

## Features Of The Healthcare Organization And The Work Of The Medical Staff In A First Wave Of The Pandemic Sarscov-2 In The World And Vietnam

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### Abstract

**Background:** SarsCoV-2 pandemic is an actual question for the whole world medical community. There is no continent free from this infection. And it is very important for world healthiness to have well coordination medical support. The present study considers different approaches to health care organization and medical staff's work during the first wave of the COVID-19 pandemic.

**Materials and Methods:** Using the examples of China, Italy, Germany, the United States and Vietnam, the authors present characteristics of different public health organization models at the governmental level by analyzing normative documents and official statistics.

**Results and Conclusions:** The article assesses the effectiveness of public health systems under the extreme conditions provoked by the first wave of the global pandemic COVID-19. The analysis of world experience indicates that rapid and decisive actions have a more significant effect in containing the spread of the virus, localizing and eliminating the pandemic. Consolidation and interaction of public health, civic initiatives, the army, the mass media and other governmental and public institutions provide an opportunity for successful prevention actions in the case of the first wave of the COVID-19 pandemic.

**Keywords:** COVID-19; SARS-CoV-2; pandemic; medical staff; public health.

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## 1. Introduction

Most countries were not prepared for the crisis caused by the SARS-CoV-2 epidemic. The World Health Organization (WHO) has identified the syndrome, caused by this virus, as COVID-19 (coronavirus disease-2019) [1]. Now we are known, the SarsCov-2 is a pandemic illness with several diseases waves. After beginning in December 2019 as an outbreak of pneumonia of unknown etiology in Wuhan city (China), COVID-19 quickly turned into a pandemic. It spread around the world with incredible speed, exposing the unpreparedness of most countries for such a scenario. At the time of August, 2020 the WHO website provided information about 18 902 735 infected people and 709 511 deaths worldwide [2]. At the same time, the main burden of fighting with disease was laid on the medical staff. They were in the zone of a high risk, due to the unpreparedness of the public health system [3]. Due to the COVID-19 pandemic progression, a large cluster of measures have been taken around the world to contain and reduce its negative impact introduced by the first wave of this pandemic disease. The main task was to limit the spread of the virus by physically distancing between people.

The Italian experience has shown that the number of new infectiousness cases can increase exponentially. Under such circumstances, there is a significant increase in the load on intensive care and other departments. The number of medical staff and their work organization play a key role for optimal care and service for patients during a pandemic [4]. Medical staff is one of the most unprotected groups in that aspect, as they have the highest number of contacts with infected people. WHO has accepted the importance of providing support to medical teams, understanding the risk, immense physical effort and psychological stress with which medical professionals are faced. Medical staff may become infected with SarsCov-2 either in the course of their professional duties when coming into contact with infected patients or other health professionals, or as a result of the ongoing virus transmission in society [5-6].

The control of SARS-CoV-2 transmission pathways is one of the main conditions for reducing the number of new cases of infection and is based on the established preventive

measures, including treatment facilities. It includes sanitary treatment, disinfection, usage of personal protective equipment, social distancing [7]. However, these measures may not fully protect health workers, as public health systems significantly vary from country to country in terms of structure, number and staff structure [8]. It is necessary to create a strategy for slowing down the transmission of the virus and mitigating its effects based on specific conditions. Since each country is unique, these strategies need to be formulated taking into account local specificities, epidemiological situation and public health potential [9]. Accordingly, the purpose of the work was to assess the organization of medical care and the medical staff work specificities during the COVID-19 pandemic in the world and in Vietnam.

## **2. Methods**

The current work conducted a narrative review of the literature in which the work organization of health institutions and medical staff during the first wave of the COVID-19 pandemic was compared, using various databases. Epidemic preparedness, disease detection and treatment capacity, staffing of medical institutions and the training of health workers based on Centers for Disease Control and Prevention frameworks, WHO, rules and guidelines for reducing the impact of the epidemic are assessed.

