International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979; Impact Factor: RJIF 5.72
Received: 01-05-2020; Accepted: 19-05-2020; Published: 01-06-2020
www.allsubjectjournal.com
Volume 7; Issue 6; 2020; Page No. 01-04

Case study of Covid-19 epidemic the lesson world learns from Italy

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Abstract
Background: The coronavirus COVID-19 pandemic is the greatest challenge we world faced since World War Two.]
Aims to work closely with global community, to expand scientific knowledge about the coronavirus and provide timely advice on measures to protect people's health and prevent the spread of this outbreak.
Methods: Study population for this case study encompass all covid-19 cases during the first 60 days of the epidemic in Italy. Data collection; all reported cases were included and the data collected from WHO situation reports, Italy MOH web site and information from other authors. Data analysis; the collected data processed and analyzed by Excel and SPSS programs. Outcome presented by table, epidemic curve and other statistical graphs also used for the data presentation.
Results: The first confirmed cases in Italy was on 31 January 2020, when two Chinese tourists in Rome tested positive for the virus and One week later an Italian man repatriated back to Italy from China, was also confirmed as the third case in Italy. A cluster of cases was later detected, the epidemic curve showed propagated source of outbreak which is caused by person to person transmission. Significant epidemiological investigations are being performed for contacts, clusters, and cases to recognize the source of infection and to implement targeted control measures, for instance, contact tracing.
Conclusion: Countries are racing to slow the spread of the virus adopting various measures such as testing and treating patients, carrying out contact tracing, limiting travel, quarantining citizens, and cancelling large gatherings such as sporting events, concerts, and schools.

Keywords: Covid-19, SARS-cov2, epidemic, pandemic, Italy

Introduction

Coronaviruses are a large family of viruses. Some cause illness in people, and others only infect animals, such as canine and feline coronaviruses. Rarely, animal coronaviruses can spread to humans and subsequently spread between people, as was the case with SARS and MERS. This is suspected to have occurred for the virus that causes COVID-19 (Li *et al.*, 2020).

Most cases in the initial stages of this outbreak reported a link to the Huanan South China Seafood Market, a live animal or 'wet' market, according to that they suggested a zoonotic origin of the virus. While the potential animal reservoir and intermediary host(s) are unknown at this point, studies suggest they may derive from a recombinant virus between the bat coronavirus and an origin-unknown coronavirus; however, this is yet to be confirmed (Li *et al.*, 2020).

In Italy, on 31 January 2020, two Chinese visitors in Rome tested positive for the virus (Frignani, 2020). One week afterward an Italian man repatriated back to Italy from the city of Wuhan, China, he was hospitalized and affirmed as the third case in Italy (Anzolin and Amante, 2020). On February 21,2020 there were 16 confirmed cases in Lombardy (Hill, 2020). On February 22,2020, 60 additional cases and first death were Reported (Hill, 2020). By the beginning of March, the virus had spread to all regions of Italy (Hill, 2020).

Method

Study population encompass all covid-19 cases during the first 60 days of the epidemic in Italy

Case study designed was followed to conduct this study. Aims of this case study is to work closely with global community, to expand scientific knowledge about the coronavirus and provide timely advice on measures to protect people's health and prevent the spread of this outbreak. Data collection; all reported cases were included and the data collected from WHO situation reports, Italy MOH web site and information from other authors. Data analysis; the collected data processed and analyzed by Excel and SPSS programs. Outcome presented by table, epidemic curve and other statistical graphs also used for the data presentation.

Result and Discussion

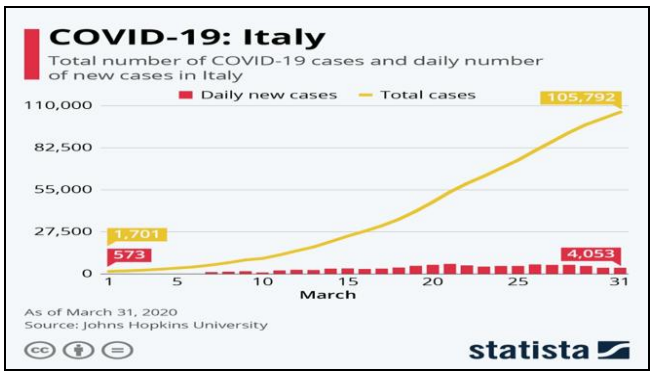

Fig 1: Cases of COVID-19 increased rapidly in Italy, reaching 101739 as of March 31 (Rudan, 2020).

