Scientific Publications

Journal of Biomedical and Life Sciences, 2025, 5, 1106
www.scipublications.org/journal/index.php/jbls
DOI: 10.31586/jbls.2025.1106

Original Article

Educated Yet Unhealthy? Diminished Returns of Education for Immigrants in the USA

Shervin Assari [1,2,3,*], Babak Najand [3] , Hossein Zare [4,5]

[1] Department of Internal Medicine, Charles R. Drew University of Medicine and Science, Los Angeles, CA, USA

[2] Department of Psychiatry, Charles R. Drew University of Medicine and Science, Los Angeles, CA, USA

[3] Marginalized-Related Diminished Returns (MDRs) Research Center, Los Angeles, CA, USA

[4] Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

[5] School of Business, University of Maryland Global Campus (UMGC), Adelphi, MD, USA

*Correspondence: Shervin Assari (assari@umich.edu)

Abstract **Background:** Minorities' Diminished Returns (MDRs) theory posits that the health benefits of socioeconomic resources, such as education, are smaller for marginalized and minoritized populations, including immigrants. While MDRs have been extensively documented for racial and ethnic minorities, less is known about whether these diminished returns extend to immigrant populations. This study tested MDRs of education on various health and cognitive outcomes, including self-rated health (SRH), cognitive function, numeracy, number of chronic medical conditions, and limitations in activities of daily living (ADLs) among immigrants compared to non-immigrants in the United States. **Objective.** To examine whether educational attainment confers weaker protective effects on SRH, cognitive function, numeracy, chronic medical conditions, and ADLs in immigrants compared to non-immigrants, confirming the presence of MDRs across these domains. **Methods:** We used data from the Understanding America Study (UAS), a nationally representative survey of U.S. adults. We tested the association between educational attainment and five outcomes—SRH, cognitive function, numeracy, number of chronic medical conditions, and limitations in ADLs—across immigrant and non-immigrant groups. Multivariate regression models were employed, adjusting for key sociodemographic covariates. **Results:** The protective effects of education on a range of health outcomes were significantly weaker for immigrants compared to non-immigrants. Education level showed weaker associations with SRH, cognitive function, numeracy, number of chronic conditions, and ADLs among immigrants. These findings suggest that even at higher levels of educational attainment, immigrants experience poorer health and cognitive functioning than their U.S.-born counterparts. **Conclusion:** This study offers strong evidence for the MDRs of education on multiple health outcomes among U.S. immigrants. One possible explanation is that, despite achieving higher levels of education, immigrants often face structural barriers—such as discrimination, limited access to resources, and economic inequities—that constrain the health-related benefits typically associated with educational attainment. Additionally, a portion of immigrant education may be acquired outside the United States, where credentials may not be fully recognized or rewarded within the U.S. labor market. These findings highlight the importance of policies aimed at addressing systemic inequities and improving access to healthcare, employment opportunities, and social support for immigrant communities. Future research should further explore the mechanisms underlying these diminished returns and identify policy solutions to reduce their impact.

Keywords: Educational Attainment, Immigrants, Nativity, Self-Rated Health, Chronic Disease, Activities of Daily Living (ADL), Cognitive Function

How to cite this paper:
Assari, S., Najand, B., & Zare, H. (2025). Educated Yet Unhealthy? Diminished Returns of Education for Immigrants in the USA. *Journal of Biomedical and Life Sciences, 5*(1), 84–97.
DOI: 10.31586/jbls.2025.1106

Received: July 10, 2024
Revised: September 9, 2024
Accepted: April 19, 2025
Published: May 5, 2025

1. Introduction

Health is a multidimensional concept [1] encompassing a wide range of conditions, including self-rated health (SRH), cognitive function, chronic medical conditions, and the ability to perform activities of daily living (ADLs) without limitations [2]. A person is considered healthier when they report higher SRH, exhibit stronger cognitive function, demonstrate better numeracy, have fewer chronic medical conditions, and experience fewer limitations in ADLs [3]. A key aim of policymakers is to optimize both individual and population health across all of these domains[3]. For example, initiatives like *Healthy People 2030* [4] in the U.S. or other human development goals seek to promote health and well-being across the general population and within specific subpopulations [5]. Another important goal is to reduce preventable and unjust health disparities across social groups [6].

