Researchers often claim primacy in their study being first in their country’s populace, pointing to ethnic importance. Race and ethnicity play an important role in disease risks, responses to environmental exposures, access to treatment and health outcomes. An excellent example of this is the Framingham heart study, which found that ethnicity significantly modifies the association between risk factors and cardiovascular events.\(^1\) Similarly, the performance of obstetric comorbidity adjustment indices was tested across race and ethnicity groups in a recent study.\(^2\)

**ETHNICITY IN ANAESTHESIA RESEARCH**

Ethnic disparities can occur in drug responses and adverse effects, anaesthesia modalities and perioperative care, for example – an association of ethnicity with the minimum alveolar concentration of sevoflurane.\(^3\) Recovery from anaesthesia with propofol and fentanyl is slower in Kenyans.\(^4\) Afro-American women have the highest odds of undergoing general anaesthesia for caesarean delivery.\(^5\) Ethnic minorities are less likely to be enrolled successfully in perioperative trials.\(^6\)

During the coronavirus disease 2019 (COVID-19) pandemic, ethnicity gained a lot of importance in related research. Indian ethnicity in COVID-19 research is reflected in the several studies published from India.\(^7\)-\(^9\)

**ETHNICITY IN RESEARCH PUBLICATIONS: JUSTIFIED/UNJUSTIFIED?**

Available medical literature, journals, editors, researchers and so-called “experts” are mostly Caucasian. Most of the current major treatment protocols, rules and guidelines, risk indices and clinical research have been created by as well as are predominantly geared to the White population in “Western” developed countries. Even in these countries, there is an enormous disparity in the amount of representation of racial and ethnic minorities in the research studies. And with half of the world population currently being Asian, treating this population with protocols directed at the Caucasian living in the Western milieu might be counter-productive, and “what works for James from the United States might actually behave differently in Prasad from India or Chang from China!”. Ethnic research priorities should be identified country-wise and randomised controlled trials (RCTs) designed and based on local research gaps to formulate local clinical practice guidelines.

Furthermore, biomedical researchers applying ethnicity should be clear in their ideas, hypotheses and interpretation of results.\(^10\) They need to understand in depth the concept of ethnicity and its application in research. If in a study, differences are found between diverse populations, the reasons need to be explored. Genetic variations, variation
in environmental exposure and differences in diet and health-related practices could be the reasons contributing to these differences in the observations and conclusion.\textsuperscript{[11]} Nevertheless, all this has to be discussed by the authors in relation to their study findings wherever such studies are conducted. Just mentioning the ethnicity of the research participants without discussing the implications of this ethnicity on the research outcomes may evoke a bias and does not give any effective message.

Researchers usually enrol participants from their local population because this is the most convenient for them. In such situations, adding only the name of the population, for example, ‘Indian’ adds just flavour to the curry without adding to the real contents! The application of ‘ethnicity’ in this manner appears as a futile attempt by the authors to project another ‘me-too’ mundane study as a novel concept with an aim to getting it successfully published. Such research tactics to raise the acceptance of a study should be condemned. Whenever ‘ethnicity’ is applied in research, it should be a truly deserving, justifiable scenario. Routine collection of ethnicity should be a part of screening log data, and ethnic bias should be included in the limitations.\textsuperscript{[6]}

Very few studies report the participants’ ethnicity in the demographic details. A review of 224 perioperative trials found that only 2.2\% had data on the race or ethnicity of the participants.\textsuperscript{[12]} Of 732 RCTs reviewed from the highest ranking Anaesthesiology journals from 2014 to 2017, few reported results for ethnicity and race. The authors concluded that ethnicity should be considered when designing and reporting research studies.\textsuperscript{[13]}

\textbf{NEED FOR ETHNICITY IN RESEARCH IN INDIA}

Dandona L et al. found that the health research output from India is grossly inadequate.\textsuperscript{[14]} For many diseases affecting Indians, there is little useful data. Even the COVID-19 papers from India figured low in ranking.\textsuperscript{[15,16]}

A considerably important proportion of global health problems are represented by our nation which represents a sixth of the world’s population. Many of these issues are common elsewhere, but affect a much larger proportion of the Indian population, and therefore significant results for these can come only from studies in the Indian population. As in other medical specialities, there is an urgent need for prioritisation of Anaesthesia research in the Indian population. We need a proportional inclusion of study results and protocols for Indians in high-ranked Anaesthesia journals. Newer anaesthetic agents, which we in India start using following the United States Food and Drug Administration approval and the Drugs Controller General of India procedures have not been tested in Indians on large multicentre trial bases. Thus, whether these have the same effects and adverse reactions on our populace is not known. An example is the recent advent of sugammadex to reverse neuromuscular blocking agents in India – systemic side effects like it making oral contraceptives ineffective from enzyme induction might have higher consequences in India, where oral contraceptive pills are the family planning method used by a significant percentage of those at pregnancy risk.\textsuperscript{[17]} The advent and deployment of such agents in India thus requires directed testing, clinical trials as well as practitioner and patient education. All this can help improve clinical and patient safety. Another approach that is currently receiving special attention in this modern era to improve patient safety and quality of care is risk assessment. Risk stratification helps in identifying high-risk cases and thus facilitates optimal allocation of resources.\textsuperscript{[18]} Risk assessment is slowly gaining momentum in the Indian subcontinent. However, risk assessment models based on data from Caucasians systematically underestimate the risk in Indians.\textsuperscript{[19,20]}