## **3. Results**

### **3.1. China's approach to fighting against the COVID-19 epidemic's first wave**

The first official comment on a person infected with COVID-19 was made by the Chinese authorities on December 31, 2019. Within a week, a new type of virus was identified and singled out, and on January 9 the 2019-nCoV coronavirus was designated as a pathogen [10]. In a relatively short period of time, scientists of this country have collected a fairly large array of data on the diagnosis and treatment of COVID-19 [11]. China's leadership formulated a public health strategy and necessary measures in the field of public health, and about 1800 epidemiological teams were formed to control and identify new infected people [12].

One of the main measures was the daily reporting of all new cases of illness and death of unknown etiology. If there was the slightest suspicion, the doctor had to make a corresponding record in the electronic database, which was used to generate general statistics for each district and each province of China [11]. Having the experience of fast hospitals construction, in particular Xiaotangshan Hospital gained during the atypical pneumonia outbreak, two new hospitals were built and put into operation in the shortest possible time (February 3 and 5, respectively) in order to reduce the burden on the public health system.

They are Huoshenshan Hospital which has an area of 269,000 square feet and accommodates 1000 patients and Leishenshan Hospital with 1500 beds [13]. By March 11, 2020, 346 medical teams had been dispatched to Wuhan from all over the country and more than 42,600 health workers had arrived in Hubei province.

In general, the COVID-19 epidemic has been a major test for China's health emergency response system. However, the lack of individual protective equipment and other materials, inadequate training of medical staff and emergency services have been noted [14].

Such problems had a significant impact on the work of medical staff. The COVID-19 outbreak required a significant increase in working time and intensity for medical workers in China, resulting in increased stress level and physical strain. A cross-sectional study carried out between 10 and 20 February with 512 health workers showed that the anxiety prevalence was 12.5%. 53 workers suffered from mild anxiety (10.35%), seven workers from medium (1.36%) and four workers from severe anxiety (0.78%) [15]. In another similar study, a significant proportion of participants also experienced significant psychological stress and reported about symptoms of depression (50.4%), anxiety (44.6%), insomnia (34.0%) and distress (71.5%) [16]. The overall average quality of sleep among health workers directly working with COVID-19 patients was quite low. Cases of moderate insomnia amounted to 61.67% and severe insomnia to 26.67% [17]. A study of skin damage was also conducted due to the peculiarities of medical staff's work during the COVID-19 period. The results showed that the total prevalence of skin injuries was 42.8%, mainly related to device pressure, wet damage, and skin rupture. It should be noted that health workers who work directly with infected people face a significant risk of infection. The given work provides data on 2457 cases of infection among medical staff in Wuhan. 52.06% of infected are nurses, 33.62% are doctors and 14.33% are other medical staff [18].

In general, China was able to halt the COVID-19 epidemic quite quickly, apparently because of its experience in dealing with such emergencies, for example, during the atypical pneumonia outbreak in 2002-2003, the source of which was the Sars-coronavirus.

### **3.2. Fight against COVID-19 in Europe. Italy**

Italy suffered from the first wave of the new virus more than other European countries. Over the past decade, the country has experienced a gradual decrease in public health funding and a decline in the number of hospitals and health workers. It has led to a reduction in bed capacity, intensive care units, clinical laboratories, doctors and nurses. Accordingly, it negatively affected the country's preparedness for the epidemic [19]. In March 2020, the country ranked the second place after China in terms of the number of infected people

(12,462) and deaths (827). Under these conditions, about 20% of health workers who had been in direct contact with patients were infected [20]. In response, the official authorities introduced a strict quarantine regime in order to minimize the number of contacts between people. Such measures had no precedent in Italy, and were aimed at curbing the COVID-19 epidemic after the total number of deaths increased by almost 100% at the beginning of March 2020 [21].

