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Making science and doing justice: The need to reframe research on racial inequities in oral health

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This article combines a review of dental studies on race with sociological insights into systemic racism to advance a counter-narrative on the root causes of racial oral health inequities. Taking racism as a form of oppression that cuts across institutional, cultural, and behavioral dimensions of social life, we ask: How pervasive are racial inequities in the occurrence of adverse oral health outcomes? What is the direction and magnitude of racial inequities in oral health? Does the inequitable distribution of negative outcomes persist over time? How can sociological frameworks on systemic racism inform initiatives to effectively reduce racial oral health inequities? The first three questions are addressed by reviewing dental studies conducted in the past few years around the globe. The fourth question is addressed by framing racial oral health inequities around sociological scholarship on racism as a systemic feature of contemporary societies. The paper concludes with a set of practical recommendations on how to eliminate racial oral health inequities, which include engaging with a strong anti-racist narrative and actively dismantling the race discrimination system. Amid the few attempts at moving the field towards improved racial justice, this paper should be followed by research on interventions against racial oral health inequities, including the conditions under which they succeed.

Keywords: *Oral health; health status disparities; race relations; racism; health policy.*

Introduction

One of the earliest accounts of race in the field of dentistry dates back to the mid-19th century. Levison's paper (1851), published in *The Lancet*, was among the first to emphasize how race could be used to explain differences in orofacial development and morphology among "civilized men" and "semi-barbarous races." Some pioneering publications on racial oral health inequities began to appear in the 1910s, but related research started to grow exponentially only from the 1960s onwards (Bastos *et al.*, 2018).

This rapidly expanding body of knowledge has, nevertheless, been characterized by a number of important insufficiencies and ethical dilemmas (Bastos *et al.*, 2020): (1) Use of purely descriptive language that overlooks power imbalances and unequal access to resources/institutions across racialized groups; (2) Overreliance on simplistic theoretical frameworks that take racism as a *novel risk factor* for poor oral health, rather than a *system of oppression that cuts across various life domains*; (3) Inattention to frames of reference assuming that racism works *with* and *through* other axes of marginalization, such as sexism and classism, in contextually-specific ways; and (4) Lack of initiatives conceptualizing racism as operating on institutional, interpersonal, and intrapersonal levels.

Overcoming these limitations necessarily entails reviewing data on racial oral health inequities, as well as framing the corresponding findings around an anti-racist scholarship. A number of sociological frameworks suit this end. The theory of the *race discrimination system* (Reskin, 2012), for example, takes racism as a foundational element of contemporary societies, cutting across micro-, meso-, and macro-level processes. As Reskin argues, the extent of inequity among racialized groups, the ideologies used to sustain it, and the racial categories themselves are all created and maintained through particular sociohistorical processes (e.g., racial residential segregation), institutions (e.g., state-level agencies, including census bureaus), and interpersonal interactions (e.g., personally-mediated discrimination).

We contend that following this or other similarly-engaged theoretical frameworks (i.e., intersectionality, as recently discussed by Elaine Muirhead *et al.*, 2020; and Schuch *et al.*, 2021) is crucially important to advance an anti-racist agenda in oral health research. The objectives of the present paper are thus manifold: (1) To examine the occurrence of racial oral health inequities, with particular attention to their direction, magnitude, and persistence over time; (2) To establish links between systemic racism and racial oral health inequities; and (3) To make research and policy recommendations to eliminate racial oral health inequities. In what follows, we address each of these points, and finish with some brief concluding remarks.

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Before we move forward, one cautionary note is in order. Even though a multitude of terms (e.g., race, ethnicity, caste, religion, tribe, origins, nationality, linguistic group etc.) have been used to establish distinct "kinds of humankind" in the field of dentistry and elsewhere, these can all be seen as alternative ways of "delineating collectivities that share ancestral or cultural roots" (Loveman, 2014). By relying on oftentimes questionable, but otherwise accepted ancestral or cultural differences among groups, these concepts are used to value some categories of people and devalue others, thereby establishing and naturalizing the inequitable distribution of power, influence, and control over institutions/resources. Drawing from their shared meanings as well as their common effects upon relations among the demarcated groups, we tentatively refer to these concepts with an all-encompassing term: race. This is not to deny the sharp analytic distinctions that exist among the terms mentioned above, but to set an agreed-upon vocabulary by which to refer simultaneously to multiple groups oppressed along ancestral or cultural lines.

