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The Impact of Climate Change on Cardiovascular Problems of the Elderly in Agricultural Areas

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ABSTRACT
Exposure to extreme temperatures and air pollution in the agricultural sector causes cardiovascular problems in the elderly. The aging process in the agricultural sector is also correlated with hypertension problems, because the aging process also changes the cardiovascular system and is related to the incidence of hypertension. Furthermore, climate change is also related to hypertension problems or cardiovascular disorders in the elderly. Therefore, it is necessary to analyze the impact of climate change on cardiovascular disease among the elderly to ensure their quality of life in the agricultural sector. Based on the explanation above, it can be concluded that climate change has a significant impact on the health problems of the elderly in the agronursing system. Climate change, including exposure to extreme heat and air pollution, affects cardiovascular disorders among elderly farmers. In responding to these problems, mitigation should be carried out to provide access to health services, enabling farmers, the majority of whom are in developing countries, to minimize the impact of climate change and improve their welfare and quality of life.

KEYWORDS
Climate change, Cardiovascular, Elderly, Agricultural Nursing

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1. BACKGROUND

Climate change is a serious problem affecting human life. This is a global challenge because climate change, driven by uncertainty, affects health problems that affect all age groups, especially the elderly (Prina et al., 2024). In 2023, the elderly population in Indonesia accounted for 11.75% and is estimated to increase to 20% in 2024 (Badan Pusat Statistik, 2024). Many elderly people in developing countries still live in rural areas where agriculture remains their main occupation (Jansuwan & Zander, 2021).

Hypertension is the biggest cardiovascular disease problem in Indonesia. Many factors have been identified from previous studies on the causes of hypertension (Susanto et al., 2019; Susanto et al., 2023; Wardani et al., 2024). In addition, hypertension problems in agricultural areas are also becoming quite high, influenced by various factors (Afandi et al., 2023; Mardiana

et al., 2021; Pratiwi et al., 2023; Susanto et al., 2024; Susanto et al., 2023). The aging process in the agricultural sector is also associated with hypertension, as it alters the cardiovascular system and is linked to hypertension incidence (Farisi et al., 2022; Khoirunisak et al., 2023; Kurdi et al., 2024; Yunanto et al., 2019). Furthermore, climate change is also related to hypertension problems or cardiovascular disorders in the elderly.

Exposure to extreme temperatures and air pollution in the agricultural sector causes cardiovascular problems in the elderly. The prevalence of cardiovascular disease increased from 271 to 523 cases between 1990 and 2019 in the elderly group (Chang et al., 2022). According to the European Heart Network, statistical data on cardiovascular disease contributed to 3.9 million deaths, accounting for 45% of all causes of death in Europe. This could increase due to the influence of recent climate change uncertainty (Gostimirovic et al., 2020). Therefore, it is necessary to analyze the impact of climate change on cardiovascular disease among the elderly to ensure their quality of life in the agricultural sector.

2. CLIMATE CHANGE AND CARDIO-VASCULAR PROBLEMS

Climate change, driven by global warming, affects the world's health order. Climate change has shifted significantly since the 19th century due to human activities, including the burning of fossil fuels, forest fires, and the greenhouse effect. Climate change that often occurs includes extreme heat and air pollution (De Vita et al., 2024). Climate change is a serious problem, so action must be taken as soon as possible, appropriately and comprehensively. The consequences of climate change on the elderly in the agricultural sector include impacts on agricultural yields that are not in line with targets and the emergence of health problems among farmers, particularly the elderly who still work in the agricultural sector (Talukder et al., 2021). The relationship between climate change and cardiovascular problems is described in Figure 1.

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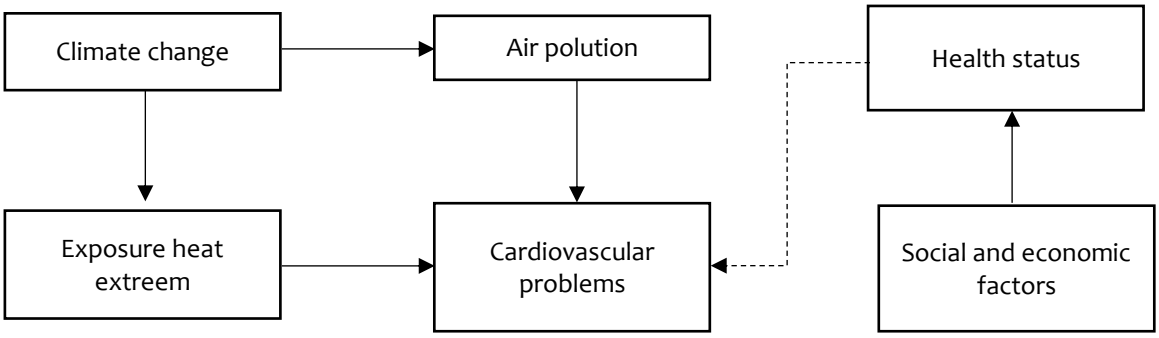

