Journal of Immigrant and Minority Health (2024) 26:689–698
https://doi.org/10.1007/s10903-024-01589-3

ORIGINAL PAPER

The Association Between Perceived Discrimination, Age and Proportion of Lifetime in the United States Among Somali Immigrants: A Cross-Sectional Analysis

Abby M. Lohr[1,2] · Rebekah Pratt[3] · Hana Dirie[4,5] · Yahye Ahmed[4,5] · Hindi Elmi[6] · Omar Nur[7] · Ahmed Osman[6] · Paul Novotny[8] · Ahmed A. Mohamed[2] · Joan M. Griffin[9,10] · Irene G. Sia[1,5] · Mark L. Wieland[1,2]

Accepted: 9 March 2024 / Published online: 18 July 2024
© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2024

Abstract

Discrimination is detrimental to health. Little is known about perceived discrimination among Somali immigrants. We examined whether age or proportion of lifetime in the United States was associated with perceived discrimination among Somali immigrants. Guided by Intersectionality, we described a secondary analysis of Everyday Discrimination Scale (EDS) survey data from the *Healthy Immigrant Community* study. Younger participants (≤40 years) experienced more discrimination than older participants (>40 years). Higher education, being male, and earning $20,000-$39,999 was associated with more perceived discrimination. These findings suggest that Somali immigrants who are younger, more formally educated, male, and/or earn $20,000-$39,000 report more discrimination than their counterparts. Possible explanations include exposure to discrimination outside the Somali community or more awareness about racism. Alternatively, the EDS may not capture the discrimination experienced by Somali women or older adults. Further research is needed to address the discrimination experienced by Somali immigrants. Clinical Trial Registration: NCT05136339, November 29,2021.

Keywords Discrimination · Intersectional framework · Immigrants · Refugees · Somali

✉ Abby M. Lohr
lohr.abby@mayo.edu

1 Center for Clinical and Translational Science, Mayo Clinic, Rochester, MN, USA

2 Division of Community Internal Medicine, Geriatrics, and Palliative Care, Mayo Clinic, Rochester, MN, USA

3 University of Minnesota Medical School, Minneapolis, MN, USA

4 Community Based Research, Mayo Clinic, Rochester, MN, USA

5 Division of Public Health, Infectious Diseases, and Occupational Medicine, Mayo Clinic, Rochester, MN, USA

6 Intercultural Mutual Assistance Association, Rochester, MN, USA

7 Somali American Social Service Association, Rochester, MN, USA

8 Division of Biomedical Statistics and Informatics, Mayo Clinic, Rochester, MN 55902, USA

9 Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, Mayo Clinic, Rochester, MN, USA

10 Division of Health Care Delivery Research, Mayo Clinic, Rochester, MN, USA

Background

Although resettlement countries are intended to be safe, immigrants often experience discrimination in their new homes [1–3]. Discrimination is “a socially structured and sanctioned phenomenon, justified by ideology and expressed in interactions among and between individuals and institutions, that maintains privileges for members of dominant groups at the cost of deprivation for others” (p. 650) [4]. Discrimination can be blatant or subtle and occurs at three levels: systemic (e.g., limited access to housing), interpersonal (e.g., insults), or individual (e.g., negative internalized beliefs about own group) [4]. Perceived discrimination can negatively impact immigrants’ mental health [5–8], by leading to increased stress [9], less sense of belonging, distrust, reduced sense of control, and less hope [10].

To learn more about perceived discrimination among Somalis in the US, we conducted a secondary analysis of baseline survey data from *Healthy Immigrant Community* (HIC). Conducted by Rochester Healthy Community Partnership (RHCP), HIC is a social network, healthy lifestyle

intervention that aims to reduce cardiovascular risk among Hispanic and Somali immigrants. RHCP is a community-academic partnership that promotes health through community-based participatory research (CBPR) in southeastern Minnesota. The community partners identified the need for HIC and were co-investigators in all steps of the research process.

Since independence in 1960, Somalia endured wars, fragmentation, repression, and famine. In response, many Somalis emigrated, primarily in one of two waves. The first wave began after a military coup in 1969 by the Supreme Revolutionary Council, led by Mohamed Siad Barre. In response, many young Somalis migrated to the United States (US) seeking work or study. The flow of people from this first wave increased in the early 1980s due to political oppression and the 1977-80 war with Ethiopia [11]. When the Siad Barre regime collapsed due to the polarization of clan-based grievances in 1991, a second wave of Somali immigration occurred [12]. In contrast to the young adult majority in the first wave, this second wave included families and elders who often had never considered leaving Somalia [11]. From 1991 to 2012, Somalia did not have a central government which led to increased militarism [12]. In 2010, a drought caused livestock deaths, reduced harvest, and decreased labor demand, which dropped incomes and triggered famine [13]. Over half a million people died, up to two million were internally displaced, and another million fled to neighboring countries [14]. In 1990, the US began resettling Somali refugees. This process was temporarily halted in 2017 through executive order. Between October 2000 and August 2022, the US resettled nearly 110,000 Somali refugees [15]. Minnesota is home to 78,846 Somalis – the largest community in the US [16].