We also assume that race, as a powerful axis of marginalization and exclusion, does not emerge in isolation, nor does it exert effects apart from other social forces. As intersectionality scholars have long argued (Collins, 2009; Crenshaw, 1989), race, gender, class, sexuality, as well as other social markers of difference not only co-constitute one another, but also conjointly operate to determine specific social-spatial locations for all social groups, including the lived experiences that follow from them. Our focus on race-based inequities throughout this article should therefore not be viewed as one fragmented approach to the broader issue of social (in)justice and health. Rather, what follows represents an effort to address a particular dimension of health inequity in the hopes that, by doing so, the other axes of marginalization with which race intersects may also be dismantled. Of note, Patricia Homan (2019) has proposed a new line of health inequity research, focusing on structural sexism, that parallels the emerging literature on racism and oral or general health (Bastos *et al.*, 2018; Krieger, 2020). Empirically and analytically integrating these research streams will help us devise more effective strategies and policies against all forms of health inequity.

How pervasive are racial inequities in the occurrence of adverse oral health outcomes?

Our narrative review focuses on quantitative papers published between 2014 and 2019, indexed in PubMed (https://pubmed.ncbi.nlm.nih.gov/), which used race or a similar classificatory schema, as per the cautionary note above, to characterize or explain variation in adverse dental outcomes. The literature search included either papers in which race was the main analytical category or studies taking it as a secondary variable (i.e., confounder, effect-modifier, or mediator etc.) in the statistical analyses.

The search query developed to identify the 53 papers whose findings were thoroughly examined here was: *("Dentistry"[MeSH] OR "Dental Health Services"[MeSH] OR "Oral Health"[MeSH]) AND ("Skin Pigmentation"[MeSH] OR "skin color"[TiAb] OR "race*"[TiAb] OR "racial group"[TiAb] OR "Minority Groups"[MeSH] OR "Population Groups"[MeSH] OR "Health Status Disparities"[MeSH] OR "Healthcare Disparities"[MeSH] OR "Race Relations"[MeSH] OR "Social Discrimination"[MeSH] OR "Prejudice"[MeSH] OR "Socioeconomic Factors"[MeSH])*. Rather than an exhaustive list of papers, this search was devised to provide us with a sufficiently broad sample of articles on the topic, to enable an updated overview of the corresponding literature.

For each oral health outcome, we computed the number of times racialized minorities fared worse, as well as, or better than the dominant groups (Table 1). Though not derived from rigorous meta-analysis, Table 1 clearly suggests that racially minoritized groups are, more often than not, disadvantaged in terms of oral health. Of the 132 race-based comparisons made across the 53 studies, 65.9% indicated worse oral health for racialized minorities. The second largest number (25.0%) comprised comparisons resulting in no racial oral health inequities, with majority groups faring worse in only 9.1% of reviewed findings. Importantly, no adverse oral health outcome appeared to be more frequent within hegemonic groups in all comparisons. The relative disadvantage of racialized minorities varied to a great extent, however. Taken together, these papers support the claim that racial inequities in oral health are ubiquitous.

Upon closer inspection, the studies also reveal that racial oral health inequities not only emerge across core and periphery countries, but also at subnational levels. The studies originated mainly in South and North America, but a handful took place in European, Asian, and Oceanian countries. A wide array of minoritized groups fared worse in terms of oral health, with studies focusing on racialized or ethnic subgroups, Indigenous peoples, immigrants, and historically marginalized castes, among others. Evidence from Australia, Brazil, Canada, Mexico, and New Zealand, for example, often emphasized the poorer oral health status of Indigenous persons, as compared to non-Indigenous majorities (García-Pérez *et al.*, 2016; Jamieson *et al.*, 2016; Schuch *et al.*, 2017). These studies suggested that Indigenous peoples have worse oral health, as indicated by higher frequencies of dental caries, tooth loss, and poor self-rated oral health, as well as worse dental hygiene, higher rates of gingival bleeding, and lower access to dental services.

