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Influence of the patient's race on the dentist's decision to extract or retain a decayed tooth

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Abstract – *Objectives:* The aim of this study was to investigate the influence of the patient's race on the dentist's decision to extract or retain a decayed tooth. *Methods:* A probabilistic random sample of 297 dentists from Recife, Brazil, was used. Two case scenarios were presented to the dentists. Both scenarios showed a molar that was extensively decayed, but indicated for conservative treatment. The scenarios included a description of the patient and eight photographs of the clinical case, including a photograph of the patient's face. The dentists were asked to regard the patient as poor and then to decide whether to extract or retain the molar. However, although the scenarios were based on the same clinical case, the photographs of the patient's face were different. One scenario showed the photograph of a white patient whereas the other showed the photograph of a black patient. The first scenario was presented 2 months before the second so that the dentists would not remember the former. *Results:* The dentist's decision varied significantly according to the patient's race, with dentists deciding to extract more frequently for the black patient than for the white patient (25.6%vs. 16.2%; $P < 0.001$). This racial variation occurred regardless of the demographic and socioeconomic variables of the dentists. It did, however, occur as a function of the setting of the dentist's practice. *Conclusion:* The patient's race may influence a dentist's decision whether to extract or retain a decayed tooth.

Key words: blacks; prejudice; tooth extraction; treatment decision

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Dental research into decision making has laid emphasis on decisions about diagnosis and treatment of dental caries (1–4). Recently, a number of studies have examined other aspects of clinical decisions in dentistry (5, 6), but almost no emphasis has been laid on tooth extraction (7).

Tooth loss can have a substantial impact on oral health, so it is important to identify all the factors that contribute to the decision to extract a tooth. However, a few studies have examined the influence of nonclinical factors on tooth extraction (8, 9) and, although the literature shows racial differences in tooth loss (10, 11), there is no study evaluating the influence of the patient's race on the dentist's treatment decision.

On the contrary, several studies have found disparities between black and white people in relation to medical procedures. Blacks receive, for example, fewer mammograms (12), cardiovascular procedures (13–15), sophisticated surgeries (16), antiretrovirals for human immunodeficiency virus infection (17), antidepressants for depression (18), influenza immunizations (19) and kidney transplants (20, 21). Socioeconomic differences, clinical indications and patients' preferences only partly explain such disparities. In fact, there is evidence that the professional's decisions contribute to those disparities (22). Therefore, the purpose of the present study was to evaluate the effect of the patient's race on the dentists' decision to extract or retain a decayed tooth.

Material and methods

This study was approved by the Human Research Ethics Committee of Pernambuco State University. It analyzed the dentist population in Recife, Brazil, where there were 2576 dentists at the time of the study, according to the Regional Dentistry Council (CRO-PE). It was a survey study based on case scenarios, which has been used in most research on treatment decisions, including dental research (2, 5, 6).

A sample of 297 dentists was randomly selected from a list of dentists drawn up by the CRO-PE (sample-size calculations required a minimum of 297 subjects for the study with 80% power to detect a 5% difference in treatment decisions at a level of significance of 0.05). All the selected dentists were then contacted by telephone and asked to undergo a face-to-face interview. Any dentist who was not actively engaged in the practice of general dentistry was excluded and replaced by the next dentist on the list (10 dentists). The same procedure was used whenever a dentist declined to participate in the research (eight dentists).

A consent form was presented to the dentists, who were informed that the purpose of the study would be to identify the factors in the treatment decision on whether to extract or retain an extensively decayed tooth. However, dentists were not told about the racial focus of the study.

The interview form comprised two parts. The first collected the dentist's professional, demographic, and socioeconomic data; the second one presented a case scenario of a molar that was extensively decayed, but indicated for conservative treatment, in which dentists were asked to decide whether to extract or retain the molar.

The case scenario included an album with photographs of the patient's face, upper and lower dental arches, habitual occlusion, close up of the decayed molar, and its periapical radiograph. It also included the information that the patient was poor and in good health, that the patient's chief complaint was moderate pain in the decayed molar, and that the patient gave the dentist the authority to decide.

Two case scenarios, similar except for the racial characteristics of the patient, were presented to each dentist. These scenarios used the same clinical case, from which a racial characterization was made by changing the photograph of the patient's face, and by digital manipulation of the colors of the intraoral photographs so that they corresponded to the photograph of the patient's face.

Digital manipulation of the intraoral photographs was also used in order to create some differences, of no clinical importance, between the two case scenarios. This differentiation included horizontally flipping the photographs of just one case scenario and putting amalgam restorations (one restoration for each dental arch) in different teeth according to the case scenario. Thus two photograph albums were prepared, one presenting a black patient and the other a white patient.

The scenarios were presented separately at different times: the first was presented at least 2 months (62–73 days) before the second so that the dentists would not remember the former. This minimum interval between the interviews was determined by pilot studies.

