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Racial disparities in prosthesis abandonment and mobility outcomes after lower limb amputation from a dysvascular etiology in a veteran population

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Abstract

Background: Non-Hispanic Black (NHB) individuals have higher rates of amputation and increased risk of a transfemoral amputation due to dysvascular disease than non-Hispanic White (NHW) individuals. However, it is unclear if NHB individuals have differences in prosthesis use or functional outcomes following an amputation.

Objective: To determine if there are racial disparities in prosthesis abandonment and mobility outcomes in veterans who have undergone their first major unilateral lower extremity amputation (LEA) due to diabetes and/or peripheral artery disease.

Design: National cohort study that identified individuals retrospectively through the Veterans Affairs (VA) Corporate Data Warehouse (CDW) from March 1, 2018, to November 30, 2020, then prospectively collected their self-reported prosthesis abandonment and mobility. Multiple logistic regression was used to control for potential confounders and identify potential effect modifiers.

Setting: The VA CDW, participant mailings and phone calls.

Participants: Three hundred fifty-seven individuals who underwent an incident transtibial or transfemoral amputation due to diabetes and/or peripheral arterial disease.

Interventions: Not applicable.

Main Outcomes Measures: (1) Self-reported prosthesis abandonment. (2) Level of mobility assessed using the Locomotor Capabilities Index.

Results: Rurally located NHB individuals without a major depressive disorder (MDD) had increased odds of abandoning their prosthesis (adjusted odds ratios [aOR] = 5.3; 95% confidence interval [CI]: [1.3–21.1]). This disparity was nearly three times as large for rurally located NHB individuals with MDD diagnosis, compared with other races from rural areas and with MDD (aOR = 15.8; 95% CI, 2.5–97.6). NHB individuals living in an urban area were significantly less likely to achieve advanced mobility, both with MDD (aOR=0.16; 95% CI: [0.04–7.0]) and without MDD (aOR = 0.26; 95% CI: [0.09–0.73]).

Conclusions: This study demonstrated that health care disparities persist for NHB veterans following a dysvascular LEA, with increased prosthesis abandonment and worse mobility outcomes.

INTRODUCTION

Amputations due to diabetes and peripheral arterial disease (PAD) occur at significantly higher rates for non-Hispanic Black (NHB) and Hispanic individuals compared with non-Hispanic White (NHW) individuals.[1–3] NHB and Hispanic individuals with dysvascular disease are more likely than NHW individuals to have an amputation at the transfemoral (TF) level, with more mobility challenges and reduced prosthesis use.[4–7] The reasons for these disparities are not clear but may in part be from worse disease at the time of presentation and disparities in preventative care, as NHB and Hispanic individuals are less likely to monitor daily blood glucose, check feet daily, be on a statin or antiplatelet medication, or be offered revascularization.[1,8–10]

The loss of mobility following a lower extremity amputation (LEA) can have a greater adverse effect on quality of life (QoL) than pain, mood disorders, changes in social role, and level of independence.[11–15] Prosthesis use is a key factor in enabling patients to meet their mobility goals and has been associated with improved QoL, even if the prosthesis is used only for transfers.[16–18] Despite the importance of prosthesis use following LEA, not all patients are fitted for a prosthesis, and for some the prosthesis may not offer a functional benefit due to chronic medical conditions, pain, or significant weakness.[19–21] For those who are fit with a prosthesis, abandonment has previously been reported as high as 53%.[20,22] Many factors are thought to affect prosthesis abandonment, including difficulty ambulating with a prosthesis, dissatisfaction with the prosthesis due to comfort and weight, bilateral lower limb amputations, and chronic medical conditions.[20,22–24]

There is evidence that NHB and Hispanic individuals with acquired disabilities because of stroke, trauma, brain and spinal cord injury have worse functional outcomes compared with NHW patients, but there is less known about disparities in outcomes after dysvascular LEA.[25–27] Prior research evaluating mobility and functional outcomes and prosthesis use after amputation is largely cross-sectional, including patients with both a first major amputation and subsequent amputation, as well as both unilateral and bilateral amputation.[28,29] Given the importance of prosthesis use and its effect on mobility and QoL, as well as previously identified racial disparities in LEA, the primary objectives of this study were to determine if there are racial disparities in prosthesis abandonment, and mobility outcomes, in veterans who have undergone their first major unilateral LEA due to diabetes and PAD. We also aimed to determine the specific factors that contribute to prosthesis abandonment and mobility outcomes.