In The Netherlands (van der Tas *et al.*, 2016), Sweden, and Norway (Gülcan *et al.*, 2015), immigrants had higher frequencies of poor oral health outcomes than their native-born peers. Inequities also extended to other seemingly oppressed groups: some Indian castes had the highest prevalence of dental caries, when compared to privileged ones (Veerasamy *et al.*, 2016). In the U.S., Blacks, as well as other multiply marginalized groups (e.g., low-income, undocumented immigrants), had poorer oral health (Huang and Park, 2015).

Nationwide population data from the U.K. suggested that ethnic minorities were less likely to have visited a dentist recently (Arora *et al.*, 2016). Inequities in caries experience were also observed between foreign- and U.K.-born residents of the same ethnic group, with long-term immigrants bearing the greatest burden of negative oral health (Delgado-Angulo *et al.*, 2018). Of note, a number of U.K. studies have been conducted in the East London

Table 1. Compilation of findings from the 53 reviewed studies. PubMed, 2020.

Oral health outcomes	*# of comparisons showing poorer outcomes for racialized minorities*		*# of comparisons showing poorer outcomes for dominant groups*		*# of comparisons showing no oral health inequity*		*Total*	
	n	*%*	*N*	*%*	*n*	*%*	*n*	*%*
Oral health-related quality of life	17	63.0	0	0.0	10	37.0	27	20.5
Self-rated oral health	7	63.6	1	9.1	3	27.3	11	8.3
Dental caries	21	84.0	3	12.0	1	4.0	25	18.9
Tooth loss	7	50.0	4	28.6	3	21.4	14	10.6
Dental filling	3	60.0	1	20.0	1	20.0	5	3.8
Periodontal conditions	16	94.1	0	0.0	1	5.9	17	12.9
Toothache or other oral health disorders*	4	50.0	1	12.5	3	37.5	8	6.1
Access to or use of dental services	8	47.0	2	11.8	7	41.2	17	12.9
Oral hygiene status	4	50.0	0	0.0	4	50.0	8	6.1
Total	87	65.9	12	9.1	33	25.0	132	100.0

*Includes temporomandibular joint disorders, malocclusion, dental erosion, and dental fluorosis.

area, an impoverished and ethnically-diverse part of the city. Black and Asian residents of this area are less likely to have filled teeth, an indicator of access to and use of oral health services, compared to their white privileged peers, for example (Delgado-Angulo *et al.*, 2016).

Our review also indicated that racial inequities were not restricted to a specific period of the life course. In Brazil, for example, a number of studies reported oral health inequities from early to old ages: racialized minorities attending primary public schools showed worse oral health-related quality of life than their white colleagues (Emmanuelli *et al.*, 2015), and Blacks aged 60+ had fewer natural teeth, when compared to their white counterparts (Andrade *et al.*, 2019). With some exceptions (see Table 1), our review provides compelling evidence that racial oral health inequities are shared by contemporary societies.

What is the direction and magnitude of racial inequities in oral health?

The 53 papers quantified racial gaps in oral health. For instance, inequities between Indian, Pakistani, and white five-year-old children in the U.K. were large, with the mean number of decayed teeth being two times higher in the former than in the latter (Rouxel and Chandola, 2018). Similarly-aged Black and Brown Brazilian children were 1.5 and 1.4 times more likely, respectively, to report poor oral health-related quality of life than whites (Abanto *et al.*, 2018). Adolescents of Maasai ethnicity (a marginalized nomadic group inhabiting northern, central and southern Kenya and northern Tanzania) were 1.7 times more likely to have gingival bleeding, whereas non-Maasai ones were two times more likely to have decayed teeth (Simangwa *et al.*, 2018). The geographic exclusion to which Maasai people have been subjected, along with the economic hardships they face, limit their access to cariogenic products, thereby reducing the risk of developing dental caries.

As indicated in Table 1, scholars (e.g., Delgado-Angulo *et al.*, 2016) have also suggested that the adult non-white British population sometimes fares better in some oral health outcomes than their majority counterparts. The prevalence, extent, and severity of oral impacts, however, was worse for Black British residents in East London (Abdelrahim *et al.*, 2017). Blacks were also 1.5, 1.7, and 1.2 times more likely to present higher prevalence, greater extent, and greater severity of oral impacts than their privileged white peers.

