Reviewer's report

Title: Ideal cardiovascular health and the subclinical impairments of cardiovascular diseases: a cross-sectional study in central south China

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Reviewer: Georgeta Vaidean

Reviewer's report:

Ideal cardiovascular health has important implications for cardiovascular prevention. A low ideal CVH is associated with an increased cardiovascular risk. Yet, the biological mechanisms underlying this association are not fully understood. The present manuscript is relevant, as it explores the association of ideal CVH with several markers of subclinical atherosclerotic disease. Further, while some studies have addressed some biomarkers in North, South American, and European populations, little is known about these associations in Asian/Chinese populations.

The present manuscript has several strengths: addresses an important question, explored a variety of subclinical markers and has a reasonable sample size.

A few issues need further attention:

Methods: Page 4, line 86: what does "retrospective cross-sectional study" mean? Were the data for this study extracted retroactively from medical charts? Or were it collected for the purpose of the study, on an ongoing basis, approaching the participants as they attended the clinic? Typically, a cross-sectional study is atemporal, neither prospective or retrospective. Please clarify.

Methods: Page 4: what was the participants' response rate and what was the amount of missing data? A flow diagram to indicate exclusions and missing data will be extremely helpful to understand the study population and the potential generalizability of the results.

Methods: Page 5, lines 106, 107: "Jin" and "Liang" may need a brief clarification that it may mean unit conversion?

Methods: Page 8, line 198: what was GraphPad soft used for? What can GraphPad do that SPSS cannot?
Results: page 9, line 221: The sentence on PAD has no place in the Results section. The issue is complex, PAD prevalence in women is age-dependent, measurement issues may complicate interpretation, etc. The PAD discussion is tangent to the manuscript's core ideas but if the authors wish to discuss it, they can do so in the Discussion section.

General comments on Results:

* While the authors present the clinical characteristics in Table 1 in a sex-stratified manner, a question still remains: was there an effect modification by sex? With other words, is the relationship between CVH and various markers different by gender? The authors used sex as a confounder and adjusted for it in their models. This is fine, as long as gender is not an effect modifier. Did the authors test for effect modification? The presence of an effect modification would be interesting to explore, as subclinical disease and cardiovascular risk factor profile have often gender-specific nuances, not fully explored to date. Given its reasonable sample size the study may offer such opportunity.

* The authors show associations between CVH score and individual biomarkers (Table 2). Yet no individual associations are shown between "subclinical disease markers" and CVH. The authors do mention the treatment of subclinical disease as a composite; yet, given that various markers reflect varied pathological pathways, it may be useful to briefly describe the individual associations as well.

* Table 2 - shows associations between CVH and log-transformed biomarker levels. For comparing the magnitude of effect, it would be useful to present standardized coefficients.

Discussion: page 13, lines 316-318: "males spend more time working and do not practice-self-care" - are both, speculative statements, unrelated to the present manuscript. Please provide references or, alternatively discard. The authors may also want to discuss alcohol consumption and college education, which were strikingly different between men and women in this study sample.

General comments on Discussion: other factors to discuss:

* duration of treatment (antihypertensive, etc.) may influence the presence of LVH, etc. Was this information not available?

* Health care utilization/frequency of health care visits may also influence the detection and treatment of cardiovascular risk factors and subclinical disease. It w'd be informative to briefly mention such factors in the population studied and discuss potential impact on results.
Minor issues:

* Terminology: Throughout the manuscript the authors use the term "subclinical markers". I suggest calling them "subclinical disease markers" as they relate to subclinical atherosclerotic disease. This w'd help avoiding confusion with what the authors call "subclinical biomarkers". The linguistic differences are arbitrary; for instance microalbuminuria may be considered a subclinical disease marker. But, for the purpose of this manuscript, it will suffice to relabel "subclinical markers" as "subclinical disease markers". The title uses the term "subclinical impairments of cardiovascular diseases". For consistency, consider using "subclinical disease markers".

* Table 1: cardiovascular health metrics: n (%) are supposed to be presented, yet the table shows only % for these metrics

* Table 1: Increased IMT and Carotid plaque: specify that it is n (%)

* The manuscript will benefit from the review by a native English speaker. Some examples only

- "was comprised" should be "comprised" (page 4, line 89)

- "Oxidant stress" should be "oxidative stress " (page 5, line 120)

- "cohort of the Chinese population" should be "cohort of Chinese population" (page 4, line 82

- "asymptomatic cardiovascular individuals" could be "cardiovascularly asymptomatic individuals" or simply "asymptomatic individuals" (page 11, line 257)

- "gave clues" - replace with "suggest"; could be mediate"- delete "be" — Page 11, lines 267-268

-Page 12, lines 281-282- please rephrase the sentence.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

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