METHODS

Study design

A cohort study that identified persons with LEA retrospectively through a large Veterans Affairs (VA) dataset, then prospectively collected their self-reported prosthesis abandonment and mobility.

Study sample

The VA Corporate Data Warehouse (CDW) was used to identify individuals who were age 40 years and older, undergoing their first amputation at the transtibial (TT) (Current Procedural Terminology [CPT] 27880, 27881) or TF (CPT 27590, 27591) level. Amputations are presumed to be related to diabetes and/or PAD if the patient was >40 years of age and had a diagnosis of diabetes and/or PAD, based on prior VA surgical quality improvement program studies.[30] Only amputations performed because of diabetes or PAD confirmed by International Classification of Diseases (ICD)-9 and 10-Clinical Modification codes were included. Patients were excluded if the amputation was due to trauma, cancer, nondiabetic related infections, or they required bilateral/contralateral amputation after incident amputation prior to prosthesis prescription. Patients were excluded if they had a diagnosis of paraplegia, quadriplegia, spinal cord injury, dementia, or a body mass index (BMI) <15 or >52 kg/m^2. For patients meeting criteria, we looked back 5 years to ensure that there was no prior CPT or ICD-9 or 10 code for a TT level or higher amputation, which enabled us to exclude those whose prosthesis prescription may be related to a prior amputation. Exclusions ensured that the cohort included only individuals with initial TT or TF amputations who represented typical candidates for a first prosthesis prescription. Inclusion criteria are reported in detail in a prior publication.[31] Briefly, individuals were eligible for this study if they received a prescription for a complete prosthesis within 12 months of their incident TT or TF amputation between March 1, 2018, and November 30, 2020. Health Care Common Procedure Coding System codes were used to ensure a complete prosthesis was prescribed rather than an immediate postoperative prosthesis, replacement prosthesis, or prosthesis repair.[31] Participants who died within 12 months of their prosthesis prescription were excluded because we could not ascertain their mobility outcomes.

Recruitment

Eligible individuals were contacted and enrolled employing a modification of the Total Design Method, in which participants were contacted in prescribed intervals to ensure high rates of completion.[32] Individuals were contacted in chronological order of their prosthesis prescription first by phone interview, from a trained study coordinator, and then, if they could not be reached, by mail to obtain their prospective mobility outcome at 12 months post-prosthesis prescription. Patients were considered enrolled after completing the interview or the mailed questionnaire. All procedures were approved by the local institutional review board.

Primary exposure

The primary exposure variable was *race*. For this analysis, we combined the "Race" and "Ethnicity" variables within the CDW. These variables are acquired through self or proxy reporting, or by a VA enrollment coordinator. The "Race" variable is categorized as NHW, NHB, American Indian (AI) or Alaska Native (AN), Asian, and Native Hawaiian or Pacific Islander (NHPI). The "Ethnicity" variable is categorized as "Hispanic or Latino" and "Not Hispanic or Latino" and does not include a race identifier. These two variables were combined to create four race categories: NHW, NHB, Hispanic, and other. Individuals were categorized as Hispanic if the "Ethnicity" variable indicated "Hispanic or Latino," otherwise we defaulted to the race categories. For the "other" category, we combined AI or AN, Asian, and NHPI.

