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Differences in Perceived Neighborhood Environmental Supports and Barriers for Walking Between US Adults With and Without a Disability

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Abstract

People with disabilities are at increased risk of chronic diseases, many of which physical activity can help prevent and manage. Certain environmental features can support or hinder participation in important activities like walking, particularly for people with disabilities. The purpose of this study is to examine differences in the prevalence of perceived neighborhood environmental supports and barriers for walking, by disability status, among US adults. Participants in the 2015 National Health Interview Survey Cancer Control Supplement (N=15,280) reported their disability status (mobility disability, non-mobility disability, or no disability) and perceptions of neighborhood environmental supports (walkable roads, sidewalks, paths, trails; sidewalks on most streets; and walkable shops; transit; movies, libraries, churches; relaxing places) and barriers (traffic, crime, animals) for walking. Adjusted models conducted in 2019 included demographic characteristics. Prevalence of most supports was lower among adults with mobility or non-mobility disabilities versus no disability. For example, 54.9% and 57.5% of adults with mobility and non-mobility disabilities respectively reported sidewalks on most streets, compared to 64.1% of adults with no disability. After adjustment, significant differences remained when comparing adults with a mobility disability versus no disability for two supports (roads, sidewalks, paths, trails; relaxing places). All perceived barriers were significantly more common among adults with any disability versus no disability, regardless of adjustment. In the United States, adults with disabilities perceive fewer neighborhood environmental supports and more barriers for walking than their counterparts. Strategies that increase supports and address barriers for walking may help promote physical activity among adults with disabilities.

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Disclaimer

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Keywords

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1. Introduction

The more than 40 million Americans with a disability are at increased risk of poor health outcomes, including numerous chronic diseases many of which physical activity can help prevent and manage [1-5]. Unfortunately, adults with a disability are more likely to be physically inactive compared to those without disabilities (47.1% vs. 26.1% respectively in 2009–2012) [4].

Most people are able to engage in an active lifestyle through walking, including people with disabilities who are able to walk or move with assistive devices such as wheelchairs or walkers [6]. However, walking and other physical activities can be challenging for people with disabilities, and certain features of the physical or social environment (e.g. traffic) may compound these challenges [6-8]. In contrast, other environmental features can support people with disabilities in walking (e.g. presence of sidewalks) [6-8]. While most research to date in this field has focused on adults with mobility disabilities, these environmental supports and barriers for walking may differ among those with other non-mobility disabilities (e.g., hearing, vision, or cognition disability) [7].

Previous studies have examined perceptions of community barriers to physical activity by disability status among small populations or in specific communities [9-11]; however, national estimates of perceived environmental supports and barriers by disability status are currently unavailable. These estimates can highlight the magnitude of this important public health issue in the United States (US), help prioritize the issue for action, and inform the development and implementation of effective strategies such as those identified in *Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities (Call to Action)* [6]. To help fill this gap, the purpose of this report is to examine differences in the prevalence of perceived neighborhood environmental supports and barriers for walking, by disability status, among US adults.

2. Methods

2.1 Study Sample

The National Health Interview Survey (NHIS) is an in-person household survey that is nationally representative of the civilian, noninstitutionalized US population. Perceptions of environmental supports and barriers for walking were assessed for NHIS sample adults (aged ≥ 18 years; response rate=55.2%) in the 2015 Cancer Control Supplement. Either the sample adult or designated family member responded to the disability questions (n=16,733; response rate=69.3%) [4]. Respondents with missing data were excluded (n=1453).

