



Early Pandemic Access to COVID-19 Testing in the Somali Community in King County, Washington, USA: a Mixed-Methods Evaluation

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Abstract

Background Racial and ethnic disparities in COVID-19 infection and outcomes have been documented, but few studies have examined disparities in access to testing.

Methods We conducted a mixed methods study of access to COVID-19 testing in the Somali immigrant community in King County, Washington, USA, early during the COVID-19 pandemic. In September 2020–February 2021, we conducted quantitative surveys in a convenience sample ($n = 528$) of individuals who had accessed PCR testing, recruited at King County testing sites near Somali population centers and through social media outreach in the Somali community. We compared self-identified Somali and non-Somali responses using Chi-square and Wilcoxon rank sum tests. We also conducted three Somali-language focus groups ($n = 26$) by video conference to explore Somali experiences with COVID-19 testing, and in-depth interviews with King County-based policymakers and healthcare workers ($n = 13$) recruited through the research team's professional network to represent key demographics and roles. Data were analyzed using qualitative rapid analysis to explore the county's COVID-19 testing landscape.

Results Among 420 survey respondents who had received COVID-19 testing in the prior 90 days, 29% of 140 Somali vs. 11% of 280 non-Somali respondents tested because of symptoms ($p = 0.001$), with a trend for longer time from symptom onset to testing (a measure of testing access) among Somali respondents (median 3.0 vs. 2.0 days, $p = 0.06$). Focus groups revealed barriers to testing, including distrust, misinformation, stigma, language, lack of awareness, and transportation. Stakeholders responding from all sectors highlighted the importance of community partnership to improve access.

Conclusion Somali communities experience barriers to COVID-19 testing, as evidenced by the longer time from symptom onset to testing and corroborated by our qualitative findings. These barriers, both structural and community-derived, may be overcome through partnerships between government and community to support community-led, multilingual service delivery and racial representation among medical staff.

Keywords COVID-19 · Testing · Somali · Immigrant

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Introduction

In the USA, the Coronavirus Disease 2019 (COVID-19) pandemic has exacerbated long-standing health disparities. Black Americans have an increased risk of COVID-19 infection, hospitalization, and mortality [1, 2], with a COVID-19 death rate 2–3 times higher than White individuals [3]. Compared to those born in the USA, immigrants have elevated COVID-19 infection risk, attributable to poverty, multigenerational and overcrowded housing, and occupations that hinder physical distancing [4–6]. Well-documented disparities in a variety of healthcare and prevention services based on race/ethnicity, income, transportation, English proficiency, and access to technology apply to COVID-19 [7].

Timely COVID-19 testing is critical to epidemic control as it enables outbreak containment and treatment. While disparities in COVID-19 acquisition, hospitalization, and mortality by race, ethnicity, English proficiency, and immigration status were well-documented early in the pandemic, fewer studies have examined disparities in testing [8–13], and routine public health data have not reported disaggregated testing rates by demographic characteristics [14].

King County, Washington, is home to approximately 30,000 Somali immigrants, comprising about 20% of the county's Black population [15]. Many Somali immigrants have limited English proficiency, are low-income, and experience attitude and structural barriers to prevention and care services for a variety of conditions [16, 17]. Data from King County and Washington State indicate that several immigrant groups with limited English proficiency are at higher risk of infection and hospitalization than those who speak English fluently [18, 19]. A study of COVID-19 testing in a single healthcare system in King County early in the epidemic documented disparities among various language speakers, with lower testing rates and higher test positivity proportions among non-English speakers, including Somali speakers, vs. English speakers [8]. Anecdotal observations of barriers to accessing COVID-19 testing led our team of university and community partners to evaluate the King County Somali community's access to testing at community sites. We conducted a mixed-methods study to quantitatively determine access disparities using the established measure of time from symptom onset to testing and to qualitatively identify barriers and recommendations to augment local testing services.

Methods

We employed a convergent mixed methods design, collecting Somali community member data from a quantitative survey and focus group discussions concurrently [20]. Preliminary analysis of data from focus groups and the survey were used to inform the development of in-depth interview guides. Toward the end of the interviews, we presented a preliminary summary of these data to policy maker and healthcare worker interviewees for their reflection on what we found in the community. Quantitative data were analyzed separately from qualitative data and then compared to formulate a contextualized view of COVID-19 testing disparities in the Somali community. Below, we describe the three data collection methods.

Quantitative Data Collection

We conducted an anonymous survey of Somali and non-Somali participants seeking COVID-19 testing in King County, WA, between September 2020 and February 2021. Eligible participants were aged ≥ 18 and had undergone polymerase chain reaction (PCR) COVID-19 testing, using the deep nasal swab method. Respondents were recruited using two approaches. (1) Bilingual study staff recruited a convenience sample of individuals presenting for testing at King County-hosted community-based PCR testing sites near Somali population centers. Staff at Somali Health Board branded tables made the survey available to all individuals presenting during data collection hours, and administered the survey in Somali or English, based on respondent preference, entering data using REDCap software [21]. (2) Somali community members who had been tested at any time were purposively recruited by disseminating paper and online flyers through the study team's social networks; respondents self-administered the survey online using REDCap software. We aimed to reach a target sample of 200, recruiting as long as resources allowed.

The survey ascertained participants' demographic characteristics, time from symptom onset to testing, perceived barriers to testing access, and factors influencing decision to test from a predetermined set of options. Survey questions were developed by the study team and are available as a supplemental file for this manuscript. Participants provided informed consent verbally if the survey was staff-administered, or electronically on the consent form page of the online survey if it was self-administered.

