Clinical and socioeconomic characteristics of older adults with COVID-19: A protocol for a rapid systematic review

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SUMMARY

The aim of this rapid systematic review is to analyze the prevalence of clinical, socioeconomic, and demographic characteristics, laboratory and imaging findings, diagnostic tests, and treatment information of older adults with COVID-19. To conduct this systematic review, the Cochrane Handbook recommendations will be followed. Patients aged 60 years or older with a confirmed diagnosis of SARS-CoV-2 infection will be included. A comprehensive literature search will be performed in the following databases: MEDLINE via PubMed, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), Latin American and Caribbean Health Sciences Literature (LILACS), Spanish Bibliographic Index on Health Sciences (IBECS) and Epistemonikos COVID-19 L·OVE platform. No language restrictions will be applied. To assess the methodological quality of the included studies and the certainty of the evidence, the Newcastle-Ottawa Scale, and the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach will be used. The meta-analysis will be performed using R software. We believe this rapid systematic review will be able to summarize the currently available evidence on clinical, socioeconomic characteristics, and management of COVID-19 in older adults. Therefore, it will help implement adequate strategies to fight the pandemic and assist in understanding the clinical profile of older patients with COVID-19, providing data with due scientific support upon which to base future choices of procedures and interventions.

KEYWORDS: Aged. Coronavirus Infections. Health of the elderly.
INTRODUCTION

In the last months, the world has been facing a pandemic unprecedented in human history\(^1\). Initially identified in China in December 2019, the novel coronavirus (SARS-CoV-2) has high transmissibility and is the cause of Coronavirus Disease 19 (COVID-19), a potentially deadly acute respiratory infection\(^2\). There are several clinical symptoms of COVID-19, but they resemble those of simple flu. The patients can have mild, moderate, severe, or critical illness\(^3\). Data from a large case series have shown that nearly 10-15% of patients have the severe form of the disease, and 5% have the critical form of the disease and require treatment in intensive care units (ICU)\(^4\).

Older age and clinical comorbidities, such as hypertension, diabetes, and obesity are factors associated with evolution to the severe form of COVID-19 and death\(^5\). However, comorbidities are much more prevalent in older adults than in the general population\(^6\). Therefore, it is not well established whether chronological age alone would be a good predictor of worse outcomes or if comorbidities would have a stronger impact on the prognosis of patients with COVID-19.

Of note, as a diagnostic test for COVID-19 depends on the dynamics of the immunological response, it has been questioned whether the sensitivity of the current diagnostic tests is affected by age\(^6\). Additionally, as age is accompanied not only by changes in the immune response but also by multimorbidity and polypharmacy, it has also been suggested that the treatment of COVID-19 in older adults should be carefully evaluated\(^7\).

Although there is a large number of reviews on COVID-19\(^8\)-\(^10\), to our knowledge, none of them have investigated several features specifically of the elderly population with COVID-19. Therefore, an accurate synthesis of the currently available evidence pointing out clinical, socioeconomic, demographic characteristics, and information on efficient diagnostic tests and specific treatments for COVID-19 in older adults is crucial and can help health professionals face the health emergency we are currently experiencing.

Thus, the purpose of this rapid systematic review is:

- To determine the prevalence of laboratory and imaging findings in older people with COVID-19;
- To analyze which diagnostic tests and treatments are most frequently used in older adults with COVID-19.

METHODS

To conduct a rapid systematic review, we will employ abbreviated systematic review methods. Therefore, we will not perform independent screenings of abstracts, nor will we search grey literature\(^11\).

ELIGIBILITY CRITERIA

Types of studies

We will include clinical studies on COVID-19 that have included older adults and with availability of clinical, socioeconomic, and demographic characteristics, laboratory and imaging findings, diagnostic tests, or treatment information.

Types of participants

Patients aged 60 years or older with a confirmed diagnosis of SARS-CoV-2 infection.

Outcome measures

We aim to determine the prevalence of the following outcomes in older adults diagnosed with COVID-19:

- Clinical characteristics: fever, cough, sore throat, difficulty breathing, diarrhea, nausea/vomiting, headache, runny nose, irritability/confusion, adynamia, pharyngeal exudate, seizure, conjunctivitis, coma, dyspnea/tachypnea, abnormal lung sounds, delirium, loss of taste or smell, chest pain or pressure, muscle pain; and previous characteristics or comorbidities: smoking status, cardiovascular disease, hypertension, diabetes, liver disease, chronic neurological or neuromuscular disease, immunodeficiency, HIV infection, kidney disease, chronic lung disease, neoplasia (solid or hematological tumor), or any other clinical characteristics and/or comorbidities reported in the primary studies.

