

# Preventive measures against 2019 Coronavirus infection in healthcare personnel: experience of a healthcare structure dedicated to covid 19 in Morocco

Nabil Jbili, Ayoub Maaroufi, Rabie Bahraoui, Mouad Guenbdar and Mohamed Nmar

Pole of anesthesia resuscitation and emergencies, Military Hospital Moulay Ismail, Meknès, Morocco

**\*Corresponding author**

Nabil Jbili, Pole of anesthesia resuscitation and emergencies, Military Hospital Moulay Ismail, Meknès, Morocco. Email: nabil-cfr@hotmail.com.

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**Abstract**

In March 2, 2020, the novel coronavirus disease 19 pandemic, declared in China at the end of 2019, made 88,948 confirmed cases worldwide, including 80,174 cases and 2,915 deaths in China, on this date Morocco recorded the first confirmed case. Given the magnitude of this pandemic, the World Health Organization has highlighted growing problems in the supply of personal protective equipment (PPE). Front-line health personnel are dangerously under-equipped to treat patients suffering from COVID-19.

Morocco has learned from the evolution of the pandemic across various countries and has developed a National vigilance and Response Plan for covid 2019 aimed at upgrading hospital structures and supplying equipment for prevention and diagnosis. In Morocco, deaths from covid 19 are few, At the level of the military field hospital where the study is being carried out, no case of infection has occurred. This observation shows the need for vigilance in the face of health epidemics and emergencies. The role of national institutions is devoted to the implementation of monitoring and response strategies that allow the management of human and logistical resources. Regarding care staff, continuous training and the provision of protection equipment and support is a fundamental point for proper functioning and better performance.

**Keywords:** Healthcare personnel, prevention, Covid 19, healthcare structure

**Introduction**

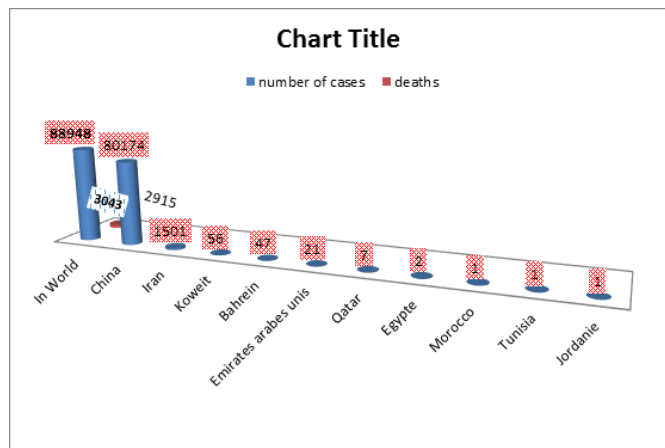
In March 2, 2020, The novel coronavirus disease 19 (covid 19) pandemic, declared in China at the end of 2019, made 88,948 confirmed cases worldwide, including 80,174 cases and 2,915 deaths in China, on this date Morocco recorded the first confirmed case [1,2] (Figure 1).

of March 2, 2020 [1,2]

Given the magnitude of this pandemic, the World Health Organization (WHO) has highlighted growing problems in the supply of personal protective equipment (PPE).

However, due to the shortage of PPE, front-line health personnel (HCP) are dangerously under-equipped to treat patients suffering from COVID-19, due to their limited access to gloves, medical masks, respirators, protective glasses, screens facials, blouses and other aprons. [3].

As of February 20, 2020, 2,055 confirmed cases have been reported among HCPs from 476 hospitals in China [4]. Such a high number of infections among HCPs is very alarming, testifying to the scale of the epidemic, the lack of understanding of the new virus and the need for the improvement of the medical system and the protection of medical teams. Little knowledge about the new virus led to an outbreak of HCP infection in the first weeks after the epidemic [5]. Morocco has learned from the evolution of the pandemic across various countries and has developed a National vigilance and Response Plan for covid 2019 aimed at upgrading hospital structures and supplying equipment for prevention and diagnosis



**Figure 1:** statistics of confirmed cases of covid 19 worldwide as

Through this study, we report on the experience of the military field hospital dedicated to patients infected by covid 19, concerning preventive measures and their impact on healthcare staff.

### Materials and methods

Our study is based on the evaluation of the effectiveness of prevention measures for the healthcare personnel of the military field hospital dedicated to the care of patients with covid 19, over a period of 2 months from March 20 2020 to May 20, 2020.

