DISPARITIES IN TELEPHONE AND VIDEO TELEHEALTH ENGAGEMENT DURING THE COVID-19 PANDEMIC

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ABSTRACT

Objective: The COVID-19 pandemic and subsequent expansion of telehealth may be exacerbating inequities in ambulatory care access due to institutional and structural barriers. We conduct a repeat cross-sectional analysis of ambulatory patients to evaluate for demographic disparities in the utilization of telehealth modalities.

Materials and Methods: The ambulatory patient population at Oregon Health & Science University (Portland, OR) is examined from June 1 through September 30, in 2019 (reference period) and in 2020 (study period). We first assess for changes in demographic representation and then evaluate for disparities in the utilization of telephone and video care modalities using logistic regression.

Results: Between the 2019 and 2020 periods, patient video utilization increased from 0.2% to 31%, and telephone use increased from 2.5% to 25%. There was also a small but significant decline in the representation males, Asians, Medicaid, Medicare, and non-English speaking patients. Amongst telehealth users, adjusted odds of video participation were significantly lower for those who were Black, American Indian, male, prefer a non-English language, have Medicaid or Medicare, or older.

Discussion: A large portion of ambulatory patients shifted to telehealth modalities during the pandemic. Seniors, non-English speakers, and Black patients were more reliant on telephone than video for care. The differences in telehealth adoption by vulnerable populations demonstrate the tendency towards disparities that can occur in the expansion of telehealth and suggest structural biases.

Conclusion: Organizations should actively monitor the utilization of telehealth modalities and develop best-practice guidelines in order to mitigate the exacerbation of inequities.

INTRODUCTION

The COVID-19 pandemic has resulted in a massive shift in ambulatory care delivery, primarily to the modalities of video and telephone.[1] The COVID-19 pandemic forced healthcare organizations to find new ways of reaching patients. Early on, many healthcare institutions limited in-person clinics and elective procedures to reduce the spread of virus, to conserve personal protective equipment, and to prevent excess demand. Telehealth was a natural solution to fill the gap in care delivery with already proven value.[2] However, widescale usage was previously hampered by restrictions in reimbursement and a confusing regulatory regime. In early March 2020, under the Coronavirus Preparedness and Response Supplemental Appropriations Act (CPRSAA) and an executive section 1135 waiver, Health and Human Services (HHS) and The Centers for Medicare & Medicaid Services (CMS) lifted barriers to support telehealth.[3] Some of the changes included: home as an originating site, removal of geographic restrictions, and reimbursement for audio-only visits.[4] Following suit, most state Medicaid programs and commercial payors relaxed their restrictions as well.[1]

Past studies have shown that telehealth can be effectively equivalent to in-person care.[2] Furthermore, it has the potential to deliver additional value for patients. The ease of access can relieve transportation burdens in rural areas, those without childcare arrangements, and for whom traveling is dangerous.[5] Moreover, the privacy of a remote visit can provide reprieve for the situational stigma of being seen in-office.[6] In some instances, telemedicine can even prevent costlier, downstream care.[7]

Yet despite the benefits, the expansion of telehealth may be exacerbating existing inequities in healthcare. Ethnic and racial minorities in The U.S. are more likely to have complex chronic diseases, be poorly insured, and experience worse health outcomes.[8–10] Adding to the

existing disparities, the disease of COVID-19 is disproportionality affecting the African Americans and Latino communities, who are more likely to suffer severe morbidity and mortality related to COVID-19.[11–14] The massive shift to telehealth may be creating a new set of healthcare barriers related to technology access and literacy. Before the pandemic, studies found that racial and ethnic minorities, low-income, immigrant, elderly, and rural patients have more difficult accessing and using telehealth services.[15–19] A number of barriers can prevent patients from engaging with their providers remotely, including technology ownership, broadband access, digital literacy, English proficiency, social isolation, provider biases, and structural racism.[16,20,21] How these barriers manifest in telehealth access for specific populations is not well understood.