Educational attainment is widely recognized as one of the most important social determinants of health [7, 8], with higher levels of education typically associated with better health outcomes, including improved self-rated health (SRH), higher cognitive function, better numeracy, fewer chronic medical conditions, and fewer limitations in activities of daily living (ADLs) in the general population. These associations are well-documented in public health literature, suggesting that education promotes healthier lifestyles, increases access to healthcare, and facilitates better employment opportunities, all of which contribute to better overall health and well-being.

However, the protective effects of education on health outcomes are not distributed equally across populations [9]. Emerging evidence suggests that while education is generally associated with better health, its benefits may be weaker for marginalized and minoritized groups [10-13]. This phenomenon, known as Minorities' Diminished Returns (MDRs) [14], posits that the same level of socioeconomic resources—such as education—translates into smaller gains in health and well-being for minoritized populations compared to their more privileged counterparts [15-31].

Most research on MDRs has focused on racial and ethnic minorities, demonstrating that despite similar or even higher levels of educational attainment, Black, Latino, and other non-White populations experience fewer health benefits from their education compared to Whites [14, 32-44]. These diminished returns are often attributed to structural and contextual factors, such as discrimination, residential segregation, and labor market inequalities, which disproportionately affect marginalized groups. Some evidence has also shown diminished returns of education on immigrant people [45-54].

Although much of the existing MDRs literature focuses on racial and ethnic disparities [18, 55-62], less attention has been paid to how MDRs operate among immigrants. Immigrants in the United States often face unique challenges, including language barriers, cultural differences, legal restrictions, and social exclusion, which can erode the protective effects of education on health outcomes [23, 42, 47, 63-69]. Despite high levels of educational attainment, immigrants may experience diminished returns on their education, leading to poorer health, greater chronic conditions, and functional limitations [42, 63, 65, 66]. Given the structural disadvantages that immigrants face, it is critical to explore whether the benefits of education on health outcomes are similarly attenuated in this population, as has been shown for racial and ethnic minorities [23, 47, 64, 67, 68].

This study aims to address this gap in the literature by examining MDRs of education among U.S. immigrants. Specifically, we investigate whether educational attainment is less protective against poor SRH, cognitive decline, lower numeracy, chronic medical conditions, and limitations in ADLs for immigrants compared to non-immigrants. By extending the MDRs framework to the immigrant population, this study provides a more comprehensive understanding of how education-related health disparities manifest across different marginalized groups. In doing so, it highlights the structural barriers that

may limit the translation of education into improved health outcomes for immigrants, offering important insights for policy interventions aimed at reducing health inequalities.

2. Methods

The Understanding America Study (UAS) [70–74], conducted by the University of Southern California, is a nationally representative, internet-based panel survey designed to capture detailed data on health, economic, and social factors across the U.S. population. Utilizing probability-based sampling methods from postal delivery listings, the UAS ensures comprehensive coverage, including hard-to-reach populations. To promote equitable participation, individuals without home internet access are provided with internet-connected tablets and data plans, enabling inclusive data collection [70–74].

As of the data collection period, the UAS panel consisted of more than 9,600 adults, nearly 5,000 of whom were aged 50 or older [70–74]. The study gathers extensive information across various domains such as cognitive performance, health behaviors, psychological well-being, financial security, and retirement preparedness. Surveys are fielded on a regular basis—either annually or biennially—allowing for longitudinal tracking of individuals over time. In addition to behavioral and demographic data, the UAS includes repeated health assessments to monitor changes in participants' physical and mental health status [70–74].

Our analytical sample was composed of those based on available data on immigration and education. They could be Latino or non-Latino, and Black or White. Participants could be immigrant or not.

