

# Impact of Covid 19 on the activity of Pharmaco-toxicology laboratory of the CHU Hasan II of Fez Morocco

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**Abstract.** *Introduction.* The pandemic associated to the SARS-Cov-2 coronavirus has presented the world with an unprecedented situation with impacts on different areas. The activities of CHU Hassan II in Fez were probably affected. In this work, we will assess the activity of the pharmacotoxicology laboratory during the Covid-19 period (2020) by comparing the results with those of the previous year (2019). *Methods.* It is a retrospective study that aims to compare the covid 19 period (between March 2020 and February 2021) with the previous year (between March 2019 and February 2020), and which concerns all intoxications and dosage of medicines received at the laboratory. *Results.* The number of requests for analyzes received during covid 19 period showed a decrease from 440 requests to 312 compared of the same period of the previous year. In addition, the requests for therapeutic drug monitoring has decreased. Indeed, 211 requests has been received in 2020 while in 2019, 329 requests were received. The dosage requests for depakinemia and carbamazepinemia fell respectively (190 and 52 in 2019 while in 2020, 127 and 12). On the other hand, the dosage of amikacinemia, research requests for pesticides and medicines remained stable, which is not the case for addictive drugs analysis, that shown a decrease; 209 requests in 2019 and 111 in 2020. Toxicological screening by HPLC-DAD was carried out in 2020 in 39 cases compared to 55 in 2019. *Conclusion.* The Covid-19 pandemic had repercussions on the physical and psychological health of the population, resulting in a change of the profile of requests for pharmaco toxicological analyzes during this period.

**Keywords:** toxicological analysis, therapeutic monitoring, pesticide, drugs, covid.

## I. INTRODUCTION

The pandemic coronavirus SARS-Cov-2 has presented the world with an unprecedented situation with impacts on different areas. The activities of CHU Hasan II in Fez were probably affected. In this work, we will assess the activity of the pharmacotoxicology laboratory during the Covid-19 period (2020) by comparing the results with those of the previous year (2019). Indeed, since its establishment in September 2009, the Pharmacotoxicology laboratory of CHU Hassan II in Fez has been playing an important role as a partner of the care units of different hospital sectors of the CHU, as well as other hospitals and private clinics in the region. This laboratory responds to all requests for toxicological and pharmacological analyzes in the region of Fes-Meknes [1].

## II. MATERIAL AND METHODS

It is a retrospective study, comparing the covid 19 period (between March 2020 and February 2021) with the previous year (between March 2019 and February 2020). This study concerns all poisoning cases and dosage of drugs received at the laboratory. The analyzes were carried out by rapid methods, such as colorimetric, immunochromatographic methods with confirmation, assay by immunoenzymatic techniques and liquid chromatography. The matrices used are blood, urine and gastric lavage. The choice of methods depends mainly on the clinicobiological orientation [1].

## III. RESULTS

The pharmacotoxicology laboratory received 312 poisoning cases during the Covid-19 study period (2020) while in 2019, 440 poisoning cases recorded, which represents a decrease of 29.09% compared to the last year. In 2019; requests came from CHU's departement (45.18%), external services (13) % (Up to 9% came from Taza and Meknes), addictology (24%), pediatrics (13.18%), reanimation department (18%) and psychiatry (16%) centers were the main requesting services. In 2020 the profile of analyzes received at the laboratory, changed with a clear increase in analyzes received from the pediatric service (27%). On the other hand, requests for external analyzes and from addictology service has decreased with an amount of (10.25%) and (11.21%) respectively. 41% of the external services concerned the city of Taza and Meknes.

**Table I: Repartition of services requesting toxicological analysis**

Services	2020	%	2019	%
External	32	<b>10.2</b>	57	<b>13</b>
Addictology	35	<b>11.2</b>	105	<b>24</b>
Reanimation	70	<b>22.4</b>	78	<b>18</b>
Pediatrics	84	<b>27</b>	58	<b>13.1</b>
Psychiatry	57	<b>18.2</b>	69	<b>16</b>
Cardiology	1	0.3	5	1.1
Internal	3	1	1	0.2

medicine				
Nephrology	5	2	6	1.3
Neurology	4	1.2	7	2
Adult	17	5.4	26	6
emergency				
Dermatology	3	1	17	4
Gynecology	0	0	1	0.2

The mean age of the intoxicated patients was  $25.18 \pm 17.87$  years, with extremes ranging from 1 month to 84 years in 2020.

Medicines	2020	2019	In 2019 the mean age was $27.21 \pm 17.67$ years, with extremes ranging from 1 month to 96 years.
Depakinemia	127	190	
Carbamazepinaemia	12	52	
Amikacinemia	59	52	

The sex ratio (M / F) was 1.37 in 2020 and 1.63 in 2019. The distribution of age groups showed a predominance of adults followed by children in 2019, while in 2020, adults and children were equal. Suicide attempts in 2019 was 6%. In 2020, up to 11.21% of cases were related to the suicidal attempts context.

**Table II: Distribution of poisoning cases by age group and gender**

Year	Age range		Gender	
	Adult	children	male	Female
Study period 2020	60 %	40%	58%	42.3%
Control period 2019	69%	28%	62%	38%

The toxic agents most incriminated in reported poisonings were primarily drugs, followed by medicines and pesticides.

