

# Characteristics Associated with Barriers to Eye Care: A Cross-Sectional Survey at a Free Vision Screening Event

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## Keywords

Barriers to eye care · Vision screening · Ophthalmology

## Abstract

**Introduction:** Social determinants of health can limit access to regular eye care, but their role in ophthalmology is under-examined. The purpose of this study is to assess the relationship between patient characteristics and self-reported barriers to eye care. **Methods:** This anonymous, cross-sectional survey was conducted at a 2-day free eye clinic event in Pittsburgh, Pennsylvania. Adult patients presenting for vision screening were eligible to participate. Patient characteristics (demographics, health status) and self-reported barriers to eye care were collected. Predictors of barriers to eye care were analyzed using binary logistic regression. **Results:** Of 269 eligible, consecutive patients approached for survey completion, 183 comprised the volunteer sample. The 183 participants (105 female patients [59%]) had a mean (standard deviation) age of 53 (15) years and generally self-identified as Black (74, 46%) or White (67, 41%). While a third reported having no health insurance (60, 34%), the remaining two-thirds of participants had public (84, 48%) or private coverage (34, 19%). Three-quarters of respondents reported at least one barrier to receiving regular eye care (136, 76%),

most commonly medical costs (89, 50%) and insurance issues (73, 41%). Not having health insurance or vision insurance was strongly associated with reporting at least one barrier to care (OR: 5.00,  $p = 0.002$ , and OR: 7.46,  $p < 0.001$ , respectively). Those with self-reported eye disease were more likely to report transportation difficulties (OR: 4.45,  $p = 0.013$ ), and employed participants reported difficulty getting time off work to attend eye exams (OR: 7.73,  $p = 0.002$ ). Finally, compared to Black race, White race was associated with a higher likelihood of reporting any barrier to care (OR: 2.79,  $p = 0.013$ ). **Conclusion:** Three-quarters of vision screening attendees reported at least one barrier to regular eye care, most commonly medical costs and insurance.

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Published by S. Karger AG, Basel

## Introduction

Many patients lack regular access to eye care, resulting in unnecessary visual impairment [1]. The approximately 61 million Americans who are at high risk of vision loss

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are underrepresented among patients who receive regular eye exams, suggesting that vulnerable patients face barriers to routine care [2]. Commonly cited barriers to attending eye exams include lack of insurance, costs, and transportation [3–7]. These factors, along with other social determinants of health – notably food insecurity, lower income, lower education, living in unsafe neighborhoods, and lack of vision insurance – affect access to vision care and are associated with visual impairment [7–10]. Thus, poor vision health may be a marker and consequence of poor access to eye care.

Community outreach events can promote health screening among underserved populations. One such program, Mission of Mercy (MoM), provides free dental services to underserved patients throughout the USA. MoM events typically involve a 2-day free dental clinic that provides patient education, screening, and treatment to promote oral health in cities across the country [11–13]. In 2021, the annual MoM event in Pittsburgh expanded beyond dental care to include vision screening exams. Vision screening for all patients included measurement of visual acuity, manifest refraction, and optical fitting. For patients with suspected ocular pathology, dilated fundoscopic examinations and optical coherence tomography imaging were also available on-site, and follow-up referrals to the university eye clinic were provided for additional care at no cost. Free prescription eyeglasses were sent by mail or picked up by patients at a designated site, based on patient preference. In anticipation of unmet social needs in this population, a patient navigator was present on-site with forms for financial assistance, insurance enrollment, and transportation resources.

While previous studies have reported patient characteristics and reasons for seeking dental care at MoM free clinics [13–15], we sought to understand characteristics and self-reported barriers to eye care among MoM patients who present for vision screening. The purpose of this study is to report the prevalence and types of barriers to eye care among participants and to assess the relationship between patient characteristics and self-reported barriers to eye care.

## Methods

This cross-sectional survey study was reviewed and deemed exempt by the University of Pittsburgh Institutional Review Board. This work adhered to the tenets of the Declaration of Helsinki and complied with the Health Insurance Portability and Accountability Act of 1996 as no identifying information was collected.