2.2 Measures

The 2015 NHIS Cancer Control Supplement included questions on environmental supports and barriers for walking. Specifically, it asks about six supports (roads, sidewalks, paths, trails; sidewalks on most streets; shopping; transit stops; movies, libraries, churches; relaxing places) and three barriers (traffic, crime, animals) for walking. To assess supports for walking, respondents were asked: "Where you live, are there roads, sidewalks, paths or trails where you can walk?" (roads, sidewalks, paths, trails); "Do most streets have sidewalks?" (sidewalks on most streets); "Are there shops, stores, or markets that you can walk to?" (shopping); "Are there bus or transit stops that you can walk to?" (transit stops); "Are there places like movies, libraries, or churches that you can walk to?" (movies, libraries, churches); and "Are there places that you can walk to that help you relax, clear your mind, and reduce stress?" (relaxing places). To assess barriers to walking, respondents were asked: "Does traffic make it unsafe for you to walk?" (traffic); "Does crime make it unsafe for you to walk?" (crime); and "Do dogs or other animals make it unsafe for you to walk?" (animals). Response options for all environmental supports and barriers questions included "Yes," "No," or "Don't know."

To assess disability status, respondents were asked: "Do you have serious difficulty walking or climbing stairs?" (mobility); "Are you deaf or do you have serious difficulty hearing?" (hearing); "Are you blind or do you have serious difficulty seeing even when wearing glasses?" (vision); and "Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions?" (cognition). These measures of disability status are commonly used and have been previously validated [12]. Based on their responses, participants were categorized into one of the following three disability status groups: mobility disability (mobility disability); non-mobility disability (no mobility disability and any of a hearing, vision, or cognition disability); or no disability (no mobility, hearing, vision, or cognition disability).

2.3 Statistical Analysis

Prevalence and 95% confidence intervals (CIs) for perceived supports and barriers were determined overall, by disability status group, and separately among adults with a hearing, vision, and cognition disability (excluding those with a mobility disability). Chi-square tests were used to determine differences between disability status groups. Separate logistic regression analyses adjusting for demographic characteristics (sex, age group, race/ethnicity, and education level) determined adjusted prevalence ratios for the association between disability status (referent group: adults with no disability) and each support and barrier. Results were deemed significant at $p < 0.05$. Analyses were repeated excluding individuals who reported being unable to walk when asked about their walking behavior ($n=400$). Analyses were conducted in 2019 using SUDAAN Version 11.0 (Research Triangle Institute) to account for the weighting (Table 1, footnote b) and complex sample design.

3. Results

Overall, 83.4% (95% CI: 82.5, 84.2) of US adults reported no disability, 9.8% (95% CI: 9.2, 10.5) reported a mobility disability, and 6.8% (95% CI: 6.3, 7.4) reported a non-mobility

disability (data not shown). Hearing disability was the most common type of non-mobility disability (3.5%; 95% CI: 3.1, 3.9), followed by cognition (2.5%; 95% CI: 2.2, 2.9) and vision disabilities (1.9%; 95% CI: 1.6, 2.2).

The prevalence of perceived environmental supports and barriers for walking varied by disability status. Adults with either a mobility or non-mobility disability reported a lower prevalence of almost all supports and a higher prevalence of all barriers compared to those with no disability (Table 1). For example, 64.1% of adults with no disability reported sidewalks on most streets, which was lower than for adults with a mobility disability (54.9%) and a non-mobility disability (57.5%). After adjusting for demographic characteristics, the observed differences in reported supports remained significant only for 1) roads, sidewalks, paths, and trails and 2) relaxing places among adults with a mobility disability compared to those with no disability. However, after adjusting for demographic characteristics, differences for all barriers remained significant among adults with either a mobility or non-mobility disability compared to those with no disability. For example, the adjusted prevalence ratio of reporting traffic as a barrier to walking was 1.38 for adults with a mobility disability and 1.28 for adults with a non-mobility disability compared to adults with no disability. These associations remained significant after removing individuals who reported being unable to walk (data not shown).