- Socioeconomic and demographic characteristics: such as gender, age, income, education, marital status, housing arrangement, country or continent, hospital, clinic, community, or long-term care institutions for the older people.

Laboratory findings: e. g. serum creatinine, platelets, hemoglobin, blood albumin, procalcitonin,
c-reactive protein, white blood cells, aspartate transaminase, alanine transaminase, ferritin, interleukins, international normalized ratio – INR; and imaging findings: chest x-ray and computed tomography abnormalities (multiple lobe lesion, single lobe lesion).

Most frequently used diagnostic tests: such as nucleic acid amplification tests (RT-PCR), serological tests for IgA, IgM, and/or IgG anti-SARS-CoV-2 antibodies, using ELISA, chemiluminescence or immunochromatographic methods, immunochromatographic test to search for viral antigens in upper respiratory tract samples.

Most frequently used treatments: such as oxygen therapy, mechanical ventilation (non-invasive and invasive), antiviral treatment, glucocorticoids, immunoglobulin, traditional Chinese medicine, antibiotics, thymopentin, continuous renal replacement therapy, immunobiologics, or any other treatment reported in the primary studies.

Data sources and searches
A comprehensive literature search will be performed in the following databases:
- MEDLINE via PubMed;
- Embase;
- Cochrane Central Register of Controlled Trials (CENTRAL);
- Latin American and Caribbean Health Sciences Literature (LILACS);
- Spanish Bibliographic Index on Health Sciences (IBECS);
- Epistemonikos COVID-19 L·OVE platform.

To identify potentially relevant studies, appropriate descriptors and synonyms will be used, adapting the search to the specifications of each database. We will also search the trials registry ClinicalTrials.gov. Studies published since December 2019 will be included and no language restrictions will be used in the selection. Finally, we will apply the technique of snowballing, searching the lists of references of the included studies.

Search strategy
We will use the terms related to the problem of interest, the intervention, and filter the date of publication. The search strategy in Medline via Pubmed is shown in Table 1.

Study selection
Two authors (E.P.R.S. and N.L.O.S.) will screen the studies retrieved during the searches and select them for inclusion in this review. If studies are found in more than one database, only one of them will be considered for inclusion. If reports using the same participants but different outcome measurements are found, both reports will be included, but they will be considered as parts of only one study.

After removing duplicated studies, the titles and abstracts will be read and those that clearly do not fulfill the eligibility criteria will be excluded. The remaining studies will then be fully read and assessed for inclusion in the review. Disagreements regarding the inclusion of studies will be solved by consulting a third author (C.F.R.S.). The reasons for any full-text paper exclusions will be documented. Rayyan application will be used for the screening and selection of studies.

### TABLE 1. SYSTEMATIC REVIEW SEARCH STRATEGY

| Number | Combiners | Terms |
|--------|-----------|-------|
| 1      | Population of interest | Coronavirus[MeSH Terms] OR Coronavirus[MeSH Terms] OR Coronavirus Infections[MeSH Terms] OR Coronavirus Infections OR COVID-19 OR COVID OR COVID19 OR "severe acute respiratory syndrome coronavirus 2" OR SARS-CoV-2 OR SARS2 OR SARS-CoV2 OR nCoV OR betacoronavirus[MeSH Terms] OR Coronavirus OR 2019-nCoV OR (Corona virus*) |
| 2      | Aged[MeSH Terms] OR Geriatrics[Mesh Major Topic] OR geriatric OR gerontology OR older OR aging OR senior OR old OR elderly OR Aged, 80 and over[Mesh Terms] OR centenarian OR nonagenarian OR octogenarian OR pensioner OR veteran OR Health Services for the Aged[Mesh Terms] OR Homes for the Aged[Mesh Terms] OR (nursing home) OR (retirement home) OR old-age |
| 3      | Publication date: 2019 - 2020 |
|        | #1 AND #2 AND #3 |

The abovementioned search strategy will be used in Medline via Pubmed and will be adapted to the specifications of each database.
Data extraction

Two authors (E.P.R.S. and N.L.O.S.) will independently extract relevant data. Discrepancies in the data extraction will be solved by a third author (C.F.R.S.). To extract data from included studies, a predefined form will be used with the following information: (I) Demographic and clinical characteristics of the participants; (II) Socioeconomic characteristics of the participants; (III) Laboratory findings; (IV) Imaging findings; (V) Tests used to confirm diagnosis; (VI) Treatment; (VII) Sources of funding; (VIII) Possibility of conflict of interests.