In-response to the pandemic, Oregon Health & Sciences University (OHSU) ambulatory clinics rapidly expanded their telehealth offerings, consisting of video and telephone visits. A majority of patients were forced to adopt some degree of telehealth to avoid in-person care or conform with institutional policies. When clinics began to re-open in-person appointments during the summer of 2020, there were no evidence-based guidelines for the best-practice usage of remote care. Prior to COVID-19, studies of telehealth were limited to willing patients and providers. As a result, there was a limited evidence base and mixed findings related to disparities in telehealth participation among racial and ethnic minorities.[16,22,23]

With the continued widespread availability telehealth, we have the opportunity to observe its full effects of on care access and utilization. In the initial months of the pandemic, multiple medical centers reported that vulnerable populations were less likely to access telemedicine after they had shifted a majority of care delivery to remote platforms.[24] An academic health system in San Francisco found that their primary care clinics saw a smaller proportion of seniors, non-

English speakers, racial and ethnic minorities after the shift to telemedicine.[15] Similarly, a health system in New York City reported that Black patients were less likely to access telemedicine than white patients.[25] It is important to note that these studies analyzed data from an unstable period in March through May 2020, when telehealth was growing rapidly and in-person visits were more severely limited. They may not reflect a steady state, and they do not differentiate between the utilization of specific telehealth modalities, such as telephone or video.

Despite the uncertain regulatory future of telehealth, experts agree that it will likely persist beyond the pandemic.[1,26] Yet, when the decision to conduct a telehealth visit is determined by provider and patient preferences, without guidelines, then inequities may be exacerbated. Furthermore, the aforementioned barriers to telehealth predominantly manifest in accessing internet-based video visits. Vulnerable populations who are unable to utilize sophisticated technology may be more reliant on the telephone for their remote care. The inequities may have policy implications if and when Centers for Medicare & Medicaid Services (CMS) discontinues reimbursements for audio-only visits that were allowed under 1135 waivers.[4] Thus, it is critical to identify and mitigate access barriers early in the implementation of telehealth. Here, we examine the impact of the pandemic and telehealth expansion on disparities in access and utilization for ambulatory care.

MATERIALS AND METHODS

A repeat cross-sectional study was conducted of patients who utilized the ambulatory clinics at Oregon Health & Science University (OHSU) from June 1 through September 30, in 2019 (reference period) and 2020 (study period). The study period was chosen because it exhibited a relatively stable rate of in-person, telephone, and video ambulatory visits. The initial

months of the pandemic in March through May 2020 were marked by shifting state and institutional policies that affected appointment availability. By the summer of 2020, clinics were more open to scheduling in-person visits. We chose to investigate a later, more stable time-frame for disparities because we believe that the analysis would be more indicative of ongoing trends.

Unique patient counts were extracted from ambulatory provider-led visits, defined as outpatient visits with physicians, nurse practitioners, or physician assistants. Visits modalities included in-person, video, or telephone, the latter two comprising telehealth. Patient demographics included ethnicity, race, preferred language, payer, age, and sex. The OHSU institutional review board determined that this project did not involve human subjects and was exempt from review (STUDY00022108).

To assess for overall changes in patient demographics, we compared the proportional representation of groups between the equivalent study and reference periods. Next, we used multivariable logistic regression to evaluate the association of patient demographics with telehealth utilization (vs in-person only). Second, we assessed the association of demographics with video utilization (vs telephone-only) amongst the subset of telehealth users. To reveal if specialty services were disproportionately weighting our results, we performed a sensitivity analysis by repeating both regression models for primary-care visits only. Adjusted odds ratios and 95% confidence intervals were produced from the models. Entries with null values were excluded. Analyses were performed in the R programming environment (R Foundation for Statistical Computing 4.02).

RESULTS

During the 2019 reference period, 140,954 unique patients accessed ambulatory provider-led care. Of those, 0.2% and 2.5% utilizing at least one video or telephone visit, respectively. Following the onset of the COVID-19 pandemic, 134,274 ambulatory patients were seen during the 2020 study period. Of these, 31% of patients utilized at least one video visit, 25% utilized at least one telephone visit, and 51% participated in either telehealth modality. Table 1 summarizes the utilization of visit modalities by demographic groups.