We implemented a 12-question survey to assess general and ocular health status, barriers to obtaining eye care, and demographic information (the questionnaire is available as online suppl. material at [www.karger.com/doi/10.1159/000526875](http://www.karger.com/doi/10.1159/000526875)). We designed the survey based on a published questionnaire about access to dental care that was given at a previous MoM dental event [16], and we adapted additional survey questions about barriers to ophthalmic care previously reported in the literature [17, 18]. The questionnaire was brief to promote completion and efficiency of clinic flow. All patient information remained anonymous, and participants were not compensated for participation.

The study population consisted of patients ages 18 and over who received a vision screening at the 2-day MoM event in Pittsburgh, Pennsylvania, on October 22 and 23, 2021. Surveys were offered by front desk staff to each English-speaking patient who registered for a vision screening. Patients completed the questionnaire while waiting to be seen for their exam, and event volunteers were available to assist with filling out the form. Patients returned completed questionnaires to the front desk staff or in a collection box upon completion of their screening. Event volunteers were present to facilitate survey collection.

The completed survey data were entered into an electronic spreadsheet, and response frequencies for each item were tallied. Statistical analysis was conducted using IBM SPSS statistical software, version 27 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were summarized as mean  $\pm$  standard deviation for continuous variables and as percentages for categorical variables. Rating scores of overall health and vision health were compared using a paired Student's *t* test. We assessed for predictors of barriers to care (coded yes vs. no) using binary logistic regression. Specifically, binary logistic regression analysis was conducted to examine predictors of self-reported barriers to care that were reported by at least 5% of participants. Odds ratios (ORs) were calculated, and a *p* value less than 0.05 was considered statistically significant.

## Results

A total of 273 patients received vision screenings at the 2-day MoM event. Eyeglasses were prescribed and ordered for 233 patients, and follow-up appointments were made for 42 patients with suspected ocular pathology. Study surveys were received from 187 participants. Four participants' responses were excluded due to age less than 18 years, yielding a survey response rate of 68% (183/269).

### *Patient Characteristics*

Table 1 contains descriptive statistics for all patient characteristics collected. The average age of participants was  $53 \pm 15$  years ( $n = 166$  responses), a slight majority was female (105/178, 59%), and most identified as either Black (74/162, 46%) or White (67/162, 41%). Almost all participants reported having at least a high school degree

(150/163, 92%), and a quarter reported having a 4-year college degree or higher (39/163, 23%). Regarding work, patients most commonly reported being employed or self-employed (67/162, 41%), and other responses included retired (29/162, 18%), looking for employment (25/162, 15%), or unable to work (18/162, 11%).

One-third of patients reported having no health insurance (60/176, 34%), and most others had either public (84/176, 48%) or private coverage (34/176, 19%). Conversely, only a quarter of patients reported having vision insurance (50/179, 28%). Most participants reported that it had been over 1 year since their last eye exam (128/181, 70%), with nearly a quarter reporting that they had not received an eye exam in over 5 years (40/181, 22%). When asked to rate their general health and their eye health on a scale from 1 (best) to 5 (worst), participants scored their vision health as poorer (mean 3.5/5 for vision vs. 2.9/5 for general health,  $p < 0.001$ ) (Fig. 1).

#### Reasons for Vision Screening

Most patients presented for a vision screening due to trouble seeing well enough to read (76/160, 47%) or to drive or watch television comfortably (52/160, 33%) (Table 2). Others presented due to having broken glasses (39/160, 24%) or sought care due to a previously diagnosed eye condition (47/160, 29%).

#### Barriers to Eye Care

Three-quarters of participants reported having at least one barrier to receiving regular eye care (136/174, 76%) (Table 3). Nearly half of the respondents reported having multiple barriers (76/174, 43%). The most commonly reported barriers were medical costs (89/174, 50%) and lack of insurance (73/174, 41%). Less commonly reported barriers included difficulty getting time off work (21/174, 12%), issues with getting an appointment (18/174, 10%), difficulty navigating the healthcare system (17/174, 10%), and transportation (13/174, 7%).

