



# Racial Disparities with Survival of Head and Neck Cancer Patients in the SARS-CoV-2 Pandemic

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## Abstract

The SARS-CoV-2 (COVID-19) pandemic caused profound disruption to the delivery of healthcare. Patients with Head and Neck Cancer (HNC) may have experienced cancelled appointments or surgeries. Racial minority patients with HNC experienced unequal access to treatment and poorer outcomes since before the pandemic. In addition, racial disparities are present in the outcome of patients with COVID-19. During the COVID-19 pandemic, racial minority patients with HNC are an especially vulnerable population. Unfortunately, unequal access to healthcare before the pandemic may have limited the understanding of the factors contributing to racial disparities in the quality of life and mental health of patients with HNC. These factors may have amplified disparities during the pandemic. The goal of this commentary is to raise awareness of the existing racial disparities with survival of head and neck cancer patients in the SARS-CoV-2 pandemic.

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## Introduction

The SARS-CoV-2 (COVID-19) pandemic caused profound disruption to the delivery of healthcare. Many outpatient clinics shutdown or restricted visits to emergencies to protect patients and staff from infection. Shortages of Personal Protective Equipment (PPE) and the need to conserve hospital resources for COVID-19 patients resulted in the cancellation and postponement of elective surgeries, including cancer cases. Unfortunately, cancer cases, including Head and Neck Cancer (HNC) cases, are time sensitive. Delayed treatment is associated with higher mortality in patients with HNC [1]. All patients with cancer are more susceptible to severe presentations of COVID-19 compared to patients without cancer [2]. In addition, patients recently treated with chemotherapy or surgery experienced more severe events from COVID-19 [3].

Despite the increased morbidity from COVID-19, surgery or chemoradiation treatment should not be delayed in patient with HNC at low risk of infection [4]. While there is limited information on access to healthcare specific to patients with HNC cancer, a significant proportion of a general population of patients with cancer surveyed reported delay in treatment or ability to afford care since the COVID-19 pandemic began [5].

Health disparities have been well documented in the United States. Unfortunately, emerging data from the COVID-19 pandemic showed that African American patients are overrepresented in proportion of cases. They comprise of 27.3% of cases of which race was reported despite representing 13.4% of the total population [6,7]. Racial minorities are more likely to have

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no health insurance, reside in densely populated areas, and have underlying health conditions. All these factors increase their susceptibility to COVID-19 [8]. Similarly, these factors also influence outcomes of racial minority patients with HNC. African American patients showed worse survival compared to white patients [9,10]. There is evidence to suggest that access to care may explain the disparity. For example, African American patients are less likely to obtain recommended surgery compared to white patients and often present with more advanced disease [11,12]. Since racial minorities tend to reside in densely populated areas and are affected more severely by COVID-19, they may experience additional disruption to HNC treatment.

Cancer survivorship begins the moment a patient is diagnosed with cancer [13]. Much of the literature on survivorship in patients with HNC have focused on treatment. However, the long-term mental health effects of treatment for HNC has also been reported [14]. There is a limited amount of peer reviewed original research studies regarding the impact of race on management of patients with HNC cancer during the COVID-19 pandemic. However, racial disparities have been identified before the pandemic and may have been amplified as more patients experience disruptions to treatment. The goal of this commen-

tary is to review the existing racial disparities of HNC survivorship and assess the impact of the COVID-19 pandemic on providing care to racial minority patients.

**Methods**

**Literature Review and Evidence Collection**

A review of English literature was performed by two authors (EEZ, SAN), using PubMed/Medline to search for epidemiology, demographics, and news articles on racial disparities in the COVID-19 or Head and Neck cancer population. A search strategy was employed with the following search strings: “head and neck cancer OR head and neck” with “race or demographics or racial determinants.” An independent search was also performed using the following search strings “covid OR covid-19 OR coronavirus” with “race OR demographics” in the last year on PubMed and Google. To identify additional sources, the reference lists of relevant articles were hand searched. Results were limited to articles in the English language. After the completed search, a total list of records was obtained and duplicates removed. A final list of full text articles was then compiled, and one author (EEZ) independently screened each article.