Among Brazilians aged 35+, oral impacts on social contacts were 48% higher for Blacks than whites (Vettore and Aqeeli, 2016). Black and Brown older Brazilians were also 45% and 65% less likely, respectively, to present a functional dentition than whites (Andrade *et al.*, 2019), which is in line with another Brazilian study showing non-white individuals to be 1.3 times more likely than whites to need complete dentures (da Veiga Pessoa *et al.*, 2016). In the U.S., non-Hispanic Blacks aged 65+ were also more likely to have fewer teeth than whites. Racially minoritized social status interacted with poverty, such that economically-deprived Blacks and Hispanics were over three and four times more likely, respectively, to have fewer permanent teeth than whites (Huang and Park, 2015). The studies thus lend credence to racial oral health inequities being not only pervasive, but also having preferential target groups, whose dental indicators are worse than those of their privileged counterparts.

Does the inequitable distribution of adverse outcomes persist over time?

The literature on time trends in racial oral health inequities is scarce, but consistent with the notion that the inequitable distribution of adverse outcomes is persistent. Of the 53 publications identified, the only three investigating inequities over an extended period of time come from Australia (Ha *et al.*, 2016), New Zealand (Schluter and Lee, 2016), Sweden and Norway (Gülcan *et al.*, 2015).

The mean numbers of decayed teeth and decayed, missing and filled teeth were consistently higher among 5-10-year-old Indigenous children from 2000-2 to 2007-10 in three Australian states or territories (Ha *et al.*. 2016).

There was some indication, though, that inequities decreased in the last period: the mean number of decayed teeth was three times higher among poor Indigenous children in 2000-2 than among non-Indigenous peers, but this gap reduced to a twofold difference in 2007-10.

Using nationally-representative data from New Zealand, Schluter and Lee (2016) revealed that the caries-free prevalence among 5-year-old non-Maori children living in fluoridated areas was 60.7% in 2004, whereas the corresponding estimate was 37.8% for Maori children. Such inequities endured, with similar caries-free rates among non-Maori and Maori children 10 years later. In Sweden, but not Norway, tooth loss inequities remained large among people aged 65 and 70 years: while 24.8% and 46.1% of the native- and foreign-born respondents, respectively, reported tooth loss in 2007, the corresponding figures remained fairly the same in 2012: 26.2% and 46.6%, respectively. A similar pattern of enduring inequity was observed for oral health-related quality of life in both Norway and Sweden.

How can sociological frameworks on systemic racism inform initiatives to effectively reduce racial inequities in oral health?

While scientific debates around how best to conceptualize racism date back to the 1940s (see Myrdal, 1944 for one of the earliest theories of racism as cumulative disadvantage across life domains), it was only recently that theoretical models building on *systemic perspectives* were first proposed. The framework known as *race discrimination system* (Reskin, 2012) gained popularity within the U.S. and elsewhere for a number of reasons. Most prominent among them were: (1) Integration of behavioral, institutional, and cultural dimensions of racism; (2) Emphasis on power imbalances among racialized groups; and (3) Appeal to eliminating racial inequities by means of structural change.

These features overcome some major limitations of previous scientific accounts of racism, which have mostly been criticized for being fragmented and circumscribed to specific disciplinary fields. Aiming to develop a broad theory of racism, sociologist Reskin referred to the *race discrimination system* as "a set of dynamically related subsystems (or domains) in which disparities systematically favor certain groups, … disparities across subsystems are mutually reinforcing, … and one source of within-subsystem disparities is discrimination." By regarding discrimination as one source of "within-subsystem disparities", Reskin meant other forms might emerge as *disparate impact*, that is, racial gaps deriving from apparently unbiased processes. We expand on this point below.