Daily new cases, gradually started to drop, with 4050 new cases reported on March 31. Total deaths reached 11,591 as of March 31, which is the highest toll of any country in the world. The fatality rate reached up to 11.39 percent. Recovery rate is reported at 55.8 percent of all cases in Italy as of March 31. Lombardy is the most affected region with 43,208 cases as of March 31,2020 (Rudan, 2020).

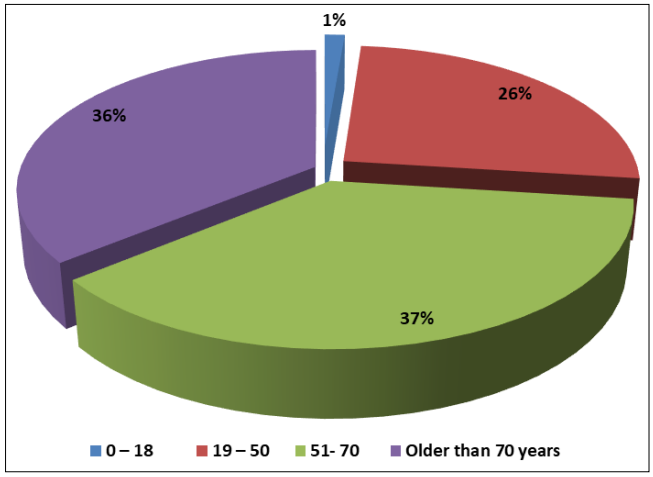

Fig 2: This chart shows COVID19 distribution according to age group (Rudan, 2020).

COVID19 mostly affected age groups 50 years and above (74%) as shown in figure 3. In 2020, 23.1 percent of the total population in Italy was estimated to be aged 65 years and older. The high old age distribution in Italy might explain higher case fatality rate compared to other countries. 0 – 18 years 1.3% 19 – 50 years 25.7% 51- 70 years 37.1% Older than 70 years 35.9%

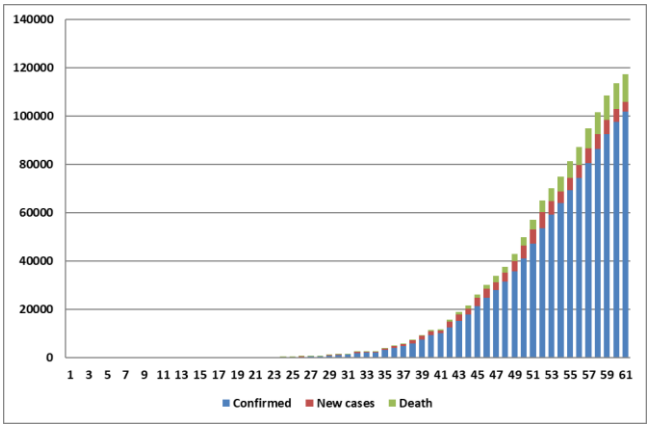

Fig 3: shows the total number of confirmed cases, new cases and deaths in Italy during first 60 days of the epidemic.

The cases rapidly increased as of 31 March 2020, 101739 confirmed cases cumulatively occurred including 3 cases imported from china, 276 cases under investigation and 101460 cases reported locally. The total deaths were was 11591.

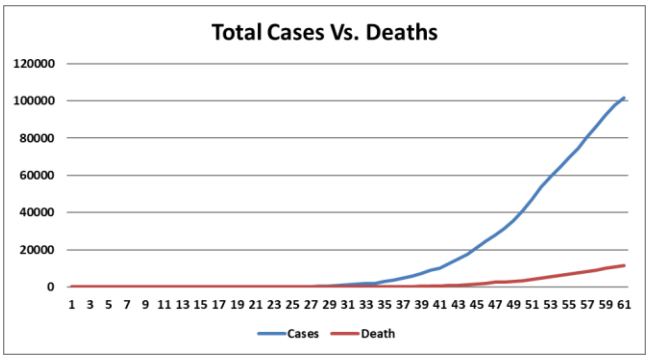

Fig 4: total numbers of cases and deaths in Italy during first 60 days of the epidemic.