**Table 1:** Racial characteristics of patients with COVID-19 in the United States.

Data source	Measurement	Black	Latino	Asian	White
APM Research Lab [18]	COVID-19 death rate per 100,000	40.9	17.9	17.9	15.8
<sup>a</sup> Centers for Disease Control and Prevention [6]	COVID-19 cases	27.4%	NA	4.8%	53.2%
<sup>a</sup> COVID-NET <sup>43</sup>	Hospitalized patients with COVID-19	36.8%	12.5%	NA	40.5%

**Abbreviation:** NA= Not Available,

<sup>a</sup>For reference, the estimated racial composition in the United States in 2019 is 13.4% black, 18.3% Hispanic or Latino, 5.9% Asian, and 60.4% white [7].

**Table 2:** States reporting racial data of COVID-19 deaths.

State	% uninsured	% Diabetes	% Hypertension	% Obesity	# of cases with reported race	Difference between % COVID-19 deaths and % population			
						Black	Latino	Asian	White
Alabama	10	12.7	41.9	36.2	360	19	-1	-0.5	-17
Alaska	12.6	7.3	31.8	29.5	7	-3	-7	13.7	-14
Arizona	10.6	9.8	30.7	29.5	286	0	-15	-2.1	0
Arkansas	8.2	10.5	41.4	37.1	68	19	*	*	-18
California	7.2	9.9	28.4	25.8	2235	4	-4	2.1	-3
Colorado	7.5	6.3	25.9	23	868	3	-4	1	0
Connecticut	5.3	7.4	30.5	27.4	2691	5	-8	-3.5	8
Delaware	5.7	9.9	34.9	33.5	182	8	-5	-3.6	1
District of Columbia	3.2	8.4	26.4	24.7	283	35	-3	-2	-26
Florida	13	9.4	34.6	30.7	1406	7	-4	Not reported	-1
Georgia	13.7	10.4	33.1	32.5	1292	19	-6	-2.3	-9
Idaho	11.1	7.8	29.8	28.4	67	1	-7	1.5	5
Illinois	7	9.2	32.3	31.8	2967	20	-1	-1.3	-17
Indiana	8.3	10	35.2	34.1	1053	8	-5	-1.8	-14
Kansas	8.8	8.8	32.8	34.4	149	27	-6	-2.8	-18
Kentucky	5.6	9.7	39.4	36.6	252	10	-2	0.9	-8
Louisiana	8	10.8	39	36.8	2072	26	-3	-0.8	-21

Maryland	6	9.2	32.4	30.9	1385	14	-3	-2.6	-5
Massachusetts	2.8	7.7	28.6	25.7	2303	3	-2	-3.6	0
Michigan	5.4	9.3	34.7	33	4039	29	-3	-2.3	-27
Minnesota	4.4	6.8	26.6	30.1	390	1	-2	-3.6	4
Mississippi	12.1	12	40.8	39.5	387	16	-2	NA	-16
Missouri	9.4	8.7	32	35	333	29	5	NA	-31
New Hampshire	5.7	8.1	30	29.6	39	-1	4	-2.6	0
New Jersey	7.4	8.2	33	25.7	6174	6	-4	-4.4	-14
New York	5.4	9.7	29.4	27.6	21093	13	8	-1.2	-20
North Carolina	10.7	10.5	34.8	33	480	14	-6	-1.8	-8
Ohio	6.5	9.2	34.7	34	1208	5	-3	-1.6	0
Oklahoma	14.2	10.2	37.7	34.8	221	2	-9	-1.4	8
Oregon	7.1	8.3	30.1	29.9	99	3	-6	1.3	-5
Pennsylvania	5.5	8.7	32.6	30.9	1667	10	*	-1.3	-4
Rhode Island	4.1	8.3	33.1	27.7	380	0	-3	*	8
South Carolina	10.5	11.3	38.1	34.3	255	22	*	NA	-19
Tennessee	10.1	11.1	38.7	34.4	230	15	-2	0.8	-14
Texas	17.7	10.9	32.5	34.8	333	6	-10	-3.1	9
Vermont	4	6.7	30.4	27.5	49	-1	0	2.6	-7
Virginia	8.8	9.2	32.4	30.4	635	8	-3	*	-5
Washington	6.4	8	29.5	28.7	772	-1	-5	0.9	6
Wisconsin	5.5	7.3	30.8	32	394	24	2	-1.3	-19

**Abbreviation:** NA= Not Available, \*= Unclear. States reporting racial data for COVID-19 deaths; prevalence of uninsured states; prevalence of diabetes; prevalence of hypertension; prevalence of obesity; number of deaths with known race; percent difference between COVID-19 deaths and representation in general population by race. Unclear (\*) indicates the specified race may be grouped into an “other” category and are not included in the number of cases with known race for the state. Because unclear cases are not included for each state, the sum of cases for all states may not equal total. Data source: US. Census Bureau [19]. Centers for Disease Control and Prevention [20,21,44]; APM Research Lab [18].