Among adults with a vision disability, traffic was reported as a barrier by 35.3% (95% CI: 28.1, 43.2), crime by 19.9% (95% CI: 14.8, 26.2), and animals by 16.4% (95% CI: 12.1, 21.8) (data not shown). Among adults with a hearing disability, traffic was reported as a barrier by 26.1% (95% CI: 21.5, 31.2), crime by 12.0% (95% CI: 9.2, 15.5), and animals by 8.2% (95% CI: 5.9, 11.2). Among adults with a cognition disability, traffic was reported as a barrier by 28.2% (95% CI: 22.9, 34.2), crime by 21.3% (95% CI: 16.8, 26.6), and animals by 16.3% (95% CI: 11.9, 22.0).

4. Discussion

We found differences in the prevalence of perceived neighborhood environmental supports and barriers for walking by disability status in the United States. Even after adjusting for demographic characteristics, significantly lower prevalence of reporting two supports (roads, sidewalks, paths, trails; relaxing places) were observed by adults with a mobility disability compared to those with no disability. In contrast, we observed significantly higher prevalence of reporting all barriers by adults with a mobility or non-mobility disability compared to those with no disability, even after adjustment. Implementing strategies to improve neighborhood environmental supports and overcome barriers may help promote walking among adults with disabilities [6].

Although previous studies have examined the relationship between neighborhood environmental supports and barriers and disability status, they have been conducted in smaller geographic areas, among specific demographic groups, or using composite measures [9-11]. While cross-sectional in nature, to our knowledge this is the first study to report national estimates of the prevalence of perceived neighborhood environmental supports and barriers for walking by disability status. In addition, while previous studies have

reported national estimates of environmental supports and barriers overall, ours is the first to examine them by disability status to address this important population [13, 14]. We observed that adults with a mobility disability were less likely to report some environmental supports compared to adults with no disability. Also, when asked about physical and social environmental barriers to walking, adults with a mobility or non-mobility disability were more likely to report them compared to adults with no disability, including traffic and crime which relate to perceptions of safety. These findings are consistent with other studies among persons with disabilities that reported barriers to walking related to a low sense of safety and security [7]. In addition, our study is unique in observing the prevalence of reported neighborhood environmental barriers to walking among persons with specific non-mobility disabilities, including disabilities in hearing, vision, or cognition [7]. Future research may wish to examine the underlying mechanisms influencing the relationship between barriers such as traffic and crime and these specific types of non-mobility disabilities.

Our findings are based on perceptions of neighborhood environmental supports and barriers. These measures may not simply reflect presence or absence; however, efforts to increase supports and address barriers may help all adults, including people with disabilities, engage in an active lifestyle. Promoting walking as a form of physical activity may be a particularly important public health strategy for people with disabilities since many people with disabilities are able to walk or roll with assistive devices such as wheelchairs or walkers [6]. Both the *Call to Action* and the Guide to Community Preventive Services include strategies and recommendations to improve walkability in the environment and promote walking for people of all abilities, including those with disabilities [6, 15]. In addition, the National Center on Health, Physical Activity and Disability provides resources to promote development of supportive environments for walking for individuals with disabilities. For example, their Inclusive Community Health Implementation Package (iCHIP) features interactive tools and their Designing for Inclusive Health Grant program funds projects related to supporting disability inclusion [16, 17]. Their “How I Walk” campaign also aims to promote walking as an inclusive term for physical activity [18].

Our study is subject to several limitations. First, perceptions of the environment may depend in part on more complex constructs such as the disablement process which considers the impact of impairment and functional limitations on disability [8, 19]. Such relationships may not be fully captured by the NHIS questions [20]. Second, respondents who were excluded were more likely to have a disability and be members of a racial/ethnic minority group compared to the analytic sample. However, a lower proportion of respondents with any disability in the analytic sample would likely underestimate our findings making them more conservative in nature. Third, walking behavior itself may be a potential confounder in the observed associations. However, walking behavior more likely serves as an effect modifier in this relationship as has been demonstrated in previous studies [7]. Future research may wish to further examine the role disability status plays in the association between environmental supports and barriers to walking and walking behavior (for leisure or transport) to better understand these potentially complicated relationships.

