

Ethnicity and sudden cardiac death: Why are some at risk and others protected?



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Out of hospital cardiac arrest (OHCA) is a major cause of mortality and responsible for more years of potential life lost than any single cancer.¹ Enhancements in prediction and prevention are a high priority. Several studies have reported that race and/or ethnicity are associated with burden of OHCA^{2–5} but there has been little information from Europe. In their analysis of 1801 OHCA cases among 1,011,565 total immigrants, Garcia et al.⁶ provide additional evidence from the Danish Cardiac Arrest Registry that incidence of OHCA differs by race/ethnicity. After adjusting for age, sex, and history of heart failure, ischemic heart disease, and diabetes, OHCA incidence was significantly higher among immigrants from Arabic, Eastern European, and African regions when compared to immigrants from Western countries, significantly lower among immigrants from Latin America, and not different among immigrants from Asia. These results were consistent when further adjusted for education level and economic status.

The definitions of “race” and “ethnicity” remain a source of confusion in the published literature. It is increasingly being recognized that the concepts of race and ethnicity are subjective, and, perhaps more importantly, these terms “are not proxies for biology,”⁷ but rather a complex marker for social determinants of health that include individual-level and community-level factors.⁷ Therefore it is important to clarify at the outset that Garcia et al defined “ethnicity” based on each immigrant sub-group’s region of origin. While this definition combines elements of race and ethnicity, it is a reasonable and practical approach since it allowed them the flexibility to distinguish between multiple immigrant sub-groups in their analysis. Decisions regarding ethnicity or country of origin groupings can also be particularly relevant for cardiovascular (CV) risk. For example, individuals from East Asia and South Asia

(combined in the Asian ethnicity group) have different prevalence of smoking, diabetes, and obesity.⁸

Their findings of higher OHCA incidence among Arabic, Eastern European and African immigrants compared to the Western origin subgroup must be addressed. However, the OHCA clinical phenotype is a complex combination of multiple, potentially interacting conditions that is somewhat challenging to tackle, especially when comparing diverse sub-groups of the population. Where does one begin?

We would suggest a stepwise approach. Garcia and co-workers adjusted for three important downstream risk predictors of OHCA, ischemic heart disease, heart failure and diabetes. It could be worth expanding the evaluation of clinical risk predictors. A recently published clinical risk score (VFRisk)⁹ validated externally in a geographically distinct population contains five additional clinical risk predictors of sudden cardiac arrest: stroke, atrial fibrillation, chronic obstructive pulmonary disease, seizure disorder and syncope. These could be worth comparing between the Danish population sub-groups. Other potential advantages of the VFRisk score are a) the score targets sudden cardiac arrest presenting with ventricular fibrillation or pulseless ventricular tachycardia, potentially treatable by a primary prevention defibrillator and b) it performs well across the spectrum of age, sex and left ventricular ejection fraction.⁹ There are 5 additional components of this risk score, consisting of simple measurements from the 12-lead ECG and the echocardiogram. In a subsequent step an even broader evaluation of upstream cardiovascular risk factors such as hypertension, hyperlipidemia and smoking could be conducted, with potential identification of factors that could drive ethnicity-specific primary prevention of OHCA.

The lower incidence of OHCA among Latin American immigrants is an interesting finding that also warrants follow-up. Studies performed in the United States have reported that Hispanics/Latinos (defined as US residents of Cuban, Mexican, Puerto Rican, South or Central American or other Spanish origin) live longer than Non-Hispanic Whites, despite a high prevalence of cardiovascular disease risk factors and lower socioeconomic status.¹⁰ Studies are ongoing to explain this “Hispanic paradox” but cultural factors, dietary intake and genetic predisposition have been proposed as possible explanations. Analogous to the “French paradox”,

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which helped to identify the benefits of the Mediterranean diet and wine consumption for coronary disease prevention, further detailed studies of the Latin American subgroup could potentially identify factors that are protective against OHCA. One caveat is that the Latin America subgroup was smallest of all in number, approximately 10% of the largest subgroup, the Eastern Europeans. OHCA incidence increased among immigrants over time by at least 20–30% among all immigrant groups except Latin America, despite an overall OHCA decline over time. This could affect the generalizability of the findings reported by Garcia et al. It could be useful to attempt replication of these findings in one or more additional European nations.

Garcia, Tfelt-Hansen and colleagues⁶ should be commended for their fresh approach to the association between ethnicity and OHCA, and for reporting novel findings in the European context. Their paper highlights the importance of ethnicity as an important determinant of OHCA burden, but presently there are more questions than answers regarding this association. There are many possible factors that could be responsible including specific clinical factors, genetic differences, lifestyle/psychosocial factors and differential access to health care. Future research should attempt to identify ethnicity-specific, modifiable risk factors that could reduce the burden of OHCA.

Contributors

S.S.C. supervised and validated. S.S.C. and K.R. conceptualized, wrote, reviewed and edited manuscript.

Declaration of interests

The authors have none to declare.

References

- 1 Stecker EC, Reinier K, Marijon E, et al. Public health burden of sudden cardiac death in the United States. *Circulat Arrhythmia Electrophysiol.* 2014;7(2):212–217.
- 2 Reinier K, Sargsyan A, Chugh HS, et al. Evaluation of sudden cardiac arrest by race/ethnicity among residents of Ventura county, California, 2015–2020. *JAMA Netw Open.* 2021;4(7):e2118537.
- 3 Dicker B, Todd VF, Tunnage B, et al. Ethnic disparities in the incidence and outcome from out-of-hospital cardiac arrest: a New Zealand observational study. *Resuscitation.* 2019;145:56–62.
- 4 Rakun A, Allen J, Shahidah N, et al. Ethnic and neighborhood socioeconomic differences in incidence and survival from out-of-hospital cardiac arrest in Singapore. *Prehosp Emerg Care.* 2019;23(5):619–630.
- 5 Reinier K, Rusinaru C, Chugh SS. Race, ethnicity, and the risk of sudden death<sup>>. *Trends Cardiovasc Med.* 2019;29(2):120–126.
- 6 Garcia R, Rajan D, Warming P, et al. Ethnic disparities in out-of-hospital cardiac arrest: a population-based cohort study among adult Danish immigrants. *Lancet Reg Health Europe.* 2022. <https://doi.org/10.1016/j.lanepe.2022.100477>.
- 7 Yancy CW, Khan SS. Replacing race with social determinants of health in risk prediction-getting it right. *JAMA Cardiol.* 2022;7(6):632.
- 8 Chiu M, Austin PC, Manuel DG, Tu JV. Comparison of cardiovascular risk profiles among ethnic groups using population health surveys between 1996 and 2007. *CMAJ.* 2010;182(8):E301–E310.
- 9 Chugh SS, Reinier K, Uy-Evanado A, et al. Prediction of sudden cardiac death manifesting with documented ventricular fibrillation or pulseless ventricular tachycardia. *JACC Clin Electrophysiol.* 2022;8(4):411–423.
- 10 Medina-Inojosa J, Jean N, Cortes-Bergoderi M, Lopez-Jimenez F. The Hispanic paradox in cardiovascular disease and total mortality. *Prog Cardiovasc Dis.* 2014;57(3):286–292.