Very few are based on Indian data, or validated in Indians.\textsuperscript{[21]} Indians are known to represent a unique population with heterogenicity in the ethnicity. There are several conditions, which affect Indians in a different manner than other races. Examples are heart diseases of the young, sickle cell anaemia and various infectious diseases with chronic sequelae that affect how the patients respond to anaesthesia, or multiply the complications of anaesthesia and surgery. There may be differences in the aetiology, epidemiology of the diseases, demographics, treatment modalities, techniques and practice of medicine as compared to the countries from which the models are derived. Since these risk algorithms are based on epidemiological data, they are applicable only to those populations from which the data has been derived. There is very little hard data available on anaesthetic risk stratification or management of the anaesthetic procedure for Indians with these conditions. There is thus a need to have a separate risk assessment approach in Indian patients. The predictive models and their relevance to the patient conditions.
population in question need to be validated. There is also the problem of heterogeneity of the Indian population, and the risk scores may need further validation in different parts across the country. Without proper model validation, the confidence that the model will generalise well can never be high.

Genetic make-up and early onset of conventional cardiovascular risks might contribute to the higher risk of cardiovascular diseases in Indians. EuroSCORE II was published in 2011, by collecting data from 22,381 patients across 154 units in 43 countries. Of these, only four were from India. It is thus clear that Indians are under-represented. Indian studies that attempted validation of EuroSCORE II were from the urban population and included a high proportion of patients undergoing coronary artery bypass graft surgery. The general Indian population and the patients undergoing valve surgery may not be represented by these studies. Validation also needs to be carried out in Indian patients from lower socio-economic strata.

 Nonetheless, researchers from our nation too are realising the importance of the development and validation of various scoring tools and risk indices in the Indian population. The Hindi version of the United Kingdom developed obstetric quality of recovery scoring tool (ObsQoR-11) was recently validated in a hospital in North India and it was found to be a promising tool to evaluate the quality of recovery after elective caesarean delivery. A study in this issue of the Indian Journal of Anaesthesia, is based on the preoperative shuttle-walk test to assess preoperative physical status and predict the risk of morbidity and mortality in patients posted for colorectal surgery. The authors state that this study is the first of its kind on Indians. Thoracoscore, a preoperative risk score, was developed in 2007 in France. Its performance varied in different validation studies. In another study in this issue, the authors applied the ‘Thoracoscore’ in the Indian population to predict post-thoracotomy mortality. Such studies are highly required for risk assessment in the Indian cohort.

**HOW CAN WE ADDRESS THE ETHNIC INEQUALITY IN CLINICAL RESEARCH?**

We need to build the clinical research infrastructure, identify and train motivated research personnel and decentralise funding for large multicentre trials, to represent health needs and interests of Indians. The article on the ‘Thoracoscore’ is a timely reminder that we need peri-operative research by Indians, for Indians, which can culminate in good quality, indexed and peer-reviewed publications. This would ultimately improve the quality of peri-operative care in the Indian population.

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**REFERENCES**

1. Gijsberts CM, Groenewegen KA, Hoefer IE, Eijkemans MJC, Asselbergs FW, Anderson TJ, et al. Race/Ethnic differences in the associations of the Framingham risk factors with carotid IMT and cardiovascular events. PLoS One 2015;10:e0132321. doi: 10.137/journal.pone.0132321.
2. Tangel VE, Bryant-Huppert J, Jiang SY, Oxford-Horrey CM, Djoufiso S, Jkaer K, et al. Comparative performance of obstetric comorbidity indices withincategories of race and ethnicity: An external validation study. Int J Obstet Anesth 2022;50:103543. doi: 10.1016/j.ijoa.2022.103543.
3. Ezri T, Sessler D, Weisenberg M, Muzikant G, Protiainov M, Massch E, et al. Association of ethnicity with the minimum alveolar concentration of sevoflurane. Anesthesiology 2007;107:9-14.
4. Oraltini O, Conti A, Ngumzi ZW, Texeira L, Olang P, Amani L. Ethnic differences in propofol and fentanyl response: A comparison among Caucasians, Kenyan Africans and Brazilians. Eur J Anaesthesio 2004;21:314-9.
5. Butwick AJ, Blumenfeld VJ, Brookfield KF, Nelson LM, Weiniger CE. Racial and ethnic disparities in mode of anesthesia forcesarean delivery. Anesth Analg 2016;122:472-9.
6. Mohamed TY, Patel J, El-Badawi S. Is ethnicity associated with recruitment into perseverative care studies? Br J Anaesth 2020;125:5:E396-8.
7. Sahoo RK, Jadon A, Dey S, Surange P. Ethnicity and its impact on pain management practices: A nation-wide survey of Indian pain physicians. Indian J Anaesth 2020;64:1067-73.
8. Jindal R, Gupta M, Khan FR, Chaudhry G. Prevalence of co-morbidities and its association with mortality in Indian patients with COVID-19: A meta-analysis. Indian J Anaesth 2022;66:399-418.
9. Ambulkar R, Rana PS, Starr N, Moore J. Perioperative health care provider safety and resource availability during the COVID-19 pandemic in India and other low middle-income countries. Indian J Anaesth 2022:66:220-3.
10. Crews DE, Bindon JR. Ethnicity as a taxonomic tool in biomedical and biosocial research. Ethn Dis Winter 1991;1:42-9.
11. Sonner JM. Ethnicity can affect anesthetic requirement. Anesthesiology 2007;107:4-5.
12. Lindsay WA, Murphy MM, Almqhairy Am, Moppett IK. Age, sex, race and ethnicity representativeness of randomized controlled trials in perioperative medicine. Anesthesiology 2020;75:809-15.
13. Begic D, Martinac CJ, Vrdojilak M, Puljak L. Reporting and analyses of sex/gender and race/ethnicity in randomised controlled trials of interventions published in the highest –ranking anaesthesiology journals. J Comp Eff Res 2019;8:1417-23.
14. Dandona L, Sivan YS, Jyothi MN, Bhaskar VS, Dandona R. The lack of public health research output from India. BMC Public Health 2004;4:55. doi: 10.1186/1471-2458-4-55.
15. Grammes N, Millenaar D, Fehlmann T, Kern F, Böhm M, Mahfoud F, et al. Research output and international cooperation among countries during the COVID-19 pandemic: scientometric analysis. J Med Internet Res 2020;22:e24514. doi: 10.2196/24514.