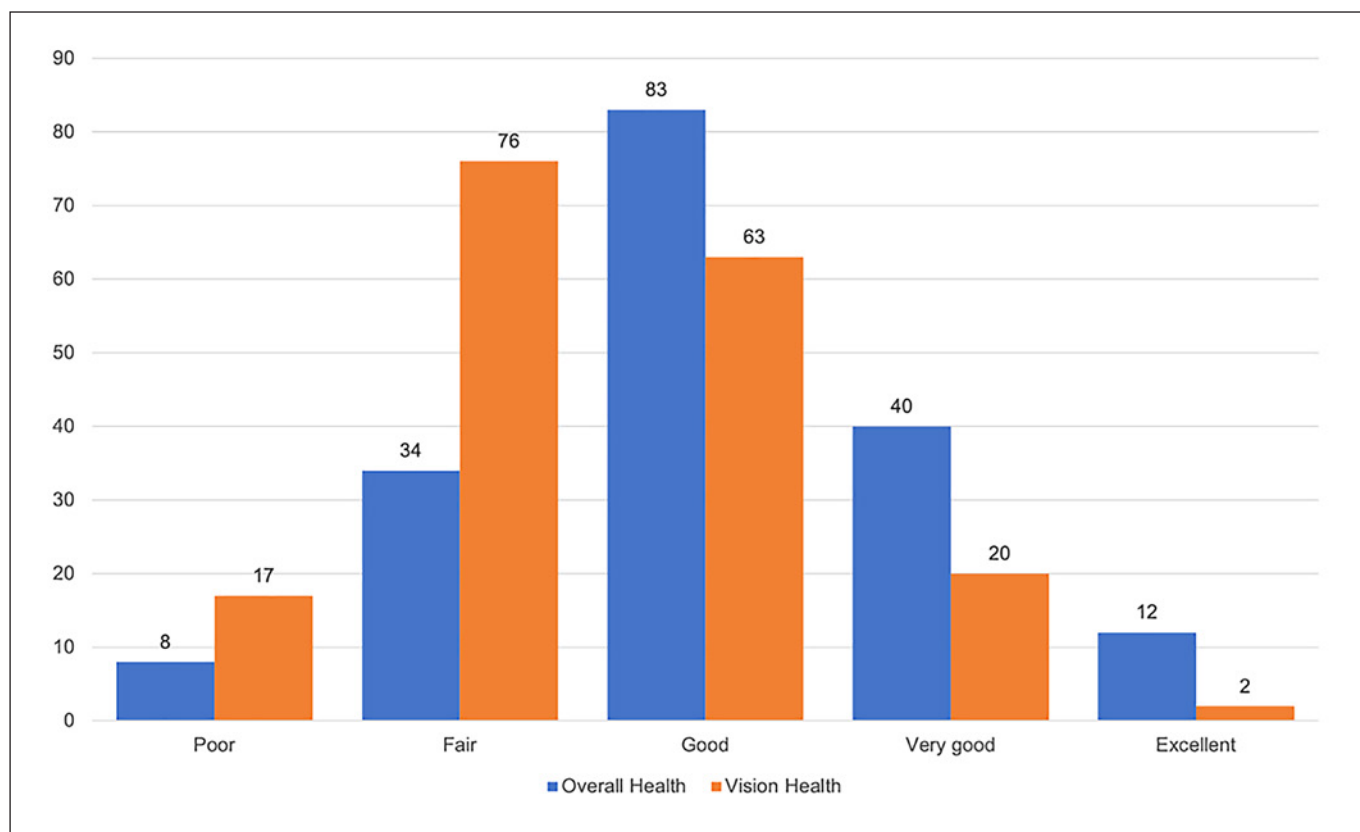
#### Predictors of Barriers to Eye Care

Not having vision insurance or health insurance was the strong predictor of reporting at least one barrier to eye care (OR: 7.46,  $p < 0.001$ , and OR: 5.00,  $p = 0.002$ , respectively) (Table 4). In terms of specific barriers, lack of health insurance and vision insurance both predicted reporting challenges with medical costs (OR: 3.05,  $p = 0.001$ , and OR: 5.59,  $p = 0.001$ , respectively). Lack of health insurance also predicted reporting challenges to getting an appointment (OR: 5.65,  $p < 0.01$ ) and navigating the healthcare system (OR: 3.00,  $p = 0.035$ ).

