-Nature de demande :

- Verbal request
- Packaging presentation
- Presentation on a smartphone

2- Antibiotic treatment implemented:

- Specialty name (s):.....
- INN/ Molécule(s) :
- Administration route:
- Pharmaceutical form:.....
- Unit dosage:
- Daily intake number:...
- Treatment Duration (days) :

We thank you for your valuable participation.