After migration to the US, discrimination may be experienced differently among Somali sub-groups. Length of stay in the US has been associated with increased experiences of perceived discrimination among Somali refugees [17]; therefore, we might expect fewer reports of perceived discrimination among young adults whose lengths of stay are shorter. Young Somali adults describe discrimination at an institutional level: for example, experiences of harsh and frequent policing [18]. In contrast, in a study of perceived discrimination among older Somali adults, acculturation (which includes length of stay) was not correlated with perceived discrimination [5]. There may be a nuanced relationship between age or length of stay in a resettlement country and perceived discrimination among Somali immigrants.

In this study we take an intersectional approach to discrimination that acknowledges overlapping social categories that together create unique challenges experienced by Somali immigrants in the US [19, 20]. Ellis called these intersecting categories “triple jeopardy” because Somali immigrants are racialized as Black and are predominantly Muslim, meaning they are more likely to experience xenophobia, racism, and Islamophobia [21]. Yet Kaptejins and Arman argue that Somalis initially face fewer historical liabilities and negative stereotypes of being Black in the US [11]. Thus, it is critical to disaggregate the complexities and diversity of experiences among Black-designated populations in the US.

Our primary objective was to determine whether age is associated with perceived discrimination among Somali immigrants. To build from existing literature that demonstrated that more time in the US is associated with more perceived discrimination [17], our secondary objective was to determine whether proportion of lifetime in the US is associated with perceived discrimination among Somali immigrants. By assessing proportion of lifetime in the US, we strove to acknowledge the formative impact of early adulthood on our lives. If age or proportion of lifetime in the US has the potential to impact perceived discrimination among Somali immigrants, it is important that we understand these influences to inform polices that guide social service support and healthcare.

Methods

Data Collection

RHCP community partners leveraged their social networks to recruit Somali immigrant adult peer interventionists in southeastern Minnesota from October 2021 through June 2022. Peer interventionists were known opinion leaders in the community. The peer interventionists then recruited 6–12 members of their social network (friends, family, co-workers, etc.) to participate in HIC. Eligibility criteria included identification as a Hispanic or Somali immigrant (in this paper, we are only reporting on results from the Somali immigrant participants), member of a social network linked to a peer interventionist, >18 years of age, willingness to participate in HIC, and completion of oral informed consent.

All participants (peer interventionists and their social network members) were enrolled at HIC baseline data collection in June 2022. RHCP staff administered a survey related to the broader study. Here we reported on the baseline results from the Everyday Discrimination Scale [22]. Study participants completed surveys in about 40 minutes in an in-person setting at an adult education learning center. Paper surveys were in English, Spanish, and Somali. Staff were available to read questions if needed. RHCP provided remuneration for participants.

Measures

Exposure

Perceived discrimination was measured using the Everyday Discrimination Scale (EDS) Short Version (Cronbach alpha = 0.77) [22]. The EDS is a subjective measure that captures perceived frequency of discriminatory experiences [23]. The EDS has been validated in the literature [24, 25] and demonstrated reliability with young adult Somali immigrants [26, 27] and other immigrant groups [28, 29]. Answer responses include almost every day (6), at least once a week (5), a few times a month (4), a few times a year (3), less than once a year (2), or never (1). The EDS score range is 5 to 30, higher scores indicate more perceived discrimination.

If EDS respondents report discrimination 'a few times a year' or more, they are asked: What do you think is the main reason for these experiences? Check all that apply (ancestry or national origins, gender, race, age, religion, height, weight, other aspect of your physical appearance, sexual orientation, education level, other). Results for this additional question were summarized as proportions.

To translate the EDS to Spanish and Somali, we adapted the World Health Organization survey translation procedure for CBPR. This process includes editing the original, English-language survey with community partners, forward translation, group discussion, backward translation, pretesting, further discussion, and consensus on the final survey by community partners [30].

Predictor Variables

Our primary predictor variable was age. Our secondary predictor variable was proportion of lifetime in the US. We calculated proportion of lifetime in the US by dividing the number of years the participant has lived in the US by the participant's age and then multiplied the result by 100 (in case their age and years in the US were not exactly equal due to rounding or data entry issues). If they were born in the US, this value is always 100%.

Covariates

We included the following covariates: sex (female / male), education (less than a high school diploma, high school graduate or general educational development [GED] test completion / some college or technical school, college graduate, or graduate degree [higher education]), employment (employed / unemployed), English language ability (not at all or not very well / well or very well), and income ($0 -$19,999 / $20,000 - $39,999 /$40,000 or higher).

Analysis

Descriptive Statistics

Guided by Erik Erikson's stages of human development [31] and Somali co-authors identification of culturally acceptable age ranges, we stratified participants into two groups: young (18–40 years) and older adults (> 40 years). By age 40, many adults have established careers and families while adults younger than 40 years may be attending school, changing careers, or starting families. Descriptive statistics included EDS results by sex, education, employment, English language ability, average income, and items in the EDS questionnaire. Categorical variables were summarized using counts and proportions. Continuous variables were summarized using means and standard deviations.