Qualitative Data Collection

Focus Groups

We conducted 3 focus group discussions (FGDs) with Somali community members who both had and had not been tested for COVID-19. Discussions were conducted in Somali during November 2020, with an additional group held in February 2021, by a bilingual, bicultural investigator who is also a known Somali community member. A semi-structured discussion guide covered experiences with, views of, and barriers and facilitators to COVID-19 testing. FGDs were chosen over in-depth interviews (IDIs) per Somali team members' advice, as FGDs are familiar and comfortable to community members. Due to resource constraints, we aimed to have one group of men and one of women, to align with common practices of gender separation. Later, we conducted an additional group targeting older adults (> 60 years) to balance the skewing of our survey sample toward younger ages.

Interviews After completing FGDs with community members, IDIs were conducted with healthcare workers serving the Somali community and local government stakeholders working at the state, county, and city levels in areas with high Somali population density. Interviews were conducted in English during January-March 2021. A semi-structured interview guide addressed interviewees' roles in COVID-19 testing implementation or policymaking, testing successes and challenges for local immigrant communities, community testing models and government testing goals, and lessons learned about testing equity. Interviewees were given and asked to comment on the preliminary results of the community FGD data in their professional capacity.

All FGD and IDI participants were recruited purposively [22] through investigators' community and professional networks via email and phone. FGD participants were selected to represent a range of characteristics. IDI participants were selected to reach stakeholders at multiple levels of government (city, county, state), and healthcare workers in multiple healthcare professions and representing both Somali and non-Somali ethnicities. Sessions were conducted and recorded via video conference, lasting 30–60 min. Interviews were conducted individually, except one group interview that involved four government stakeholders who assumed varying roles within the same office. Participants provided verbal informed consent and, when ethically permitted, received a \$50 gift for their time. The study team transcribed all recordings and translated Somali discussions into English.

Quantitative Data Analysis

Somali identity was the exposure of interest. Outcomes of interest included time from symptom onset to testing and motivations, perceived accessibility, and barriers to testing. We compared participant characteristics and outcomes of interest between respondents who self-identified as Somali vs. non-Somali (this could include first generation Somali immigrants as well as second generation Somali Americans). Proportions were compared by Chi-square test; if any categories contained < 5 individuals, Fisher's exact test was used. Days from symptom onset to testing were compared between Somali and non-Somali participants using the Wilcoxon rank sum test. The threshold for statistical significance was a *p*-value 0.05. Univariate and multivariate regressions were not conducted due to sample size constraints. Statistical analyses were conducted using RStudio version 1.3.1093 (2020–10–10).

Qualitative Data Analysis

We deductively developed a structured coding template based on each IDI/FGD guide using the rapid analysis approach to qualitative analysis [23]. In addition, our FGD coding template contained codes for the 5 dimensions of healthcare access theorized by Pechansky and Thomas (affordability, availability, accessibility, accommodation, acceptability) [24]. After training by the team's senior qualitative researcher (KW), all analysts used Microsoft Excel to apply the template to one transcript for calibration and template revision, consistent with the rapid analysis approach. Teams of two analysts independently double coded each IDI and FGD transcript and resolved coding discrepancies through discussion. Analyst pairs' reconciled coding templates for a single stakeholder group were compiled. The same process was applied to each stakeholder group. The combined templates were used to draft stakeholder-specific narrative summaries [23]. The full analytic team read summaries for commonalities across stakeholder groups and stakeholder-specific views.

Ethics Approval

This study was determined to be exempt by the University of Washington Institutional Review Board.

Results

Survey Findings

Participant Characteristics In total, 528 individuals completed the survey. To reduce recall bias, we limited analyses to those who had tested within the previous 90 days ($n=420$). Of these, 140 participants (33%) were Somali and 280 (67%) were non-Somali (Table 1). All Somali participants identified as Black/African American/African-born. Non-Somali participants were 48% White, 19% Asian/Asian American, 18% Black/African American/African-born, 10% Hispanic/Latinx, and 4% Native Hawaiian/Pacific Islander. The study population was young, with 187 (45%) participants aged 18–29 and 112 (27%) aged 30–39. The majority spoke English fluently or proficiently (83%) and were employed either full- or part-time (76%). Around half (53%) had private health insurance, 131 (32%) had public insurance, and 62 (15%) were uninsured.

Compared with non-Somali participants, fewer Somali participants were proficient in English (70% vs. 89%, $p < 0.001$), fewer were employed full-time (44% vs. 66%, $p < 0.001$), and more were employed part-time (25% vs. 13%, $p = 0.004$). Somali participants were also significantly more likely to be on public insurance options of Medicaid, Medicare, or Veterans Affairs (62% vs. 17%, $p < 0.001$).

Factors Influencing Testing

Overall, 30% of participants reported some hesitation about COVID-19 testing (Table 1). The proportion of Somali participants who expressed any hesitation was higher than non-Somalis, though this did not reach statistical significance (35% vs. 28%, $p = 0.14$). Hesitation due to cost and perceived utility were both higher in Somali participants (6%, vs. 2%, $p = 0.02$, and 16% vs. 3%, $p < 0.001$, respectively). A smaller proportion of Somali participants reported awareness that COVID-19 testing was available for free in King County (69% vs. 86%, $p < 0.001$).