Statistical analysis was performed using SPSS (11.0), in which racial variation with regard to the dentist's treatment decision was analyzed using the McNemar test. This test was used because this study compares paired proportions, i.e. there are two observations per individual (23).

Reliability

Thirty dentists who participated in the study were randomly selected and interviewed a third time. This third interview was conducted at least 1 month after the second one and presented the dentist with the same case scenario used in the first interview. The analysis of data obtained in this way showed a high consistency in the dentists' responses, with Kappa values of 1 for categorical variables, including the dentist's treatment decision, and the intraclass correlation coefficient ranged from 0.97 to 1.00 for numerical variables.

Results

Table 1 shows the paired frequencies of the dentists' decisions for black vs. white patient. It can be seen that 9.4% of the dentists decided to extract for the black patient but retain for the white patient; however, no dentists decided to extract for the white patient but retain for the black patient. This racial variation in the dentist's treatment decision to extract more frequently for the black patient than for the white was highly significant ($P < 0.001$).

The paired frequencies of the dentists' decisions for black vs. white patient according to their

Table 1. Frequency of the treatment decision for the black vs. the white patient

Decision	Black patient		Total (white)	*P*-value[a]
	Extract	Retain		
White patient				
Extract	16.2 (48)	0.0 (0)	16.2 (48)	<0.001
Retain	9.4 (28)	74.4 (221)	83.8 (249)	
Total (black)	25.6 (76)	74.4 (221)	100.0 (297)	

Values are given as % (*n*).
[a]McNemar's test (because of the value zero inside the table, the statistical software used the binomial alternative).

sociodemographic and professional characteristics are displayed in Table 2. This table shows that the racial variation in the dentists' treatment decisions occurred regardless of their sociodemographic characteristics and regardless of whether or not they had undertaken postgraduate studies. It did, however, occur as a function of the setting of the dentist's practice. In a public setting there was no significant racial variation and in a military setting all dentists decided to retain for both the black and the white patients.

Discussion

Although case scenarios cannot reproduce all the complexity of the dentist–patient interaction, such as non-verbal communication, other research methods have more limitations for achieving the aim of the present study. By the use of secondary data, for example, it could not be confidently affirmed that differences are due to the dentist's decision, and the use of simulated clients (24) raises a number of ethical problems. Because of the distinct advantage of case scenarios in control variables, allowing one to analyze the extent to which these variables account for differences in the treatment decision (25–27), the present study shows that the patient's race influences the dentist's treatment decision on whether to extract or retain a decayed tooth. In a real-life clinical situation, however, the degree of this influence may be increased or diminished.

Unlike the majority of studies of racial disparities in health procedures (12–21), the present study directly analyzed the professional's decision, and its results suggest that bias on the part of the dentist may contribute to racial disparities in tooth loss (10, 11).

It seems reasonable to consider clinical uncertainty, prejudice and stereotyping as possible sources of the racial differences in the dentists' treatment decisions revealed by the present study. With regard to uncertainty, it is important to

Table 2. Frequency[a] of the treatment decision for the black vs. the white patient, according to the dentist's sociodemographic and professional characteristics

Dentist's characteristics	Decision			*P*-value[d]
	White patient	Black patient		
		Extract	Retain	
Age (years)				
≤35	Extract	12.8 (16)	0.0 (0)	0.016
	Retain	5.6 (7)	81.6 (102)	
36–45	Extract	23.8 (20)	0.0 (0)	0.002
	Retain	11.9 (10)	64.3 (54)	
>45	Extract	13.6 (12)	0.0 (0)	0.001
	Retain	12.5 (11)	73.9 (65)	
Gender				
Male	Extract	25.3 (24)	0.0 (0)	<0.001
	Retain	14.7 (14)	60.0 (57)	
Female	Extract	11.9 (24)	0.0 (0)	<0.001
	Retain	6.9 (14)	81.2 (164)	
Race[b]				
White	Extract	15.8 (32)	0.0 (0)	<0.001
	Retain	9.4 (19)	74.9 (152)	
Mulatto	Extract	17.0 (16)	0.0 (0)	0.004
	Retain	9.6 (9)	73.4 (69)	
Marital status				
Single[c]	Extract	8.0 (8)	0.0 (0)	<0.001
	Retain	16.0 (16)	76.0 (76)	
Married	Extract	20.3 (40)	0.0 (0)	<0.001
	Retain	6.1 (12)	73.6 (145)	
Income (US$/month)				
<500	Extract	14.8 (8)	0.0 (0)	0.016
	Retain	13.0 (7)	72.2 (39)	
500–1300	Extract	21.3 (36)	0.0 (0)	0.001
	Retain	6.5 (11)	72.2 (122)	
>1300	Extract	5.4 (4)	0.0 (0)	0.002
	Retain	13.5 (10)	81.1 (60)	
Degree				
First degree only	Extract	19.2 (20)	0.0 (0)	<0.001
	Retain	11.5 (12)	69.2 (72)	
Postgraduate degree	Extract	14.5 (28)	0.0 (0)	<0.001
	Retain	8.3 (16)	77.2 (149)	
Practice setting				
Public	Extract	41.1 (12)	0.0 (0)	1.000
	Retain	3.4 (1)	55.2 (16)	
Military	Extract	0.0 (0)	0.0 (0)	–[e]
	Retain	0.0 (0)	100.0 (24)	
Company	Extract	17.4 (16)	0.0 (0)	<0.001
	Retain	13.0 (12)	69.6 (64)	
Private office	Extract	13.2 (20)	0.0 (0)	<0.001
	Retain	9.9 (15)	77.0 (117)	