Primary Analysis

To examine whether age is associated with Somali immigrants' perceived discrimination, we used the EDS score to first fit an unadjusted linear regression model. Second, we fit an adjusted multilevel linear regression model and controlled for covariates. Prior to running this model, we checked for interactions between age and the covariates.

Secondary Analysis

To examine whether proportion of lifetime in the US impacts Somali immigrants' perceived discrimination, we conducted unadjusted and adjusted linear regression models with proportion of lifetime as an independent variable and EDS score as the dependent variable. This adjusted model included the same primary analysis covariates.

Sensitivity Analysis

Michaels et al., argue that using the more common frequency-based EDS scoring system does not capture how each successive response represents increasing chronic experiences of discrimination. In response, we developed models a priori and followed Michaels et al., recommendations and re-coded our EDS results using a weighted scoring system (almost every day [260], at least once a week [104], a few times a month [12], a few times a year [3], less than once a year [0.5], never [0]). Using Michaels et al.'s scoring system, the EDS possible score range is 0 to 1300. This approach more accurately reflects the chronicity of experiences of discrimination [23]. As a sensitivity analysis, we re-ran our primary and secondary analyses using the square root of this weighted EDS scale because the weighted scores were skewed.

Positionality

Our team includes both Somali and non-Somali researchers with lived experience of discrimination and/or a commitment to eliminate discrimination. Two of the six Somali researchers are under 40 years and all six emigrated outside Somalia in the 1990s. We worked together in all steps of this project. The Somali researchers provided key input to shape the interpretation of our findings.

Human Subjects Research

This research was approved by the Mayo Clinic Institutional Review Board. Oral informed consent was obtained from all study participants.

Results

Of the 183 Somali participants, the average age for young adults was 30 years compared to 57 years for the older adults. Compared to older adults, more younger adults completed some college or technical school (25% vs. 7%) or a college degree (10% vs. 5%) while more older adults completed less than a high school diploma (27% vs. 59%). When asked how well they speak English, responses were opposite: 76% of younger adults reported speaking English 'well or very well' while 68% of older adults reported speaking English 'not at all' or 'not very well'. More older adults (40%) reported earning <$10,000 compared to younger adults (21%). While the average proportion of lifetime in the US was higher for older adults (69%) compared to younger adults (64%), the standard deviation for younger adults was high meaning there was wide variation in when younger adults immigrated. The mean score on the EDS was 7.8 with older adults scoring lower (7.0) compared to younger adults (9.4). When we re-scored the EDS using weighted coding, older adults again had lower scores than younger adults (27.2 vs. 42.2) (Table 1).

Fifty-three (27% of participants) reported perceived discrimination a few times a year or more and answered the question explaining why. Both age groups identified the primary reason as their religion followed by ancestry or national origin, race, and language. More younger than older adults attributed the cause to their gender, weight, other physical aspects, or education or income level. None of the respondents thought the discrimination they experience was due to their sexual orientation (Fig. 1). In our analysis of EDS results by question, the younger adults reported ever experiencing each situation about equally (36–42%). In contrast, the older adults reported being treated with less respect than others (26%), receiving poorer service at restaurants and stores (26%), and people acting as if they think you are not smart (20%) more often than they reported people acting afraid of you (12%) or being harassed (11%) (Table 1).

In our unadjusted model, perceived discrimination had a statistically significant association with participants' age (Table 2). Being > 40 years resulted in a 2.32-point lower score (95% confidence interval [CI] = -3.79, -0.85) compared to being ≤ 40 years. In our adjusted model, perceived discrimination was also significantly associated with participants' age. Being > 40 resulted in a 2.46-point lower score (95% CI = -4.07, -0.85) than being ≤ 40 years.

Sex and educational attainment showed statistically significant associations with perceived discrimination. Being male resulted in a 1.45-point higher score (95% CI = 0.06, 2.84) than being a female. Completing some higher education resulted in a 4.63-point higher score (95% CI = 2.61, 6.65) compared to individuals who completed high school, GED, or less (Table 2). The sensitivity analyses were similar. Being > 40 years resulted in a 1.81-point lower score (95% CI = -3.52, -0.10) compared to being ≤ 40 years (Table 3).

In both our unadjusted model (0.01; 95% CI = -0.03, 0.04) and adjusted model (0.02; 95% CI = -0.01, 0.06), discrimination did not have a statistically significant association with participants' proportion of lifetime in the US. Educational attainment and average family income showed statistically significant associations with discrimination. Having completed some higher education resulted in a 4.32-point higher score (95% CI = 2.00, 6.65) than earning a high school diploma, GED, or less. Additionally, earning an average income of $20,000-$39,999 resulted in a 2.42-point higher score (95% CI = 0.35, 4.49) compared to earning $0-$19,999 or $40,000 or higher (Table 4).

The sensitivity analyses produced similar results: participants' perceived discrimination was not associated with their proportion of lifetime in the US. Having completed some higher education resulted in a 3.14-point higher score (95% CI = 0.59,5.70) than earning a high school diploma, GED, or less (Table 3).