When asked about their choice of test location, Somali participants were significantly more likely to report no-cost testing (39% vs. 16%, $p < 0.001$) and seeing the location advertised (14% vs. 5%, $p = 0.005$) as deciding factors. About a quarter of participants (107, 26%) tested due to COVID-19 exposure and 57 (14%) tested ahead of contact with others. Only 74 (18%) tested due to COVID-19 symptoms. Somali participants were significantly more likely to test due to symptoms than non-Somali participants (31% vs. 11%, $p < 0.001$).

Accessibility of COVID-19 Testing

As an indicator of timely testing access, we compared the median number of days from symptom onset to testing between Somali and non-Somali participants who tested due to COVID-19 symptoms ($n = 74$). We found a non-significant trend for longer time among Somali participants: median 3 days (interquartile range, IQR: 1.5–4 days) among Somalis vs. 2 days (IQR: 1–3 days), $p = 0.06$.

Participant assessments of COVID-19 testing accessibility in King County revealed that a minority of participants (55, 16%) perceived testing as hard or very hard to access. No significant differences were found in perceived accessibility of testing between Somali and non-Somali participants ($p = 0.13$).

Interview and Focus Group Findings

Participant Characteristics FGDs were conducted with 26 Somali participants. Most identified as male (60%) (Table 2). Ten participants were at least 60 years old (36%) and the remainder were under 50 years old. Twelve participants (43%) reported having intermediate or higher English proficiency. Twenty participants (71%) had resided in the USA at least 10 years. Thirteen participants (46%) were not employed, while 8 were employed full-time (29%). Most participants (16, 57%) had below college education and most (17, 61%) had been tested for COVID-19 once.

In-depth interviews (IDIs) were conducted with 5 healthcare workers and 8 government stakeholders. Most interviewees identified as male (7, 54%), 8 identified as Black/African American/African-born, 4 as White, and 1 as Hispanic/Latinx (Table 3). The majority held Master's degrees (7, 54%). Healthcare workers had worked in their field for a median of 10 years. Government stakeholders had worked in their field for a median of 5.5 years and held positions in the local, county, and state governments. Four interviewees (31%) identified as part of the Somali community, while 6 (46%) provided services for the Somali community and 4 (30%) had a professional or volunteer relationship with the Somali community.

Interview and Focus Group Themes

We report our findings across all three groups (Somali community members, healthcare workers, and government stakeholders) in two domains: (1) testing barriers, and (2) overcoming barriers and future pandemic preparedness. Participant quotes illustrating each theme are displayed in Table 4. We identified in our data all five dimensions of the Penchansky and Thomas concept of access [24], and note these dimensions within the barriers, which are reported by salience across stakeholders.

Table 1 Survey participant characteristics

Characteristic	Overall (N=420)			Non-Somali (N=280)			Somali (N=140)			p-value Somali vs non-Somali
	N	n or median	% or IQR	N	n or median	% or IQR	N	n or median	% or IQR	
Race/Ethnicity*	420			280			140			
African American/ Black/ African-Born	191		45.5%	51		18.2%	140		100.0%	
American Indian/Alaska Native	2		0.0%	2		0.7%	0		0.0%	
Asian/Asian American	53		12.6%	53		18.9%	0		0.0%	
Hispanic/Latinx	27		6.4%	27		9.6%	0		0.0%	
Native Hawaiian/Pacific Islander	12		2.9%	12		4.3%	0		0.0%	
White	135		32.1%	135		48.2%	0		0.0%	
Other	8		1.9%	8		2.9%	0		0.0%	0.10
Age Group	418			278			140			
18–29	187		44.7%	115		41.4%	72		51.4%	
30–39	112		26.8%	76		27.3%	36		25.7%	
40–49	54		12.9%	35		12.6%	19		13.6%	
50–59	38		9.1%	31		11.2%	7		5.0%	
60+	27		6.5%	21		7.6%	6		4.3%	
Comfort in English	416			276			140			<0.001
≤ Intermediate	73		17.5%	31		11.2%	42		30.0%	
≥ Proficient	343		82.5%	245		88.8%	98		70.0%	
Employment*	397			263			134			
Full-time	233		58.7%	174		66.2%	59		44.0%	<0.001
Part-time	67		16.9%	34		12.9%	33		24.6%	0.004
Unemployed	80		20.2%	48		18.3%	32		23.9%	0.18
Student	32		8.1%	10		3.8%	22		16.4%	<0.001
Health Insurance	412			273			139			<0.001
Uninsured	62		15.0%	46		16.8%	16		11.5%	
Public Insurance	131		31.8%	45		16.5%	86		61.9%	
Private Insurance	219		53.2%	182		66.7%	37		26.6%	
Reason for testing	418			278			140			<0.001
Symptoms	74		17.7%	31		11.2%	43		30.7%	
In contact with positive individual	107		25.6%	73		26.3%	34		24.3%	
In preparation for travel/Visit Vulnerable Person	57		13.6%	42		15.1%	15		10.7%	
Other	180		43.1%	132		47.5%	48		34.3%	
Days since symptom onset				2.0		1.0–3.0	3.0		1.5–4.0	0.06
Accessibility of Testing	348			223			125			0.13
Hard to access	55		15.8%	30		13.5%	25		20.0%	
Easy to access	293		84.2%	193		86.5%	100		80.0%	
Motivators for testing site choice*	414			277			137			
Saw it advertised	34		8.2%	15		5.4%	19		13.9%	0.005
Close to home	209		50.5%	136		49.1%	73		53.3%	0.54
Free	99		23.9%	45		16.2%	54		39.4%	<0.001
Interpretation	2		0.5%	2		0.7%	0		0.0%	0.55
Other	130		31.4%	110		39.7%	20		14.6%	<0.001