Figure 1. The relationship between climate change and cardiovascular problems (De Vita et al., 2024)

In maintaining optimal body temperature conditions, humans maximize thermoregulatory function in various conditions. Farmers are generally elderly who experience more exposure to sunlight in their daily activities. Factors that cause the risk of illness and death due to heat exposure in the elderly illustrated in Figure 2. The aging process in the elderly also affects the immune system, cardiovascular function and sweat gland function. The most common conditions are dehydration and hyperthermia. If this is not treated immediately, it will result in cases of illness and death in the elderly (Millyard et al., 2020).

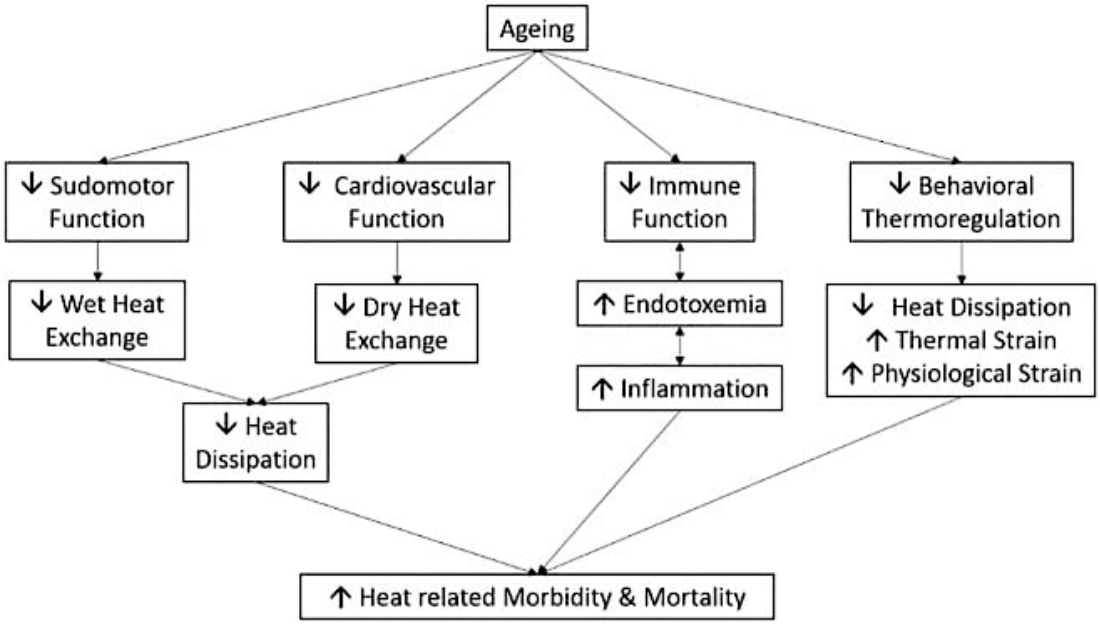

Figure 2. Factors that cause the risk of illness and death due to heat exposure in the elderly (Millyard et al., 2020)

Ozone, as a protector of the Earth, functions as an absorber of ultraviolet radiation. Unpredictable climate change disrupts ozone function, especially due to land burning and the greenhouse effect. Air pollution is often associated with respiratory and cardiovascular problems in the elderly. Air pollution can affect the respiratory system and may indirectly affect cardiovascular disorders. PM 2.5 and Nitrogen in the air are pollutants that increase the risk of inflammation and plaque buildup in blood vessels, resulting in atherosclerosis (narrowing of blood vessels) and a risk of acute coronary syndrome (De Vita et al., 2024). The effects of climate change on the cardiovascular system are mentioned in Figure 3. Climate change affects the human cardiovascular system. Exposure to extreme heat impairs cardiovascular performance. The most common cardiovascular problems include hypertension and myocardial infarction (Gostimirovic et al., 2020).