Discussion

We sought to determine whether perceived discrimination was associated with age and proportion of lifetime in the US among Somali immigrants. Our results suggest that perceived discrimination is associated with age. Older adults had lower EDS scores while men and individuals who completed some higher education had higher scores indicating more perceived discrimination. Our sensitivity analyses had the same results. We conclude that younger Somalis report experiencing more discrimination whether we consider the frequency or chronicity of discrimination. Additionally,

Table 1 Characteristics of Healthy Immigrant Community study Somali survey participants stratified by age (N = 183)

Characteristic[a]	Young Adults (18–40 years) (N = 59)	Older Adults (> 40 years) (N = 124)	Total (N = 183)
Age, mean (SD) (years)	30 (7)	57 (12)	48 (16)
Sex, N (%)	30 (52%)	60 (50%)	90 (50%)
Female			
Educational Attainment, N (%)			
Less than high school diploma	16 (27%)	72 (59%)	88 (48%)
High school graduate or GED	17 (29%)	30 (25%)	47 (26%)
Some college or technical school	15 (25%)	9 (7%)	24 (13%)
College degree	6 (10%)	6 (5%)	12 (7%)
Graduate degree	5 (9%)	5 (4%)	10 (6%)
Employment, N (%)			
Employed	38 (64%)	64 (52%)	102 (56%)
English language ability, N (%)			
Not at all or not very well	14 (23%)	83 (68%)	97 (54%)
Well or very well	45 (76%)	38 (31%)	83 (46%)
Average family income, N (%)			
$0 -$9,999	12 (21%)	48 (40%)	60 (34%)
$10,000 to $19,999	9 (16%)	18 (15%)	27 (15%)
$20,000 to $29,999	10 (18%)	23 (19%)	33 (19%)
$30,000 to $39,999	5 (9%)	15 (13%)	20 (11%)
$40,000 or higher	20 (36%)	15 (13%)	35 (20%)
Proportion of lifetime in US mean (SD) [b]	64 (28)	69 (18)	67 (22)
Situations ever experienced by EDS question, N (%)			
Treated with less courtesy or respect than others	25 (42%)	31 (26%)	56 (31%)
Received poorer service at restaurants or stores	25 (42%)	31 (26%)	56 (31%)
People acted as if they think you are not smart	23 (40%)	24 (20%)	47 (26%)
People acted as if they are afraid of you	21 (36%)	15 (12%)	36 (20%)
Threatened or harassed	21 (36%)	13 (11%)	34 (19%)
EDS Scale mean (SD) [c]	9.4 (5.5)	7.0 (4.3)	7.8 (4.8)
Weighted EDS Scale mean (SD) [d]	42.2 (98.9)	27.2 (105.1)	32.0 (103.1)
Square Root of Weighted EDS mean (SD)	3.52 (5.51)	1.93 (4.86)	2.45 (5.12)

Abbreviations SD = standard deviation; GED = General Educational Development test; US = United States

[a] Proportion of lifetime in the US is only defined for 146 subjects (20% missing). All other variables have less than 5% missing

[b] We calculated proportion of lifetime in the US by dividing the number of years the participant has lived in the US by the participant's age and then multiplied the result by 100. If they were born in the US, this value is always 100%

[c] We measured perceived discrimination using the Everyday Discrimination Scale (EDS) Short Version [22, 24, 25, 47]. Answer responses include almost every day (6), at least once a week (5), a few times a month (4), a few times a year (3), less than once a year (2), or never (1). The possible score range for the EDS short version is 5 to 30, with higher scores indicating more experiences of perceived discrimination

[d] In our sensitivity analysis, we re-coded the EDS to reflect the chronicity of experiences of discrimination [23]: almost every day (260), at least once a week (104), a few times a month (12), a few times a year (3), less than once a year (0.5), never (0). Using this scoring system, the possible score range for the EDS short version is 0 to 1300

regardless of proportion of lifetime in the US, participants who completed some higher education and/or earned an average income of $20,000-$39,999 reported more perceived discrimination. Our sensitivity analysis had similar results.

Intersectionality guided our analysis of the power imbalances experienced by Somali immigrants [19, 20]. We present overlapping social and structural factors that may explain our results and highlight social institutions that produce inequities [19].

Age and Environment

Younger Somali adults may have reported more discrimination because they are defining their identity and relationship to society [32]. They may often face discrimination at