Study Sample

The analysis used data from the 2012 wave of the Understanding America Study (UAS) [70–74], focusing on adults aged 30 and older, segmented into four age groups: 30–50, 50–64, 65–74, and 75 and above. The primary dependent variable was retirement preparedness, assessed via a continuous scale where higher values reflected greater perceived financial readiness for retirement. This variable integrated participants' perceptions of their financial stability, encompassing savings, pension access, and income continuity. Participants also provided detailed background information, including demographic characteristics and employment status, which were used to adjust for potential confounding factors.

Measures

The UAS [70–74] offers extensive national data suitable for evaluating disparities in retirement preparedness and health outcomes, particularly when exploring the differential effects of educational attainment by race, ethnicity, and immigration status.

Self-rated health: Self-rated health (SRH) serves as a widely accepted and valid indicator of overall health perception, typically measured using a five-point scale from poor to excellent. This subjective assessment has demonstrated strong predictive power for important health outcomes such as chronic illness, physical limitations, and even mortality. Although SRH is often analyzed in categorical form, using it as a continuous variable enables researchers to detect more refined distinctions in individual health perceptions. In the present study, SRH was treated as a continuous outcome, with values ranging from 1 (indicating poor health) to 5 (indicating excellent health), allowing for a more detailed analysis of perceived health differences.

Cognitive Function: Cognitive function was measured using a standardized cognitive assessment that evaluates memory, attention, executive function, and processing speed. Higher scores indicate better cognitive function.

Numeracy Score: Numeracy was assessed using a continuous scale that measures mathematical reasoning and the ability to understand and manipulate numbers. Higher scores reflect greater numeracy skills, which are essential for daily decision-making and financial literacy.

Number of Chronic Medical Conditions: The number of chronic medical conditions was assessed based on self-reported diagnoses of long-term health conditions such as hypertension, diabetes, heart disease, and others. This measure is continuous, with higher values indicating a greater number of chronic health conditions.

Limitations in Activities of Daily Living (ADLs): Limitations in ADLs were measured by assessing the individual's ability to perform basic self-care tasks, such as bathing, dressing, eating, and mobility. A higher score indicates more limitations in ADLs, signifying greater functional impairment.

Educational Attainment: This study used self-reported years of formal education as the primary independent variable. Educational attainment was treated as a continuous variable, allowing for nuanced analysis of how incremental differences in schooling relate to health and retirement preparedness. Previous work has established education as a strong predictor of various health outcomes, and measuring it continuously facilitates a more precise understanding of its influence across racial, ethnic, and immigration groups.

Covariates: Key covariates were included to account for demographic and socioeconomic differences that might confound the relationship between education and the outcomes of interest. Age was recorded in years, and participants self-identified their sex as male or female. Employment status was categorized as either employed or unemployed, reflecting current engagement in the labor market—a factor known to affect health and financial security. Marital status, also self-reported, was dichotomized into married versus not married, acknowledging the potential protective influence of social and financial support structures. These variables helped control for broader contextual influences on health and retirement preparedness.

Moderator: Nativity status, defined as U.S.-born versus foreign-born, was examined as a moderator to test whether educational benefits varied between immigrant and non-immigrant groups.

Data Analysis Approach

To explore these associations, we used linear regression models adjusting for age, sex, employment status, marital status, and immigration status. Two models were estimated: Model 1 tested the main effects of education and immigration status without interactions. Model 2 included interaction terms between education and immigration status to determine whether the returns of education varied between immigrant and U.S.-born individuals.

Results are presented using unstandardized regression coefficients (β), with corresponding p-values and 95% confidence intervals (CIs). This strategy enabled assessment of whether educational attainment is equally protective across groups, with particular attention to the Minorities' Diminished Returns (MDRs) framework [15, 16, 19, 22, 24, 61, 62, 75, 76]. MDRs suggest that the positive effects of SES resources like education are reduced for historically marginalized groups, including racial/ethnic minorities and immigrants [14, 32, 33, 35, 38, 41, 43].

