How might repeated experiences of racial discrimination lead to the biological outcome of cardiovascular disease?

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Background

- Frequent activation of the stress response can increase the risk of cardiovascular and inflammatory diseases (Dimsdale, 2008; Wellen & Hotamisligil, 2005)
- Black Americans are at higher risk of developing cardiovascular disease relative to White Americans (Van Dyke et al., 2018). Racism is pervasive in the U.S. (Lee et al., 2019); it is likely that racial discrimination is one of the chronic stressors that leads to detrimental health outcomes for Black Americans.

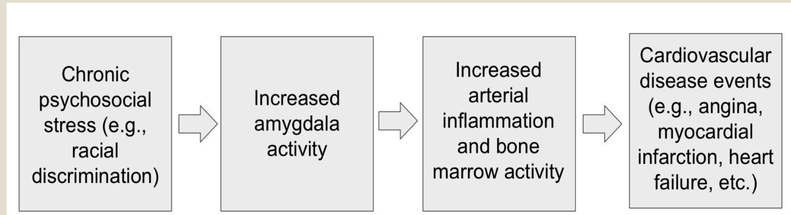
Research Objectives

This review proposes one pathway through which repeated experiences of racial discrimination may lead to the biological outcome of cardiovascular disease (CVD). It will do so based on a psychosocial stress and cardiovascular disease model proposed by Tawakol and colleagues (2017): stress leads to increased amygdala activity, which leads to increased bone marrow activity and arterial inflammation, which, in turn, lead to CVD.

Methods

This literature review was conducted using the Google Scholar database to locate articles on racial discrimination in relation to the steps of the Tawakol model. The following terms were searched for in the database: 1) “racism AND chronic stress”/ “racism AND perceived stress”; 2) racism AND amygdala/ “racism AND amygdala activity”; 3) “racism AND arterial inflammation”/ “racism AND bone marrow activity”; 4) “racism AND cardiovascular disease.”

Table 1. Proposed Pathway



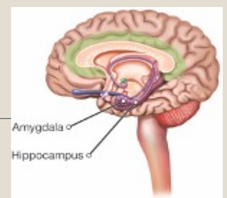
Results

Chronic Perceived Psychosocial Stress

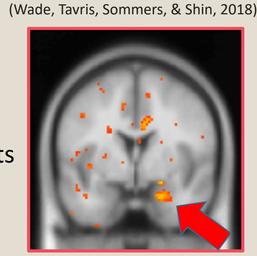
Self-reported experiences of racial discrimination have been linked to perceived social stress (Cuevas et al., 2019; Han et al., 2020; Ong et al., 2017; Yang & Chen, 2018). Racial discrimination is experienced by many Black Americans daily, leading to anticipatory stress and racism-related vigilance (Hicken et al., 2013; Vines et al., 2006).

Amygdala Reactivity

- Clark, Miller, and Hegde (2018) found that participants with greater exposure to racial discrimination showed greater levels of spontaneous, resting amygdala activity.
- Social exclusion has been linked to greater amygdala reactivity (Carter, 2007). The amygdala processes ambiguity, and subtle acts of discrimination may lead to increased amygdala reactivity (Jones et al., 2016).



(Wade, Tavris, Sommers, & Shin, 2018)



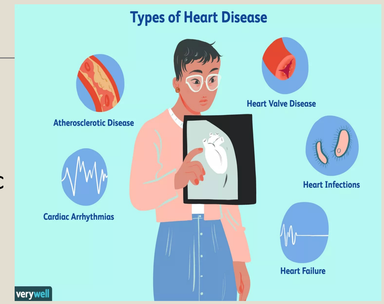
(Shin et al., 2005)

Arterial Inflammation and Bone Marrow Activity

Greater arterial inflammation was found in African-American individuals experiencing chronic stress and living in underserved neighborhoods than in controls; bone marrow activity was found to mediate the relationship between inflammation and increased amygdala activity (Powell-Wiley et al., 2021). Studies have linked chronic discrimination and chronic inflammation in African-American individuals (Black et al., 2015; Cunningham et al., 2012).

Cardiovascular Disease

Experiences of discrimination and internalized negative racial attitudes are correlated with higher CVD risk (Chae et al., 2010; Lewis et al., 2014). A systematic lit. review from 1984 to 2017 demonstrated a significant relationship between discrimination and CVD (Panza et al., 2019).



(Roberts, 2021)

Conclusions

The use of the Tawakol model of cardiovascular disease in studying racism is supported by current literature on the biological effects of racial discrimination as a psychosocial stressor. Ultimately, this model seems to be one effective way to study how repeated experiences of racial discrimination could lead to the biological outcome of CVD.

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