Potential confounders and effect modifiers

To accurately estimate the association between race and prosthesis abandonment and mobility, we evaluated several potential confounders and effect modifiers based on evidence from literature and clinical experience. These included amputation level, demographic factors (age, BMI, gender, marital status, and rural versus urban living environment), comorbidities (diabetes, PAD, dialysis, chronic obstructive pulmonary disease, liver disease, and peripheral neuropathy), mental health factors (mild cognitive impairment, posttraumatic stress disorder, anxiety disorder, and major depressive disorder [MDD]), health behaviors (alcohol and tobacco use disorder), prior revascularization, and current pain. All variables except pain were extracted from CDW data sources (Table 1). For demographic factors, the most recent value of each factor prior to prosthesis prescription was extracted except for age and BMI, which represented their status at the time of incident amputation.

For rural versus urban living locations, the VA uses the Rural–Urban Commuting Areas (RUCA) system, which is divided into urban, rural, and highly rural areas. We combined the rural and highly rural for analysis. For comorbidities, any prior diagnosis was considered present since these are chronic conditions. For mental health and health behavior, any prior diagnosis of the disorder was considered present unless there was an additional remission code. MDD is a clinical diagnosis made according to the *Diagnostic and Statistical Manual of Mental Disorders-V* criteria by a qualified clinician. Any prior ICD-9296.2x and 296.3x codes were used to indicate a prior diagnosis of MDD except for 296.36, which indicates the patient is in remission. For prior revascularization, we included any revascularization (open, endovascular, or a combination; ipsilateral or contralateral to the amputated side) that occurred within the previous 12 months of the prosthesis prescription. We combined these into "any revascularization procedure." Pain at the time of mobility outcome assessment was obtained using a 0–10 numeric rating scale. Living location (rural versus urban) and MDD were evaluated as potential *effect modifiers* with the a priori hypothesis that these factors may influence prosthesis-related outcomes differently by race.

Outcomes

The first outcome for this study was prosthesis abandonment, which was defined by a participant's response to the question, "Are you currently using your prosthesis, or have you stopped using it?" If an individual answered that they "stopped using it," the prosthesis was considered "abandoned." The second set of outcomes was achieving an independent *basic* and *advanced* level of mobility. Mobility was assessed using the Locomotor Capabilities Index (LCI)-5; 14 items are graded on a five-level ordinal scale ranging from "unable to perform the activity" (0 points) to "able to perform independently without assistance" (4 points).[33] Among persons with LEA, the LCI-5 has well-established internal consistency, test–retest reliability, and content, discriminant, and criterion validity.[33] The LCI describes *basic* as household and limited community mobility and *advanced* as able to pick up an object from the floor, getting up from the ground, walking outside on uneven terrain, and ascending and descending steps without a railing.

Statistical methods

For descriptive statistics, we reported the frequency counts and percentages or means and standard deviations by race. Chi-square analysis was used to determine statistical significance (set at $p < .05$) of categorical

TABLE 1 Distribution of baseline factors by race for those eligible ($N = 357$).