In February-March 2020, the number of deaths from COVID-19 infection in China and Italy was almost the same - 2.3% [22]. However, already in April the number of registered cases of COVID-19 in Italy exceeded 135 000, of which more than 17 000 were fatal. During this period Italy ranked first place in the world in terms of deaths number [23]. Difficulties have arisen in providing rehabilitation care in outpatient and home conditions due to restrictions imposed by national and local authorities on the people movement to prevent the spread of the infection [24].

Medical staff at the first SarsCov-2 pandemic found themselves in extremely difficult conditions. Although Italy's public health system was highly regarded for its readiness to provide medical care compared to other European countries, it was impossible to meet the needs of so many seriously ill patients at the same time in the situation with COVID-19. Scheduled operations were cancelled; operating theatres were converted to intensive care units. All beds were occupied, corridors and administrative premises were filled with patients, some of them were on ventilators. It caused enormous psychological stress for the medical staff [25]. The health system was not prepared for the rapid spread of the virus, and even protective equipment such as masks were not enough for medical staff, not to mention ventilators. It was literally a matter of deciding who had to die and who had to be left alive. The tests for COVID-19 were done mainly for people with symptoms of the disease. Tests were not done for health workers that contributed to the rapid increase in the number of infected people.

Measures to protect health workers, including nurses, therapists and nursing staff, from infection were insufficient. Moreover, the problem was related not only to the care of patients with COVID-19, but also to everyday activities: touching the computer keyboard, using an elevator, examining outpatients, eating, etc. [26].

In order to cope with the lack of medical equipment, an emergency purchase of 3800 ventilators, 30 million masks and 67 thousand tests for COVID-19 was made. The shortage of medical staff resulting from a decade of inappropriate policy in the sphere of public health had to be urgently filled by hiring 20,000 health workers with the allocation of 660 million euros for such purpose [27-28].

Italy's experience in the beginning of the pandemic Covid-19 has shown that the country was not prepared for such a scenario, and the subsidy and capacity of the public health system must take into account the occurrence of emergencies [29].

### **3.3. Fight against COVID-19 in Europe. Germany**

One of the most successful countries in Europe to cope with COVID-19 is Germany. The first reports confirming COVID-19 among the inhabitants of this country appeared at the end of January 2020 [30]. Already in the middle of May more than 175 thousand people were infected and more than 8 000 deaths were detected [5]. The percentage of lethality from the virus in this country is much lower in comparison with the neighbors. In early April, statistical analysis showed that the mortality rate from COVID-19 in Germany was 1.2%, while in Italy it was 11.9%, in Spain it was 9%, and in France 7.1% [31]. It was explained by the fact that during this period Germany conducted much more tests than other countries. Respectively, a larger sample provided a lower percentage. However, by August 1, 2020, out of 209 653 confirmed cases, 9 148 were fatal in the country. For comparison, the situation in neighboring countries was different: in France there were 175 920 cases with 30 147 deaths, in Italy 247 537 cases, with 35 141 fatal outcomes [32]. As can be observed, with similar numbers of infected people, the percentage of mortality is much lower. Although at some point there were concerns that there may not be enough beds for all seriously ill patients in the intensive care units [33].

Obviously, the operative actions of the German authorities at the pandemic beginning such as closing schools, retailing, ban on mass events, isolation of infected people have played a significant role. Calculations show that the isolation strategy has significantly reduced the number of new infections (according to some data by 20-40 times) [34]. It was recommended to maintain such a public health policy until December 2020, otherwise the number of new COVID-19 cases may increase exponentially [35].

Medical institutions were not fully prepared for the rapid spread of the epidemic in this disease wave. By the middle of May already more than twelve thousand health workers (73% - women, 27 % - men) were infected with SarsCoV-2. It is assumed that the actual number of infected health workers, as a result of their professional duties, is twice higher than official statistics show [36]. The lack of personal protective equipment for medical staff, including masks (especially in the first months), forced official authorities to urge the population to use only non-medical respiratory protective equipment outside of the public health sphere, in order to protect doctors who are in direct contact with sick people [37]. Therefore, doctors and other medical staff constantly experience psychological tension, anxiety, stress [38].

