

Pandemic Control COVID 19: The Results of Analytical Studies of Ten Health Systems in the Word. Scopus Review

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ABSTRACT

OBJECTIVES

Description of the epidemiological situation of COVID-19 and analyze and compare between ten-health systems control epidemic around the word for use in public health system settings.

METHODS

This study was a descriptive, exploratory analysis of all cases of COVID-19 in the world especially in the ten countries. We conducted a Scopus review of the literature. Thirty articles are been recolted.

RESULTS

The estimates of human transmissibility (R_0) range from 2 to 3. Pre-symptomatic transmission has been reported. The Incubation period is 5.1 days; the overall global case fatality rate is currently approximately 6%. The countries are characterized into three categories of pandemic control: excellent level of control for Germany, South Korea, Hong Kong and turkey a medium level for China, Morocco and a low level for the USA, France, Spain and Italy.

CONCLUSION

The present descriptive, exploratory analysis offers important new information to the international community on the Corona virus Pandemic in world. Important questions remain including determination of infectiousness period, identification of transmission routes, and effective treatment and prevention methods including further test development, drug development, and vaccine development.

KEYWORDS

COVID 19; Pandemic; Health systems; Control diseases

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1. INTRODUCTION

In the past two decades two highly pathogenic human coronaviruses, responsible for severe acute respiratory syndrome (SARS-Cov) and responsible for Middle East respiratory syndrome (MERS-Cov), [1,2] have emerged in two separate events. A recent emergence, rapid kinetics around the world and a "Severe" Infection noticed On 29 December 2019 in China a clustering of cases of unusual pneumonia with an apparent link to a market that sells live fish, poultry and animals to the public [3]. Officially named coronavirus 2 (SARS-Cov-2). On 30 January 2020, the World Health Organization declared that the outbreak of SARS-Cov-2 constituted a public health emergency of International concern.

2. EPIDEMIOLOGY

The Chinese Centers for Disease Control (CDC) recently reported that most of the confirmed cases were classified as mild or moderate, 13.8% as severe, and only 4.7% as critically ill. [4]. Advanced age (>60), male sex, and comorbidities (particularly hypertension) are believed to be risk factors for severe disease and death from SARS-Cov-2 infection. Male sex was more predominant in patients who died than in those who recovered. Chronic hypertension and other cardiovascular comorbidities were more frequent among deceased patients than recovered patients [5]. Wang and al, report a relatively high mortality rate for COVID-19 of up to 14.1%, which is higher than in recent reports [6]. In accordance with the recent reports on characteristics of patients with COVID-19 who needed management in intensive care units [6-8]. The median estimated incubation period is five to six days (range 0 days to 14 days) [9]. The median age of patients with a confirmed case is around 59 years [10]. In adults, the most common symptoms at presentation are cough (68%), fever (44%), fatigue (38%), myalgia/arthralgia (15%), and headache (14%) [10]. Initial data indicate that more than 80% of patients have asymptomatic to moderate disease and recover, but

about 15% may get severe disease including pneumonia, and around 5% become critically unwell with septic shock and/or multi-organ and respiratory failure [11].

3. METHOD

Study design

This study was a descriptive, exploratory analysis of all cases of COVID-19. We have opted for a comparative and analytical approach to 10 data countries.

Pandemic control criteria

We have integrated the elements of primary and secondary prevention as input to the health systems and efficiency criteria as output.

Population data

Descriptive epidemiological indicators case number, death and recovered and prevalence, Number of new cases (Incidence); Case fatality ratio (CFR), Attack rate; Basic reproduction rate (R0); Generation interval.