Table 1 (continued)

Characteristic	Overall (N=420)		Non-Somali (N=280)		Somali (N=140)		p-value Somali vs non-Somali
	N	n or median % or IQR	N	n or median % or IQR	N	n or median % or IQR	
Hesitations to test*	420		280		140		
None	294	70.0%	203	72.5%	91	65.0%	0.14
Wait time	35	8.3%	20	7.1%	15	10.7%	0.29
Cost of testing	14	3.3%	5	1.8%	9	6.4%	0.02
Transport to site	15	3.6%	12	4.3%	3	2.1%	0.40
Perceived test utility**	29	6.9%	7	2.5%	22	15.7%	<0.001
Knowledge of free COVID-19 testing	417		278		139		<0.001
Aware	334	80.1%	238	85.6%	96	69.1%	
Not aware	42	10.1%	24	8.6%	18	12.9%	
Unsure	41	9.8%	16	5.8%	25	18.0%	

*Sum is greater than 100% as participants could select more than one response

** Perceived test utility includes not trusting the accuracy of the result, feeling the result would not influence their behavior due to long turnaround or inability to quarantine, and feeling confident they did not have COVID-19

Table 2 Focus group discussion participant characteristics

Characteristics (n = 28)	n	%
Age		
18–29	2	7.1
30–39	6	21.4
30–40	7	25.0
40–49	3	10.7
≥ 60	10	35.7
Gender		
Female	11	39.3
Male	17	60.7
English proficiency		
None	2	7.1
Elementary	5	17.9
Limited working	9	32.1
Intermediate	2	10.7
Fluent	9	32.1
Duration in the USA		
< 10 years	8	28.6
≥ 10 years	20	71.4
Employment status		
Part-time	3	10.7
Full-time	8	28.6
Self-employed	1	3.6
Unemployed or stay at home parent	13	46.4
Social assistance	2	7.1
Retired	1	3.6
Education completed		
No formal schooling	2	7.1
Less than high school	1	3.6
High school	13	46.4
Some college	5	17.9
Bachelor’s degree	3	10.7
Graduate degree	4	14.3
Previously tested for COVID-19		
Never	17	60.7
Once or more	11	39.3

Domain 1: Barriers to Testing

Our quantitative survey results identified that Somali respondents reported more delayed access to testing, less knowledge of free testing, and greater hesitation to test due to test cost and utility. In our qualitative data, we elucidated greater depth in and potential reasons for these patterns. Barriers noted across stakeholder groups in our qualitative study included logistics, language-related barriers, and distrust and fear.

Table 3 Key informant interview participant characteristics

Characteristics	Healthcare Workers (<i>n</i> = 5)		Policy makers (<i>n</i> = 8)		Total (<i>n</i> = 13)	
	<i>n</i> or median	% or IQR	<i>n</i> or median	% or IQR	<i>n</i> or median	% or IQR
Gender						
Female	2	40.0	4	50	6	46.2
Male	3	60.0	4	50	7	53.8
Race/ethnicity						
Black/African American/African-born	3	60.0	5	62.5	8	61.5
White	2	40.0	2	25.0	4	30.8
Hispanic/Latinx	-		1	12.5	1	7.7
Education completed						
Bachelor's degree or RN	1	20.0	2	25.0	3	23.0
Master's degree (MPH, M.Ed., MPP)	2	40.0	5	62.5	7	53.8
Terminal degree (MD, PhD)	2	40.0	1	12.5	3	23.1
How long in their professional field (in years)	10	9–12	5.5**	3.8–5.5	9***	7–12
Relationship* to Somali community						
Service provider for Somali community	5	100.0	1	12.5	6	46.2
Somali community member	2	40.0	2	25.0	4	30.8
Volunteer or involved with SHB and other community programs	2	40.0	-		2	15.4
Professional work with Somali community members and organizations	-		2	25.0	2	15.4
Personal relationships with community members	-		1	12.5	1	7.7
None	-		2	25.0	2	15.4

*Sum is greater than 100% due to multiple relationships per individual. All responses were open-ended, so categories were not pre-determined, and some individuals might have chosen an additional option if pre-determined choices were offered

***n* = 4 had data on time in profession

****n* = 9 had data on time in profession

Logistical Barriers

Accessibility of Site Locations All government stakeholders noted early disparities in testing locations, with sites located far from the most affected communities. Healthcare workers reported that drive-up testing sites did not accommodate clients who used public transit. Healthcare workers and community members expressed that testing site location and schedule information was inconsistent and confusing. These responses differ somewhat with our quantitative finding that seeing a site advertised or known to be without cost was a key factor in test site choice. Importantly, the survey respondents had all been tested for COVID-19, while the FGD participants represented a mix of testers and never testers, so the qualitative data offer additional insights beyond the survey regarding test site location as a barrier to testing.

Availability of Resources Government stakeholders highlighted early difficulty obtaining test supplies and unreliability of government funding for wrap-around services, including testing and grocery delivery for those who must self-isolate.

Accommodation Several community members reported that site hours did not accommodate work schedules. Multiple healthcare workers reported supporting non-native English speakers and those with limited technology access or technological proficiency to schedule testing through online portals and access test results through QR codes. As many test sites only offered online scheduling and results, technology presented a barrier for many with limited technological proficiency.

