



# Blood pressure in the longevous population with different status of hypertension and frailty

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**Keyword** Oldest old · Hypertension · Frail

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In the present study entitled “Blood pressure in the very old with different status of hypertension and frailty”, in the Hypertension Research, Wang et al. [1] aimed to determine antihypertensive treatment strategies for the oldest old compare to the results of the Hypertension in the Very Elderly Trial (HYVET) study [2] and others. Previous epidemiological studies have consistently suggested an inverse correlation between a decrease in blood pressure and the risk of mortality in older adults aged  $\geq 80$  years [3–5]. These studies have reported that a decrease in blood pressure predicts mortality in the oldest old. However, this decline is likely attributable to frailty due to old age and may not necessarily lead to a shortened life expectancy, as observed in patients with heart failure.

This observation is pertinent to the present study, where a reduction in systolic blood pressure (sBp) is presumed to be correlated with life expectancy. However, the study population included not only those with frailty but also the robust oldest old, with a blood pressure of 160 mmHg. Thus, lowering the blood pressure of the frail oldest old with antihypertensive treatment might lead to the shortening of their life expectancy, akin to the observed correlation between a decrease in blood pressure and life expectancy in the frail population.

In this regard, the HYVET study administered an active combination treatment using an antihypertensive agent to older adults with an average age of approximately 83 years. This intervention led to a reduction in the stroke-related, cardiovascular disease-related, and all-cause mortality rates,

as well as the incidence of heart failure [2]. The HYVET study included community-dwelling patients living outside a nursing home or other care facilities who can be considered the robust oldest old. Although active antihypertensive treatment reduced the cardiovascular mortality, heart failure, and stroke mortality rates in the robust oldest old with a blood pressure of 160 mmHg or higher, the HYVET study excluded individuals with dementia or emaciation. This strategic exclusion underscores the HYVET study’s focus on administering an antihypertensive treatment to a robust population.

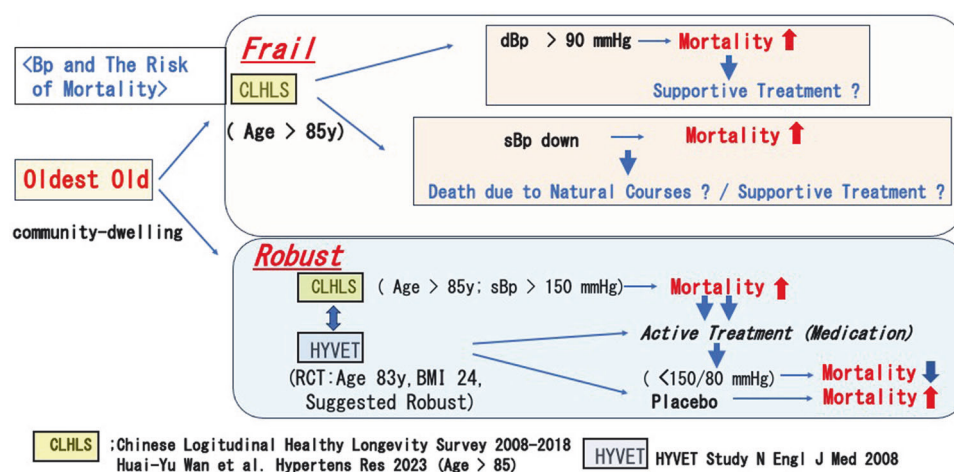
Although the causes of mortality, such as cardiovascular diseases, were not specified, the present study assessed the association between blood pressure and the risk of mortality based on all-cause mortality. This study showed that the robust oldest old with an sBp of 150 mmHg or higher had an increased risk of mortality. This finding serves as potential evidence supporting the application of antihypertensive treatments in the robust oldest-old population. Furthermore, the frail oldest old with a diastolic blood pressure (dBp) of 90 mmHg or higher had an increased risk of mortality. Although various studies have explored its causative factors [6, 7], the comparison conducted in this study indicated that active anti-hypertensive treatment, akin to the one administered in the HYVET study, suggested to poses a risk in the frail oldest-old population with a dBp of 90 mmHg or higher. Hence, future studies are warranted to determine whether drug interventions or conservative treatments, such as salt restriction, should be selected (Fig. 1).

In accordance with the 2018 ESC/ESH Guidelines [8] and the 2022 AHA/ACC/HFSA Clinical Practice Guideline [9], all large-scale clinical trials primarily focused on examining community-dwelling older adults and excluded patients with cognitive dysfunction, heart failure, and living in a nursing home. Conversely, the present study addressed the inadequacies identified in these guidelines and divided

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**Fig. 1** Flowchart of the treatment intervention provided to control the blood pressure in the oldest old; comparison with the HYVET study. The age of the oldest old in the present study corresponded with that of the oldest old in the HYVET study. However, the treatment intervention in the HYVET study mainly focused on the oldest old with robust hypertension. Using the data from the Chinese Longitudinal Healthy Longevity Survey (CLHLS; 2008–2018), the present study classified the oldest-old population into the robust group and the frail

group and investigated the risks for prognosis. Among the robust group, patients with a sBp of 150 mmHg or higher had an increased risk of mortality and were eligible for active antihypertensive treatment in the HYVET study. In the frail group of CLHLS, a decrease in blood pressure and a diastolic blood pressure of 90 mmHg or higher were reported to increase the risk of mortality; hence, the treatment intervention for the frail oldest-old population should be administered with caution while assessing their condition

the oldest-old population into groups based on their condition before estimating the risks and proposing treatment interventions. Whether the frail population in China examined in this study corresponds to the population living in a nursing home in Europe and the United States remains unclear. However, the present study investigated the association between blood pressure and risks in populations excluded in large-scale clinical trials in Europe and the United States, yielding valuable insights.

As mentioned above, an sBp under 120 mmHg was correlated with the risk of mortality in the frail oldest old. This is thought to be predictive of life expectancy. As such, treatment with an antihypertensive agent should be avoided. However, an increase in dBp is also correlated with the risk of mortality. Therefore, treatment interventions should be carefully selected based on the condition of each individual.

To compensate for the lack of sufficient data on interventions with antihypertensive agents, the prognosis of older adults who were unaware of their hypertension was investigated. In the non-intervention group, frailty and a dBp of 90 mmHg or higher were the risk factors in patients who were unaware and aware of their hypertension, and an increase in sBp was not correlated with these risks (Supplementary Table 3: Association between age, frailty, levels of BP, and the risk of mortality stratified by awareness of hypertension). In particular, the unaware hypertension group did not receive any antihypertensive treatment. Therefore, caution should be exercised when implementing an antihypertensive intervention based on the sBp in the

oldest-old population, especially those with frailty, in contrast to the robust population observed in the HYVET study.

## Compliance with ethical standards

**Conflict of interest** The authors declare no competing interests.

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