Authors: C. Leung

Article Title: Risk factors for predicting mortality in elderly patients with COVID-19: A review of clinical data in China

Journal: Mechanisms of Ageing and Development

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1st Reviewer: Eileen Partridge

2nd Reviewer: Nathaniel Chin

Instructions:

- **1st Reviewer**: Please read the accompanying article and fill in the following tables. There is no need to use complete sentences in the tables. If a question is not applicable, just note N/A. Please use quotation marks if using exact wording from the article. Once you have completed the tables, please write a paragraph summarizing the major conclusions of the study, and how those conclusions should be used in clinical or research practice. Please email the completed tables and paragraph to the 2nd reviewer listed above and to geriatricsliteraturereview@medicine.wisc.edu.

- **2nd Reviewer**: After reading the accompanying article, please read through the 1st reviewer’s evaluation of the study in the following tables and the paragraph summary of the article. Consider whether you generally agree or disagree with the 1st reviewer and make edits to the summary paragraph as needed. Once edits to the summary are complete, please e-mail it and any additional comments to geriatricsliteraturereview@medicine.wisc.edu. The summary of the article will then be shared with other clinicians within the SMPH.

- If you have any questions about the literature evaluation process or this worksheet, please contact the Geriatrics Clinical Literature Review Committee at geriatricsliteraturereview@medicine.wisc.edu. Thank you for your contribution to this initiative.
### 1. Purpose of the Study

<table>
<thead>
<tr>
<th>a. Describe the purpose of the study in your own words.</th>
<th>For older adults who get COVID-19, which factors increase risk of death</th>
</tr>
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<tbody>
<tr>
<td>b. What was the gap in knowledge that researchers wanted to address with this study?</td>
<td>Since older adults are at higher risk of mortality from COVID, the authors sought to determine which characteristics of older adults increase mortality risk</td>
</tr>
</tbody>
</table>

### 2. Study Design

| a. What is the overall study design (RCT, case-control, observational, prospective cohort study, etc.)? | Retrospective, case-control |

### 3. Sample description

<table>
<thead>
<tr>
<th>a. What is the sample size?</th>
<th>154 individual cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. What are the samples' characteristics (demographics)?</td>
<td>Older adults diagnosed with COVID from 26 Chinese provinces, n=89 deceased, n=65 surviving</td>
</tr>
<tr>
<td>c. What were the eligibility and/or exclusion criteria?</td>
<td>Adults age 60+ diagnosed with COVID, exact date of discharge or death, and symptoms on admission.</td>
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<tr>
<td>d. What was the attrition rate? What was the majority of attrition attributed to?</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 4. Methods & Outcomes

<table>
<thead>
<tr>
<th>b. What main outcomes were researchers looking for, and how were they measured? (e.g. prevalence of depression, measured using PHQ-9)</th>
<th>“The following data were collected: (i) gender, (ii) age, (iii) travel history to Hubei, (iv) time from symptom onset to admission, (v) time from admission to discharge/death, (vi) symptoms on admission and (vii) comorbidities.”*</th>
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<tbody>
<tr>
<td></td>
<td>Data gathered from clinical data available in the public domain (Google search) from Chinese health authorities and the media</td>
</tr>
<tr>
<td>c. How did the researchers analyze the data? What tests did they use?</td>
<td>“Statistical tests on the difference in measures (i) to (vi) between the deceased and surviving patient groups were performed and a logistic regression model was estimated to identify risk factors for mortality with the stepwise regression procedure for independent variable selection.”</td>
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</table>

*article available online, no journal pages available
### 5. Results

| a. What were the results for the main outcomes? | Age is mortality risk factor, OR increases with age  
“...deceased patients were less susceptible to fever...” |
| --- | --- |
| b. Were there any other findings? | Dyspnea and chest pain/discomfort more common in deceased patients  
Median time from admission to discharge longer than median time from admission to death  
Muscle ache significantly higher in deceased group  
“The most commonly observed comorbidities in deceased patients were hypertension (53.2 %), cardiovascular and cerebrovascular disease (42.0 %), and diabetes (37.8 %).” |

### 6. Limitations & Interpretation

| a. What were the authors’ major conclusions?  
Please use quotation marks and page number if using exact wording. | Results suggest age as independent risk factor for mortality  
Results suggestive “... of long and erratic clinical course of geriatric patients.”  
Higher prevalence of dyspnea and CP among deceased patients attributed to severe pneumonia  
Higher prevalence of muscle ache in deceased group conflict with prevalence reported in other COVID studies  
The lower prevalence of fever in the Deceased group was attributed to lower baseline body temperatures in older adults, and “blunted” fever responses to infection  
The proportion of deceased COVID-19 patients with diabetes and coronary heart disease were higher than the corresponding prevalence of those diseases in the general Chinese population aged 60+ |
<table>
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<tbody>
<tr>
<td>b. Do the authors’ conclusions make sense to you? If no, why not?</td>
<td>Not entirely. The authors did not compare the comorbidities present in the surviving group to the deceased group, or looked at patients diagnosed with COVID that were not hospitalized. So although the prevalence of diabetes and coronary heart disease in the deceased group were higher than the general Chinese population, I don’t think you can conclude that these</td>
</tr>
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</table>
comorbidities increase older adult’s risk of severe disease/mortality (based on this study alone).