The theory of the race discrimination system first assumes that there are feedback relationships among domains or subsystems (Figure 1). In contemporary U.S., for example, racial residential segregation is regarded as a powerful linking force between school education, socioeconomic status, health, and healthcare. By concentrating racialized minorities in neighborhoods that lack quality schools, racial residential segregation severely limits possibilities for attending high-standard universities. Less-than-optimal education then decreases the chances of finding well-paid, stable jobs along a professional career. A lifelong experience of poor working conditions with underpaid salaries, in turn, contributes to poor health, which poses an additional burden on often underfunded and lower-quality healthcare available to racialized minorities.

The second fundamental assumption underpinning this framework is that pervasive racial inequities across multiple domains give rise to *über discrimination*, a larger entity that sustains and intensifies race-linked inequities in each subsystem. As Reskin (2012) expounds, "über discrimination operates at a meta-level, influencing the cultural and social contexts in which people act. In social psychological terms, it distorts how we see others, the attributions we make about them, and our predictions of their performance. *It misinforms our understanding of events and our inferences about causes and consequences* (italics added)." Über discrimination transforms a set of race-related inequities into

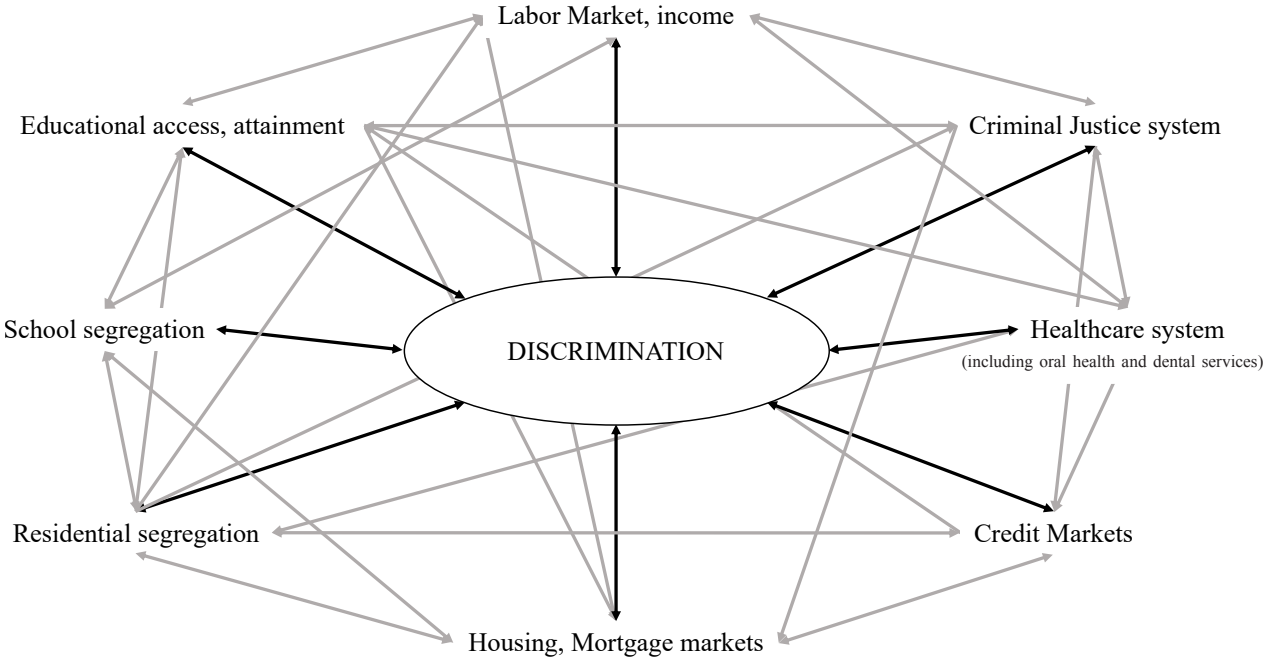

Figure 1. The race discrimination system, as adapted from Reskin (2012).

a race discrimination system. Figure 1 illustrates this with double-headed arrows connecting subsystems, as well as the emergence of über discrimination and its reciprocal effects on each specific domain. The concept of über discrimination thus makes it clear that the cultural dimensions of racism, which legitimize and reinforce widespread racial injustice, also need to be dismantled in order to effectively mitigate racial inequities.