**Table 3:** Prevalence of comorbidities by race.

Comorbidities	Black	Hispanic	Asian	White
Diabetes	11.7	12.5	9.2	7.5
Hypertension	40.3	27.8	25	27.8
Obesity	49.6	44.8	17.4	42.2

Data source: Centers for Disease Control and Prevention [23-25].

**Table 4:** Factors associated with racial disparities between COVID-19 deaths and racial representation in the general population.

Factors	Black	White
Uninsured %	$r = -0.022, p = 0.895$	$r = 0.078, p = 0.637$
Diabetes %	$r = 0.386, p = 0.015$	$r = -0.272, p = 0.094$
Hypertension %	$r = 0.313, p = 0.052$	$r = -0.289, p = 0.075$
Obesity %	$r = 0.415, p = 0.009$	$r = -0.314, p = 0.052$

Pearson’s correlation coefficients (r) of factors associated with racial disparities for blacks and whites in COVID-19 deaths. Bolded indicates significance.

**Table 5:** Racial characteristics of occupations with high risk of exposure to COVID-19 and limited access to personal protective equipment.

Occupation	Percent of total employed			
	Black	<sup>a</sup> Hispanic or Latino	Asian	White
Bailiffs, correctional officers, and jailers	34.2	12.3	1.7	60.5
Bus drivers	27	15	3.1	67.2
Cashiers	17.9	24.1	7.3	69.2
Driver/sales workers and truck drivers	18.1	20.5	2.9	75.2
Food processing workers, all other	18.1	38.8	7	72.1
Janitors and building cleaners	18.2	31.6	3.4	74
Licensed practical and licensed vocational nurses	27	13.8	3.3	67
Nursing, psychiatric, and home health aides	37.2	17.6	4.4	54.3
Personal care aides	25.1	21.6	8.4	60.2
Police and sheriff’s patrol officers	12.6	17	1.5	82.9
Postal service mail carriers	19.6	14.4	5.5	72.7

Data source: U.S. Bureau of Labor Statistics [45]. <sup>a</sup>Hispanic can be of any race. The sum of all races for each occupation may not equal 100.

## Discussion

Racial minorities worldwide have been affected by COVID-19. Native Americans, Australian Aboriginals, and indigenous people worldwide all reported COVID-19 cases within their communities. Unfortunately, it is difficult to assess the impact on these populations due to limited data [15]. In the United Kingdom, COVID-19 positive patients of black African, black Caribbean, and Pakistani ancestry had mortality rates 3.5, 1.7, and 2.7 times higher than that of white British patients, respectively [16,17]. Underlying health conditions, residence in COVID-19 hotspots, and low socioeconomic status have been attributed to the findings [17]. Although there appears to be a trend in the marginalization of racial minorities worldwide, countries classify and report data on racial groups differently. In addition, countries may have different healthcare systems and different treatment preferences. Thus, it is difficult to directly compare results. The remainder of this commentary is focused on the impact of COVID-19 on racial minorities in the United States and potential consequences for patients with HNC.