The management of the epidemic was very different between the three groups in Asia (group A); the European countries and the USA (group B) and Morocco (Group C). the criteria for choosing countries was a reasoned choice to encompass the different control strategies and the continents most affected by COVID 19 and a representativeness of the continents especially for Morocco which represents the African continent and the developing countries. In Group 'A' for East Asian countries (China, South Korea and Hong Kong), which have mobilized effectively against the pandemic: Targeted containment not generalized Good hygiene, screening at will, monitoring and geolocalization of contaminated persons-Wearing a protective face mask is mandatory in public places. In Group 'B' Europe countries and United States (Italy, Spain, France, Germany, United Kingdom and Turkey), most of the containment decisions announced by the governments of

these countries were taken late and Group 'C' for Morocco.

The analysis

Confirmed cases, demographic and clinical characteristics were summarized using descriptive statistics. Case fatality rates were calculated as the total number of deaths (numerator) divided by the total number of cases (denominator), expressed as a percent. Will be presented in the form of static and dynamic comparative tables analysing the results in focus of the interventions carried out with effectiveness indicators (Deaths/1 million population, Critical care beds 100000 population, Hospital overcrowding, Research investment). The ranking of countries is based on the sum of scores from one to three assigned to each variable.

Data source

31 Articles and report written on COVID 19 until April 15, 2020.

4. RESULTS

Transmission and dynamic of transmissibility

Recent epidemiological reports have provided evidence for person-to-person transmission of the SARS-Cov-2 in family and hospital settings [10,12].

Transmissibility (R0) range

An infectious disease outbreak can be characterized by its reproductive number 'R0'. Early estimates of the attack rate in China range from 3% - 10%, mainly in households [13]. The current estimates of R0 for the SARS-CoV-2 outbreak in China range from 2.5 to 2.9, with an associated all-age case fatality ratio estimated to be 2.3% [14]. DHS Science and Technology High-quality estimates of human transmissibility (R0) range from 2.2 to 3 [15]. SARS-CoV-2 is believed to spread through close contact and droplet transmission, with fomite transmission [6]. Pre-symptomatic or asymptomatic

patients can transmit SARS-CoV-2; between 12% and 23% of infections may be caused by asymptomatic or pre-symptomatic transmission [16]. Modellers have suggested reproductive rates (R0) of 3.8 (95% confidence interval, 3.6 - 4.0) [17] and 2.6 (1.5 - 3.5) [18].

Clinical and symptoms

Asymptomatic transmission

Pre-symptomatic transmission has been reported; exposure in these cases occurred 1 days - 3 days before the source patient developed symptoms [19].

There is some evidence that spread from asymptomatic carriers is possible, although it is thought that transmission is greatest when people are symptomatic [20]. Estimating the prevalence of asymptomatic cases in the population is difficult. A modelling study found that approximately 700 people with confirmed infection (18%) were asymptomatic [21]. A recent modelling study suggested that asymptomatic individuals might be major drivers for the growth of the COVID-19 pandemic [19].

Incubation period

The best current estimate of the COVID-19 incubation period is 5.1 days, with 99% of individuals exhibiting symptoms within 14 days of exposure. Fewer than 2.5% of infected individuals show symptoms sooner than 2 days after exposure [22]. The reported range of incubation periods is wide, with high-end estimates of 11.3 and 18 days [10].

Clinical symptoms

Individuals can test positive for COVID-19 despite lacking clinical symptoms. Individuals can be infectious while asymptomatic [23] and asymptomatic individuals can have similar amounts of virus in their nose and throat as symptomatic individuals. Infectious period is unknown, but possibly up to 10 days - 14 days [24]. Experimentally infected macaques were not capable of being reinfected after their primary infection resolved [25].

Clinical diagnosis

PCR protocols and primers have been widely shared among international researchers though PCR-based diagnostic assays do not differentiate between active and inactive virus [10].