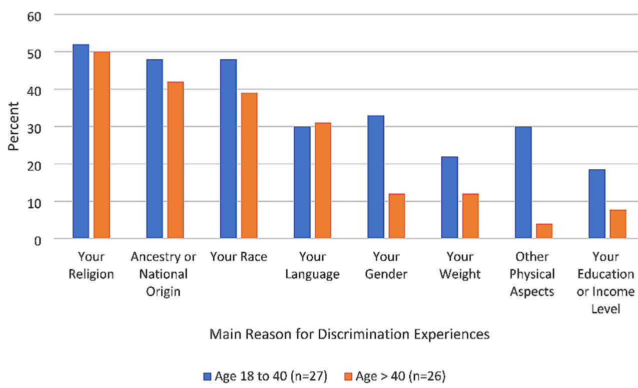

Fig. 1 Distribution of reasons for racism experienced among Somali participants in the Healthy Immigrant Community study stratified by age. Note: If EDS respondents report discrimination 'a few times a year' or more, they are asked: What do you think is the main reason for these experiences? Check all that apply. None of the respondents replied that the discrimination they experience is due to sexual orientation thus we excluded this option from the figure

school or work, especially as they progress up a hierarchy [10, 33, 34]. In contrast, older Somali adults may experience less discrimination by staying within their community [10, 27, 35]. The younger Somali adults may also have attributed discrimination to their body weight more often than older Somali adults due to cultural differences. After growing up in Somalia where being overweight is celebrated, older Somali adults who have spent less time in the US may be less concerned about their weight compared to younger Somali adults who have spent more time in the US where being overweight is stigmatized [36, 37].

We were not surprised that respondents with more education reported more perceived discrimination [38, 39]. Identifying, reporting, and quantifying experiences as discriminatory is a learned process [40]. Somalis who immigrate to the US as children learn about equity and inclusion in school from formal curriculum and peers. This group may hold learned expectations that unequal treatment is attributed to discrimination [41]. In contrast, older Somali adults may be less aware of discrimination because they have less informal or formal schooling or completed their education outside the US.

Gender and Religion

Because many Somali women wear hijab which puts them at risk of experiencing Islamophobia [42–44], we were surprised that the Somali men reported more discrimination than the women. It is possible that the Somali women participants did not report discrimination on the EDS. Alternatively, the Somali men may experience discrimination differently than women.

Table 2 Results from the unadjusted and adjusted analyses of perceived discrimination[a] using age among Somali participants in the Healthy Immigrant Community study

Variable	Unadjusted coefficient (N = 182)	p-Value (95% CI)	Adjusted coefficient (N = 164)	p-Value (95% CI)
Intercept			8.10	< 0.01 (6.24,9.96)
Age				
≤ 40 years			Reference	
> 40 years	-2.32	< 0.01 (-3.79, 0.85)	-2.46	< 0.01 (-4.07, -0.85)
Sex				
Female			Reference	
Male			1.45	0.04 (0.06,2.84)
Educational Attainment				
High school graduate, GED, or less			Reference	
Some college, technical school, college or graduate degree			4.63	< 0.01 (2.61,6.65)
Employment				
Unemployed			Reference	
Employed			0.10	0.91 (-1.63,1.82)
English language ability				
Not at all or not very well			Reference	
Well or very well			-1.64	0.08 (-3.44,0.16)
Average family income				
$0 -$19,999			Reference	
$20,000 to $39,999			1.65	0.08 (-0.17,3.47)
$40,000 or higher			-2.07	0.09 (-4.46,0.32)

CI = Confidence interval

[a] We measured perceived discrimination using the Everyday Discrimination Scale (EDS) Short Version [22, 24, 25, 47]. Answer responses include almost every day (6), at least once a week (5), a few times a month (4), a few times a year (3), less than once a year (2), or never (1). The possible score range for the EDS short version is 5 to 30, with higher scores indicating more experiences of perceived discrimination

Race and Income

Somali participants earning an average income of $20,000-$39,999 reported more discrimination compared to those earning $0-$19,999 or ≥$40,000. It is likely that the lower income group are unemployed and/or receiving financial assistance. The higher income group likely has limited

Table 3 Adjusted results from the sensitivity analyses[a] using the square root of the weighted coding of the Everyday Discrimination Scale to examine the impact of age and proportion of lifetime in the United States among Somali participants in the Healthy Immigrant Community study

Variable	Age (N = 164)		Proportion of Lifetime in the US (N = 132)	
	Coefficient (N = 164)	p-Value (95% CI)	Coefficient (N = 132)	p-Value (95% CI)
Intercept	2.66	0.01 (0.68,4.64)	0.95	0.60 (-2.54,4.43)
Age > 40	-1.81	0.04 (-3.52, -0.10)		
Proportion of Lifetime in US			0.00	0.87 (-0.04,0.04)
Gender				
Female	Reference			
Male	1.55	0.04 (0.08,3.02)	1.28	0.14 (-0.41,2.98)
Educational Attainment				
High school graduate, GED, or less	Reference			
Some college, technical school, college or graduate degree	3.38	0.01 (1.24,5.52)	3.14	0.02 (0.59,5.70)
Employment				
Employed	-0.42	0.66 (-2.26,1.42)	-0.41	0.71 (-2.56,1.74)
Unemployed	Reference			
English language ability				
Not at all or not very well	Reference			
Well or very well	-1.31	0.18 (-3.21,0.59)	-0.67	0.55 (-2.83,1.50)
Average family income				
$0 -$19,999	Reference			
$20,000 to $39,999	1.14	0.25 (-0.80,3.08)	1.51	0.19 (-0.76,3.79)
$40,000 or higher	-1.52	0.24 (-4.05,1.01)	-1.06	0.48 (-3.98,1.85)