This care structure has a bed capacity of 200 beds expandable to 300, including 20 intensive care beds. The study workforce includes the healthcare team in direct contact with patients, consisting of 16 doctors, 38 nurses, 30 nursing assistants, 10 hygiene workers, and the 08 technicians authorized to access hospital services.

### These preventive measures are based on simple principles: Organization and coordination;

At the national level, Morocco has set up a National Watch and Response Plan for Covid 2019 which aims to improve healthcare structures and manage equipment and resources. At regional and local level, monitoring committees have been set up for the implementation and evaluation of the measures taken.

### Planning:

The choice of the structure and setting up of circuits, as well as the selection of the medical team made up of personnel of young age and without comorbidities and endowed with notable professional experience

### Information:

Consists of awareness and education sessions on covid-19 disease, its modes of transmission, its symptoms, and how to prevent it. The tools used were often explicit videos and simplified computer presentations [6,7]



Figure 2: images illustrating the protective equipment and training

sessions in dressing / dressing

The training consisted in sessions of recognition of individual protection equipment and their use with dressing and undressing workshops [8,9] (Figure 2).

Training sessions in airway management [10,11], as well as the recognition of the different circuits of the hospital, and simulation sessions of the different hospital and administrative activities were organized

The evaluation consisted of the supervision of the simulation sessions by a team of seniors who detect errors and correct unsuitable behavior.

### The results

The study workforce includes the care team in direct contact with patients, it is made up of 16 doctors, 38 nurses, 30 nursing assistants, 10 hygiene agents and 08 technicians authorized to access hospital services.

Table 1: Demographic characteristics, exposure risk categories, and job titles of the HCP of the hospital

Characteristic	No. (%)
<b>Age in years, median (range)</b>	39 (26- 52)
<b>Sex</b>	
Female	28 (27,45%)
Male	74 (72.55%)
<b>Risk category</b>	
High	19 (18,62%)
Medium	76 (74,50%)
Low	7 (6,86%)
<b>Job title</b>	
Anesthesiologist- resuscitator	4
Emergency doctor	2
Internal medicine	1
Cardiologist	1
Radiologist	2
Pulmonologist	2
Biologist doctor	2
Surgeon	1
Pharmacist	1
Radiology technician	3
Nurse resuscitator	8
Certified nurse	23
Laboratory assistant	2
Pharmacy nurse	2
Nurse assistant	30
Hygiene services worker	10
Hospital technician	8

**Table 2: prevention measures used for the benefit of the personnel of the military field hospital**

Prevention measures	Numbers
Information sessions	05
Dressing / undressing workshops	08
Simulation sessions	10

**Table 3: Care activities carried out at the hospital and their classification according to the degree of risk**

High risk activities	Intubation Airway suctioning Noninvasive ventilation Manual ventilation Nebulizer treatments Collecting respiratory specimen nasopharyngeal swab respiratory physiotherapy Bathing or cleaning patient Manipulation of ventilator or Tubing Lifting or positioning patient Changing linens
Moderate risk activities	Taking medical history Performing physical exam Taking vital signs Peripheral line insertion Central line insertion Drawing blood radiology Cleaning patient room
Low risk activities	Providing medication routing of biological samples Present in room

Among the healthcare team, 03 presented symptoms of infection and two were exposed to the risk of infection, one during a non-invasive ventilation session and the other during a nasopharyngeal swab.

All 5 healthcare personnel benefited from a PCR test at the onset

of symptoms or exposure, a second control PCR the next day and a 3rd PCR after the 14th day of isolation.

The PCR results of all the personnel examined returned negative, including the rapid serological test which revealed the absence of anti SARS-CoV 2 IgM and IgG antibodies.

**Table 4 : job, risk level, symptoms, patients contact duration and results of RT-PCR tests for healthcare workers whose were symptomatic or exposed to the infection risk with covid 19**

Job	Risk level	Symptoms	Number of contact with patients	Total duration of contact	Results of 1RT-PCR	Results of 1RT-PCR	Results of 1RT-PCR
Anesthesiologist-resuscitator	high	Fever and cough	15	60 hours	negative	negative	negative
Emergency doctor	high	Exposition (écouvillonnage)	32	10 hours	negative	negative	negative
Nurse resuscitator	high	Exposition (NIV)	12	71 hours	negative	negative	negative
Certificated nurse	moderate	Exposition (NIV)	76	19 hours	negative	negative	negative
Hygiene services worker	moderate	pharyngitis	42	21 hous	negative	negative	negative