Assessment of methodological quality in included studies and certainty of the body of evidence

The Newcastle-Ottawa Scale for assessing the methodological quality of observational studies will be used\(^5\). The certainty of evidence will be assessed with the Grading of Recommendations Assessment, Development and Evaluation (GRADE)\(^14\) using GRADE profiler software\(^15\). An assessment of risk of bias and of the certainty of evidence will be performed by two authors (E.P.R.S. and N.L.O.S.), and all disagreements will be resolved through discussion or, if required, by consulting with a third author (C.F.R.S.).

Data Synthesis and Analysis

When at least two studies are found assessing the same clinical, epidemiological, or treatment characteristics of COVID-19 in older adults, we will assess the possibility of pooling the data into a meta-analysis. To perform the meta-analysis, R software\(^16\) with the “meta” package (version 4.9–6), the “metaprop” function for proportion data, and the “metamean” function for continuous data will be used. We will present pooled results of proportion with their respective 95% confidence intervals (CI) by using the inverse variance method with a random-effects model. For continuous data, we will present pooled results of means with their respective 95% CI by the inverse variance method with a random-effects model. Heterogeneity will be assessed by Cochran’s Q test considering a statistically significant value for \(p < 0.1\) and Higgins \(I^2\).

Reporting Characteristics

This rapid systematic review protocol was reported following the preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) guidance\(^7\) and was registered in the Prospective Register of Systematic Reviews (PROSPERO) platform (CRD42020190951).

DISCUSSION

Our rapid systematic review planned with this protocol aims to estimate, analyze, and determine the sociodemographic, clinical, laboratory, and imaging findings, as well as the diagnostic tests and treatments of older adults with COVID-19. Since the first reports of COVID-19 cases in Wuhan, China, studies have shown that older adults are at a higher risk of complications when infected by SARS-CoV2\(^2^3\), especially those with frailty and comorbidities. Of note, most publications have considered their results in the adult populations without providing specific information regarding older adults. As a huge amount of publications have addressed COVID-19, an updated synthesis compiling the best available evidence is critical and can help guideline developers and front-line health professionals create strategies to assist patients with due scientific support.

To ensure the methodological quality of this review, we will follow the Cochrane Handbook of the Systematic Reviews recommendations\(^18\), search the largest electronic databases, assess the risk of bias of included studies using the Newcastle-Ottawa Scale\(^13\), and, finally, evaluate the certainty of evidence with GRADE\(^14\). We believe this rapid systematic review will be able to summarize the currently available studies on the clinical profile and management of older adults with COVID-19. Therefore, it will not only guide future research but also help implement adequate strategies to fight the pandemic and provide critical data upon which future choices of procedures and interventions can be based.

Conflict of interest

There was no conflict of interest.

Author’s Contributions

MSP, APM, NCRI, VTKF, DGO, APR, ANA, and ACPNP contributed to the study conception and design, article writing, and editing. EPRS, CFRS, and NLOS contributed to the article writing. All authors read and approved the final version of the article to be published.
APPENDIX
Search Strategy

EMBASE
#1 'coronavirinae'/exp OR coronavirinae OR 'COVID-19'/exp OR 'COVID-19' OR covid OR COVID-19 OR 'coronavirus'/exp OR 'coronavirus infection' OR 'coronaviridae'/exp OR coronavirus OR 'coronavirus infection' OR 'sars-cov-2' OR SARS-CoV2 OR ncov* OR coronaviruses OR 'severe acute respiratory syndrome coronavirus 2' OR 'SARS coronavirus'/exp OR 'SARS coronavirus' OR 'SARS-related coronavirus'/exp OR 'SARS-related coronavirus' OR 'beta coronavirus'/exp OR betacoronavirus
#2 'aged'/exp OR aged OR elder* OR 'geriatrics'/exp OR geriatric* OR 'geriatric patient'/exp OR gerontolog* OR 'geriatric care'/exp OR older OR old OR aging OR senior OR senium OR 'very elderly'/exp OR 'very elderly' OR centenarian* OR nonagenarian* OR octogenarian OR 'pensioner OR veteran' OR 'nursing home' OR 'home for the aged'/exp OR 'retirement home' OR old-age
#3 #1 AND #2
#4 #3 AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND [1-12-2019]/sd