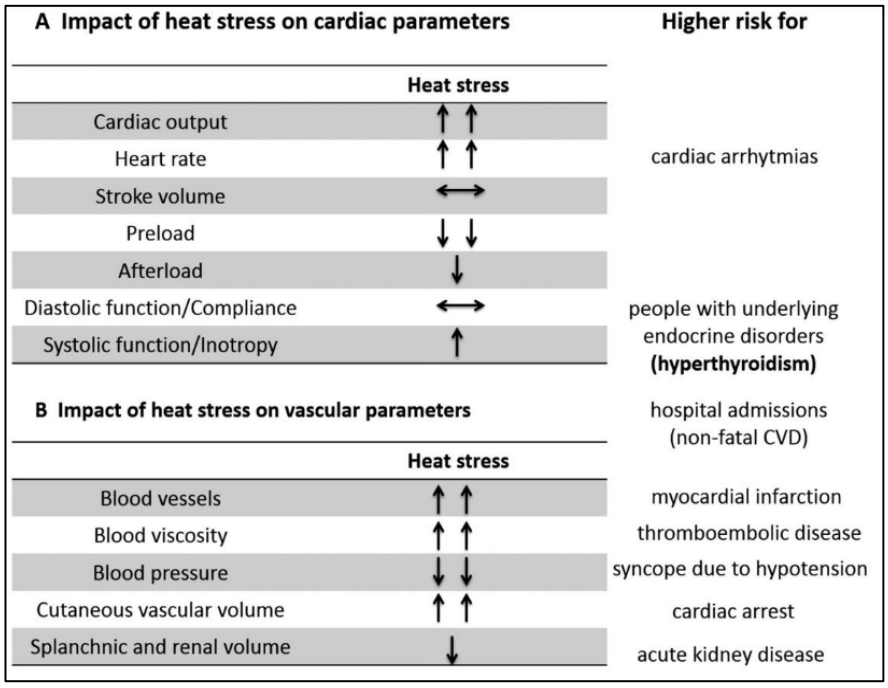

Figure 3. The effects of climate change on the cardiovascular system (Gostimirovic et al., 2020)

3. CLIMATE CHANGE AND CARDIO-VASCULAR PROBLEMS AMONG THE ELDERLY

Climate change is the biggest problem facing humans in the 21st century. Extreme phenomena such as forest fires, heat waves, and droughts are risk factors that impact health problems (Romanello et al., 2022). Elderly people in agriculture exposed to climate change are at high risk of

cardiovascular problems. The 2019 GDB (Global Burden of Disease, Injuries, and Risk Factors Study) reported that there were 93,000 deaths from cardiovascular disease. Evidence also shows a 2.1% increase in deaths from cardiovascular disease for every 1-degree Celsius increase (Liu et al., 2022). Epidemiological studies show that the risk of death from cardiovascular disease due to climate change, for example exposure to extreme heat, occurs in the elderly (Vu et al., 2019).

In the agronursing setting, apart from climate change factors, cardiovascular problems in the elderly are caused by health status and socioeconomic factors. Health status, such as hypertension, diabetes, and hyperlipidemia, further exacerbates the risk of morbidity and mortality from cardiovascular disease (Romanello et al., 2022). Socioeconomic factors also influence the increasing cases of morbidity and mortality from cardiovascular disease due to climate change that occur in many countries with low income per capita. Lack of knowledge, smoking behavior, and eating unhealthy foods also play an important role in the increase in these cases (Alahmad et al., 2023). The solutions that can be done in responding to this problem are by mitigating climate change disasters in agriculture, health education related to the impact of climate change, providing access to integrated health services, access to food assistance and nutritional support, and access to digital services related to farmer health problems (Talukder et al., 2021).

4. CONCLUSION

Based on the explanation above, it can be concluded that climate change has a significant impact on the health problems of the elderly in the agronursing system. Climate change, including exposure to extreme heat and air pollution, affects cardiovascular disorders among elderly farmers. In responding to these problems, mitigation should be carried out to provide access to health services, enabling farmers, the majority of whom are in developing countries, to minimize the impact of climate change and improve their welfare and quality of life.

DECLARATION OF INTEREST

The author declares no conflict of interest.

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