CI = Confidence interval

[a] In our sensitivity analysis, we re-coded the EDS to reflect the chronicity of experiences of discrimination [23]: almost every day [260], at least once a week [104], a few times a month [12], a few times a year [3], less than once a year [0.5], never [0]. Using this scoring system, the possible score range for the EDS short version is 0 to 1300

interaction with the public at work (e.g., long haul truck drivers). In contrast, the participants in the middle-income range are likely employed in (possibly multiple) public-facing service positions (e.g., retail, food service, child or elder care) where they may face discrimination because some customers may prefer White employees [45]. It is also likely that this group has White, working-class co-workers without a college education who often hold more conservative views about immigration. In a 2017 survey, 62% of White, working-class respondents believed "the growing number of newcomers from other countries threatens American culture" while 30% said newcomers strengthen our society [46]. Thus, the Somali participants with an average income of $20,000-$39,000 may have higher EDS scores because they experience discrimination from the public and their White colleagues at work.

Alternatively, the EDS may not capture the discrimination faced by Somali women or older adults. For example, if older adults are exclusively patronizing Somali-owned businesses, then they are unlikely to report receiving poorer service at stores due to discrimination (EDS question #2). More research is needed to examine the psychometric properties of the EDS for Somali women and older adults.

Strengths and Limitations

The strengths of this study include the large sample size and CBPR approach we used to collect and analyze data. One limitation was our small sample size of younger Somali adults. Future research should include recruitment strategies that prioritize younger Somali adults. Additionally, there was a large amount of missing data (20%) for the proportion of lifetime in the US variable which may have biased our results. Finally, we collected data in a midsize urban area in the Midwestern US. Our results may not be generalizable to other geographic areas. We recommend further examination of (1) how best to collect data on perceived discrimination with both younger and older Somali immigrants; (2) the short- and long-term health consequences of perceived discrimination on this population; and (3) the reasons why Somali adults experience discrimination.

Implications for Policy and Practice

Discrimination should be considered an emerging public health issue that may be more intense for younger compared to older Somali immigrants. It is important that policy makers are informed of differences in discrimination among Somali immigrants to inform policies, provide support, dismantle structural discrimination, and promote programs that encourage cross-cultural communication and education.

Table 4 Results from the unadjusted and adjusted analyses of perceived discrimination[a] using proportion of lifetime in the United States[b] among Somali participants in the Healthy Immigrant Community study

Variable	Unadjusted coefficient (N = 146)	p-Value (95% CI)	Adjusted coefficient (N = 90)	p-Value (95% CI)
Intercept			4.25	0.01 (1.08,7.42)
Proportion of lifetime in the US	0.01	0.71 (-0.03,0.04)	0.02	0.25 (-0.01,0.06)
Gender				
Female			Reference	
Male			1.01	0.20 (-0.54,2.55)
Educational Attainment				
High school graduate, GED, or less			Reference	
Some college, technical school, college or graduate degree			4.32	< 0.01 (2.00,6.65)
Employment				
Unemployed			Reference	
Employed			0.24	0.82 (-1.73,2.18)
English language ability				
Not at all or not very well			Reference	
Well or very well			-0.42	0.68 (-2.39,1.56)
Average family income				
$0 -$19,999				
$20,000 to $39,999			2.42	0.02 (0.35,4.49)
$40,000 or higher			-1.31	0.34 (-3.96,1.35)

CI = Confidence interval

[a] We measured perceived discrimination using the Everyday Discrimination Scale (EDS) Short Version [22, 24, 25, 47]. Answer responses include almost every day (6), at least once a week (5), a few times a month (4), a few times a year (3), less than once a year (2), or never (1). The possible score range for the EDS short version is 5 to 30, with higher scores indicating more experiences of perceived discrimination

[b] We calculated proportion of lifetime in the US by dividing the number of years the participant has lived in the US by the participant's age and then multiplied the result by 100. If they were born in the US, this value is always 100%

New Contribution to the Literature

Our research adds to literature on the role of age on perceived discrimination. This work contributes data from Somali immigrants – a population often absent or aggregated with other groups in research.

Acknowledgements We would like to acknowledge the Rochester Healthy Community Partnership members and partners who participated in the development of the *Healthy Immigrant Community* intervention. The authors also wish to thank the C2DREAM Paper Hatchling Program for helping launch this work.

Author Contributions All authors contributed to the study conception and design. Data collection and interpretation were performed by Abby Lohr, Hana Dirie, Yahye Ahmed, Hindi Elmi, Omar Nur, and Ahmed Osman. Paul Novotny analyzed the data. Abby Lohr wrote the first draft of the manuscript and all authors commented on and substantively revised later versions. All authors read and approved the final manuscript.

Funding Research reported in this publication was conducted in partnership between the University of Minnesota Program in Health Disparities Research, the University of Minnesota School of Public Health, the Mayo Clinic, and Hennepin Healthcare Research Institute. Funding provided by the National Institute on Minority Health and Health Disparities of the National Institutes of Health under Award Number P50MD017342.