Variable	NHW ($N = 252$)	NHB ($N = 83$)	Hispanic ($N = 14$)	Other ($N = 8$)	*p* value
	n (%) or Mean (SD)				
Amputation level					.88
TT	202 (80)	64 (77)	11 (79)	7 (88)	
TF	50 (20)	19 (23)	3 (21)	1 (13)	
Age[a]	65.0 (8.5)	64.3 (8.3)	68.4 (6.5)	62.6 (5.2)	.86
BMI (kg/m^2)[a]	30.8 (6.2)	28.3 (6.8)	26.8 (5.5)	31.5 (7.1)	.01
Marital status (married)	140 (56)	43 (52)	6 (43)	5 (63)	.72
Gender (male)	247 (98)	81 (98)	13 (93)	8 (100)	.61
Urban–rural classification					
Rural	107 (42)	21 (25)	5 (36)	3 (38)	.05
Urban	145 (58)	62 (75)	9 (64)	5 (62)	
Diabetes	228 (90)	74 (89)	12 (86)	8 (100)	.73
Peripheral artery disease	149 (59)	68 (82)	10 (71)	3 (78)	.01
Kidney dialysis	12 (8)	13 (16)	1 (7)	1 (13)	<.001
COPD	94 (37)	30 (36)	4 (29)	5 (63)	.44
Chronic liver disease, all cause	23 (9)	11 (13)	1 (7)	3 (38)	.06
Peripheral neuropathy	169 (67)	54 (65)	7 (50)	7 (88)	.33
Prior revascularization (any)[b]	82 (33)	35 (42)	4 (29)	2 (25)	.37
Mild cognitive impairment	10 (4)	2 (2)	3 (21)	0 (0)	.01
Post-traumatic stress disorder	51 (20)	25 (30)	7 (50)	4 (50)	.01
Anxiety disorder	73 (29)	23 (28)	3 (21)	4 (50)	.54
Major depressive disorder	76 (30)	32 (39)	4 (29)	2 (25)	.52
Alcohol use disorder	46 (18)	23 (28)	3 (21)	3 (38)	.19
Tobacco use disorder	129 (51)	44 (53)	7 (50)	5 (63)	.93
Prosthesis sophistication[c]					.83
Basic	77 (31)	28 (34)	5 (36)	2 (25)	
Intermediate	126 (50)	38 (46)	7 (50)	6 (75)	
Advanced	7 (3)	2 (2)	1 (7)	0 (0)	
Pain[d]	4.2 (2.7)	4.8 (2.7)	4.5 (4.1)	5.3 (3.0)	.10

Note: Unless otherwise specified, all diagnoses represent diagnosis prior to prosthesis prescription.
Abbreviations: BMI, body mass index; COPD, chronic obstructive pulmonary disease; NHB, non-Hispanic Black; NHW, non-Hispanic White; TF, transfemoral; TT, transtibial.
[a]At time of incident amputation.
[b]All revascularizations are based on time prior to prosthetic prescription (any prior ipsilateral and contra; endovascular and open).
[c]Based on a validated prosthesis sophistication classification system (missing 10 values) Not included in multivariable model.
[d]Based on a 0–10-point numeric rating scale measured at the time of mobility (missing seven values).

variables, and a Student's *t* test for continuous variables. Potential confounder selection was based on factors a priori thought to affect outcomes that may be unequally distributed between racial groups (Table 1). Data were missing for tobacco use disorder ($n = 22$; 6%) and race ($n = 19$; 5%). Multiple imputations for missing values were performed using sequential regressions against all other predictors and the outcome. Variable selection was performed simultaneously with imputation by stacking the imputed data and weighting each observation by its proportion of nonmissing variables. Seven values (2%) were missing for prosthesis abandonment. These were not imputed; therefore, a complete case analysis ($n = 350$) was performed for this outcome.

To evaluate the effect of race on the three outcomes, we first performed a bivariable analysis and reported the crude differences. To estimate the difference in abandonment rates and probability of achieving *basic* and *advanced* mobility, controlling for potential confounders, and considering possible effect modification, we performed a multivariable logistic regression including all main effects and interaction terms in the model and reported adjusted odds ratios (aORs) with their 95% confidence intervals (CIs).

Interpretation of main effects from a multivariable regression model in the presence of several interaction terms is not necessarily clinically meaningful because the ORs apply to factors that are not present in the