How can we then use Reskin's framework to combat racial inequities in oral health? The first of three tentative answers we offer is that oral health should be seen as an integral part of the general health and healthcare domain, as illustrated in Figure 1 and long advocated by oral health scholars (e.g., Sheiham and Watt, 2000; Watt *et al.*, 2019), though for different reasons. By placing oral health within this domain, it should be clear that addressing the corresponding racial inequities necessarily entails dismantling racism in other parts of the system (e.g., labor market and criminal justice system), intervening at leverage points of the system, as well as attacking the belief system that perpetuates and reinforces racial inequities across domains. A fruitful line of research would thus focus on the extent to which racial oral health inequities decrease as a function of, for instance, neighborhood desegregation, increased racial diversity in the labor market (particularly among positions of prestige/power), and reduced mass incarceration, which typically targets racialized minorities.

A second answer to the question is to recognize that oral health researchers and the societies that surround them are all immersed in a system of meanings, values, and practices that is fundamentally racist and, as such, "misinforms our understanding of events and our inferences about causes and consequences" (Reskin, 2012). Über discrimination operates silently by setting research agendas, defining the questions we ask, as well as the strategies we devise to tackle racial oral health inequities. Only by acknowledging that oral health research and policy operates within this cultural milieu, may scholars and policy makers realize that combating racial inequities in oral health has more to do with being constantly aware of racism and how it distorts our worldviews than anything else.

A third but no less important tentative answer to the question is making dental clinicians, oral health researchers, policy makers, and other social actors more accountable for their actions. Whether in the realm of healthcare provision or public policy implementation, for example, decision-makers should be held accountable for both the expected and unintended consequences of their actions, especially when they increase racial inequities. We highlight the term "unintended" here, because the race discrimination system is plagued with not only openly racist events against minoritized groups, but also disparate impact across racially dominant and subordinate categories. As the U.S. National Research Council (2004) clearly puts it, disparate impact "occurs if a behavior or practice that does not involve race directly has an adverse impact on members of a disadvantaged racial group." Therefore, the social actors mostly concerned with oral health should be held accountable by both the extent to which their actions are visibly bigoted and how much the outcomes of their decisions are characterized by disparate impact.

What should be clear from Reskin's framework is that the strategies to eliminate racial oral health inequities are both numerous and inherently intersectoral. Eliminating racial inequities in dental diseases is thus not the sole responsibility of social actors mostly concerned with oral health. Influencing every domain of the race discrimination system, acting on leverage points (e.g. racial residential segregation), removing institutions from the discrimination system (e.g. by abolishing racism from the hidden curricula of dental schools), and increasing accountability all demand widespread and sustained commitment. Below, we outline some recommendations which might help build such a movement within the field of oral health.

Research and policy recommendations to mitigate racial oral health inequities

We urge oral health scholars, clinicians, providers, planners, and policy makers to consider seriously:

- Working with race and other markers of social difference, to describe the inequitable distribution of adverse dental outcomes, alongside racism, classism, sexism, and other related concepts, to explain and counteract the sources of injustice within and outside the field of oral health;
- Interacting with key actors from other areas of expertise (particularly, humanities and social sciences), and other social sectors (e.g., labor market, housing, education etc.), when planning and implementing strategies to mitigate racial oral health inequities;
- Increasing racial diversity among dental schools, faculties, university staff, state-held departments/agencies, and policy makers, so that the perspectives of racially minoritized groups are also taken into account;
- Constructing an anti-racist narrative, which takes racism as the rule rather than the exception in our contemporary societies; and
- Reflecting upon the limited value of traditional approaches to oral health promotion, given that they might potentially increase racial inequities in oral health if not attuned to a systemic perspective on racism.

Concluding remarks

We would like to finish with one overarching message from Reskin's (2012) seminal publication, as applied to dental research: The oral health field has been reluctant to incorporate racism into studies (Bastos *et al.*, 2018), not because it unlikely shapes inequitable patterns of disease distribution, but because scientific activity as a whole has been silently racist. Such a bias has significantly impeded our devising of interventions that might reduce or eliminate racial oral health inequities. We hope to see an upsurge in articles on interventions against systemic racism, including the conditions under which they succeed, in order to strengthen the fight against this backdrop of pervasive and persistent (oral) health inequity.

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