Racial and ethnic disparities in metabolic dysfunction-associated steatotic liver disease outcomes: A call for culturally sensitive interventions

Running title: Racial and ethnic disparities in MASLD

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Metabolic dysfunction-associated steatotic liver disease (MASLD), formerly known as nonalcoholic fatty liver disease (NAFLD), represent significant and growing health concerns globally. In the United States, these conditions are the most common chronic liver diseases, affecting approximately 75–100 million Americans. However, the burden of these conditions and their outcomes are not uniformly distributed across different racial and ethnic groups. Understanding the underlying factors and their interplay is crucial for managing and improving patient outcomes, especially given the racial and ethnic disparities in healthcare access and quality. This editorial discusses the disparities in MASLD outcomes among racial and ethnic groups, emphasizing the importance of addressing social determinants of health (SDOH) and implementing culturally sensitive interventions for effective management and prevention.

**Genetic background and environmental factors in MASLD**

The variability in MASLD outcomes among different racial and ethnic groups can be attributed to a combination of genetic, environmental, and socioeconomic factors. Genetic polymorphisms such as PNPLA3, TM6SF2, and MBOAT7 significantly influence NAFLD susceptibility and progression with varying prevalence among racial and ethnic groups. For instance, the PNPLA3 I148M variant is more prevalent among Hispanics, contributing to their higher susceptibility to NAFLD compared to non-Hispanic Whites and Blacks. Additionally, populations with the same genetic variant show a higher propensity for developing severe liver disease, highlighting the role of genetic differences in disease progression and outcomes.

Environmental factors, including diet, physical activity, and access to healthcare, also play critical roles. SDOH such as income, education, and neighborhood conditions profoundly impact MASLD prevalence and outcome. Hispanic populations often experience higher levels of adverse SDOH, which exacerbate their risk of developing severe MASLD. Limited access to healthy foods, lower levels of physical activity due to unsafe neighborhoods, and reduced
healthcare access due to social and economic barriers contribute to worse health outcomes.

**Disparities in MASLD outcomes**

Nguyen *et al.* recently published a paper indicating significant disparities in NAFLD outcomes among different racial and ethnic groups using longitudinal real-world data. This study found that Black patients with NAFLD face the highest risk of overall and non-liver-related mortality, followed by Hispanic patients, while Asian patients exhibit the lowest risk for all adverse outcomes compared to white patients. These findings highlight the complex interplay of genetic predisposition, environmental exposures, and SDOH in shaping MASLD outcomes. Black patients, despite having a lower prevalence of NAFLD, tend to have worse outcomes once the disease is established. Studies suggest that Black patients with NAFLD are disproportionately affected by comorbid conditions such as obesity, prediabetes, type 2 diabetes, hypertension, and dyslipidemia, all of which contribute to higher mortality rates. Moreover, structural racism and socioeconomic disadvantages limit their access to early diagnosis, treatment, and preventive care. This disparity is further compounded by systemic biases within healthcare systems that can result in less aggressive treatment and follow-up care for minority patients.

Hispanic patients, on the other hand, exhibit the highest prevalence of NAFLD, often linked to higher rates of obesity and diabetes in this population. However, the progression to severe liver disease and related mortality is also significant among Hispanics, necessitating targeted interventions. The cultural context, including dietary habits and lifestyle factors, plays a crucial role. For instance, traditional diets high in carbohydrates and fats can contribute to higher rates of obesity and metabolic syndrome, leading to MASLD. Addressing these dietary patterns through culturally sensitive dietary interventions can be an effective strategy in this population.
Cardiovascular mortality and MASLD

One critical aspect of managing NAFLD is recognizing that the leading cause of death in these patients is not liver-related but cardiovascular. This has led to the proposal of MASLD as a more comprehensive term that better captures the metabolic dysfunctions associated with fatty liver disease\(^1\). MASLD emphasizes the role of metabolic syndrome components such as obesity, insulin resistance, and dyslipidemia, which are prevalent across various racial and ethnic groups but manifest differently\(^11\).

Studies show that patients with MASLD have higher all-cause and cardiovascular mortality compared to those with NAFLD\(^12\). This further underscores the need for integrated care approaches that address both liver and cardiovascular health, particularly in high-risk racial and ethnic populations. Managing metabolic syndrome through lifestyle modifications and pharmacotherapy can significantly reduce the risk of both liver-related and cardiovascular outcomes\(^13,14\).

Precision medicine and culturally sensitive interventions

Addressing racial and ethnic disparities in MASLD outcomes requires a precision medicine approach that considers the unique genetic, environmental, and social factors affecting different populations\(^15\). Culturally sensitive interventions are crucial for improving health outcomes in these groups. For example, tailored lifestyle modification programs that respect cultural dietary preferences and incorporate community-based support can enhance engagement and effectiveness\(^13\).

Healthcare providers should be trained to understand and address the specific needs of diverse populations. This includes not only clinical knowledge but also cultural competence to build trust and improve patient-provider communication. Using culturally relevant materials and
involving community health workers who share similar backgrounds with the patients can improve outreach and adherence to treatment plans 16. Policymakers must also work towards reducing structural barriers to healthcare access and implementing policies that address broader SDOH, such as improving education, housing, and economic opportunities for marginalized communities 17.

Moreover, precision medicine involves using genetic information to tailor treatments. Genetic testing can identify individuals at higher risk for severe MASLD and allow for early interventions. For instance, knowing that a Hispanic patient with obesity carries the *PNPLA3* I148M variant can prompt more aggressive lifestyle interventions and monitoring 18. This personalized approach ensures that interventions are both effective and efficient, addressing the root causes of disparities in MASLD outcomes 19.

**Conclusion**

The disparities in MASLD outcomes among different racial and ethnic groups are a complex issue influenced by genetic, environmental, and social factors. Black and Hispanic patients are at higher risk for adverse outcomes, including higher mortality rates, compared to White and Asian patients 7. Addressing these disparities requires a multifaceted approach that includes precision medicine, culturally sensitive interventions, and policies aimed at improving SDOH. By doing so, we can move towards more equitable healthcare and better outcomes for all patients with MASLD.

**Author’s contribution**

Conception or design of the work: JHB. Data collection: JHB. Data analysis and interpretation: JHB. Drafting the article: JHB. Critical revision of the article: JHB. Final approval of the version: JHB.
Conflicts of interest

The authors have no conflicts to disclose.

Abbreviations

MASLD      metabolic dysfunction-associated steatotic liver disease
NAFLD      non-alcoholic fatty liver disease
SDOH       social determinants of health
References