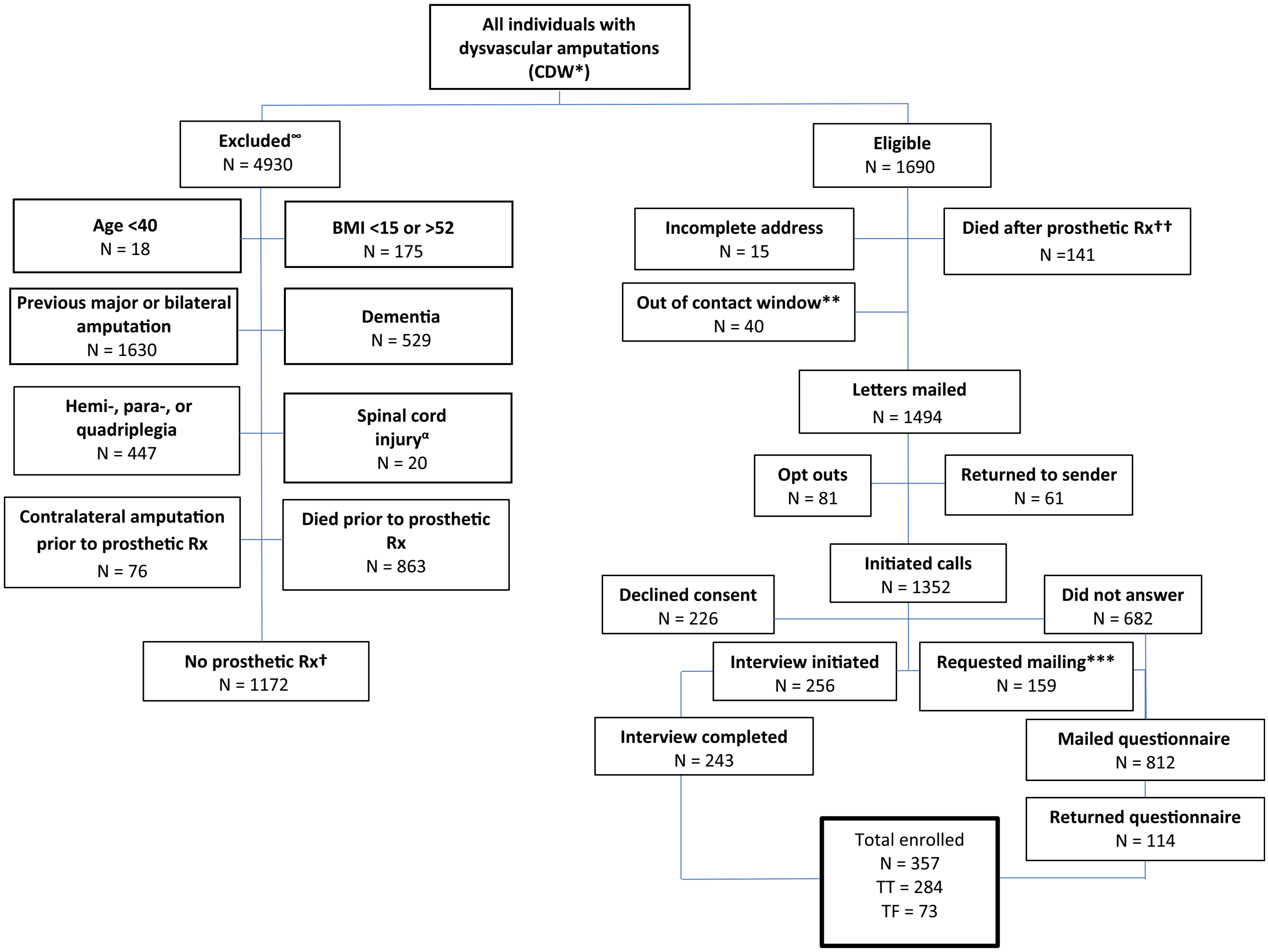

FIGURE 1 STROBE diagram depicting total numbers identified in the VA Corporate Data Warehouse, total numbers and reasons for exclusion, and final number enrolled. BMI, body mass index; CDW, Corporate Data Warehouse; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology; VA, Veterans Affairs.

interactions. Therefore, to provide the reader with more interpretable results, the aORs comparing race by presence or absence of a significant effect modifier were calculated from the linear combination of multiple interaction coefficients from the multivariable model using the lincom command in Stata. Analyses were performed using Stata software, version 15.0 (College Station, TX, USA).

RESULTS

Participant recruitment

Among the 6620 persons identified with TT and TF amputation due to PAD or diabetes, 4930 (74%) individuals were not eligible. The primary reasons for exclusion were prior major or bilateral major amputation ($n = 1630$), death prior to prosthesis prescription ($n = 863$), and no prosthesis prescription ($n = 1172$) (Figure 1). The total analysis sample included 357 veterans who were eligible and either completed the interview or responded to the mailed questionnaire (284 TT and 73 TF).