Data Availability We will grant access to the participant-level dataset and statistical code pending approval by Rochester Healthy Community Partnership (RHCP) community partners.

Declarations

Competing Interest The authors have no competing interests to declare that are relevant to the content of this article.

Ethical Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Institutional Review Board at the Mayo Clinic (October 19, 2021/No. 21-009339).

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

References

1. Sangalang CC, Becerra D, Mitchell FM, Lechuga-Peña S, Lopez K, Kim I, Trauma P-M. Stress, and Mental Health: a comparative analysis of refugees and immigrants in the United States. J Immigr Minor Health. 2019;21(5):909–19. https://doi.org/10.1007/s10903-018-0826-2.

2. Tsai P-L, Ghahari S. Immigrants' experience of Health Care Access in Canada: a recent scoping review. J Immigr Minor Health. 2023;25:(3):712–27. https://doi.org/10.1007/s10903-023-01461-w.
3. Allen JD, Kunicki ZJ, Greaney ML, Mental Health of Brazilian Immigrant Women. The role of discrimination, Social Support, and Community strengths. J Immigr Minor Health. 2023. https://doi.org/10.1007/s10903-023-01485-2.
4. Krieger N. Discrimination and health inequities. Int J Health Serv. 2014;44(4):643–710.
5. Mölsä M, Kuittinen S, Tiilikainen M, Honkasalo M-L, Punamäki R-L. Mental health among older refugees: the role of trauma, discrimination, and religiousness. Aging Ment Health. 2017;21(8):829–37.
6. Cho YJ, Lee WJ, Oh H, Lee JO, Kim B-KE, Jang Y. Perceived Racial Discrimination and Mental Health in Diverse groups of Asian americans: the Differing impacts by Age, Education, and ethnicity. J Immigr Minor Health. 2022;24(4):970–6. https://doi.org/10.1007/s10903-021-01271-y.
7. Roy S, Hassan S, Kanaya AM, Kandula NR, Desai MM. Associations of discrimination, low Social Support, and Limited English proficiency with Depression in South Asian immigrants. J Immigr Minor Health. 2023. https://doi.org/10.1007/s10903-023-01467-4.
8. Tikhonov AA, Espinosa A, Huynh Q-L, Hoggard L, Anglin DM. You're tearing me apart! Racial/Ethnic discrimination, Bicultural Identity, and Mental Health. J Immigr Minor Health. 2023. https://doi.org/10.1007/s10903-023-01462-9.
9. Jasinskaja-Lahti I, Liebkind K, Perhoniemi R. Perceived discrimination and well-being: a victim study of different immigrant groups. J Community Appl Social Psychol. 2006;16(4):267–84.
10. Ziersch A, Due C, Walsh M, Discrimination. A health hazard for people from refugee and asylum-seeking backgrounds resettled in Australia. BMC Public Health. 2020;20(1):1–14.
11. Kapteijns L, Arman A. Educating immigrant youth in the United States: an exploration of the Somali case. Bildhaan: Int J Somali Stud. 2008;4:(1):6.
12. Adam HM. Somalia: militarism, warlordism or democracy? Review of African Political Economy. 1992; 19:(54): 11–26.
13. United Nations Office for the Coordination of Humanitarian Affairs. Mortality among populations of southern and central Somalia affected by severe food insecurity and famine during 2010–2012. 2013. Available from: https://reliefweb.int/report/somalia/mortality-among-populations-southern-and-central-somalia-affected-severe-food Accessed September 16, 2022.
14. Internal Displacement Monitoring Centre. Somalia: window of opportunity for addressing one of the world's worst internal displacement crises. 2006. Available from: https://www.internal-displacement.org/sites/default/files/publications/documents/200601-af-somalia-somalia-window-of-opportunity-for-addressing-one-of-the-worlds-worst-internal-displacement-crises-country-en.pdf Accessed September 15, 2022.
15. Refugee Processing Center. Refugee Admissions Report August 31, 2022. 2022. Available from: https://www.wrapsnet.org/admissions-and-arrivals/ Accessed September 15, 2022.
16. Minnesota Compass. Somali Population. 2022. Available from: https://www.mncompass.org/topics/demographics/cultural-communities/somali Accessed September 15, 2022.
17. Hadley C, Patil C. Perceived discrimination among three groups of refugees resettled in the USA: associations with language, time in the USA, and continent of origin. J Immigr Minor Health. 2009;11(6):505–12.
18. Ellis BH, Lincoln AK, Abdi SM, Nimmons EA, Issa O, Decker SH. We all have stories: black muslim immigrants' experience with the police. Race Justice. 2020;10(3):341–62.
19. Viruell-Fuentes EA, Miranda PY, Abdulrahim S. More than culture: structural racism, intersectionality theory, and immigrant health. Soc Sci Med. 2012;75(12):2099–106.
20. Crenshaw K. Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. u. Chi. Legal f. 1989; 139.
21. Ellis BH, MacDonald HZ, Klunk-Gillis J, Lincoln A, Strunin L, Cabral HJ. Discrimination and mental health among Somali refugee adolescents: the role of acculturation and gender. Am J Orthopsychiatry. 2010;80(4):564.
22. Sternthal MJ, Slopen N, Williams DR. Racial disparities in health: how much does stress really matter? 1. Du Bois Review: Social Sci Res race. 2011;8(1):95–113.
23. Michaels E, et al. Coding the Everyday discrimination scale: implications for exposure assessment and associations with hypertension and depression among a cross section of mid-life African American women. J Epidemiol Community Health. 2019;73(6):577–84. https://doi.org/10.1136/jech-2018-211230.
24. Taylor TR, Kamarck TW, Shiffman S. Validation of the Detroit Area Study discrimination scale in a community sample of older African American adults: the Pittsburgh healthy heart project. Int J Behav Med. 2004;11(2):88–94.
25. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. Soc Sci Med. 2005;61(7):1576–96.
26. Ellis BH, MacDonald HZ, Lincoln AK, Cabral HJ. Mental health of Somali adolescent refugees: the role of trauma, stress, and perceived discrimination. J Consult Clin Psychol. 2008;76(2):184.
27. Lincoln AK, et al. Discrimination, marginalization, belonging, and mental health among Somali immigrants in North America. Am J Orthopsychiatry. 2021;91(2):280.
28. Carlisle SK. Nativity differences in chronic health conditions between nationally representative samples of Asian American, latino American, and afro-caribbean American respondents. J Immigr Minor Health. 2012;14:903–11.
29. Carlisle SK. Perceived discrimination and chronic health in adults from nine ethnic subgroups in the USA. Ethn Health. 2015;20(3):309–26.
30. Formea CM, et al. Lessons learned: cultural and linguistic enhancement of surveys through community-based participatory research. Progress Community Health Partnerships: Res Educ Action. 2014;8(3):331.
31. Erikson EH. Identity and the life cycle. WW Norton & company; 1994.
32. Ellis BH, Winer JP, Murray K, Barrett C. Understanding the mental health of refugees: Trauma, stress, and the cultural context. The Massachusetts General Hospital textbook on diversity and cultural sensitivity in mental health. 2019; 253–273.
33. Fangen K. Humiliation experienced by Somali refugees in Norway. J Refugee Stud. 2006;19:(1):69–93.
34. Osman F, Mohamed A, Warner G, Sarkadi A. Longing for a sense of belonging—Somali immigrant adolescents' experiences of their acculturation efforts in Sweden. Int J Qualitative Stud Health well-being. 2020;15(sup2):1784532.
35. Nangia P. Discrimination experienced by landed immigrants in Canada. Ryerson Centre for Immigration and Settlement Toronto, ON; 2013.
36. Altman CE, Van Hook J, Gonzalez J. Becoming overweight without gaining a pound: weight evaluations and the social integration of mexicans in the United States. Int Migrat Rev. 2017;51(1):3–36.
37. Fikru E. Black Immigrant Weight Perceptions and Desires to Weigh Less. 2016. https://etda.libraries.psu.edu/files/final_submissions/12360.