[a]Because of rounding, sums of percentages within each dentist's category may not come to exactly 100.
[b]Racial categories in Brazil include white, black, mulatto, yellow and indigenous, but no dentists regarded themselves as black, yellow or indigenous.
[c]Including divorced and separated.
[d]Because of the zeroes inside the table, the statistical software used the binomial alternative.
[e]Computed only for a table $P \times P$, where P must be >1.

remember that the decision on whether to extract or retain an extensively decayed tooth like that presented by the case scenario may be tentative if the social factors involved in this question are taken into account. In the face of such uncertainty, intuitive and heuristic processes may operate, thereby enabling nonclinical factors and easily identifiable variables, such as the patient's racial features, to be taken into account (28, 29).

With regard to prejudice, it is important to remember that it is common across cultures, time, national boundaries, and languages; no race, ethnic group, or gender has a monopoly on prejudice (30). It is not a problem peculiar to health care, being common throughout the society. Therefore, the judgements of health professionals, including dentists, often reflect the biases prevalent in society at large (31). In accordance with this reasoning, several researchers have suggested that the prejudice of the professional is a possible source of racial disparities found in medical procedures and believe that such prejudice is perhaps unintentional (20, 22, 32–34).

The dentists in the present study may have been influenced by the socioeconomic stereotypes of a black patient, even though they received the information that both the black and white patients were poor. Identical descriptions have different connotations depending on who or what is being described and people interpret what labels generally mean by reference to different standards. This very process characterizes the application of stereotypes (35). It is worth pointing out that the information concerning the patient's socioeconomic condition available on an actual clinical encounter is also incomplete. Thus, a similar process of stereotyping may occur. Dentists may have their own preconceptions about how different groups of patients should be cared for (9).

The present study found that there was racial variation according to all the dentist-related variables that were analyzed, except for the practice setting. This fact makes the practice setting a determining factor in racial variation. It may affect the aforementioned possible sources of the racial differences in the dentists' treatment decisions, namely clinical uncertainty, stereotyping, and prejudice.

Different working conditions of the practice setting may determine different levels of certainty of the professional concerning the possibility of an extensively decayed tooth receiving a conservative form of treatment. For example, in a well-equipped dental center, such as the military centers that took part in this study, dentists seemed to be quite certain about this possibility, as all of them decided to retain the tooth presented in the case scenario.

The application of socioeconomic stereotypes of a black patient may depend on whether or not he needs to pay for the treatment. Thus, in a public practice setting, for example, this stereotype seems to have had very little or no influence on the dentist's decision.

Prejudice expression may be restrained by a variety of suppression processes such as social norms and empathy (30). The rigid norms and the very hierarchical organization of a military setting may possibly suppress prejudice, and a more frequent contact with black patients may possibly enhance the empathy of dentists in a public setting with these patients and therefore suppress prejudice.

What about racial variation in treatment decision-making regardless of the dentist's race? Some researchers have suggested that black clinicians may be as susceptible as their white counterparts to racial stereotypes regarding black clients (36, 37). McClellan (38) argues that educational and professional socialization may lead health care professionals to distance themselves in terms of emotional attachment and self-interest from their group of origin.

Another important point to be discussed is the racial variation in treatment decision-making regardless of whether or not the dentist has undertaken postgraduate studies. This finding reinforces the idea that education in the humanities and social sciences can provide social norms and teach values that lead to the suppression of prejudice, but merely technical education, such as that commonly provided in postgraduate courses in Dentistry, cannot (30).

The first step toward eliminating the racial differences in the treatment decision is to stimulate regular, continuous, open and broad discussions of the racial issue. The entire dental community should be engaged in this task.

The universities should give instruction in decision making and provide specific and scientifically accurate guidelines in order to reduce the uncertainty in treatment decisions and teach dentists to decide objectively. They should also develop the dentist's social skills by, for example, training and motivating them to be aware of the circumstances that activate racial stereotypes and to learn how to eliminate the influence of such stereotypes by focusing on clinical factors.

Conclusions

The dentist's decision on whether to extract or retain a decayed tooth varied according to the patient's race with dentists deciding to extract more frequently for the black patient. This racial variation occurred with almost all the dentist-related variables that were analyzed. It was, therefore, concluded that the patient's race influences the dentist's decision to extract or retain a decayed tooth.

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