Potential confounders and effect modifiers

Differences in baseline factors by race/ethnicity are included in Table 1. Significant differences include BMI, living location, PAD, currently on dialysis, mild cognitive impairment, and posttraumatic stress disorder.

Crude association between race and prosthesis abandonment

Overall prosthesis abandonment was relatively uncommon (12%), with NHB having a nonsignificant increased risk of abandonment. In the rural setting, NHB individuals were significantly more likely to abandon their prosthesis than NHW and Hispanic individuals (33%, 9%, and 0%, respectively) ($p = .01$) (Table 2).

TABLE 2 Crude rates of prosthesis abandonment by race overall and stratified by living location and diagnosis of depression.

	NHW	NHB	Hispanic	Overall	*p* value
All	26 (11%)	14 (17%)	2 (14%)	42 (12%)	.30
Living location					
Rural	9 (9%)	7 (33%)	0 (0)	16 (12%)	**.01**
Urban	17 (12%)	7 (12%)	2 (22%)	26 (12%)	.66
Depression					
No MDD	21 (12%)	8 (16%)	1 (10%)	30 (13%)	.71
MDD	5 (7%)	6 (19%)	1 (25%)	12 (11%)	.19

Note: Bold values represent statistical significance at $p < .05$.
Abbreviations: MDD, major depressive disorder; NHB, non-Hispanic Black; NHW, non-Hispanic White.

TABLE 3 aOR[a] and 95% CI comparing NHB to other races for rates of *prosthesis abandonment* in those with and without MDD stratified by living location.

Stratified by living location	MDD	95% CI (*p* value)	No MDD	95% CI (*p* value)
NHB versus other races	aOR		aOR	
Rural	**15.8**	2.5–97.6 (.003)	**5.3**	1.3–21.1 (.02)
Urban	1.4	0.30–6.9 (.65)	.44	0.08–2.3 (.33)

Note: Significant ORs are in bold.
Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; MDD, major depressive disorder; NHB, non-Hispanic Black.
[a]Adjusted for all variables included in Table 1 in a multivariable logistic regression model.

TABLE 4 Crude rates for achieving *basic* mobility by race stratified by living location and diagnosis or depression.

	NHW	NHB	Hispanic	Other	*p* value
	n (%)				
All	168 (67%)	38 (46%)	9 (64%)	3 (38%)	**.004**
Living location					
Rural	46 (68%)	9 (43%)	2 (40%)	0 (0)	**.01**
Urban	95 (66%)	29 (48%)	7 (78%)	3 (60%)	.07
Depression					
No MDD	119 (68%)	26 (51%)	6 (60%)	3 (50%)	.14
MDD	49 (65%)	12 (39%)	3 (75%)	0 (0)	**.03**

Abbreviations: MDD, major depressive disorder; NHB, non-Hispanic Black; NHW, non-Hispanic White.

Factors that modify the effect of NHB race on prosthesis abandonment

Given crude differences demonstrated a negative impact in prosthesis abandonment for NHB individuals, the multivariable analyses focused on the effect of NHB race versus other races. NHB individuals who had a diagnosis of MDD living in a rural area had an increased odds of abandoning their prosthesis (aOR = 15.8; 95% CI: [2.5–97.6]). Although not as strong, NHB individuals living in a rural area without MDD had an increased odds of abandoning their prosthesis (aOR = 5.3; 95% CI: [1.3–21.1]) (Table 3).

Crude rates of achieving basic and advanced mobility

A significantly greater proportion of NHW and Hispanic individuals achieved *basic* mobility compared with NHB individuals (67%, 64%, and 46%, respectively; $p = .004$). These differences were greatest in those living in a rural area and in those with MDD (Table 4). NHW and Hispanic individuals were significantly more likely to achieve *advanced* mobility than NHB individuals (40%, 43%, and 18%, respectively; $p = .003$). These differences were seen especially in those living in an urban area and in those with MDD (Table 5).