Attributing the lower prevalence of fever in the Deceased group to lower baseline body temperatures in older adults and “blunted” fever responses to infection makes sense on a surface level, but I think further research regarding COVID-19 and inflammatory responses in older adults would be needed to make this a conclusion.

c. What limitations did the authors discuss?

“The major limitation of the present work is that only baseline characteristics were considered as mortality risk factors. Because of the lack of data, lab findings and physiological measures were left unstudied.”

d. What are the contributions of the article as described by the authors?

“To assist surveillance against the current pandemic, elderly should measure on a regular basis the baseline body temperature that can be used to define the threshold temperature for fever. If this is not feasible, a baseline body temperature of 36.5 degrees Celsius might be used instead”

“The present study further enhanced the understanding of mortality by age stratification in geriatric patients.”

“For COVID-19 patients aged 60 years or above, the data of the present study may shed some light on the association between comorbidities and mortality, despite without a control”

### 7. Analysis

<table>
<thead>
<tr>
<th>a. What do you think are the article/study’s strengths?</th>
<th>Incorporated data from multiple provinces/health centers</th>
</tr>
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<tbody>
<tr>
<td>b. What do you think are the article/study’s weaknesses?</td>
<td>Variety of sources of public data – including media outlets. Not sure of the completeness or consistency of the data reported. The authors used “pneumonia” in their search; this may have narrowed the cases available, if the presenting symptoms were different than those of lower respiratory infection. The eligibility criteria also included “exact date of discharge or death,” which may exclude cases in which older adults were COVID positive and not hospitalized from the surviving group.</td>
</tr>
<tr>
<td>c. What do you think are the most meaningful takeaways for clinical practice or research?</td>
<td>Contributes to other literature that age is risk factor for severe disease, and that fever is not a reliable prognostic factor in older adults. I don’t think this study is strong enough to say which</td>
</tr>
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</table>
comorbidities or symptoms indicate a higher risk/prognosis of death.

Summary paragraph:

This study aimed to find mortality risk factors among patients over the age of 60 with COVID-19. The author used publicly available data from Chinese government and media sources to compare the following factors between deceased and surviving patients: age, travel history to Hubei, time from symptom onset to admission, time from admission to discharge or death, and symptoms on admission. The author also collected available data on comorbidities of deceased patients. After reviewing 154 cases from 26 provinces in China, the author found age to be a mortality risk factor, with increasing odds ratio of death as age increased. The author also found that deceased patients were less likely to present with fever at admission; and more likely to present with dyspnea, chest pain or muscle ache than the surviving control group. The surviving group had significantly longer times from admission to discharge compared to the deceased group’s time from admission to death. The author gathered data on comorbidities reported in the deceased group’s cases, but not the surviving group; findings indicated that the prevalence of diabetes and coronary heart disease in the deceased group were higher than the general Chinese population. Issues with the author’s methods include using only publicly available data from a variety of sources including news media sources, which may impact the completeness or consistency of data gathered; the term “pneumonia” was utilized in the author’s Google searches, which may have resulted in exclusion of cases in which the source of data did not explicitly state the term pneumonia; the study examined only baseline characteristics and not clinical events that may have occurred during the course of disease and treatment; the criteria for the study excluded patients with COVID-19 that survived without hospitalization; and finally, the authors did not compare the comorbidities present in the surviving group to the deceased group.

THE TAKEWAY: The author’s findings in this study are suggestive that age is an independent risk factor for mortality, and that fever may not be a significant risk factor in the geriatric population (60 years old and older). Muscle aches were more prevalent among deceased patients and may be clinically significant. Based on this study alone, clinicians cannot determine which co-morbidities or symptoms on admission increase the mortality risk for an older adult with COVID 19.

Initial 2nd reviewer comments:

- Impact Factor for journal is 4, though I have not heard of it before
- Interesting methods of using Google for information
- Strength of methods in collecting data from multiple hospitals and regions
- Limited findings with the narrow search terms
- Unclear why they did not compare covid19 to non-covid19 hospitalized patients for chronic medical conditions; reason for not doing this should have been given
- There is 1 paragraph stating that the chronic medical condition comparisons were mixed among hospitals and locations, they should have spent more time sharing/explaining this
• Results are interesting and unique given the geriatric population being studied
• Discussion section was lacking alternative reasons for muscle ache and absence of fever findings, should have delved into geriatric physiology and pathophysiology here
• More limitations should have been discussed

2nd Reviewer Feedback on 1st Reviewer Document

• Excellent analysis of study
• Strong and comprehensive critique of weakness and limitations
• Finding not discussed was that people who died presented later to the hospital (median days) but this was not statistically significant for mean; not worth adding to the paragraph but perhaps in the section above
• Perhaps add a comment on muscle aches in the take away, as that could be clinically meaningful or at least something for clinicians to keep in mind