Figure 4 shows the rapid development of the cases and deaths starting from 23 February, which indicate that the outbreak was out of control.

Table 1: Cases epidemiologic links categorized to cases from China, Italy and under investigation

Cases epidemiologic links	Numbers	%
From china	3	0.003
Reported in country among contacts	101460	99.73
Under investigation	276	0.27
Total cases till 31 march	101739	100

As in the above table 99.73% of the cases can be linked to social close contact, while all other epidemiologic links less than 1%

Table 2: Fatality rate and death to case ratio per week from 31 Jan. to 31 March in Italy during first 60 days of the epidemic.

Weeks	Total cases	Total new cases	Total deaths	Total new deaths	Fatality rate	Death to case ratio
Week 1	2	0	0	0	0	0
Week 2	3	1	0	0	0	0
Week 3	3	0	0	0	0	0
Week 4	400	397	12	12	3%	30 per1000
Week 5	3,089	2,689	107	95	3.5%	35 per 1000
Week 6	12,462	9,373	827	720	7.7%	77 per 1000
Week 7	35,713	23,251	2,978	2,149	9.2%	92 per1000
Week 8	74,386	38,673	7,505	4,527	11.7%	117 per 1000
From 27 to 31-3	101,739	27,353	11,591	4,086	14.9 %	149 per 1000

As per the calculations in Table 3, fatality rate went from 0 to 3% in week 4. It was then increasing each week reaching 14.9% in week 9. Death to case ratio increased significantly in week 9 reaching 149 per 1000.
As of 31 March 2020, Italy was one of the world's centers of active coronavirus cases with 75,528 active cases. The total of confirmed cases was 101,739, with 11,591 deaths, and 14,620 recoveries. On 19 March, Italy became the country with the highest number of confirmed deaths in the world.

Discussion
There are valuable lessons to be learned from COVID-19 pandemic and a global response is required to prepare health care systems worldwide to meet this challenge (Remuzzi and Remuzzi, 2020). Italy is the second country in the world that was hit hardest by the COVID-19 pandemic (Paterlini, 2020). It is necessary to know the factors that made death rates high in Italy to be able to prepare and plan effectively in other countries (Boccia, Ricciardi and Ioannidis, 2020). As seen in table (2) 99.73% of the cases can be linked to social close contact, while all other epidemiologic links less than 1%.
Several factors should be looked into such as the age structure of the population, prevalence of chronic disease and health care system preparedness (Board, 2020). As for Italy, it has the most elderly population in Europe, and there is a large number of patients with history of smoking as well as chronic obstructive pulmonary disease and ischemic heart disease (Boccia, Ricciardi and Ioannidis, 2020). COVID-19 mostly affected age groups 50 years and above (74%) as shown in figure 3. In 2020, 23.1 percent of the total population in Italy was estimated to be aged 65 years and older (Italian Higher Institute of Health, 2020). In Italy, the median aged of people with covid-19 infection who were dying was 80 years (Boccia, Ricciardi and Ioannidis, 2020), and the average age of patients requiring critical care support has been 67 years. Therefore, age structure and prevalence of chronic disease in the population must be considered in preparing intensive care units beds need and in estimating expected deaths (Boccia, Ricciardi and Ioannidis, 2020), 9% of covid-19 infection in Italy was within medical personnel (Boccia, Ricciardi and Ioannidis, 2020) (Frignani, 2020). Hospital overcrowding might explain the high rate of covid-19 infection within medical personnel (Boccia, Ricciardi and Ioannidis, 2020). This early infection in medical personnel contributed to the spread of infection to other patients in the hospitals (Boccia, Ricciardi and Ioannidis, 2020). Therefore, it is necessary to ensure strict preventive procedures in hospitals and patients who have COVID-19 should not visit the hospital unless they require hospital care (Boccia, Ricciardi and Ioannidis, 2020). It is also important to have a rapid response in case of healthcare workers exposure(Boccia, Ricciardi and Ioannidis, 2020).
Veneto region in Italy implemented strategies to contain the virus, which included: testing symptomatic and asymptomatic cases extensively early on; tracing potential positive cases; emphasizing on home diagnosis and care; monitoring and protecting health care workers and essential workers (Remuzzi and Remuzzi, 2020). The policies implemented in Veneto are thought to have considerably decreased the burden on hospitals and reduced the risk of Covid-19 spreading in medical facilities (Remuzzi and Remuzzi, 2020).
Although cases started to increase starting February 21st, quarantine was declared in Lombardy only on March 8 (Hill, 2020). (Organization, 2020). Many media reports warned that the population may not have taken those measures as seriously as the Chinese did when orders were introduced to their population in Wuhan. This allowed the virus to spread (Rudan, 2020).
As seen in table (2) 99.73% of the cases can be linked to social close contact, while all other epidemiologic links less than 1%.