Factors that modify the effect of NHB race on basic and advanced mobility

NHB individuals were significantly more negatively affected in terms of mobility; therefore, the multivariable analyses focused on the effect of NHB race compared with other races. NHB individuals were less likely to achieve *basic* mobility than others; however, these differences were not statistically significant (Table 6).

TABLE 5 Crude rates for achieving advanced mobility by race stratified by living location and diagnosis of depression.

	NHW	NHB	Hispanic	Other	*p* value
	n (%)				
All	101 (40%)	15 (18%)	6 (43%)	2 (25%)	**.003**
Living location					
Rural	46 (43%)	6 (29%)	2 (40%)	0 (0)	.32
Urban	55 (38%)	9 (15%)	4 (44%)	2 (40%)	**.009**
Depression					
No MDD	65 (37%)	11 (22%)	5 (50%)	2 (33%)	.15
MDD	36 (47%)	4 (13%)	1 (25%)	0 (0)	**.005**

Abbreviations: MDD, major depressive disorder; NHB, non-Hispanic Black; NHW, non-Hispanic White.

TABLE 6 aOR[a] and 95% CI comparing NHB to other races for achieving *basic mobility* in those with and without MDD stratified by living location.

Stratified by rural versus urban	MDD	95% CI (*p* value)	No MDD	95% CI (*p* value)
Black versus other races	aOR		aOR	
Rural	.49	0.12–1.9 (.30)	.39	0.12–1.3 (.13)
Urban	.72	0.24–2.2 (.55)	.58	0.24–1.4 (.23)

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; MDD, major depressive disorder; NHB, non-Hispanic Black.
[a]Adjusted for all variables included in Table 1 in a multivariable logistic regression model.

TABLE 7 aOR[a] and 95% CI comparing NHB to other races for achieving *advanced mobility* in those with and without MDD stratified by living location.

Stratified by rural versus urban	MDD	95% CI (*p* value)	No MDD	95% CI (*p* value)
NHB versus other races	aOR		aOR	
Rural	0.40	0.08–1.9 (.25)	0.65	0.18–2.3 (.50)
Urban	**0.16**	0.04–0.70 (.015)	**0.26**	0.09–0.73 (.01)

Note: Significant ORs are in bold.
Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; MDD, major depressive disorder; NHB, non-Hispanic Black.
[a]Adjusted for all variables included in Table 1 in a multivariable logistic regression model.

NHB individuals in urban areas were significantly less likely to achieve *advanced* mobility compared with other races, in those with MDD (aOR = 0.16; 95% CI: [0.04–7.0]) and without MDD (aOR = 0.26; 95% CI [0.09–0.73]) (Table 7).

DISCUSSION

This study looked at racial disparities in rates of prosthesis abandonment and mobility outcomes in veterans who received a prosthesis prescription after their first major unilateral LEA for diabetes or PAD. NHB veterans were more likely to abandon their prosthesis, and the risk was greatest in those living in rural areas, especially if they had a diagnosis of MDD. NHB veterans living in an urban area were less likely to achieve *advanced* mobility compared with NHW and Hispanic veterans, and this was also worse with those with a diagnosis of MDD.

Prosthesis abandonment is related to many factors, including age, chronic medical conditions, confidence with use, mobility outcomes, and prosthesis-related factors such as weight, comfort, and fit.[20,24,34–36] Rural veterans face unique challenges to meeting health care needs, including increased cost, time, and transportation related to living further from both VA and non-VA health care facilities.[37–39] Compared with veterans living in an urban area, rural veterans have a higher prevalence of physical and mental health comorbidities yet engage with VA health care less often than urban veterans.[37,39–41] Disparities for NHB rurally living individuals have been identified in mortality, health outcomes, and health care access; NHB individuals are more likely than NHWs to avoid necessary care due to cost and are less likely to have a family doctor.[42–44] These disparities have been linked to systemic inequities, with rural NHB populations more likely than NHWs to live in economically distressed communities, live below the federal poverty line, and come from homes with higher rates of unemployment.[45,46]