NIV : Non invasive ventilation

### Discussion

The outbreak of (COVID-19) in Wuhan, China has been declared as a public health emergency (PHE) by the (WHO) [12]. HCP are at high risk for acquiring infections during novel disease outbreaks, especially before transmission dynamics are fully characterized [2]. During the periods of outbreak of COVID-19 or other infectious diseases, implementation of infection prevention and control (IPC) is of crucial role in healthcare settings, especially personal protection of healthcare workers [13]

The shortage of personal protective equipment was also a serious problem. the front-line healthcare workers received inadequate training for IPC, leaving them with a lack of knowledge of IPC for respiratory borne infectious diseases[13]

Facing this health crisis, healthcare workers have not had enough time for systematic training and practice. Professional supervision and guidance, as well as monitoring mechanisms, were lacking [13, 14].

As of February 20, 2020, 2055 laboratory-confirmed cases have been reported among HCPs from 476 hospitals in China. The majority of HCP cases (88%) have been reported from Hubei [4]. According to the Chinese Red Cross Foundation, as of April 3, 23 of the health care professionals among 3387 persons had died from Covid-19 after they became infected during the practice of medicine in China [15, 16]. Other cases of infections and deaths from covid 19 has been reported in Italy, Spain and the United States, although more cases have since been identified [17, 5]

Such a high number of infections among HCPs is very worrying, testifying to the scale of the epidemic, and the obligation to improve the health system. Little knowledge of covid 19 led to an outbreak of HCP infection in the first month after the epidemic. [5, 13].

In Morocco, deaths from covid 19 are few, until April 5, 2020 there were two confirmed deaths from the disease [18], however there

are no official figures for infected cases to date. At the level of the military field hospital where the study is being carried out, no case of infection has occurred. This observation shows the need for vigilance in the face of health epidemics and emergencies. The role of national institutions is devoted to the implementation of monitoring and response strategies that allow the management of human and logistical resources. Regarding care staff, continuous training and the provision of protection and support is a fundamental point for proper functioning and better performance.

A retrospective cohort study of HCPs with acute respiratory illness in the hospital of Wuhan University sought to determine risk factors and behaviors associated with the development of COVID-19. The high-risk department, longer duty hours, and suboptimal hand hygiene after contacting with patients were linked to COVID-19. High-risk exposure was defined as the high-risk department (HRD) with interventional medical or surgical procedures that generate respiratory aerosols, including the respiratory department, infection department, ICU and surgical department [19]

Indeed, the massive flow of patients in January 2020 created an intense workload on Wuhan's healthcare systems. healthcare workers had to work ten or more hours a day without a break due to a high volume of patients and staff shortages.

Stress and burnout could further challenge the immune system and increase sensitivity to nCoV 2019 in HCPs [5]. Many lacked the required experience and knowledge to deal with such infectious diseases, 2 and the use of personal protective equipment (PPE) which were insufficient [5, 3].

The growing number of infections highlights the need to protect HCPs from COVID-19. For this reason the government has attached great importance to the protection of HCPs and has taken a number of immediate actions [20], with the establishment of a surveillance system for the benefit of HCPs, contributing to rapid detection, efficient triage and isolation of infected HCPs and their management. In addition, a health and life insurance fund is set up

for all front-line health professionals at the national and provincial levels [21].

In addition, continuing medical education in this area is another crucial step towards reducing the rate of infection among health-care workers [13, 22].

HCPs, whatever their disciplines, must do routine exercises in emerging infectious pathology and in professional prevention. Above all, the medical personnel linked to the management of infectious diseases should be well trained to use PPE and the certificate studies may be mandatory for the HCP. In addition, easy access of health professionals to mental health services should be available throughout their professional careers, especially in times of crisis when they need anxiety and stress relief.

As an encouraging finding, the ratio between a confirmed HCP infection and patients has decreased over time from 5.72% (January 2020) to 2.68% (February 2020), due to the supply of EPI, vigilance increased and accumulated experience among HCPs [5]. It is difficult to predict when and where an epidemic, like COVID-19, will occur in the world, the disease knows no national borders [5]. The COVID-19 epidemic warns us that prevention measures, an adequate stock of PPE and other essentials are the key to preparing for infectious diseases and optimal HCP function [23].

## Conclusion

The COVID-19 pandemic from its onset in China has spread to many countries around the world, causing millions of infected cases and thousands of deaths, in addition to its economic and social impact. This is worrying and arouses much interest in the ability of countries to deal with these types of global public health problems. It seems legitimate that all countries must be vigilant and ready to respond to all types of pandemics and health problems of global scope, by adopting a policy of logistical and human anticipation and preparation

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