Containment measures in Ital:
On January 31, 2020 the Italian government declared a state of emergency and all flights to and from China was suspended. In February, 11 municipalities in northern Italy were placed under quarantine. On March 6, 2020 medical ethics recommendations regarding triage protocols that might be employed was published by the Italian College of Anesthesia, Analgesia, Resuscitation and Intensive Care (SIAARTI). On March 8 2020, quarantine was extended to all of Lombardy and 14 other northern provinces, and on the following day to the rest of Italy, making more than 60 million people in quarantine. On March 11, 2020, almost all commercial activities were inhibited except for supermarkets and pharmacies. On March 21, all non-essential businesses and industries were closed and there was additional restrictions regarding movement of people, Frignani, R. (January 31, 2020) & Board, I. M. P. E. (April 8, 2020).

The Impact of COVID-19 Pandemic
Health care
The widespread outbreak put weight on the Italian healthcare system (Horowitz, 2020). In order to handle with the numbers of COVID-19 patients, intensive care units were extended, and new hospitals were made, particularly in Lombardy (Marsi, 2020). Due to hospitals packing with coronavirus patients, thousands of cancer patients experienced challenges in getting get to treatment and transplants, with their lives put at indeed higher hazard. Handfuls of cancer healing center segments were without a doubt wilt committed to have coronavirus wards or closed after faculty got infected (Marsi, 2020). Concurring to a consider, cancer patients spoken to 17% of coronavirus fatalities in Italy. Hotels were utilized to have healthcare workers or patients, in some region. Healthcare workers were moreover influenced by coronavirus contaminations, with a higher rate of the contaminated healthcare specialists being ladies since of their prevalence among nurses. This caused death in a significant sum of cases, particularly common practitioners (Tondo, 2020). By the end of March, more than 60 physicians in Italy had passed on with COVID-19 (Chustecka, 2020).

Economy
The widespread incited huge financial harm to the Italian economy. The segments of tourism, convenience and nourishment administrations were among the hardest hit by outside countries' confinements to travel to Italy, and by the nationwide lockdown forced by the government on 8 March (Frignani, 2020).

Education

After the first episode in Lombardy and Veneto, territorial governments of Emilia-Romagna, Friuli Venezia Giulia, Liguria, Lombardy, Piedmont, Trentino, and Veneto closed all schools and colleges (Hill, 2020).

Conclusions & Recommendations

Italy is the second country in the world that was hit hardest by the COVID-19 pandemic (Paterlini, 2020). Important lesson must be learned from Italy's experience with COVID-19 pandemic so health care systems can deal with this challenge effectively. In order to do that, several factors should be investigated such as the age structure of the population, prevalence of chronic disease and health care system preparedness (Board, 2020). Italy has the most elderly population in Europe, and there is a high amount of patients with history of smoking as well as chronic obstructive pulmonary disease and ischemic heart disease (Boccia, Ricciardi and Ioannidis, 2020). Therefore, age structure and prevalence of chronic disease in the population must be considered in preparing intensive care units beds need and in estimating expected deaths (Boccia, Ricciardi and Ioannidis, 2020). 9% of covid-19 infection in Italy was within medical personnel and it is necessary to ensure strict preventive procedures in hospitals (Boccia, Ricciardi and Ioannidis, 2020), 99.73% of the cases can be linked to social close contact. Therefore, implementing quarantine and social distancing is an important preventive measure.

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