Affordability Although free testing was available throughout the county, healthcare workers noted commonly held concerns about cost and limited awareness of free sites preventing some community members from seeking testing. One male community member succinctly combined the financial insecurity caused by the pandemic with concern for test cost: “Do I pay rent or for a COVID-19 test?”. This concern is consistent with the quantitative survey finding that Somali respondents were more likely to state cost of testing was a perceived barrier to testing, more likely to state free testing was a factor in selecting a testing site, and less likely to be aware that free testing was available.

Table 4 Illustrative quotes from key informant interviews and focus group discussions*Domain 1: Barriers to testing*

Logistical barriers

Site locations and availability

“So, we saw that in South King County, there were testing deserts up until recently... we had to advocate for...more communication around accessibility and interpretation being available at these sites...These are all sort of the social determinants of health that the county may not have considered, and we were not as preventative as we could have been.” (County-level government stakeholder, Black woman)

“There are a lot of logistical challenges and not enough...supplies. And those kinds of things were challenging... The budget issues have also been challenging, in the sense that these have been supported with COVID funds at this point. It was CARES [temporary Federal aid] funds. And there have been several rounds of these. So, it is hard to plan.” (City/county-level government stakeholder, Latinx man)

“Transportation is, indeed, another challenge for our community considering... majority of them don't even have a driver's license...Even the people that they could have called to get a ride from, now they're not allowed to see that person. So, you have people...not getting tested simply because they can't access the site.” (Nurse, Somali man)

“I think there have been more testing sites...However, I think it's still more around certain hours...I think we can still do better at making sure that [testing is available] every day...because people are working different jobs and just don't have the time to go during those specific hours.” (State-level government stakeholder, Black man)

Technology

“It's gonna be a nightmare for you to find out your results because they give us a paper with a barcode and you have to have...a smartphone...or a computer so...you can find out what your result is...Imagine if my mother or my grandmother went into that test center, she will not figure out her results, ever...It is tough even to find out what is the barcode and how many numbers you have to put in the website to access your health record.” (Internal medicine clinician, Somali man)

Cost

“If you go to testing sites set up near the road, [there are] signs that advertise that it is free...but if you go to hospital...they will charge your insurance. They will tell you that testing here is not free and to go [elsewhere] if you want free testing. But if you are in a hurry, you would just do it there and not go to the free testing site...It depends on the location that you go to.” (Male community member, 30–39 years old, college degree)

Language barriers

Lack of Somali language at sites

“At the testing site there are no Somali people...I took my mother and if I was not with her, there would be nobody there to translate for her. So we really need translation services, they have it at other places but not with Somali people.” (Female community member, 30–39 years old, middle school education)

“From what I've seen there has been an emphasis on Spanish and making sure that there are Spanish interpreters and less so for other languages. I know there hasn't been as much for people that are of African descent, or even Pacific Islander descent, which is two highly populated populations in [the region].” (State-level government stakeholder, Black man)

Distrust and fear

Government and health systems

“I initially definitely was trusting and messaging around [testing]... the messaging was you know only certain demographic age 65 and above seniors those with you know who were had health risks such as diabetes and whatnot could get tested and when that message was no longer true, and testing was widely available to all Community members.” (County-level government stakeholder, Black woman)

When they don't have...accurate information immediately, people hear rumors and stories from their friends and colleagues and community members and *they* didn't have the...most current information...Building that trust and that information lag was definitely part of the reason why that happened.” (County-level government stakeholder, Black woman)

Lack of Somali representation

“[Somalis] are entitled to get those tests, but...they are dealing with ‘can I do this?’, ‘what will I see?’, and ‘will it be welcoming if I go?’... He has a list of questions to answer for himself before he drives to that site. So, someone who has those kinds of questions, and nobody is answering them. That is the biggest barrier for me.” (Public Health Professional, Somali man)

Fearing positive result: Economic loss & stigma

“Dealing with a pandemic that caused a lot of people to lose the small businesses, like our people lost their jobs, and the number of hours that they have been working reduced due to the pandemic...the main thing they're thinking about now is, ‘how do I feed my kids, how do I pay my utilities, how do I pay my rent?’” (Nurse, Somali man)

Risks of the test

“I too, am uneasy about the nasal swab because it goes too deep. Someone I know went before me and told me that their experience was good, which prompted me to go get tested and it was very easy and simple. That is why I got tested.” (Male community member, > 60 years old, graduate degree)

Domain 2: Overcoming barriers to testing and preparing for future pandemics

Table 4 (continued)*Domain 1: Barriers to testing*

Logistical barriers

Centering communities to overcome language, distrust and fear barriers

Leadership from the most impacted communities

“It was these partnerships, which are led by community and...trusted leaders. I think the partnership that happened with the Somali Health Board, the testing event...it was very well attended...I think that's at least one of the lessons learned as we move into vaccination...and we know whether it's with groups like Somali Health Board or with faith-based groups – those are critical for us to be able to support those kinds of efforts.” (City/county-level government stakeholder, Latinx man)

“I think the first support that's needed from the youth, public health or any other health field students, and nurses are to be available for the community. It takes our parents time to grasp and take youth seriously, that they are educated enough, so we need more of your time...It needs a full well-rounded community, including youth and other junior or senior staff from the community working hand-in-hand and supporting each other...That is really what makes communities to improve their health.” (Public Health Professional, Somali man)