Ethical Compliance

All UAS participants had previously consented to participate in survey-based research under protocols approved by the University of Southern California's Institutional Review Board (IRB). For the current analysis, informed consent procedures were reinforced, including an eligibility check to exclude individuals with cognitive impairments who may not be able to provide valid consent. A brief quiz ensured participants understood their rights before confirming participation. This study received full ethical approval from the USC IRB.

3. Results

As shown by Table 1, the sample had a mean age of 48 years (SD = 16), with an average educational attainment of 11.27 years (SD = 2.29). Cognitive function scores had

a mean of 50.45 (SD = 8.57), and the average numeracy score was 0.87 (SD = 0.50). Participants' self-rated health (SRH) had a mean score of 2.56 (SD = 1.00). The mean number of chronic medical conditions was 1.44 (SD = 1.40), and the average limitations in activities of daily living (ADLs) score was 0.06 (SD = 0.14), with higher scores indicating more limitations.

Table 1. Descriptive Data

	Mean	SD
Age	48	16
Education (Years)	11.27	2.29
Cognitive Function	50.45	8.57
Numeracy Score	.87	.50
SRH	2.56	1.00
Chronic Medical Conditions	1.44	1.40
ADL	.06	.14

As shown by Table 2, the analysis revealed significant associations between educational attainment, immigration status, and cognitive function. Years of schooling was positively associated with cognitive function (b = 1.44, SE = 0.04, 95% CI [1.36, 1.53], p < .001). However, the interaction between years of schooling and immigrant status indicated diminished returns for immigrants, with a negative effect on cognitive function (b = -0.55, SE = 0.13, 95% CI [-0.81, -0.29], p < .001). Being an immigrant was associated with higher cognitive scores (b = 6.62, SE = 1.49, 95% CI [3.70, 9.54], p < .001), while Hispanic ethnicity was associated with lower cognitive scores (b = -3.51, SE = 0.33, 95% CI [-4.16, -2.87], p < .001). Black race was also associated with significantly lower cognitive function (b = -6.11, SE = 0.32, 95% CI [-6.74, -5.48], p < .001). Employment status had a small but significant positive effect on cognitive function (b = 0.69, SE = 0.20, 95% CI [0.29, 1.09], p = .001), and being married was similarly associated with higher cognitive function (b = 0.86, SE = 0.19, 95% CI [0.49, 1.24], p < .001). Age was negatively associated with cognitive function (b = -0.04, SE = 0.01, 95% CI [-0.05, -0.03], p < .001), as was female sex (b = -3.74, SE = 0.19, 95% CI [-4.12, -3.37], p < .001).

Table 2. Summary of Linear Regression between Education and Cognitive Score by Immigration Status

	B	Std. Error	Beta	Lower Bound	Upper Bound	Sig
Immigrant	6.619	1.489	.182	3.701	9.538	<.001
Ethnicity (Hispanic)	-3.514	.331	-.125	-4.162	-2.866	<.001
Race (Black)	-6.105	.322	-.207	-6.735	-5.475	<.001
Working	.691	.204	.040	.291	1.092	.001
Married	.864	.193	.050	.486	1.243	<.001
Age (Years)	-.039	.007	-.071	-.052	-.026	<.001
Sex (Female)	-3.744	.189	-.217	-4.116	-3.373	<.001
Years of Schooling	1.443	.044	.384	1.357	1.528	<.001
Years of Schooling x Immigrant	-.552	.132	-.169	-.811	-.293	<.001

Dependent Variable: Cognitive Score

As shown by Table 3, the regression analysis examining the relationship between education and numeracy score by immigration status revealed several significant findings. Years of schooling was a strong predictor of numeracy scores (b = 0.06, SE = 0.004, 95% CI [0.05, 0.06], p < .001). However, the interaction between years of schooling and immigrant status showed diminished returns for immigrants, with a negative effect on numeracy scores (b = -0.03, SE = 0.01, 95% CI [-0.05, -0.003], p = .027). Being an immigrant was marginally associated with higher numeracy scores, though this relationship approached statistical significance (b = 0.29, SE = 0.15, 95% CI [-0.01, 0.58], p = .054). Hispanic ethnicity was significantly associated with lower numeracy scores (b = -0.12, SE = 0.03, 95% CI [-0.17, -0.06], p < .001), as was Black race (b = -0.15, SE = 0.03, 95% CI [-0.20, -0.10], p < .001). Being employed was positively associated with numeracy scores (b = 0.16, SE = 0.02, 95% CI [0.12, 0.19], p < .001), as was being married (b = 0.09, SE = 0.02, 95% CI [0.06, 0.12], p < .001). Age also showed a positive association with numeracy (b = 0.01, SE = 0.001, 95% CI [0.008, 0.01], p < .001), whereas being female was associated with lower numeracy scores (b = -0.05, SE = 0.02, 95% CI [-0.08, -0.02], p = .001).