An important task was to ensure the protection of health workers from infection. Telemedicine was one of the main means of providing skilled health care to people, minimizing direct contact between people, thereby reducing the risk of COVID-19 transmission. The majority of patients and health workers highly praised the usefulness provided by telemedicine in Germany. It is declared that increasing the use of remote patient management methods will significantly reduce the risk of COVID-19 infection for medical workers. The German experience has shown that the usage of strict quarantine combined with the use of remote medical care methods is one of the factors in the fight against the pandemic [39-40].

### **3.4. COVID-19 epidemic wave in the USA**

In just three months, the first pandemic wave of the SarsCoV-2 virus has caused a deep crisis in the USA public health system, leading to a nationwide disaster. For the first time in the history of this country, a disaster declaration was introduced in all the states, and more than 90% of the inhabitants were restricted to some extent in freedom of movement [41]. The United States spends more on public health than any other country, and there is no leadership in public health in practice. Currently, there is a significant shortage of infectious disease specialists in the country, and the number of epidemiologists is even smaller. It is largely connected with the peculiarities of credits repayment for medical education in this specialty [42].

In May 2020, health workers reported about a catastrophic lack of personal protective equipment in the states that have been most affected by COVID-19. The lack of diagnostic tests accelerated the spread of the virus among the population. Thus, in January-May, tests were done three times less than in the same period in South Korea, although this country is six times inferior to the United States in terms of population [43]. A significant number of hospitals reported a lack of equipment needed to care for seriously ill patients, including ventilators. Another negative point was the lack of the necessary number of respirators, gloves, protective masks, robes and disinfectants for public health workers [44]. By May 2nd of 2020, 6,169 requests for personal protective equipment had been submitted to the specialized web platform of GetUsPPE. Among them, 27% are hospitals, 15% are outpatient clinics and 9% are other medical institutions [45-46].

Obviously, the first wave of the COVID-19 pandemic has shown the USA public health problems as well as the need to transform public health policies.

### **3.5. Vietnam model of the reaction to the pandemic SarsCoV-2**

The Government of Vietnam promptly responded to the first wave of the COVID-19 outbreak by establishing a task force to prevent and control the disease under the leadership of Vice Prime Minister Vu Duc Dam [47]. As a result, a number of important decisions have been taken to reduce the spread of infection, such as: restriction of entry into the country, abolition of public events, wearing masks, social distancing, etc. The Ministry of Health has published a special regulation of actions, including identification of infected people, isolation, monitoring of first level contacts. The Clinical Support Management Centre for COVID-19 patients at the pandemic beginning was created which issued a number of recommendations about treatment of COVID-19 patients [48]. The Vietnamese public health system has set the highest demands to prevent the development of the epidemic. The authorities have introduced the obligation to wear masks in public places and to report on health condition and visited foreign countries through NCOVI mobile application. Harsh quarantine of affected areas, finding possible contacts and tracking any changes in people health have effectively curbed the spread of the virus among the population [49]. The medical staff of local community health centres played a major role in the fight against COVID-19 by implementing educational and preventive measures, establishing people - contacts of the first and second levels, identifying persons returning from epidemiologically unfavourable areas, conducting temperature control or medical examination of the population. At the time the article was written, only 750 cases of COVID-19 had been registered in Vietnam, 10 of which were fatal (WHO, 2020b). In general, it can be concluded that Vietnam is relatively painlessly coping with the epidemic on its territory [2, 50].

### **Conclusion**

The global health community in real conditions of the first wave COVID-19 pandemic has not been prepared for the challenges. The public health systems of countries around the world, regardless of the economic development level, were in a critical situation. The Vietnamese model has shown good results in the fight against the COVID-19 pandemic in its first wave. Tough measures, rapid decision-making, timely and complete public awareness are key to curbing the epidemic, especially when the virus is highly contagious. It is important to create a sustainable public health infrastructure, interaction between different government institutions (public health, army, civil institutions) and to make unpopular decisions (restrictions on movements, privacy and personal freedoms).



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