Table 1. Utilization of ambulatory visit modalities by patient demographic groups, June 1 through September 30, 2020

	Patient participation in visit modality, n (%)[a]				
Demographic	**In-Person**	**Telephone**	**Video**	**Any Telehealth**	**Total Patients**
All Patients	95,407 (71.1)	33,418 (24.9)	41,766 (31.1)	68,275 (50.8)	134,274
Race					
White	78,717 (70.6)	28,304 (25.4)	34,963 (31.4)	57,355 (51.5)	111,436
Black	2,422 (73.0)	1,055 (31.8)	956 (28.8)	1,805 (54.4)	3,316
Asian	4,176 (74.8)	1,083 (19.4)	1,781 (31.9)	2,631 (47.1)	5,585
American Indian	697 (69.3)	295 (29.3)	279 (27.7)	529 (52.6)	1,006
Multiracial	3,869 (73.0)	986 (18.6)	1,766 (33.3)	2,521 (47.6)	5,301
Ethnicity					
Non-Hispanic	83,410 (70.7)	29,765 (25.2)	37,544 (31.8)	61,000 (51.7)	118,010
Hispanic	8,967 (74.5)	2,710 (22.5)	3,077 (25.6)	5,340 (44.4)	12,038
Sex					
Female	54,801 (70.8)	19,401 (25.1)	25,471 (32.9)	40,507 (52.3)	77,385
Male	40,584 (71.4)	14,011 (24.6)	16,285 (28.6)	27,753 (48.8)	56,857
Preferred Language					
English	90,670 (70.7)	31,597 (24.6)	41,079 (32.0)	65,899 (51.4)	128,207
Spanish	3,062 (77.9)	1,162 (29.6)	371 (9.4)	1,463 (37.2)	3,931
Other Language	1,689 (78.3)	662 (30.7)	316 (14.7)	919 (42.6)	2,156
Insurance					
Commercial	53,370 (70.9)	15,502 (20.6)	25,983 (34.5)	37,897 (50.3)	75,293
Medicaid	21,787 (68.7)	8,869 (28.0)	9,728 (30.7)	16,914 (53.3)	31,728
Medicare	16,644 (73.2)	7,680 (33.8)	4,863 (21.4)	11,310 (49.7)	22,743
Age Group					
0-17	20,268 (73.8)	2,977 (10.8)	8,878 (32.3)	11,166 (40.7)	27,449
18-34	14,675 (66.4)	4,883 (22.1)	9,646 (43.6)	13,089 (59.2)	22,114
35-64	33,922 (67.9)	14,414 (28.9)	16,837 (33.7)	28,113 (56.3)	49,954

65+	26,702 (76.1)	11,182 (31.9)	6,478 (18.5)	16,036 (45.7)	35,075

[a]Percentages add to greater than 100% because patients utilized multiple care modalities during the study period.

Between the reference and study periods, there were small but significant decreases in the representations of Asians (4.5 to 4.2%, P < .001), males (43 to 42.3%, P < .001), Medicaid (22.7 to 23.6%, P < .001), Medicare (17.2 to 16.9%, P = .03), Spanish preferred (3.2 to 2.9%, P < .001), and other non-English language preferred patients (1.8 to 1.6%, P <.001; Table 2).

Table 2. Changes in demographic representation of ambulatory population during reference and study periods in 2019 and 2020

	Unique Ambulatory Population, n (%)		
Demographic	**June 1 - Sept 30, 2019**	**June 1 - Sept 30, 2020**	***P* value[a]**
All Patients	140,954	134,274	
Race			
White	117,732 (83.5)	111,436 (83.0)	< 0.001
Black	3,328 (2.4)	3,316 (2.5)	0.06
Asian	6,292 (4.5)	5,585 (4.2)	< 0.001
American Indian	1,033 (0.7)	1,006 (0.7)	0.63
Multiracial	5,406 (3.8)	5,301 (3.9)	0.13
Ethnicity			
Non-Hispanic	124,305 (88.2)	118,010 (87.9)	0.02
Hispanic	12,637 (9.0)	12,038 (9.0)	>0.99
Sex			
Female	80,272 (56.9)	77,385 (57.6)	< 0.001
Male	60,662 (43.0)	56,857 (42.3)	< 0.001
Preferred Language			
English	133,841 (95.0)	128,207 (95.5)	< 0.001
Spanish	4,542 (3.2)	3,931 (2.9)	< 0.001
Other Language	2,571 (1.8)	2,156 (1.6)	< 0.001
Insurance			
Commercial	79,203 (56.2)	75,293 (56.1)	0.54
Medicaid	31,940 (22.7)	31,728 (23.6)	< 0.001
Medicare	24,309 (17.2)	22,743 (16.9)	0.03
Age Group			
0-17	30,587 (21.7)	27,449 (20.4)	< 0.001
18-34	21,698 (15.4)	22,114 (16.5)	< 0.001