Table 3. Summary of Linear Regression between Education and Numeracy Score by Immigration Status

	B	Std. Error	Beta	Lower Bound	Upper Bound	Sig
Immigrant	.285	.148	.120	-.005	.576	.054
Ethnicity (Hispanic)	-.117	.029	-.063	-.174	-.060	<.001
Race (Black)	-.149	.025	-.091	-.199	-.100	<.001
Working	.156	.017	.140	.122	.190	<.001
Married	.090	.016	.088	.059	.121	<.001
Age (Years)	.009	.001	.218	.008	.010	<.001
Sex (Female)	-.050	.016	-.049	-.081	-.020	.001
Years of Schooling	.056	.004	.250	.049	.064	<.001
Years of Schooling x Immigrant	-.028	.013	-.137	-.053	-.003	.027

Dependent Variable: Numeracy Score

As shown by Table 4, the regression analysis examining the relationship between education and self-rated health (SRH) by immigration status showed several significant associations. Years of schooling was negatively associated with SRH score (b = -0.10, SE = 0.006, 95% CI [-0.11, -0.08], p < .001), suggesting that higher education was linked to better self-rated health. However, the interaction between years of schooling and immigrant

status revealed a positive association (b = 0.05, SE = 0.02, 95% CI [0.02, 0.09], p = .001), indicating that the protective relationship between education and poor SRH was weaker for immigrants compared to non-immigrants. Being an immigrant was associated with lower SRH scores (b = -0.69, SE = 0.19, 95% CI [-1.05, -0.32], p < .001), indicating better self-rated health among immigrants. Hispanic ethnicity was not significantly associated with SRH (b = 0.06, SE = 0.04, 95% CI [-0.02, 0.13], p = .139), and race (Black) was also not a significant predictor (b = 0.01, SE = 0.04, 95% CI [-0.07, 0.09], p = .856). Employment status was significantly associated with lower SRH score (b = -0.33, SE = 0.03, 95% CI [-0.38, -0.28], p < .001), as was being married (b = -0.19, SE = 0.02, 95% CI [-0.24, -0.14], p < .001). Age showed a small but significant positive association with SRH (b = 0.004, SE = 0.001, 95% CI [0.002, 0.005], p < .001). Female sex was not significantly associated with SRH (b = 0.01, SE = 0.02, 95% CI [-0.04, 0.06], p = .629).

Table 4. Summary of Linear Regression between Education and Self-rated Health by Immigration Status

	B	Std. Error	Beta	Lower Bound	Upper Bound	Sig
Immigrant	-.685	.187	-.168	-1.051	-.319	<.001
Ethnicity (Hispanic)	.057	.039	.019	-.019	.133	.139
Race (Black)	.007	.040	.002	-.072	.086	.856
Working	-.330	.026	-.163	-.380	-.280	<.001
Married	-.192	.024	-.095	-.239	-.144	<.001
Age (Years)	.004	.001	.061	.002	.005	<.001
Sex (Female)	.011	.024	.006	-.035	.058	.629
Years of Schooling	-.095	.006	-.216	-.106	-.084	<.001
Years of Schooling x Immigrant	.054	.016	.148	.022	.086	.001