16. TokgözAkyl F, Saygili E, Arikan H, Akyil M, Karadogan D. Country-based analysis of COVID-19 publications in the first few months of the pandemic. Popul Med 2021;3:15. doi: 10.18332/popmed/136032.

17. Lazorwitz A, Dindinger E, Aguirre N, Sheeder J. Pre- and post-operative counseling for women on hormonal contraceptives receiving sugammadex at an academic hospital. J Anaesth 2020;34:294-7.

18. Malviya D, Bajwa SJ, Kurdi MS. Striving towards excellence in research on biomarkers. Indian J Anaesth 2022;66:243-7.

19. Kar P, Geeta K, Gopinath R, Durga P. Mortality prediction in Indian cardiac surgery patients: Validation of European system for cardiac operative risk evaluation II. Indian J Anaesth 2017;61:157-62.

20. Pillai BS, Baloria KA, Selot N. Validation of the European system for cardiac operative risk evaluation-II model in an urban Indian population and comparison with three other risk scoring systems. Ann Card Anaesth 2015;18:335-42.

21. Durga P, Sahu BP, Mantha S, Ramachandran G. Development and validation of predictors of respiratory insufficiency and mortality scores: Simple bedside additive scores for prediction of ventilation and in-hospital mortality in acute cervical spine injury. Anesth Analg 2010;110:134-40.

22. Nashef SA, Roques F, Sharples LD, Nilsson J, Smith C, Goldstone AR, et al. EuroSCORE II. Eur J Cardiothorac Surg 2012;41:734-44; discussion 744-5.

23. Deo AS, Kashyapi R, Joshi V, Balakundi P, Raman P. Predictors of peri-operative cardiac events and development of a scoring tool for patients with chronic kidney disease undergoing non-cardiac surgeries: A prospective observational multicentre study. Indian J Anaesth 2022;66:278-89.

24. Kumar S, Ashok V, Jain D, Arora A, Singh A, Sikka P. Validation of an obstetric quality of recovery scoring tool (ObaQoR-11) after elective caesarean delivery in a developing country: A prospective observational study. Int J Obstet Anaesth 2022;49:103235. doi: 10.1016/j.joa.2021.103235.

25. Soumya CN, Thomas M, Ravindran S, Jagathnath Krishna KM. Preoperative incremental shuttle walk test for morbidity and mortality prediction in elective major colorectal surgery. Indian J Anaesth 2022;66:S244-50.

26. Falcoz PE, Conti M, Brouchet L, Chocron S, Puyraveau M, Mercier M, et al. The thoracic surgery scoring system (Thoracoscore): Risk model for in-hospital death in 15,183 patients requiring thoracic surgery. J Thorac Cardiovasc Surg 2007;133:325-32.

27. Chamogeorgakis T, Toumpoulis I, Tomos P, Ieromonachos C, Angouras D, Georgiannakis E, et al. External validation of the modified Thoracoscore in a new thoracic surgery program: prediction of in-hospital mortality. Interact Cardiovasc Thorac Surg 2009;9:463-6.

28. Pathy A, Kar P, Gopinath R, Gubha D, Soujanya Rani N, Kanimozi A. Thoracoscore: Does it predict mortality in the Indian scenario? - A retrospective study. Indian J Anaesth 2022;66:S251-7.

29. Burt T, Sharma P, Dhillon S, Manchanda M, Mittal S, Trehan N. Clinical research environment in India: Challenges and proposed solutions. J Clin Res Bioeth 2014;5:1-8.

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Page no. 18