**Table 1.** Characteristics of 183 survey respondents

Characteristic <sup>a</sup>	n (%)
Age (mean±SD), years, n	53±15, 166
Gender	
Male	73 (41)
Female	105 (59)
Race/ethnicity	
Black	74 (46)
White/European-American	67 (41)
Latino/Chicano	8 (5)
Other	6 (4)
Multiple	5 (3)
Asian	2 (1)
Education	
8th grade or less	4 (2)
Some high school	9 (6)
High school graduate	50 (31)
Some college	61 (37)
4-year college graduate	22 (13)
More than 4-year college degree	17 (10)
Employment <sup>b</sup>	
Employed for wages or salary	49 (30)
Retired	29 (18)
Self-employed	18 (11)
Unable to work for health reasons or disability	18 (11)
Out of work for less than 1 year and looking for work	15 (9)
Multiple or other	15 (9)
Out of work for 1 year or more and looking for work	10 (6)
Going to school	5 (3)
Taking care of house or family	3 (2)
Health insurance <sup>b</sup>	
None	60 (34)
Medicare	47 (27)
Medicaid	31 (18)
Employer-sponsored	27 (15)
Direct purchase or marketplace or HealthCare.gov	7 (4)
Military	6 (3)
Other	21 (12)
Vision insurance	
No	102 (57)
Yes	50 (28)
I do not know	27 (15)
Last eye exam	
6 months ago or less	22 (12)
6 months to 1 year ago	24 (13)
1-2 years ago	46 (25)
2-5 years ago	42 (23)
>5 years ago	40 (22)
I have never been to an eye doctor	7 (4)

<sup>a</sup>Total responses may be less than 183 because participants were able to skip questions. <sup>b</sup>Total selection may exceed 183 because participants could select more.



**Fig. 1.** How would you rate your... overall health ( $n = 177$ ) and vision health ( $n = 178$ ). When asked to rate their general health and their eye health on a scale from 1 (best) to 5 (worst), participants scored their vision health as poorer (mean 3.5/5 for vision vs. 2.9/5 for general health,  $p < 0.001$ ).

**Table 2.** Reasons for presenting for an eye exam ( $n = 160$ )

Reason <sup>a</sup>	n (%)
I am not seeing well enough to read	76 (47)
I am not seeing well enough to drive and watch TV	52 (33)
My current glasses are broken	39 (24)
I have been diagnosed with an eye condition:	47 (29)
Cataract	15 (9)
Glaucoma	9 (6)
Diabetic retinopathy	6 (4)
Macular degeneration	1 (1)
Other:	18 (11)
Dry eye	2
Floaters	1
Allergies	1
Convergence insufficiency	1
Unspecified	13

<sup>a</sup>Participants could select more than one response.

**Table 3.** What barriers do you have to seeing an eye doctor? ( $n = 174$ )

Barrier <sup>a</sup>	n (%)
<i>Any barrier</i>	136 (76)
Medical costs	89 (50)
<i>Multiple barriers selected</i>	76 (43)
Lack of insurance	73 (41)
Getting time off work	21 (12)
Getting an appointment	18 (10)
Difficulty navigating the health system	17 (10)
Transportation	13 (7)
Lack of available services	8 (4)
Language barrier	5 (3)
Other:	8 (4)
Time	1
Finding a new eye doctor	1
Unspecified	6
None or I do not have any eye problems	45 (25)

Italics indicate aggregated data categories. <sup>a</sup>Participants could select more than one response.