Dependent Variable: SRH

Table 5 shows the regression analysis examining the relationship between education and the number of chronic medical conditions by immigration status revealed several significant associations. Years of schooling was negatively associated with the number of chronic conditions (b = -0.07, SE = 0.01, 95% CI [-0.09, -0.05], p < .001), indicating that higher education was linked to fewer chronic medical conditions. However, the interaction between years of schooling and immigrant status showed a positive association (b = 0.05, SE = 0.02, 95% CI [0.003, 0.09], p = .035), suggesting that the protective effect of education on chronic conditions was weaker for immigrants compared to non-immigrants. Being an immigrant was associated with a lower number of chronic medical conditions (b = -0.78, SE = 0.27, 95% CI [-1.30, -0.26], p = .003), suggesting that immigrants tend to have fewer chronic conditions compared to non-immigrants. Hispanic ethnicity was also associated with fewer chronic conditions (b = -0.20, SE = 0.06, 95% CI [-0.31, -0.09], p < .001), as was Black race (b = -0.16, SE = 0.06, 95% CI [-0.28, -0.05], p = .005). Employment was significantly associated with fewer chronic conditions (b = -0.41, SE = 0.04, 95% CI [-0.49, -0.33], p < .001), while being married was also associated with fewer conditions (b = -0.14, SE = 0.04, 95% CI [-0.22, -0.07], p < .001). Age was positively associated with the number of chronic medical conditions (b = 0.03, SE = 0.001, 95% CI [0.03, 0.04], p < .001), indicating that older individuals tend to report more chronic conditions. Being female was not significantly associated with the number of chronic medical conditions (b = 0.03, SE = 0.04, 95% CI [-0.05, 0.10], p = .451).

Table 5. Summary of Linear Regression between Education and Number of Chronic Medical Conditions by Immigration Status

	B	Std. Error	Beta	Lower Bound	Upper Bound	Sig
Immigrant	-.779	.266	-.159	-1.301	-.256	.003
Ethnicity (Hispanic)	-.203	.056	-.053	-.313	-.093	<.001
Race (Black)	-.163	.058	-.038	-.277	-.050	.005
Working	-.406	.040	-.142	-.485	-.327	<.001
Married	-.142	.039	-.050	-.218	-.066	<.001
Age (Years)	.034	.001	.388	.032	.037	<.001
Sex (Female)	.029	.038	.010	-.046	.103	.451
Years of Schooling	-.070	.009	-.113	-.088	-.052	<.001
Years of Schooling x Immigrant	.049	.023	.113	.003	.094	.035

Dependent Variable: Number of Chronic Medical Conditions

As shown by Table 6, the regression analysis investigating the relationship between education and limitations in activities of daily living (ADLs) by immigration status yielded significant results. Being an immigrant was associated with fewer limitations in ADLs (b = -0.08, SE = 0.03, 95% CI [-0.13, -0.03], p = .003), indicating better functional health compared to non-immigrants. Hispanic ethnicity was also associated with fewer ADL limitations (b = -0.02, SE = 0.01, 95% CI [-0.03, -0.01], p = .001), while Black race was not significantly related to ADL limitations (b = 0.002, SE = 0.006, 95% CI [-0.01, 0.01], p = .717).

Employment was strongly associated with fewer ADL limitations (b = -0.07, SE = 0.004, 95% CI [-0.08, -0.07], p < .001), as was being married (b = -0.02, SE = 0.003, 95% CI [-0.03, -0.02], p < .001). Age was positively associated with more ADL limitations (b = 0.001, SE = 0.000, 95% CI [0.001, 0.001], p < .001), indicating that older individuals experienced greater functional impairments. Being female was also significantly associated with more ADL limitations (b = 0.01, SE = 0.003, 95% CI [0.002, 0.015], p = .011).

Years of schooling was negatively associated with ADL limitations (b = -0.01, SE = 0.001, 95% CI [-0.011, -0.008], p < .001), suggesting that higher education was linked to fewer functional limitations. However, the interaction between years of schooling and immigrant status showed a positive association (b = 0.006, SE = 0.002, 95% CI [0.002, 0.011], p = .006), indicating that the protective effect of education on ADL limitations was weaker for immigrants compared to non-immigrants.