Representation and culturally responsive, proactive outreach and education

“When you're in the public health world you know sometimes you can get a little disconnected and so...collaborating with different community members and working through our advisory group kind of...gives us that eye level of what's going on in the community. And then we are giving our partners tools to educate community members about testing sites, vaccinations – different ways to communicate different policies and procedures and safety precautions...Our Community Navigator, I think that is one strategy, especially for trust. Even when you're going into communities and you're a representative of that community, there still can be a level of mistrust.” (City/county-level government stakeholder, Black woman)

“We need people who are Somali and when they're calling with positive results, they can understand both the cultural and religious part of the situation and can calmly deliver and reassure that a positive result isn't as bad as other people can portray it...We need someone who understands the culture when delivering such news.” (Male community member, > 60 years old, high school education)

Prioritize services in communities experiencing health disparities

“Not having those testing sites at those locations was another example of the areas with the greatest needs not receiving the services that they needed right away...I think it was an oversight, what they were trying to do is have a regional sort of response...all throughout the region and try to do it in an equal sort of way, but really what needed to be centered was equity, making sure that we...really look at the areas with the greatest needs and start there.” (County-level government stakeholder, Black woman)

Logistical barriers

Site-related

“Now what, to me, is going really well is the fact that [testing] is available to people, regardless of their immigration status, insurance status, there are also options...One of the things that we've done was advocate really hard for more testing sites, more testing sites to be placed in South King County and I think now what we're seeing is the availability of testing across the region.” (County-level government stakeholder, Black woman)

Sustainability:

Maintain and leverage infrastructure established during COVID-19

“[Previously] we didn't have this large community-facing effort which is community mitigation and recovery... So, I think we've been able to do some things and bring people together to both help us and be an extension of the response, but more importantly also inform us in a real way whether it's through that advisory group and saying we need to be shifting in a different direction or through community navigators who are telling us that certain things are not working for community.” (City/county-level government stakeholder, Latinx man)

Funding

“There's a disconnect between the state level and the local level, and we need to find people that can make those connections and so that's part of the problem. I do know that there's funding available that was earmarking but who's going to get that funding, we want to make sure it's the right organizations like you said, the communities of color-led organizations that are facilitating that funding and it's in the right hands.” (State-level government stakeholder, Black man)

Language Barriers

Accommodation All stakeholder groups reported that translated materials available online and at testing sites were lacking. Participants described poor dialect and cultural appropriateness of available translations, lack of live interpreters at testing sites, and difficulties with receiving test results. Government stakeholders noted that phone interpretation was available but often not actively offered, and community members did not note awareness of such services.

Distrust and Fear

Acceptability Several barriers arose within the theme of distrust and fear, which falls under the Penchansky and Thomas concept of acceptability [24].

Government and Health Systems Government stakeholder acknowledged communities' existing distrust of the healthcare system and that this was exacerbated by delays

in information dissemination to communities and services developed without community input. Community members expressed distrust of how privacy and confidentiality were maintained, especially among undocumented individuals. Some feared how the government would handle a positive case. “A lot of people in the community were afraid about the contact tracing and feared the county would lock them in rooms for isolation.” (Female community member).

Lack of Somali Representation Community members and healthcare workers identified the lack of Somali and culturally attuned workers administering and supporting testing as a barrier to trust.

Fearing Economic Loss and Stigma Community members feared lost wages after a positive test result, compounding the overall pandemic economic hardship. Worries about stigma prevented some community members from disclosing a positive result to those they may have exposed. “People within the community spread the word of those families' positive results and don't do it for others to stay cautious but do it to alienate that family from the community. It has gotten to the point where families have started to hide their positive result in fear of backlash.” (Male community member).

Fearing the Test Some community members feared contact with testing staff who are potentially in contact with positive cases. One community member worried about test safety, observing his sister becoming sick after testing and worrying that testing would trigger his asthma. Healthcare workers and community members noted fearing pain from the nasal swab. The theme of distrust and fear is consistent with quantitative survey findings that Somali respondents were more likely to identify lack of utility of the test as a cause of hesitation to test. Our qualitative results go beyond lack of utility to emphasize fear and harm from the test, an important difference in degree not captured in the survey.

Domain 2: Overcoming Barriers to Testing and Preparing for Future Pandemics

When asked about effective efforts and lessons learned, participants across all groups discussed effectiveness of community-led interventions, logistical improvements, and the importance of sustainable actions (Table 4).

Centering Communities to Overcome Barriers

Prioritize Services in Communities Experiencing Health Disparities Government stakeholders recognized that default social structures maximizing overall reach led to racial and

ethnic inequities in test access. They recommended that future responses prioritize communities of color early on using data already available to health departments to ensure access to free high-throughput testing sites and accurate information in appropriate languages. Suggested alternative testing approaches—some of which were subsequently adopted by the County—included supporting testing events organized by community organizations in places of worship or gathering, providing more mobile and at-home testing, and increasing the number of sites with walk-up capacity.

Leadership and Representation from the Most Impacted Communities While IDI participants were not surprised by the results of our community FGDs when presented with the summary, participants from all stakeholder groups emphasized the primacy of partnering with and relying on community leadership to guide or carry out efforts. For nearly all barriers mentioned, effective solutions stemmed from community-driven actions. “There is no one-size-fits-all even from the same community...depending on the people's [length of] stay in the country, educational level... You have to live through that experience and someone from the same culture only can relay and then get it back to the assurance they need... That's what we have to do, finding the audience-specific, community-centered approach that will address all those kinds of barriers that each community is facing.” (County-level government stakeholder).