Our study found that NHB veterans who live in a rural area, with and without MDD, are more likely to abandon their prosthesis. Maintaining and using a prosthesis is a time-consuming and labor-intensive process, requiring patient involvement and motivation and regular visits with a physician, prosthetist, and physical therapist. The increased abandonment may be due in part to the multiple challenges in completing this process in a population with fewer resources. To address this inequity, it is important to provide low-barrier access to care in rural communities. The VA has initiated the Mobile Prosthetic and Orthotic Care program, to close these gaps by using traveling teams to provide care in hard-to-reach areas.[47]

Many factors are associated with mobility in a person with limb loss. One study showed those with higher household income and educational levels showing improved mobility and increased likelihood of unlimited community ambulation but did not find differences based on ethnicity or urban versus rural living location.[36] Working full time and having higher self-efficacy is associated with greater mobility.[29] A greater number of medical comorbidities have also been found to negatively affect mobility outcomes.[28,36]

This study identified racial disparities in mobility outcomes, with NHB urban living veterans significantly less likely to achieve *advanced* mobility compared to NHW and Hispanic veterans, which may be partially explained by these known factors. Mobility outcomes are better for people who return to work after an amputation, yet NHW men are more likely to work after an amputation than NHB men.[29,48] Similarly, higher household income has been associated with mobility, yet NHB patients are at an increased risk of amputation when living in lower socioeconomic status urban communities.[36,49] In a predominantly urban nationwide sample of adults with amputations, lower household income was associated with a two- to threefold increase in perceived environmental barriers.[50] It may be that in an urban area, *advanced* mobility outcome differences are multifactorial and related not just to patient-specific factors but social determinants of health, with NHB urban living veterans experiencing increased barriers, resulting in worse mobility outcomes.

MDD also appears to play a role in prosthesis use and mobility outcomes for NHB veterans. Although a depressive episode can affect prosthesis use, it is unclear how MDD negatively affect mobility, but similar findings have been found in other studies of adults with disabilities.[19,51,52] MDD is associated with a greater likelihood of unemployment and lower socioeconomic status.[53,54] In similar medical populations, MDD is also associated with more difficulty adhering to health and care recommendations and has been documented in NHB individuals.[55,56] MDD is common after an amputation, with relatively high rates for the first few years, and understanding the disproportionate impact on NHB individuals, it is important to identify early so that necessary treatments can be provided.[57]

STUDY LIMITATIONS

Strengths of this study included rigorous methods for ensuring an incident amputation and first definitive prosthesis prescription, and that potential confounders and effect modifiers preceded the outcomes. Despite this study representing the largest prospectively collected patient-reported mobility data after LEA, the number of enrolled participants was still relatively small, especially in NHB, Hispanic, and other non-White populations. Therefore, despite the large effect size disparities in specific subgroups, the confidence intervals were wide, making it challenging to establish precise estimates. The racial disparities are still important to highlight and notable when comparing the crude rates. However, when adjusting for other factors in a multivariable model, there should be some caution on interpreting the strength of these disparities.

CONCLUSION

This study of veterans undergoing their first LEA due to diabetes or PAD who received a prosthesis identified racial disparities in prosthesis abandonment and mobility outcomes, with NHB veterans living in rural areas more likely to abandon their prosthesis, and NHB veterans in urban areas less likely to achieve *advanced* mobility. Resources supporting NHB patients in rural areas should focus on increasing access to prosthesis provision and ensuring they can maintain prosthesis use over their lifespan. In urban areas, resources should focus on access to rehabilitation for NHB patients to achieve higher levels of mobility. Additionally, MDD should be screened for early after an amputation, with patient-centered interventions, as it negatively affects prosthesis use and mobility outcomes.

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DISCLOSURES

The authors declare no conflict of interest.

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