Table 6. Summary of Linear Regression between Education and ADL (Limitations) by Immigration Status

	B	Std. Error	Beta	Lower Bound	Upper Bound	Sig
Immigrant	-.081	.027	-.137	-.134	-.028	.003
Ethnicity (Hispanic)	-.019	.005	-.043	-.029	-.008	.001
Race (Black)	.002	.006	.004	-.009	.013	.717
Working	-.072	.004	-.248	-.079	-.065	<.001
Married	-.023	.003	-.080	-.030	-.016	<.001
Age (Years)	.001	.000	.100	.001	.001	<.001
Sex (Female)	.009	.003	.030	.002	.015	.011
Years of Schooling	-.010	.001	-.152	-.011	-.008	<.001
Years of Schooling x Immigrant	.006	.002	.124	.002	.011	.006

Dependent Variable: ADL (Limitations)

4. Discussion

This study aimed to investigate the MDRs of education on various health and cognitive outcomes, including SRH, cognitive function, numeracy, the number of chronic medical conditions, and limitations in ADLs, among immigrants compared to non-immigrants in the United States. We hypothesized that the protective effects of education on these outcomes would be weaker for immigrants, reflecting the structural barriers and marginalization they encounter.

Our results confirmed the presence of MDRs for immigrants across multiple domains. Specifically, education was less strongly associated with better SRH, higher cognitive function, improved numeracy, fewer chronic medical conditions, and fewer limitations in ADLs for immigrants compared to non-immigrants. These findings extend the MDRs framework to suggest that despite higher levels of education, immigrants face systemic barriers that hinder the full realization of the health and cognitive benefits that education typically provides.

Educational attainment is well-established as a powerful determinant of health, often linked to better SRH, cognitive function, fewer chronic conditions, and reduced limitations in ADLs in the general population [77-89]. Prior research has shown that education enhances access to resources, increases health literacy, and promotes healthier behaviors, all of which contribute to better health outcomes. However, our study highlights that these associations are significantly attenuated for immigrants, suggesting that educational attainment alone is insufficient to overcome the structural disadvantages that this population faces.

While existing research has extensively documented the MDRs of education on health outcomes for racial and ethnic minorities [14, 32, 35, 37, 40, 42, 43, 47, 50, 53, 63, 90-94], our study provides novel evidence that these diminished returns also extend to immigrants. Even with high levels of education, immigrants experience fewer health benefits, as reflected in their SRH, chronic medical conditions, and ADLs, compared to non-immigrants. These findings underscore the need to consider the intersection of immigration status and education when examining health disparities.

Xenophobia in the United States has been significantly exacerbated by key historical and political events, particularly in the post-September 11 era [95, 96]. Following the terrorist attacks of September 11, 2001, there was a marked increase in hostility and suspicion toward immigrant communities, especially those from Muslim-majority countries, as fear of terrorism led to widespread stereotyping and discrimination. Muslims and individuals perceived as Middle Eastern or South Asian were disproportionately targeted, facing increased surveillance, hate crimes, and social ostracism. This climate of fear is further inflamed by some politicians who frequently used anti-immigrant language to stoke nationalist sentiments. Public policies such as the travel ban on several Muslim-majority countries and the harsh treatment of undocumented immigrants, particularly from Latin America, may reinforce xenophobic attitudes across the country. His portrayal of immigrants as threats to national security and economic stability contributed to a cultural and political environment in which immigrants, particularly those from non-European backgrounds, were increasingly vilified. This enduring xenophobia has left many immigrant communities feeling unsafe, marginalized, and excluded from broader society, exacerbating social divides and hindering the ability of immigrants to fully participate in American life [95, 96].