**Table 4.** Binary logistic regression to assess predictors of barriers to care

Characteristic	Any barrier		Medical costs		Lack of insurance		Getting time off work		Getting an appointment		Difficulty navigating the health system		Transportation	
	OR	p value	OR	p value	OR	p value	OR	p value	OR	p value	OR	p value	OR	p value
Age	0.984	0.205	<b>0.978</b>	<b>0.042</b>	1.006	0.570	<b>0.961</b>	<b>0.010</b>	1.007	0.700	0.996	0.803	1.104	0.519
Gender	Ref.													
Male	1.122	0.750	1.128	0.698	1.112	0.737	0.939	0.894	1.016	0.976	0.459	0.134	0.994	0.991
Female	Ref.													
Race	Ref.													
Black	<b>2.790</b>	<b>0.013</b>	<b>3.000</b>	<b>0.002</b>	<b>2.137</b>	<b>0.033</b>	1.876	0.251	0.238	0.077	1.050	0.942	0.571	0.391
White	1.408	0.081	1.177	0.327	0.956	0.784	0.683	0.133	<b>1.774</b>	<b>0.043</b>	0.716	0.227	3.465	0.001
Overall health	1.341	0.159	1.187	0.339	1.002	0.905	1.187	0.534	1.332	0.351	1.213	0.524	1.197	0.613
Vision health	1.004	0.963	1.022	0.785	0.930	0.382	0.949	0.686	1.033	0.802	1.162	0.213	<b>0.545</b>	<b>0.019</b>
Education														
Employment	Ref.													
Not employed	1.650	0.197	1.595	0.172	1.490	0.244	<b>7.634</b>	<b>0.002</b>	1.050	0.934	0.676	0.548	<sup>a</sup>	<b>&lt;0.001</b>
Employed	Ref.													
Insurance status	Ref.													
Any insurance	<b>5.000</b>	<b>0.002</b>	<b>3.049</b>	<b>0.001</b>	<b>5.650</b>	<b>&lt;0.001</b>	0.924	0.874	<b>5.650</b>	<b>&lt;0.001</b>	<b>3.000</b>	<b>0.035</b>	0.317	0.143
No insurance	Ref.													
Vision insurance	Ref.													
Yes	<b>7.463</b>	<b>&lt;0.001</b>	<b>5.587</b>	<b>&lt;0.001</b>	<b>23.81</b>	<b>&lt;0.001</b>	0.855	0.773	0.372	0.073	3.704	0.092	0.946	0.931
No	Ref.													
Last eye exam	Ref.													
Within 2 years	<b>2.900</b>	<b>0.006</b>	<b>2.273</b>	<b>0.008</b>	1.727	0.078	1.876	0.188	1.080	0.877	2.110	0.161	0.750	0.636
>2 years ago	Ref.													
Self-reported eye disease	Ref.													
No	<b>0.367</b>	<b>0.013</b>	0.585	0.137	0.744	0.420	0.312	0.135	2.378	0.097	0.780	0.683	<b>4.454</b>	<b>0.013</b>
Yes	Ref.													

OR, odds ratio; Ref., reference. <sup>a</sup>Because of a 0 in one cell, Fisher's exact test used.



Those who report not having had an eye exam in the last 2 years were more likely to report having at least one barrier to care (OR: 2.90,  $p = 0.006$ ) and particularly the barrier of medical costs (OR: 2.27,  $p = 0.008$ ). Additionally, lower self-perceived overall health predicted reporting the barrier of difficulty getting an appointment (OR: 1.77,  $p = 0.043$ ), and self-reported eye disease was associated with reporting having the barrier of transportation difficulties (OR: 4.45,  $p = 0.013$ ).

Demographic characteristics were also predictors of reporting particular barriers to care. Getting time off work was more likely to be reported as a barrier for younger (OR: 0.96,  $p = 0.010$ ) and employed persons (OR: 7.63,  $p = 0.002$ ), and younger age also predicted reporting challenges with medical costs (OR: 0.98,  $p = 0.042$ ). Lower education level was a predictor for challenges with transportation (OR: 0.55,  $p = 0.019$ ). Race was also predictive of barriers to care. White participants were more likely to report at least one barrier compared to Black participants (OR: 2.79,  $p = 0.013$ ), particularly in citing medical costs (OR: 3.00,  $p = 0.002$ ) and lack of insurance (OR: 2.14,  $p = 0.033$ ).

## Discussion

We found that three-quarters of attendees at a free vision screening event reported barriers to regular eye care, most commonly related to medical costs and insurance. Several demographic characteristics were associated with reporting specific barriers to regular eye care, such as younger age with difficulty getting time off work and self-reported eye disease with transportation difficulties.

Our finding of insurance and medical costs as major barriers to eye care is consistent with previous reports. For example, an assessment of a community-based vision screening program in Detroit found that insurance was cited by half of patients as a barrier to care, and a third of insured patients still reported financial concerns [19]. Likewise, a study on the effect of an eye health education program in Birmingham, Alabama, showed that the costs of an eye examination and eyeglasses were identified as barriers by one-quarter and one-half of the study participants, respectively [20]. Other commonly reported barriers to regular vision care include difficulty navigating the healthcare system, transportation, poor health literacy, lack of awareness, and cultural and language barriers [4, 5, 8, 19, 21]. While most of these previous barriers are represented in our study population, problems with insurance and medical costs predominated.

