INTRODUCTION

Coronavirus (2019-nCoV), or COVID-19 infection, which has spread in over 160 countries till date has proved to be the biggest disease outbreak of the millennium. The outbreak first occurred in Wuhan, China, in December, 2019, which later became epicentre for the disease. The pandemic of coronavirus disease continues to spread and affect millions of people worldwide and has resulted in over 9000 deaths so far! Infected patients present clinical manifestations including fever, cough, dyspnea, myalgia, fatigue, normal or decreased leukocyte counts and radiographic evidences of pneumonia. The huge socio-economic impact of COVID-19 has raised a major concern for researchers worldwide for controlling its spread. The international virus classification commission has named novel coronavirus as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). In past two decades, world has witnessed three epidemic outbreaks of coronavirus namely COVID-19, severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS)\(^2\). There is an urgent need to develop effective diagnostics, therapeutics, and vaccines for COVID-19. The whole-genome sequence of COVID-19 obtained in mid of January may be helpful in improving existing technologies for diagnosis and treatment. Pathogenetic mechanism of SARS-CoV-2 is similar to that of SARS-CoV. It binds to its target cells via angiotensin-converting enzyme 2 (ACE2)\(^3\), which acts as receptors for its entry into the cell. As the virus enters the cells, antigens are presented on antigen presentation cells (APC), which is a central part of the body's anti-viral immunity. Viral cells are then recognized by virus-specific cytotoxic T lymphocytes (CTLs). In SARS-CoV, patients had spectrum of disease severity ranging from common cold and pneumonia to acute respiratory distress syndrome resulting in death. Majority of the deaths were due to the complications related to sepsis, acute respiratory distress syndrome (ARDS) and multi-organ...
failure in elderly people with co-morbidities, whereas children with SARS had better prognosis than adults. Age and comorbidities like diabetes mellitus and heart disease were found to be significant independent predictors of adverse outcomes in SARS. Thus age and overall health condition are the most important factors which determine the severity of disease and clinical outcome. In absence of any specific antiviral treatment recommend for COVID-19, it becomes even more important for clinicians to take utmost care in treatment of patients with pre-existing medical conditions. Under present study, a meta-analysis of clinical data available on COVID-19 patients with various comorbidities has been critically analyzed for risk assessment and appropriate recommendations.

**Objectives**

1. Systematic evaluation of published literature available on COVID-19 cases.

**METHODS**

An extensive web search was conducted for reports on COVID-19 outbreak for all indexed articles from December 1’ 2019 to March 15’ 2020. The search terms (MeSH) were: “Novel coronavirus,” “Novel coronavirus 2019”, “2019 nCoV”, “COVID-19”, “Wuhan coronavirus,” “Wuhan pneumonia,” “SARS-CoV-2” “AND” “ Cardiovascular Disease”, “Hypertension”, “Diabetes”, “Liver Diseases”, “Lung Disease”, “Renal Diseases”. We limited our search to English and Chinese language (accessible in English) articles that described the epidemiological, demographic and clinical features of COVID-19 cases along with various comorbidities. All published and accepted peer-reviewed research articles, cohort studies, case reports, letters to editor consisting of patient clinical data were included for the study. Above search results identified a total of 139 records on the basis of comorbidities with an additional 11 reports from retrospective bibliography search of originally identified articles. We excluded reports published as review, meta analysis, editorials, comments, perspectives and language restricted articles (non accessible in English). The results of the initial search were first screened by the title and abstract of the report, on the basis of above mentioned inclusion/exclusion criteria. After screening, twenty eight articles were shortlisted and further categorised on the basis of COVID-19 infection along with comorbidity. All relevant clinical information was extracted for further analysis from eligible articles. The flow chart of the meta analysis is depicted in figure 1. In case of two or more article reporting information from the same patient having more than one comorbidity, the clinical data of both reports were combined in order to obtain complete information, however, counted later as one. Data extraction from each article included age, sex, infection, mortality, recovered cases and comorbidities such as hypertension, cardiovascular diseases (CVD), diabetes, lung diseases, renal diseases and liver disease. Each article was checked very carefully at the data extraction stage to ensure that there was no duplicity in terms of clinical information as well as patient cases.

**RESULT AND DISCUSSION**

In the present investigation, a meta analysis of studies on COVID-19 cases with pre-existing comorbidities has been conducted. Prevalence of pre-existing comorbidities could be associated with pitiable clinical outcome in COVID-19 patients and might posses greater risk of mortality. Under this meta-analysis, a total of twenty eight clinical studies were examined which comprised of 3537 laboratory-confirmed COVID-19 patients. These studies included COVID-19 patients with pre-existing comorbidities as mentioned above. Included studies were from various regions in China and single study was from Singapore. Meta-analysis of the identified studies showed that the most prevalent pre-existing
comorbidity along with COVID-19 infection is hypertension (23.44%) followed by CVD (11.36%), diabetes (10.52%), renal diseases (9.8%), lung diseases (5.6%) and liver diseases (4.98%) as shown in figure 2 a & b. In present analysis, cases have been segregated on the basis of age and gender (Figure 2c &d). Only 17 studies reported median age of 2608 patients in total, out of which there were 1345 patients (51.57%) who were above 50yrs of age while 1263 patients (48.42 %) were those in younger age group (less than 50yrs). It was also observed that in younger age group (≤50yrs), percentage of male patients (58.59%) and female patients (41.40%) showed a remarkable difference. Whereas, in older group (≥50yrs), it is reflected that total number of male and female patients, 723 (53.75%) and 622 (46.24%) respectively, did not show much difference. Thus it could be stated that the emergence of COVID-19 infection with co-morbidity is related to age to a greater extent. Our results indicate that in younger age group, there is predominance of male patients whereas in older age group COVID-19 infection did not show a gender bias. Out of 28 reports, 14 reports cited mortality in COVID-19 patients. Under these 14 studies, 2884 infected cases were examined and 292 deaths were reported (10.12%). Mortality was much higher in older age (≥50yrs), 18.21% in comparison to young patients (1.84%)(Figure 2d). On the other side, only 8 reports cited that 242 patients had already recovered from COVID-19 infection, out of 1772 (13.65%) did not show much difference. It could be stated that the emergence of COVID-19 infection with co-morbidity, advance age also play a critical role towards severity of infection and mortality due to COVID-19. Such patients might have a poor clinical outcome and may require special care during the course of medical assistance.

**CONCLUSION**

Present analysis consolidates available evidences from various recent clinical reports and provides the information on severity and risk of COVID-19 infection in patients with pre-existing comorbidity and advanced age. Such individuals might be more vulnerable to severe coronavirus infection. While treating these patients, serious attention should be paid to comorbidities such as hypertension, CVD, diabetes, kidney, lung and liver diseases, etc. as these can have an adverse impact on clinical outcome.

**Conflict of Interest**

None.

**References**

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