Like the United Kingdom, black patients in the United States were also disproportionately affected by COVID-19. The current data regarding the racial composition of COVID-19 patients. African Americans were overrepresented in the percent of total cases (27.3%), deaths (27%) and hospitalized patients (36.8%) compared to their representation in general population (13.4%). They also have the highest death rate (40.9 per 100,000) out of all races. The disparity varied by location. The prevalence of uninsured status (Table 2), diabetes, hypertension, and obesity, and percent difference between COVID-19 deaths and representation in the general population in states that reported race [18-21]. Out of 39 locations that report race for COVID-19 deaths, 30 states and District of Columbia showed a 3% or greater difference between the percent of COVID-19 deaths and the general population of African Americans. The greatest difference was observed in District of Columbia (35%), followed by Michigan (29%) and Missouri (29%). Racial minorities' representation in densely populated areas, lack of health insurance, farther distance from grocery stores and healthcare facilities and underlying health conditions have all been proposed as possibilities for the disparity. Although District of Columbia is densely populated, only 3.2% of the population was uninsured in 2018, well below the national average of 8.9% [19]. In addition, the national average of uninsured blacks (9.7%) and uninsured non-Hispanic whites (5.4%) is unlikely to explain the overall difference in COVID-19 deaths and racial representation the general population, 14% and -13% respectively. A study of hospitalized patients with COVID-19 in New York reported the most common comorbidities were hypertension, diabetes, and obesity [22]. Data reported by the Centers for Disease Control and Prevention showed that these conditions were more common among blacks, shown in (Table 3) [23-25]. To assess if these comorbidities are associated with the difference between COVID-19 deaths and representation in the general population, Pearson coefficients were obtained between the percent differences in COVID-19 deaths and representation in the general population, and prevalence of comorbidities for blacks and whites. Results are shown in (Table 4). The prevalence of diabetes and obesity showed a positive correlation with the percent difference between COVID-19 deaths and representation in the general population for blacks ( $r = 0.386$ ,  $p = 0.015$ ;  $r = 0.415$ ;  $p = 0.009$ ). No significant correlations were observed for whites. Unfortunately, racial data for comorbidities associated

with COVID-19 deaths is not publicly reported. Thus, it is difficult to assess the impact of comorbidities on racial disparities at a national level. Data for Latinos and Asians are inconsistently reported. For example, some states group Latinos or Asians in an "other" category while others may group Latinos with Hispanics of any race. This presents a challenge to understand the impact of COVID-19 on Latinos and Asians. Another explanation for the racial discrepancy is occupation. Occupations at a high risk of exposure to COVID-19 that may have limited access to PPE is shown in (Table 3). Blacks were overrepresented in all except police and sheriff's patrol officers [26]. This suggests that employed African Americans are at a higher risk of exposure to COVID-19. Some employers of these occupations traditionally did not provide PPE to the employees and may have less access to procure these supplies compared to large hospital systems. Providing adequate PPE to high-risk employees is one way to reduce racial disparities during the pandemic. Since occupation of deceased COVID-19 patients is not included in official reports, it is difficult to evaluate its association with racial disparities.

The COVID-19 pandemic affected many patients' access to treatment. Otolaryngologic procedures are considered at high risk of generating aerosol and COVID-19 transmission. To protect staff and patients from aerosol exposure, institutions delayed surgeries but attempted to proceed with time sensitive HNC resection. Unfortunately, some patients with HNC inevitably experienced surgery delay as a recent survey showed some institutions surveyed temporarily suspended free flap surgery [27]. An increase in the overall treatment time and the postoperative time to radiation have been shown to increase mortality [28,29]. Before the pandemic, interruptions to radiotherapy was more likely to occur in patients residing in racial minority neighborhoods [30]. Further interruption to chemotherapy is expected during the pandemic when patients become infected. Since these therapies may increase morbidity from COVID-19, patients who test positive or are at high risk of infection are recommended to delay treatment as clinicians are forced to balance the two risks [4]. Minority patients with HNC are more likely to have comorbidities, which is associated with reduced survival in both HNC and COVID-19 [8,31]. Poorer health at baseline in combination with reduced access to healthcare place minority patients with HNC at a higher risk of complications from both COVID-19 and delayed HNC treatment. Although outcomes data has yet to become available, these patients are likely to fare poorly during the pandemic. Institutions should proactively identify barriers faced by racial minority patients and ensure all patients receive prompt treatment. In addition to surgery and chemoradiation, patients with HNC often require multidisciplinary support, such as swallow evaluations, as part of their comprehensive treatment. These multidisciplinary support were recommended to continue during the pandemic [4]. However, swallow evaluations can generate aerosol and the supply of PPE may determine if these studies are available. In pre-COVID-19 times, patients receiving treatment at safety net hospital are less likely to receive speech or swallow therapy, which has been shown to improve dysphagia and quality of life [32]. Safety net hospitals serve a higher proportion of racial minority and uninsured patients. They also experienced PPE shortage during the current pandemic [33]. As these hospitals attempt to reduce PPE consumption, support for patients with HNC may be delayed or suspended, which can further contribute to increased morbidity and mortality. One way to reduce racial disparities during the pandemic is to provide adequate resources to institutions that serve racial minority patients.