5. Conclusions

People with disabilities, particularly mobility disabilities, report more neighborhood environmental barriers and fewer supports for walking than those without. Evidence-based strategies that address the specific needs of people with disabilities in their environments may help this important population perceive their neighborhoods as being more supportive of walking and physical activity.

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HIGHLIGHTS

- Environmental features can support or hinder walking for people with disabilities
- Prevalence of perceived supports and barriers varies by disability status in the US
- Supports are less common among adults with a mobility disability vs no disability
- Adults with any disability are more likely to perceive barriers than those with no disability

Prevalence and APRs^a of Neighborhood Environmental Supports and Barriers to Walking Among US Adults, by Disability Status, NHIS 2015^b

TABLE 1.

Support or Barrier	Prevalence Overall (N=15,280)			Prevalence by Disability Status						APR ^d (Referent group: no disability)		
	%	95% CI		No Disability (n=12,201)	Mobility Disability (N=1,851)	Non-mobility Disability (N=1,228)	%c	95% CI	APR	95% CI	APR	95% CI
Supports:												
Roads, sidewalks, paths, trails	85.1	84.0, 86.1	86.0*	84.8, 87.1	77.6 ^y	74.4, 80.5	84.7*	81.7, 87.3	0.96 ^d	0.93, 1.00	1.01	0.98, 1.04
Sidewalks on most streets	62.7	61.3, 64.2	64.1*	62.6, 65.6	54.9 ^y	51.5, 58.3	57.5 ^y	53.3, 61.5	1.00	0.95, 1.06	0.99	0.93, 1.06
Shopping	58.0	56.5, 59.4	59.4*	57.8, 61.0	48.4 ^y	45.0, 51.9	53.9 ^y	49.8, 57.9	0.97	0.91, 1.04	1.00	0.93, 1.07
Transit stops	53.4	51.8, 55.0	54.9*	53.1, 56.6	45.5 ^y	42.2, 48.8	46.7 ^y	42.4, 51.0	1.00	0.93, 1.07	0.96	0.88, 1.04
Movies, libraries, churches	47.5	46.1, 48.9	48.9*	47.4, 50.5	39.0 ^y	35.8, 42.3	42.7 ^y	39.1, 46.5	0.96	0.88, 1.04	0.96	0.89, 1.05
Relaxing places	71.8	70.5, 73.0	74.1*	72.6, 75.4	55.6 ^y	52.5, 58.7	66.9 ^y	62.8, 70.8	0.86 ^d	0.81, 0.92	0.95	0.89, 1.01
Barriers:												
Traffic	23.3	22.2, 24.4	21.8*	20.7, 23.0	32.2 ^y	29.1, 35.5	28.7 ^y	25.0, 32.7	1.38 ^d	1.23, 1.56	1.28 ^d	1.11, 1.48
Crime	12.8	12.1, 13.6	11.6*	10.9, 12.4	20.8 ^y	18.1, 23.8	16.2 ^z	13.7, 19.2	1.86 ^d	1.59, 2.18	1.50 ^d	1.26, 1.78
Animals	10.4	9.7, 11.2	9.5*	8.8, 10.3	16.6 ^y	14.2, 19.4	12.6 ^z	10.1, 15.4	1.61 ^d	1.35, 1.94	1.27 ^d	1.01, 1.59

Abbreviations. APR = adjusted prevalence ratio; NHIS = National Health Interview Survey; CI = confidence interval.

^a Adjusted for sex, age group (categorized as 18-24, 25-34, 35-44, 45-64, and 65+ years), race/ethnicity, and education level.

^b Estimates are weighted to be nationally representative. Sample adult weights were adjusted to account for only half of the sample being asked disability questions.

^c Superscript letters (x,y,z) indicate significant differences across disability statuses: values with different letter(s) are significantly different ($p < 0.05$).

^d $p < 0.05$