

# Hypertension and COVID-19

Scientific brief

17 June 2021



## Introduction

Chronic noncommunicable diseases have been identified as risk factors for SARS CoV-2 infection and as prognostic for severe COVID-19 and other unfavourable outcomes (e.g. admission to intensive care units or mortality). Hypertension is a noncommunicable disease affecting millions of people around the world. Whether hypertension increases the risk of acquiring SARS CoV-2 infection, or the risk of severe COVID-19, remains unclear. As the basis for this scientific brief, a rapid systematic review was commissioned to examine whether hypertension increases the risk of SARS CoV-2 infection and the risk of severe COVID-19. The brief summarizes the role of hypertension as a risk and prognostic factor in COVID-19, while itemizing research and knowledge gaps.

## Related WHO recommendations

Previously, WHO has acknowledged that hypertension – along with other cardiovascular diseases – increased the risk of severe COVID-19 and mortality from COVID-19.(1) Similarly, a WHO Information Note reported that people with pre-existing noncommunicable diseases, including hypertension, appeared to be more vulnerable to developing a severe form of COVID-19.(2)

## Methods

A protocol for the rapid review was documented in advance of evidence retrieval and data analysis. A systematic review was carried out using Medline, Embase and Global Health through Ovid; the search was conducted on 11<sup>th</sup> January 2021 without language restrictions. Systematic reviews with meta-analyses of association or risk estimates were only included if they reported evidence on hypertension (either self-reported or diagnosed) as the exposure and COVID-19 or severe COVID-19 as the outcomes. SARS-COV-2 diagnosis could have been based on any laboratory test (e.g. rt-PCR), imaging or clinical diagnosis. Standard systematic review methods were followed. The AMSTAR-2 tool was used to assess the quality of the systematic reviews included in this brief synthesis. Results are presented narratively. Finally, starting from the last search date of the selected systematic reviews, primary studies retrieved through our literature search were screened and relevant reports (providing adjusted association/risk estimates) were narratively summarized herein.

## Review of the evidence

There were 53 peer-reviewed systematic reviews and meta-analyses studying hypertension as the exposure and severe COVID-19 as the outcome,(3-55) where severity could have been defined as admission to intensive care units, mechanical ventilation, disease progression, clinically-defined severity or a combination of these (i.e., composite outcome) or mortality. Most studies followed a retrospective or prospective design, based on registries or cohorts of patients. Almost all systematic reviews and meta-analyses revealed that hypertension was strongly associated with severe COVID-19. Nonetheless, it was unclear whether the pooled estimates were crude or adjusted (e.g. related to other co-morbidities). There were no systematic reviews and meta-analyses examining whether hypertension increased the risk of acquiring SARS CoV-2 infection. Nine primary studies were selected (56-64), all of which reported adjusted association/risk estimates. The variables included in the regression models were age, sex, signs, symptoms and comorbidities. The outcomes were

severe disease and mortality. These nine reports suggested that hypertension was associated with higher risk of unfavourable outcomes in COVID-19.

## Limitations

There were three key limitations to drawing definite conclusions. First, systematic reviews and meta-analyses did not clearly report whether the association or risk estimates they pooled were based on crude or adjusted results. Second, literature searches were conducted between February and August 2020. Although there were already several original reports at that time, these included limited samples and, in many cases, reported unadjusted association or risk estimates. Third, many of the systematic reviews summarized herein did not conduct a risk of bias assessment, and when they did, it is possible that they did not use the most appropriate tool for studies of prognostic factors (such as QUIPS).

## Knowledge gaps

The available evidence is consistent overall in suggesting that hypertension increases the risk of COVID-19, admission to intensive care units, severe disease and mortality. Whether these increased risks were independent of other risk factors, however, has not been fully elucidated. Future original studies, systematic reviews and meta-analyses, including individual-level meta-analyses, could complement the current evidence. Hypertension as a risk factor for acquiring SARS CoV-2 infection has not been studied by systematic reviews and meta-analyses. Future systematic reviews, meta-analyses and original studies should also clearly explain how the presence of hypertension was ascertained (e.g. self-reported, extracted from past medical records or drugs claims or actively measured as part of the study).

## Conclusions

Almost all available evidence suggests that hypertension increases the risk of severe COVID-19, defined as, admission to intensive care, clinically-defined severity or a combination of these; or mortality. It was sometimes unclear, however, whether this prognostic profile was independent of other risk factors. There were no systematic reviews or meta-analysis studying whether people with hypertension, in comparison to otherwise healthy individuals, were at higher risk of being infected by SARS CoV-2.

## Plans for updating

WHO continues to monitor the situation closely for any changes that may affect the information in this scientific brief. Should any factors change, WHO will issue a further update. Otherwise, the validity of this brief will be reviewed one year after the date of publication.

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WHO continues to monitor the situation closely for any changes that may affect this scientific brief. Should any factors change, WHO will issue a further update. Otherwise, this scientific brief document will expire two years after the date of publication.

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