35-64	52,615 (37.3)	49,954 (37.2)	0.50
65+	36,414 (25.8)	35,075 (26.1)	0.09

Unique patient counts extracted from ambulatory visits at Oregon Health and Sciences University. [a] Proportions of ambulatory population compared using two-proportion z-tests.

Table 3 shows the patient demographics associated with telehealth utilization. Patients who participated in telehealth were less likely to be male, Asian, and Hispanic. Telehealth users were also more likely to prefer English over Spanish or another non-English language. Age displayed a bell-shaped distribution: patients using telehealth were most likely to be 30-39 years old, and were progressively less likely to be in younger or older age groups. When restricted to primary care visits, results were similar except telehealth engagement was more likely in Black patients compared to White (OR 1.20, 95% CI 1.08-1.34; P < .001; Table 4).

Table 3. Adjusted odds of telehealth utilization by patient demographic group

Factors	Adjusted Odds Ratio (95% CI)
Race	
Black	0.99 (0.93-1.07)
American Indian	1.00 (0.89-1.14)
Asian	0.83 (0.78-0.88) *
Multiracial	0.97 (0.92-1.03)
Other Race	0.92 (0.86-0.98)
White	1 (Reference)
Ethnicity	
Hispanic	0.84 (0.80-0.88) *
Unknown Ethnicity	0.92 (0.84-1.00)
Non-Hispanic	1 (Reference)
Preferred Language	
Spanish	0.63 (0.59-0.69) *
Other Language	0.76 (0.69-0.83) *
English	1 (Reference)
Insurance	
Medicaid	1.31 (1.27-1.35) *
Medicare	1.17 (1.13-1.21) *
Other Insurance	0.73 (0.69-0.78) *
Commercial	1 (Reference)
Sex	
Male	0.94 (0.92-0.96) *

Female	1 (Reference)
Age Group	
0-9	0.37 (0.35-0.39) *
10-19	0.61 (0.58-0.64) *
20-29	0.86 (0.82-0.91) *
30-39	1 (Reference)
40-49	0.85 (0.82-0.89) *
50-59	0.75 (0.72-0.78) *
60-69	0.63 (0.60-0.65) *
70-79	0.52 (0.50-0.55) *
80+	0.36 (0.34-0.39) *

Multivariable logistic regression of telehealth utilization against demographic factors. Model intercept: 1.41 (95% CI: 1.37, 1.46), P < .001. *P < .001. CI, confidence interval.

Table 4. Adjusted odds of telehealth utilization by patient demographic group, limited to primary care visits

Factors	Adjusted Odds Ratio (95% CI)
Race	
Black	1.20 (1.08-1.34) *
American Indian	0.96 (0.75-1.22)
Asian	0.77 (0.70-0.85) *
Multiracial	1.11 (1.00-1.23) *
Other Race	0.96 (0.84-1.09)
White	1 (Reference)
Ethnicity	
Hispanic	0.89 (0.81-0.97) *
Unknown Ethnicity	0.84 (0.71-1.00)
Non-Hispanic	1 (Reference)
Preferred Language	
Spanish	0.81 (0.68-0.95) *
Other Language	0.83 (0.71-0.98) *
English	1 (Reference)
Insurance	
Medicaid	1.72 (1.63-1.81) *
Medicare	1.24 (1.16-1.33) *
Other Insurance	1.05 (0.94-1.17)
Commercial	1 (Reference)
Sex	
Male	0.83 (0.80-0.86) *
Female	1 (Reference)
Age Group	
0-9	0.21 (0.19-0.23) *
10-19	0.46 (0.42-0.50) *

20-29	0.87 (0.81-0.94) *
30-39	1 (Reference)
40-49	0.95 (0.88-1.02)
50-59	0.89 (0.82-0.96) *
60-69	0.80 (0.74-0.86) *
70-79	0.81 (0.74-0.89) *
80+	0.73 (0.65-0.82) *

Multivariable logistic regression of telehealth utilization against demographic factors, filtered to the subset of primary care visits. Model intercept: 1.32 (95% CI: 1.25, 1.40), P < 0.001. *P < 0.001.