Healthcare workers believed that informing communities with high levels of distrust of government and health systems about the virus, precautions, and timely testing may foster trust. Community members suggested that Somali youth could bridge gaps between older generations and the healthcare system by providing elders with COVID-19-related education and outreach services framed with religious and cultural relevance.

Testing offered by community organizations was widely supported as a strategy to dispel misinformation and fears, explaining cost, billing, and implications of positive tests. The presence of Somali staff leading testing efforts centering cultural context was viewed as ideal, but if infeasible, the presence of Black staff or staff of color could provide some comfort. To illustrate the value of cultural concordance in testing, a public health professional shared, “If there is a gap, I think that would be providing the language support [and] cultural support, which is not only the language interpretation, but also someone they can connect to.” (County-level government stakeholder).

Sustainability

Maintain Infrastructure Established During COVID-19 Government stakeholders applauded the invaluable community partnerships that were bolstered during the pandemic. They

advocated to prioritize maintaining these relationships and leverage partnered approaches enabled by the pandemic to improve access and reduce health disparities more broadly. They acknowledged that this depends on sustainable public funding and shared that short-term emergency funds cannot be relied upon for ongoing community services as it breeds confusion and difficult future planning. They suggested that public–private partnerships could strengthen mobile testing services and pop-up clinics, and that funds should be dispersed directly to community organizations without government agency mediators.

Discussion

In this mixed-methods, cross-sectional, community-based study, we analyzed access to timely COVID-19 testing among the King County Somali community and explored stakeholder views on meeting community testing needs. Compared with non-Somali participants, Somali participants were significantly more likely to test due to symptoms, to choose a testing site based on cost, to hesitate to test due to distrust and cost, and were less aware that free testing was available in King County. We found a trend for longer time to testing among Somali participants, suggesting elevated access barriers. Qualitative interviews and focus groups highlighted several barriers faced by the Somali community, including inaccessible testing locations, confusion about cost (consistent with quantitative findings about the influence of cost), lack of interpretation services, and distrust resulting from misinformation, discrimination, and economic precarity (consistent with quantitative findings about distrust as a deterrent to testing). Participants made several recommendations to overcome these barriers in ongoing and future pandemic responses, primarily by amplifying community-led work and centering the needs of the most marginalized communities at the outset.

Our quantitative findings of reduced access to testing and more testing due to COVID-19 symptoms in the Somali community are consistent with previous studies reporting racial and economic disparities in access to COVID-19 testing. Studies conducted throughout 2020 using surveillance data from Washington, Missouri, West Virginia, Illinois, North Carolina, and New York reported lower testing rates in areas with a larger Black, Latinx and low-income population [9–13]. Regions with the most testing access were not the regions with the highest test positivity rates, indicating inequitable distribution of testing sites [13, 25]. Similarly, a study among patients at a medical system in King County, Washington, reported that non-English-speaking patients, including Somali speakers, were less likely to receive testing but more likely to have a positive result than English speakers [8].

Participants in our qualitative data collection identified barriers across all 5 dimensions of healthcare access in Panchansky and Thomas's model of access to health services: accessibility, affordability, availability, acceptability, and accommodation [24]. Accessibility of testing locations was frequently mentioned, with community members reporting inaccessibility of sites far from home, and that drive-through-only sites were inaccessible to those who do not drive. Limited availability with regard to testing site hours of operation was identified as a barrier to testing for community members who could not take time off work to test during business hours. Despite free testing, affordability was a frequent community member concern, in both quantitative and qualitative data, possibly resulting from delayed communication about free testing to the Somali community, or opportunity costs associated with receiving a positive result. Accommodation barriers included lack of translation, interpretation, and culturally attuned staff at testing facilities, as well as use of digital tools for community members with limited technology fluency. Barriers to acceptability included distrust rooted in discrimination, misinformation, lack of community engagement by public health authorities, and a mismatch between guidelines and community members' own realities.

Similar barriers to COVID-19 testing have been documented in other immigrant communities and communities of color [26]. A study conducted in Washington State found that accessibility, affordability, acceptability and accommodation of COVID-19 testing and treatment in Latinx communities was impaired by anti-immigrant policies, lack of health insurance, lack of interpretation services, and misinformation [19, 27, 28]. To our knowledge, our study is the first to gather multiple stakeholder perspectives on these issues, including community members, service providers, and government stakeholders; this approach supports the development of strategies that simultaneously address the needs of the distinct groups affected. Our study is also the first to report on barriers to testing specifically in a Somali immigrant community. Analysis of barriers and strategies in specific communities is critical to developing strategies that are nuanced and responsive to community needs.

While several published studies have documented testing barriers, few have elicited stakeholders' proposed solutions to improve access to COVID-19 testing among immigrants, low-income communities, and communities of color. Our participants' primary recommendation was to elevate and partner with community leaders to deliver representative and culturally coherent COVID-19 testing services. Community and government stakeholders recommended prioritizing site locations by proximity to underserved communities and access via public transport. These recommendations are consistent with development of community-based testing in neighborhoods with large populations of immigrants and

people of color in Chicago, Baltimore, New Orleans, Cleveland, Minnesota, and San Francisco [29–36]. Other studies have highlighted the importance of community leaders in epidemic control and prevention. For example, religious leaders or community advocates can be trusted messengers in providing accurate COVID-19 information or addressing misinformation [37]. These suggestions have also been raised specifically in the Somali and East African immigrant communities for the prevention of HPV and HIV [38–40]. Our participants highlighted medical distrust and suggested this can be addressed with more Somali or Black representation at testing sites to appropriately provide information, language services and comfort for community members. They also noted that in King County’s response, although areas with large communities of immigrants and people of color ultimately gained priority for testing and community partners were ultimately engaged, these approaches should have been implemented from the start of the public health response.