Racial disparities in the subjective outcomes of patients with HNC is less studied. Guerriero et al., reported that African American patients with HNC report poorer Quality of Life (QoL) [34]. The authors attributed this finding to psychological distress and lack of emotional support among African American patients. Additional studies are needed to further understand the racial disparities in QoL. One barrier to understanding the impact of HNC on racial minority patients' QoL is healthcare access. Consistent follow-up in clinic and multidisciplinary support visits will give providers insight into the challenges unique to this population and allow the opportunity to tailor treatment to fulfill their needs. In the pandemic era, it is important to maintain contact with vulnerable patient populations and give each patient the opportunity to discuss the disease impact on daily life. Information obtained can be used to improve the delivery of care to minority patients during pandemic and non-pandemic times.

Another challenge for patients with HNC during the COVID-19 pandemic is mental health. As the pandemic unfolds, the general population experience stress from isolation and uncertainty [35]. Patients with HNC, who may face cancelled appointments and surgeries or loss of insurance, are undoubtedly affected too. Lee et al., reported the prevalence of mental health disorders increased from 20.6% to 29.9% after diagnosis of HNC [14]. In addition, patients with HNC have the second highest suicide rate among all cancer patients, a population at elevated risk compared to healthy individuals [36]. Thus, it is essential to address the mental health of patients with HNC. Currently there is limited data regarding the racial impact on the mental health of patients with HNC. However, data from a mixed sample of cancer patients showed that Latinos and African Americans reported poorer mental health [37]. Furthermore, racial and ethnic minorities are less likely to receive treatment for mental health disorders [38]. We recommend clinicians to provide mental health resources to patients with HNC and identify potential obstacles to access mental health care for racial minority patients.

Lastly, telemedicine has been recommended for the management of patients with HNC during the pandemic. However, initial cancer evaluation and post treatment surveillance, which require physical exams and possible flexible laryngoscopy, are difficult to conduct remotely [39]. Despite the limitations, patients are able to obtain nutritional or exercise advice and mental health support [4,40]. Although telemedicine has been used in the management of patients with HNC for years, the pandemic accelerated its use. Clinicians are expanding the capabilities of virtual patient care. For example, a guide for remote physical exams has been developed [41]. Virtual appointments provide the opportunity for clinicians stay in contact with all patients scheduled for follow up and limit in person visits to patients requiring urgent assessment. This model mitigates the disruption due to the pandemic and reduce unnecessary exposure for both patients and staff. The effect of race on telemedicine outcome is not well studied. Evidence suggests that telemedicine can effectively deliver care to underserved minority patients [42]. Telemedicine has the potential to reduce racial disparities for patients with HNC, but more data is needed to assess if access to technology limits its use in low income minority populations.

### Limitations

This commentary is limited by data availability. Worldwide, many countries do not report race and ethnicity for COVID-19

patients. For example, reports of COVID-19 in indigenous communities are limited to anecdotal news articles. As these populations live in isolated communities and lack access to healthcare, it is difficult to assess the impact of COVID-19. In the United States, race was reported for only 47.0% of total cases [6]. Regarding patients with HNC, little is known about the association of race with quality of life or mental health from pre-pandemic times. Increased reporting of race in published studies will allow for an improved understanding of the factors contributing to racial disparities.

### Conclusion

There is limited information available regarding racial disparities in HNC survivorship during the COVID-19 pandemic. Data from pre-pandemic times suggest that racial minorities experience higher mortality from HNC and are less likely to receive recommended care. Studies regarding racial disparities in quality of life and mental health of racial minority patients with HNC are scarce. Unequal access to care for racial minority patients may have impeded the understanding of factors contributing to these disparities. Further reduction of access to care during the pandemic may have amplified existing racial disparities. The rapid adoption of telemedicine in the management of HNC is a solution to mitigate disruption for selected patients and has the potential to reduce racial disparity in access to care. Further studies are needed to improve the understanding of racial disparities in patients with HNC and determine methods to alleviate these inequalities during the pandemic.

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