Table 5 displays the demographic factors associated with the use of video versus telephone-only amongst the subset of telehealth users. Video participation was less likely in Blacks, males, patients who prefer Spanish or another non-English language, and those with Medicare or Medicaid. Video participation was more likely for Asians. Finally, video engagement was increasingly less likely in older than younger age groups. Restricting the analysis to primary care visits had no significant impact on results (Table 6).

Table 5. Adjusted odds of video versus telephone-only utilization, limited to telehealth users

Factors	Adjusted Odds Ratio (95% CI)
Race	
Black	0.67 (0.60-0.74) *
American Indian	0.66 (0.55-0.80) *
Asian	1.19 (1.08-1.31) *
Multiracial	1.07 (0.97-1.19)
Other Race	0.99 (0.89-1.11)
White	1 (Reference)
Ethnicity	
Hispanic	0.93 (0.86-1.01)
Unknown Ethnicity	0.92 (0.80-1.05)
Non-Hispanic	1 (Reference)
Preferred Language	
Spanish	0.20 (0.17-0.23) *
Other Language	0.41 (0.35-0.48) *
English	1 (Reference)
Insurance	
Medicaid	0.42 (0.40-0.44) *
Medicare	0.77 (0.73-0.81) *
Other Insurance	0.53 (0.48-0.58) *

Commercial	1 (Reference)
Sex	
Male	0.87 (0.84-0.91) *
Female	1 (Reference)
Age Group	
0-9	1 (Reference)
10-19	0.65 (0.59-0.71) *
20-29	0.44 (0.40-0.48) *
30-39	0.42 (0.39-0.46) *
40-49	0.28 (0.26-0.30) *
50-59	0.17 (0.16-0.19) *
60-69	0.11 (0.11-0.13) *
70-79	.09 (.08-0.10) *
80+	.05 (.04-.05) *

Multivariable logistic regression of video utilization against demographic factors, limited to telehealth users. Model intercept: 9.35 (95% CI: 8.64, 10.13), P < .001. *P < .001. CI, confidence interval.

Table 6. Adjusted odds of video vs telephone utilization by demographic group, limited to telehealth users and primary care visits

Factors	Adjusted Odds Ratio (95% CI)
Race	
Black	0.65 (0.56-0.75) *
American Indian	0.59 (0.41-0.83) *
Asian	1.32 (1.12-1.57) *
Multiracial	1.07 (0.90-1.27)
Other Race	1.10 (0.90-1.35)
White	1 (Reference)
Ethnicity	
Hispanic	1.08 (0.94-1.24)
Unknown Ethnicity	0.87 (0.66-1.15)
Non-Hispanic	1 (Reference)
Preferred Language	
Spanish	0.37 (0.28-0.48) *
Other Language	0.42 (0.32-0.55) *
English	1 (Reference)
Insurance	
Medicaid	0.34 (0.31-0.36) *
Medicare	0.76 (0.69-0.84) *
Other Insurance	0.39 (0.33-0.46) *
Commercial	1 (Reference)
Sex	
Male	0.88 (0.83-0.94) *
Female	1 (Reference)

Age Group	
0-9	1 (Reference)
10-19	0.74 (0.61-0.90) *
20-29	0.59 (0.50-0.70) *
30-39	0.60 (0.50-0.71) *
40-49	0.41 (0.35-0.49) *
50-59	0.24 (0.20-0.29) *
60-69	0.14 (0.11-0.16) *
70-79	0.10 (0.09-0.13) *
80+	0.06 (0.05-0.07) *

Multivariable logistic regression of video utilization against demographic factors, limited to a subset of patients who utilized video or telephone at a primary care visit. Model intercept: 8.50 (95% CI: 7.23, 10.02), P < 0.001. *P < 0.001

DISCUSSION

During the COVID-19 pandemic, a large portion of ambulatory patients shifted their care to telehealth modalities. Our study reveals significant disparities in ambulatory access and utilization between demographic populations. When comparing equivalent periods in 2019 and 2020, we saw a decline in the representation of multiple populations, including non-English speaking patients, suggesting that these communities may be disenfranchised in accessing ambulatory care during the pandemic. We further found that racial minorities, seniors, and non-English speakers were not engaging fully with telehealth services. These results are consistent with the early pandemic reports from March through May 2020, in New York, San Francisco, and Philadelphia.[15,24,25,27] We now see that these disparities have persisted in June through September, beyond the instability of the initial telehealth expansion and are reproduced across different urban centers. The consistency of these disparities across multiple institutions suggests the contribution of larger structural inequities.