LILACS AND IBIECS VIA PORTAL BVS
mh:"Coronavirus" OR mh:"Infecções por Coronavirus" OR mh:"Coronaviridae" OR mh:"Beta coronavirus" OR mh:"Severe Acute Respiratory Syndrome" OR COVID-19 OR COVID-19 OR COVID-19-2019-ncov OR sars-cov-2 OR "Novo Coronavirus" OR mh:b04.820.504.540* OR "Coronavirus infections" OR "novel coronavirus"
AND
mh:"idoso" OR aged OR anciano OR Idosos OR (Pessoa idosa) OR (Pessoa de idade) OR (Pessoas Idosas) OR (Pessoas de Idade) OR (População Idosa) OR mh:"Idoso de 80 Anos ou mais" OR Centenários OR Nonagenários OR Octogenários OR Velhíssimos OR mh:"Instituição de Longa Permanência para Idosos" OR Anciantos OR ILPI OR (Instituição Asilar) OR (Instituições Geriátricas de Longa Permanência) OR mh:"Geriatra" OR Geriatrics OR Geriatría OR Gerontologia
Filter: Year 2019-2020

COCHRANE
#1 MeSH descriptor: [Coronavirus] explode all trees
#2 MeSH descriptor: [Coronaviridae] explode all trees
#3 MeSH descriptor: [Coronavirus infections] explode all trees
#4 MeSH descriptor: [Beta coronavirus] explode all trees
#5 coronavirinae OR COVID-19 OR COVID-19 OR "severe acute respiratory syndrome coronavirus 2" OR Coronavirus" OR "2019-nCoV" OR nCoV* OR "SARS-CoV-2" OR SARS2 OR SARS-CoV2 OR "Corona virus"
#6 #1 or #2 or #3 or #4 or #5
#7 MeSH descriptor: [Aged] explode all trees
#8 MeSH descriptor: [Geriatrics] explode all trees
#9 MeSH descriptor: [Aged, 80 and over] explode all trees
#10 MeSH descriptor: [Health Services for the Aged] explode all trees
#11 MeSH descriptor: [Homes for the Aged] explode all trees
#12 geriatric OR gerontolog OR older OR aging OR senior OR old OR elder OR "centenarian" OR "nonagenarian" OR octogenarian OR "pensioner OR veteran" OR (nursing home) OR (retirement home) OR old-age
#13 #7 OR #8 or #9 or #10 or #11 or #12
#14 #6 AND #13
Filter: Year 2019-2020

EPISTEMONIKOS
https://app.iloveevidence.com/loves/5e6fd9669c00e44ac072701d
Primary Studies
Reporting results

CLINICAL TRIALS
https://clinicaltrials.gov/ct2/results?cond=COVID-19
Filters:
-Age 18-65
-Age (65+)
-With results
RESUMO

O objetivo desta rápida revisão sistemática é analisar a prevalência de características clínicas, socioeconômicas e demográficas, achados laboratoriais e de imagem, testes de diagnóstico e informações de tratamento de idosos com COVID-19. Para conduzir esta revisão sistemática, serão seguidas as recomendações do Manual Cochrane. Pacientes com 60 anos ou mais com diagnóstico confirmado de infecção por Sars-CoV-2 serão incluídos. Uma pesquisa bibliográfica abrangente será realizada nas seguintes bases de dados: Medline via PubMed, Embase, Cochrane Central Register of Controlled Trials (Central), Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs), Índice Bibliográfico Espanhol em Ciências da Saúde (Ibecs) e Epistemônico Plataforma COVID-19 L - OVE. Nenhuma restrição de idioma será aplicada. Para avaliar a qualidade metodológica e a certeza das evidências dos estudos incluídos, serão utilizadas a Escala Newcastle-Ottawa e a abordagem Grading of Recommendations Assessment, Development and Evaluation (Grade). A meta-análise será realizada no software R. Acreditamos que esta revisão sistemática rápida será capaz de resumir as evidências atualmente disponíveis sobre as características clínicas, socioeconômicas e sobre o manejo de idosos com COVID-19. Portanto, ajudará a implementar estratégias adequadas para combater a pandemia e ajudará a entender o perfil clínico de pacientes idosos com COVID-19, fornecendo dados com o devido apoio científico sobre o qual basear futuras escolhas de procedimentos e intervenções.

PALAVRAS-CHAVE: Idoso. Infecções por coronavírus. Saúde do idoso.

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