Mortality rate and contagiousness

The overall global case fatality rate is currently approximately 6% based on World Health Organization data as of 13 April 2020. The case fatality rate varies between countries; for example, it is currently higher in countries such as France, Italy, and Spain, and lower in countries such as the US, Germany, and Australia. The case fatality rate is estimated at approximately 2% overall, but ranges from 0.2% in people under 50 to 14.8% in those over 80, and is higher among those with chronic comorbid conditions [11]. Based on data from EU/EEA countries, 32% of the diagnosed cases have required hospitalization and 2.4% have had severe illness requiring respiratory support and/or ventilation. The crude fatality rate was 1.5% among diagnosed cases and 11% among hospitalized cases. The likelihood of hospitalization, severe illness and death increases in persons over 65 years of age and those with defined risk factors including hypertension, diabetes, cardiovascular disease, chronic respiratory disease, compromised immune status, cancer and obesity [26]. The confirmed case fatality ratio (CFR) is the total number of deaths divided by the total number of confirmed cases at one point in time appears quite constant oscillating between 2% - 3% [27]. The case fatality rate was highest among critical cases (49%), it was also higher in patients aged 80 years and older (15%), males (2.8% versus 1.7% for females), and patients with comorbidities (10.5% for cardiovascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6% for hypertension, and 5.6% for cancer) [28]. Another study found the case fatality rate in China to be 6.4% in patients aged ≥60 years versus 0.32% in patients aged. In Italy, the case fatality rate was 8.5% in patients aged 60 years to 69

years, 35.5% in patients aged 70 years to 79 years, and 52.5% in patients aged ≥80 years [29]. In a case series of 1591 critically ill patients in Lombardy, the majority of patients were older men, a large proportion required mechanical ventilation and high levels of positive end-expiratory pressure, and the mortality rate in the intensive care unit was 26% [30]. In the US, the case fatality rate was highest among patients aged ≥85 years (10% to 27%), followed by those aged 65 years to 84 years (3% to 11%), 55 years to 64 years (1% to 3%), 20 years to 54 years (<1%), and ≤19 years (no deaths). Patients aged ≥65 years accounted for 80% of deaths [26]. The results of the ten countries are summarized in a table 1. This (table 1) shows that there are several three categories of countries those with a very high contamination rate (+4000 cases/million) USA and Spain, those with a high rate (between 2000 and 4000) UK, Italy, France and Germany, those considered medium (between 1000 and 2000) Turkey and those with a low rate (-1000) China, South Korea, and Morocco.

	Total Cases	Tot Cases/1m Population	Total Deaths	% Death/Cases	Deaths/1 M Population	Test/1 M Population
USA	1408039	4254	83366	5.92	252	30010
Spain	269520	5765	26920	9.99	576	52781
UK	226463	3336	32692	14.44	482	29566
Italy	221216	3659	30911	13.97	511	44221
France	178225	2730	26991	15.14	414	21213
Germany	173171	2067	7738	4.47	92	32891
Turkey	141475	1677	3894	2.75	46	17082
China	82919	58	4633	5.59	3	
South Korea	10936	213	258	2.36	5	13281
Morocco	6418	174	188	2.93	5	1946

Table 1: Evolution over time of cases, deaths and test in different countries.

The classification according to percentage of deaths/registered cases (-3%) for South Korea, Turkey and Morocco; (3% - 6%) for China, USA and Germany; (6% - 9%) and (+9%) for Spain, Italy, France and UK. The classification according to the number of tests per million inhabitants (+40000) for Italy and Spain; between 30000 and 40000 for Germany; USA and UK; between 20000 and 30000 for France and (-20000) for Turkey, China; Morocco and South korea. It is noted that there is no correlation between the number of cases and deaths so there is a correlation between the number of tests

performed and the number of deaths. Where other elements are needed to explain these results and especially the elements of the fight against the epidemic.

5. CONCLUSION

COVID-19 epidemic has spread very quickly. The present descriptive, exploratory analysis offers important

new information to the international community on the Corona virus pandemic in world. Important questions remain including determination of infectiousness period, identification of transmission routes, and effective treatment and prevention methods including further test development, drug development, and vaccine development.

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