Unjustified assertions regarding race and ethnicity in clinical decision-making (Re: The effect of ethnicity on semen analysis and hormones in the infertile patient, *CUAJ*, Feb 2020)

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Punjani et al describe the "effect" of race/ethnicity on semen and hormonal parameters in relation to clinical decision-making.[1] The word "effect" properly describes a causal relation, but race/ethnicity cannot serve as a causal exposure because it cannot be assigned in trials and, thus, is inherently inseparable from ancestry, history, culture, and a myriad of other confounding factors that defy distinct attribution.[2] Race/ethnicity may potentially be used predictively or descriptively, but this usage must be justified substantively and statistically, and the authors provide no such justification.

The authors repeat the claim four times that the racial differences reported are important for patient management but never how they propose to use this information. It is well-established in clinical epidemiology that a risk marker must have a very strong association with the outcome to be used in medical decision-making. An odds ratio (OR) of at least 30 is needed, otherwise most patients will be misclassified.[3] For example, the authors report an OR 1.70 for the prediction of azoospermia by noting that a patient is black. Based on calculations in Pepe et al,[3] if black race were to mislabel only 10% of non-azoospermic men as azoospermic, then black race would correctly identify only 16% of all the truly azoospermic men, and 84% percent of the true cases must be missed. On the other hand, if one wants the sensitivity of black race to be higher, so that it captures 80% of true cases of azoospermia, then with OR 1.70 it must necessarily misclassify 70% of the other men as azoospermic. In short, with this magnitude of association, one cannot avoid misclassifying the majority of men by taking black race as a marker for azoospermia. An OR 1.70 is clinically useless, and most of the associations reported are even weaker.

Worse, this is a highly selected population with no prospects for internal or external validity. Participants are not only Canadian men with subfertility, but only those willing and able to access clinical intervention for this condition. Then, among the 9079 patients registered in the clinic, over half were dropped because they had missing race/ethnicity data or lab results. This heavily non-random missingness makes the estimates unreliable even for use within the same clinic, since this magnitude of selection can easily reverse the direction of associations.[4]

The authors confuse statistical significance for clinical significance, focusing on differences in mean or median values when distributions overlap substantially. The "significant" differences reported are often opposite in direction from those reported in larger and more representative surveys.[5] Yet the authors propose that the difference is "important, as it may alter patient management, for example in deciding which patients would be more likely to benefit from hormonal manipulation." Given the selected sample, non-random exclusions, and weak associations, this would be an unjustified and ill-fated way to guide medical clinical practice. The application of racialized treatment rules based on these data would be indefensibly discriminatory, in addition to being ineffectual or harmful.

Competing interests: Dr. Merckx is employee of bioMérieux. This letter is unrelated to her function of Director Medical Affairs bioMérieux Canada Inc. The remaining authors report no competing personal or financial interests related to this work.

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Author reply

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Links between ethnicity and health have been well-established for many medical conditions. Genes, geography, environmental exposures, behaviors, and access to care likely explain such links. Canada is ethnically and culturally diverse.

It is well-established that variations in semen analyses and hormones exist in men with infertility. In an effort to provide insight into the counselling, workup, and management for infertile men, the current study sought to identify if such parameters varied, in part, based on patient self-reported ethnicity. Some differences were identified. It is our hope that understanding such associations will promote better healthcare and not "discrimination and racializing treatment."

Our conclusions are responsible and acknowledge the limitations of the study, suggesting that "further validation and assessment of current references is required in large and varying populations, to help understand the potential genetic, environmental, behavioral, and cultural patters that may explain these differences."

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