About half of all participants in our study cited medical costs and/or lack of insurance as a barrier to vision care. In our regression model, self-reported lack of health or vision insurance was significantly associated with cost-related barriers to care. Although two-thirds of patients had some form of medical coverage, only a quarter of patients reported having vision insurance. Lack of vision insurance has previously been associated with vision impairment and shown to hinder utilization of eye care services [10]. We additionally found that not having health insurance was significantly associated with difficulty getting an eye appointment and navigating the healthcare system. Our findings emphasize the critical role of enrolling patients in medical and vision insurance to connect them with eye care services.

In our regression analysis, we found associations between demographic characteristics and specific barriers to care. These associations between characteristics and specific barriers to care may help in the design and targeting of interventions to improve eye care access. While transportation was less commonly cited as a barrier in our study compared to others [6, 22], our results suggest that transportation resources might be most needed among unemployed persons and those who report eye disease. It is also possible that the overall low prevalence of transportation difficulty in our population is unrepresentative of the broader community as the participants of this study had the ability to travel from varying distances to attend the event at its urban, downtown location.

Unexpectedly, patients who identified as White reported having more barriers to care than patients who identified as Black. While minority status is generally associated with lower access to eye care, the literature on race and barriers to eye care is mixed [4, 5]. For example, among patients attending free eye clinics in Oregon, White patients had the longest average interval since their last eye exam compared to those who identified as Black, Asian, or Hispanic, although White patients were more likely to have had a previous eye exam [4]. Further elucidation of the role of race in barriers to vision care is warranted.

Interestingly, a considerable subset of patients in our study reported relatively high education levels, with a quarter having a 4-year college degree or higher. The education level of our population skews higher than that from previous reports [19]. Low education level has been noted to contribute to disparities in eye care [23], and patients with less education report more barriers to care [19]. As lower education levels have been associated with

lack of awareness for need of screening and difficulty knowing where to go for care [19], it is possible that patients with lower education are less represented in a population of individuals who sought care at a health screening event.

Our study population had higher education levels and a greater proportion of insurance coverage compared to the population described in a previous MoM event [15]. Paramore et al. [16] examined demographic characteristics among patients seeking dental care at MoM in Florida. Both populations were similar in age, gender, and race composition, and patients in both studies described their own vision or dental health to be poorer than their general health. Our patient populations also had comparable employment statuses, with approximately 40% of patients in both studies being employed or self-employed. In contrast, education status differed between both of these patient populations, with 60% participants in our study reporting at least some college education compared to 38% in Paramore et al. [16]. Insurance status also varied between both study populations. While having no health insurance was reported by one-third of patients in our study, it was reported by nearly half of the patients at the Florida MoM. Finally, while the number of patients with vision or dental insurance, respectively, was low in both studies, more patients in our study (28%) reported having vision insurance than the 18% who reported dental benefit coverage in Paramore et al. [16]. These differences highlight the importance of examining local characteristics and needs to tailor services to each community. Additionally, the role of the coronavirus 2019 pandemic on attendance at large community health events requires further examination, and the pandemic may limit direct comparison of patient populations at this event compared with those who attended events held before coronavirus 2019.

MoM events are single, annual clinics that address short-term screening needs but do not in themselves address pervasive barriers to care. Nonetheless, large community screening events provide an important setting for engagement with underserved communities by identifying unmet vision needs and connecting patients to local resources, such as financial assistance, transportation, and no-cost referrals to subspecialty clinics. Our department augments participation in this annual event with regular vision outreach using a mobile eye clinic, termed the Guerrilla Eye Service, which brings eye care to free clinics on evenings and weekends [24]. We also employ a full-time patient navigator in our department to connect our patients with needed community resources that

promote vision care or address underlying social determinants of health. Until larger policy changes in insurance coverage and medical costs are implemented, community outreach initiatives provide a valuable mechanism to reach underserved populations.