Amongst telehealth users, we found that certain groups relied significantly more on audio-only telephone visits. Internet-based video engagement was less likely for those who were male, Black, American Indian, have Medicaid, prefer a non-English language, or in older age

groups. These findings are unsurprising for seniors given a recent analysis of the 2018 American Community Survey that found 26% of Medicare beneficiaries lack access to a desktop, laptop, or smartphone at home.[19] Furthermore, seniors often encounter barriers related to technological literacy, cognitive decline, and physical disability.[28] For non-English speakers, interpreters were available at our institution prior to the study period, but communication can still be burdensome and time-consuming. Black patients may utilize less video due to structural racism with the underlying mechanisms of income, education, broadband availability, or provider biases.[15,16,21] Low income patients may prefer the telephone because they are at work during appointments or lack the privacy in a crowded home.[29]

The disparities in video engagement likely impact quality of care. The limited comparisons between the efficacy of ambulatory telehealth modalities suggest that video is superior to an audio-only visit.[30] While telephone offers access benefits, video offers a partial physical exam, nonverbal communication, and a stronger patient-provider relationship.[30,31] Moreover, video allow providers to check on a patient's home environment, where conditions and family wellbeing are often intertwined with health.

Our study has policy implications given the uncertain future of telehealth regulations and the substantial use of telephone by our ambulatory population. Experts agree that telehealth will likely persist as an important platform for healthcare delivery following the pandemic.[1,26] However, commercial payers have already begun to eliminate payments for audio-only visits, and CMS has not committed to continue telehealth reimbursements following the public health emergency. A reduction in payments could result in the reduced availability of specific telehealth services, and telephone visits are most likely to be cut. In this case, Blacks, seniors, and non-English speakers, who are unable to attend in-person visits, may be left behind. Ideally, there

would be appropriate financial incentives to promote a balance of telehealth and in-person care.[26]

The telehealth expansion of 2020 occurred without established evidence for the best use of video or telephone visits for patients. Our findings of disparities in telehealth utilization are reflective of what can occur when new care modalities are implemented in the absence of guidelines or established evidence for best-practice. When providers and patients operate on their own preferences, they may be guided by structural racism and other biases. The questions of who benefits most from these modalities and in what situations must be answered by ongoing research focused on clinical outcomes. Meanwhile, institutions must actively monitor for disparities and work to mitigate them.

LIMITATIONS

First, these data were collected from a single academic medical center, though one with a large regional catchment area. The demographic of our catchment area that encompasses Oregon and southwest Washington is unique and may limit generalizability, but our findings are similar to those reported by other institutions earlier in the pandemic. Second, in assessing the changing demographics before and during the pandemic, we were unable to control for changing diagnoses or chief complaints. Third, we were unable to assess other personal or structural barriers, such as physical disabilities and economic status. While we accounted for insurance status, we were unable to control for income level directly. Finally, we did not investigate the patient or clinic-level preferences for scheduling a particular modality, though we did see similar results when limiting to primary care clinics. Further qualitative research may be needed to delineate the preferences and biases that influence choice of visit modality.

SUMMARY AND CONCLUSIONS

The COVID-19 pandemic and telehealth expansion resulted in a large portion of patients participating in telehealth. Yet, certain populations are more reliant on the telephone or less likely to access telehealth at all. Inequities in telehealth adoption are being magnified by structural barriers and a lack of best-practice guidelines. While the future of telehealth is uncertain, it has the potential to continue benefiting patients beyond the pandemic. In order to build a more equitable healthcare system, institutions and policymakers should monitor the adoption of telehealth among vulnerable communities and prioritize the development of evidence-based guidelines for telehealth use.

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