38. Van Doorn M, Scheepers P, Dagevos J. Explaining the integration paradox among small immigrant groups in the Netherlands. J Int Migration Integr. 2013;14:381–400.
39. Alemi Q, et al. Effect of perceived discrimination on depressive symptoms in 1st-and 2nd-generation afghan-americans. J Prim Prev. 2017;38:613–26.
40. Viruell-Fuentes EA. Beyond acculturation: immigration, discrimination, and health research among mexicans in the United States. Soc Sci Med. 2007;65(7):1524–35.
41. Vang ZM, Chang Y. Immigrants' experiences of everyday discrimination in Canada: unpacking the contributions of assimilation, race, and early socialization. Int Migrat Rev. 2019;53(2):602–31.
42. Weichselbaumer D. Multiple discrimination against female immigrants wearing headscarves. ILR Rev. 2020;73:(3):600–27.
43. American Civil Liberties Union. Discrimination against Muslim Women -Fact Sheet. 2008. Available from: https://www.aclu.org/other/discrimination-against-muslim-women-fact-sheet Accessed April 27, 2023.
44. Weichselbaumer D. Discrimination against female migrants wearing headscarves. 2016. https://www.econstor.eu/bitstream/10419/147903/1/dp10217.pdf.
45. Hekman DR, Aquino K, Owens BP, Mitchell TR, Schilpzand P, Leavitt K. An examination of whether and how racial and gender biases influence customer satisfaction. Acad Manag J. 2010;53:(2):238–64.
46. Cox D, Lienesch R, Jones RP. *Beyond Economics: Fears of Cultural Displacement Pushed the White Working Class to Trump | PRRI/The Atlantic Report*. 2017. Public Religion Research Institute & The Atlantic. Available from: https://www.prri.org/research/white-working-class-attitudes-economy-trade-immigration-election-donald-trump/ Accessed April 27, 2023.
47. Williams DR, Yu Y, Jackson JS, Anderson NB. Racial differences in physical and mental health: Socio-economic status, stress and discrimination. J Health Psychol. 1997;2(3):335–51.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.