Our findings must be interpreted in the context of the COVID-19 pandemic’s ever-changing landscape. At the time of our data collection (late 2020 and early 2021), timely testing and behavior change were the only prevention tools available; at-home testing was not available. At the time of publication, at-home antigen tests are widely available, and a multitude of prevention tools exists. This means disparities in access to facility-based PCR testing per se may not contribute as substantially to COVID-19 epidemic control now as they did then. However, our findings remain applicable to current disparities in epidemic control. The disparities and access barriers we and others have reported to testing mirror current disparities and barriers to COVID-19 vaccination in immigrant communities and communities of color [41–43]. Community member, healthcare worker, and government stakeholder participants in our qualitative data collection highlighted that the issues of access and distrust in testing also applied to vaccine roll-out. Furthermore, the themes we identified in our data were consistent with themes identified in barriers to other preventative health services in the Somali community [38, 39], highlighting the persistent shortcomings of service delivery and the continued need for tailoring to marginalized and underserved communities. Our participants’ recommendations for promoting testing equity may be relevant to promoting equity in access to COVID-19 vaccination and treatment.

Our study’s strengths include its mixed-methods design, exploration of multiple stakeholder perspectives, data disaggregation to describe a specific community of Black immigrants, and leveraging a partnership between a Somali community-based organization (Somali Health Board) and an academic institution (University of Washington). The Somali Health Board is a widely known and trusted grassroots organization in King County, and their established community relationships and cultural fluency supported collection of

detailed views from a highly impacted community that were not already widely documented in published literature.

There are limitations to this study. While sample size for our quantitative survey was considerable, the subgroup who reported testing due to symptoms was smaller, limiting statistical power to compare time to testing among Somali and non-Somali respondents, possibly attenuating the resulting association. To minimize the risk of recall bias, we limited responses to individuals who had tested in the past 90 days. Still, as with any self-reported data, ours may be prone to recall bias and misclassification. Additionally, our two-pronged sampling approach (at testing sites and through outreach in the Somali community) was intended to increase inclusion of Somali respondents, but did not produce a sample representative of King County.

Recruiting survey respondents at COVID-19 testing sites may have introduced selection bias by excluding people who were unable to attend due to the most severe access barriers. Additionally, our survey sample was skewed towards younger participants, a result we determined after survey data collection ended. To address these potential threats to internal validity, we oversampled older adults and included never-testers in our qualitative data collection to gain insights into barriers that may not have been experienced by survey respondents who were able to test.

Our qualitative aim used purposive sampling of our professional and social networks to reach a broad representation of individuals within three stakeholder groups. As the Somali Health Board is well-known and respected in the community, Somali survey respondents likely knew the Board, potentially influencing their participation. All Somali FGD and IDI participants had some relationship with the Somali investigators, which might have influenced their responses either to be more positive, or to be more open and truthful with known community members. Given the language needs, having known Somali speakers was the best option to communicate effectively and provide a comforting space for Somali participants. We strove to include government stakeholders at multiple levels of government, and healthcare workers in varying healthcare roles; however, resource limitations limited the breadth of voices we could include. Many intersectionalities are not represented, including both Somali and non-Somali representatives at each level of government or in all healthcare roles.

The focus groups resulted in differing levels of depth by gender. All groups were conducted by a male Somali member of the team, which may have resulted in different gender-based dynamics across the groups. Gender separation is common in many activities in the Somali community, so having a gender concordant interviewer in the men’s group and a gender discordant interviewer in the women’s group may have explained the different richness of responses across groups. Additionally, the older adults were enrolled at a later

point in time (February 2021) compared with the younger men's and women's groups, both held in November 2020, which may have resulted in recall bias or responses based on newer information. However, we believe that including their views was necessary to gain a broader representation of the community and the range of access barriers that may exist.

Conclusions

While our study focused on COVID-19 testing within the first year of the pandemic and much has since changed, timely testing remains an essential tool in monitoring and controlling pandemic surges. The barriers and strategies identified in our data may be generalizable to ongoing efforts to ensure equitable access to COVID-19 testing, vaccination, and treatment. This study also highlights a continued need for community leadership in health responses, as well as disaggregation of county-level data to identify and address disparities found in many immigrant and refugee communities across the USA.

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Author Contribution Ahmed Ali, Kathleen McGlone West, and Keshet Ronen contributed to the study conception and design. Data collection was performed by Najma Abdi, Nasra Mohamed, Ayan Mohamed, Asiya Ahmed, Abdifatah Abdi, Ruweida Ahmed, Farah Mohamed, Kathleen McGlone West. Data analysis was performed by Najma Abdi, Sabrina Ebengho, Nasra Mohamed, Andrea Scallon, Ayan Mohamed, Asiya Ahmed, Abdifatah Abdi, Ruweida Ahmed, Farah Mohamed, Kathleen McGlone West, Keshet Ronen. The first draft of the manuscript was written by Najma Abdi, Sabrina Ebengho, Kathleen McGlone West, and Keshet Ronen. All authors reviewed and approved the final manuscript.

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Data Availability Data are available by request from the corresponding author.

Declarations

Ethics Approval This study was determined to be exempt by the University of Washington Institutional Review Board.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Competing Interests The authors declare no competing interests.

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