**Table III: Distribution of the families of products incriminated in a Covid-19 / Containment context**

Toxic agents incriminated	2020	2019
Medicines	78 (16 %)	44(7 %)
Pesticides	24(5 %)	20 (3.14%)
Drugs	111 (22 %)	209(33 %)
Plants	7(1.4 %)	8 (1.2%)

The toxicological screening by HPLC-DAD was carried out in

2020 in 39 cases versus 55 in 2019. The pharmacotoxicology laboratory of Fez received during the covid-19 period: between March 2019 - February 2020; 329 requests for pharmacological dosage in the context of therapeutic monitoring, versus 211 requests in the same corresponding period in 2020, which represents a decrease of 35%. The mean age in 2020 was 26.76 while in 2019 was 27.11. Depakinemia and carbamazepinemia dosage decreased respectively (190 and 52 in 2019 versus 127 and 12 in 2020). On the other hand, amikacinemia dosage remained stable (52 in 2019 against 59 in 2020).

**Table IV: Distribution of medicines included in therapeutic pharmacological monitoring**

Gentamicin	4	20
Digoxin	0	8
Paracetamol	0	2
Benzodiazepine	5	1
Salicylates	1	0

**IV. DISCUSSION**

The Covid-19 pandemic has disrupted the functioning of hospitals around the world, in particular the activities of clinical departments and biology laboratories [2]. In our study, the number of poisoning cases received at the CHU Hassan II laboratory in Fez, during the period of covid-19, has decreased by 29%. This may be probably due to the fact that people, tend to travel less to hospitals, to consult in case of poisoning, for fear of being contaminated by the coronavirus. This agrees well with international data which shows that recourse to outpatient care in France has rapidly collapsed, either because of the reduced accessibility to care centers, or the attitude of patients fearing of being infected. In health facilities, most scheduled care activities have been suspended and delayed. Overall, emergency department, including reanimation emergencies, has decreased (VAC, etc.) [3]. Further more in USA; the decrease in the number of hospitalizations concerned all specialties [4].

The number of requests for therapeutic pharmacological monitoring in our laboratory, experienced a significant decrease in all parameters except for amikacinemia, which remained stable during the study period. The decrease in requests for therapeutic pharmacological monitoring dosages for depakine, and carbamazépine, can be explained by the restrained reception of external analyzes. The stability of test requests for amikacine, may be justified by the fact that this drug is part of hospital treatments used in various departments, such as nephrology, reanimation and pediatrics. Overall, the activities of the hospital CHU Hassan II were stopped, regarding all services. The consultations were also reduced. Indeed, hospitalizations concerned only patients

infected by covid-19 disease. Furthermore, the confinement situation blocked travelling and access to health structures.

The stability of Pesticide and medicines demands, could be explained by domestic poisoning, due to confinement and the stressful situation.

The drop in drug requests, could be explained by the closure of the Addiction Service during the study period, as well as the drop in drug use, and the decrease in consultations given the confinement.

Containment led to a decrease in outpatient activity. The decrease in requests for analyzes received from external services, in particular the addictology and psychiatry Service and private clinics can be explained by the major restrictions of the movement of the population. [5].

In addition, the start of the covid-19 pandemic and the confinement saw a significant decrease in the analyzes received from the pediatric services, which was related to the period when the services, were closed for disinfection purposes, before resuming their activities.

Children and adolescents, have been strongly affected by the abrupt withdrawal from school, social life and outdoor activities. Some of them have also experienced an increase in domestic violence. The stress they are subjected to has a direct impact on their mental health due to increased anxiety, changes in their diet and school dynamics, fear or even failure to measure the problem.. [6]. This may explain the equality of the age group observed in 2020.

Suicidal attempts were a real problem during the covid-19 pandemic. In our work, we observed that 6% of patients in 2019 presented a risk of suicide, while in 2020 the risk has increased; around 11.2% of cases were hospitalized for suicidal purposes. Many factors are prompt to increase the emergence of suicidal intensions and the onset of suicide during this crisis. Distancing and confinement could foster a sense of disconnection and the perception of social pain mainly in vulnerable individuals. Some populations are already "at a high risk of suicide" and could be further weakened by the current pandemic; elderly people, medical personnel and individuals exposed to severe economic precariousness. [7]

The analysis of the products incriminated in poisoning in 2020,

showed that drugs were in the lead (22%), followed by medicines (16%) and pesticides (5%), of the same year 2019 recognized the same classification with drugs (33%), medicines (7%) and pesticides (3.14%).

The analysis of products incriminated in poisoning in 2020 at the poison control center in Morocco showed that medicines were in the lead (55.16%), followed by disinfectants (14.40%) and pesticides and agricultural products, while " in 2019, medicines were in the lead (45%) followed by pesticides and agricultural products (10.36%) and disinfectants (8.04%).

In accordance with moroccan data, the poison control centers of Canada, declared that between January to June 2019 and January to June 2020, a high number of calls for certain cleaning products concomitant has been registered, with a peak in March, related to the appearance of covid-19 outbreak [8].

As a result, a change in the profile of disinfectants and household cleaning products, during the covid-19 period, for which no toxicological analysis is available.

## V. CONCLUSION

The COVID-19 pandemic has had a huge impact on population's lifestyles [9] It's repercussions affected the physical and psychological health of the population, which influenced the profile of requests for pharmaco-toxicological analyzes during this period. The requests for analysis in the toxicopharmacology laboratory in Fez were reduced.

On the other hand, we have received other requests for which we have not been able to deal with, due to a lack of suitable techniques, namely antimalarials. People during this crisis, took antimalarials which required therapeutic monitoring and regular dosage adjustment, especially in case of adverse effects.

Unfortunately, due to the scientific and technical insufficient, as well as the lack of equipment, we were unable to support covid in this component and we were unable to participate in the pharmacological therapeutic monitoring and the dosage adjustment.

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