Our study has several notable strengths. We collaborated with the MoM dental mission to provide eye care at an established, large health event. We also directly surveyed an underserved population receiving free vision screening with a high response rate. Our moderately large sample size allowed for analysis of predictors of specific barriers to eye care, which may help to inform future interventions. Of note, the vision screening portion of the dental event was not advertised beforehand. We were able to appreciate the necessity of accessible vision screening, as approximately 250 people who attended the event for dental exams had enough vision concerns to stay for eye exams. Future events with advertised vision screening may allow for an even more representative sample of patients with vision needs in our community.

Our study is not without limitations. While self-reported barriers to care are informative, they are unlikely to be comprehensive. Barriers to care are often pervasive and include deeper issues such as low self-efficacy, conflicting demands, fear of results, and distrust in physicians [3]. While our survey focused on the traditional, modifiable barriers to care, these other fundamental issues also likely play a role in limiting access to care. Additionally, as an anonymous survey, our study may have been influenced by response bias as patients who left questions blank or did not participate may not be well represented in our results. Although our questionnaire was adapted from previously validated instruments from the literature, our survey instrument could be optimized further. For instance, future iterations of the survey could include adding more open-ended response sections, assessing its readability with attention to low health literacy, and conducting cognitive debriefing with a subset of participants to ensure understanding of the survey questions as intended [25]. The anonymous nature of the survey also limits our ability to associate responses with clinical findings, instead relying on self-report about previous eye disease. Likewise, we did not assess medical comorbidities, thus limiting our ability to associate their impact with self-reported barriers to eye care. Additionally, we surveyed only English-speaking attendees, and non-English-speaking patients likely face other important barriers to care that we did not measure in this study; translation of the questionnaire into other languages would allow a more comprehensive assessment of barriers to eye care in

future research. Finally, anonymous responses preclude us from assessing how self-reported barriers to care affect clinic follow-up for those referred for further evaluation at the university eye clinic. Despite these limitations, our findings contribute the nascent literature on barriers to ophthalmic care among an urban, underserved population. Moreover, we identify associations between demographic characteristics and individual barriers to care. These associations highlight important differences in social needs between population segments, which could inform targeted interventions.

## Conclusion

In conclusion, three-quarters of patients at a free vision screening event in an urban area reported at least one barrier to receiving routine eye care, most often medical costs and inadequate insurance. Our findings suggest that specific interventions at outreach programs could include aiding participants with financial assistance, insurance applications, and institutional aid. Further study is warranted on implementing targeted interventions to promote access to vision care among underserved communities.

## Acknowledgments

The authors wish to acknowledge leaders of Mission of Mercy Pittsburgh for incorporating vision care and this research survey at the 2021 event, including Keith Young, Michael Zamagias, and Daniel Pituch, DMD, MD. We are also grateful for support from the Eye and Ear Foundation of Pittsburgh in coordinating vision services and from Carl Zeiss for generously loaning an optical coherence tomography device for our department's outreach services. Finally, we are deeply appreciative of all Mission of Mercy volunteers, particularly UPMC Eye Center staff, residents, and faculty who committed their time and expertise to make this event successful.

## Statement of Ethics

The study was approved by the University of Pittsburgh Institutional Review Board (STUDY21090007) and granted exemption from requiring written informed consent.

## Conflict of Interest Statement

None of the authors have any proprietary interests or conflicts of interest related to this submission.

## Funding Sources

This work was supported by funding from the Henry L. Hillman Foundation, NIH CORE Grant P30 EY08098, the Eye and Ear Foundation of Pittsburgh, and an unrestricted grant from Research to Prevent Blindness to the Department of Ophthalmology at the University of Pittsburgh. Dr. Williams receives funding from Research to Prevent Blindness and a Mentoring for the Advancement of Physician Scientists (MAPS) award from the American Glaucoma Society. The funding organizations had no role in the design or conduct of this research.

## Author Contributions

Sarah Atta, Haniah A. Zaheer, and Owen Clinger contributed to study design, analysis of the data, drafting the work, and data acquisition. Peggy J. Liu contributed to analysis of the data, drafting the work, and critical revision of the manuscript. Dana McGinnis-Thomas, Evan L. Waxman, and José-Alain Sahel contributed to the conception of the work and critical revision of the manuscript. Andrew M. Williams contributed to the conception of the work, regulatory approval, study design, analysis of the data, critical revision of the manuscript, and oversight of the work. All authors read and approved the final manuscript.

## Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material files. Further inquiries can be directed to the corresponding author.

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