Living as an immigrant in the United States presents a range of unique and complex challenges that can profoundly affect individuals' well-being and quality of life. One of the primary difficulties is navigating the legal and bureaucratic processes associated with immigration status, which can create uncertainty and stress, particularly for those without permanent residency or citizenship. Language barriers further complicate daily life, as limited English proficiency can restrict access to essential services such as healthcare, legal

assistance, and education. Immigrants often face discrimination, which can result in social exclusion, limited job opportunities, and wage disparities. Many immigrants also work in precarious or low-paying jobs, often without benefits or job security, despite their educational qualifications, leading to economic hardship. Additionally, the stress of acculturation—balancing the preservation of cultural identity while adapting to a new environment—can take a toll on mental health. These barriers are compounded by limited access to healthcare and social safety nets, particularly for undocumented immigrants, leaving many individuals vulnerable to poorer health outcomes. All these factors contribute to a reality where immigrants in the U.S. often experience diminished opportunities for upward mobility and struggle to fully benefit from their education and skills.

The educational experiences of many immigrants are often rooted in their country of origin, which can lead to several significant challenges when they attempt to enter the U.S. labor market. First, the quality of education in their home countries may not always align with U.S. standards, particularly in terms of curriculum, resources, and access to advanced training. This disparity can result in the perception that immigrant qualifications are less competitive, even when individuals have extensive education. Second, the focus of education in the country of origin may center on issues, industries, or methodologies that are less relevant or in demand in the U.S. labor market. For example, specific technical skills or certifications may not translate well to the requirements of U.S. employers, leaving immigrants at a disadvantage despite their educational backgrounds. Compounding these factors, U.S. employers often exhibit a preference for candidates with U.S.-based education, due to familiarity with American institutions, accreditation processes, and standardized training. This bias towards U.S. education makes it harder for immigrants to leverage their foreign credentials, leading to underemployment, wage disparities, and the need for additional education or retraining to meet local job market demands. As a result, many highly educated immigrants struggle to fully capitalize on their academic achievements in the U.S. context.

Several structural mechanisms may explain the MDRs of education observed among immigrants. First, systemic discrimination and labor market segregation limit the ability of educated immigrants to secure high-paying, stable jobs, which in turn reduces their access to quality healthcare and healthier living conditions. Second, immigrants often face chronic stress from acculturation, legal uncertainties, and economic instability, which may offset the usual health benefits of education. These stressors can contribute to the development and worsening of chronic medical conditions and functional limitations. Third, language barriers and unfamiliarity with healthcare systems can reduce access to preventive care, leading to more chronic conditions and greater limitations in ADLs, despite higher education levels. The reduced returns on education in these domains reflect broader societal inequalities that disproportionately affect immigrant populations.

Our findings highlight the urgent need for policies that address the structural barriers preventing immigrants from fully benefiting from their educational attainment. Policies aimed at reducing labor market discrimination, improving access to healthcare, and promoting social integration could help mitigate the diminished returns on education among immigrants. Specific interventions to support immigrants in navigating healthcare systems and accessing preventive care may reduce chronic conditions and improve functional capacity in daily living. Future research should explore MDRs in other health-related outcomes and investigate how factors such as length of stay, region of origin, and legal status contribute to the variation in MDRs among different immigrant subgroups.

Limitations

There are several limitations to this study. First, the cross-sectional nature of the data limits our ability to infer causality. Longitudinal studies are needed to examine how the diminished returns of education evolve over time. Second, our study focused on

education as the key social determinant, but other factors such as income, occupation, and social support networks may also play critical roles in shaping health outcomes. Lastly, the immigrant population in the U.S. is highly diverse, and future studies should examine how MDRs of education vary by immigrant subgroup, including differences by country of origin, generational status, and acculturation levels.

5. Conclusion

In conclusion, this study provides new evidence of the Minorities' Diminished Returns of education on a range of health and cognitive outcomes, including SRH, cognitive function, numeracy, chronic medical conditions, and ADLs, among immigrants compared to non-immigrants. The findings suggest that despite high educational attainment, immigrants face structural barriers that limit the protective effects of education on their health and functional well-being. To address these disparities, policies should focus on reducing systemic inequities and enhancing access to healthcare and economic opportunities for immigrant populations. Future research should continue to explore the complex interactions between education, immigration status, and health outcomes.

Funding

Part of Hossein Zare effort comes from the NIMHD U54MD000214. No funders had any role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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