Designed to Deter

Community Barriers to Physical Activity for People with Visual or Motor Impairments

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Background: People with disabilities are more likely to be obese, in poor health, and get less physical activity than the general population. However, research on community factors for physical activity has generally either excluded most people with disabilities, or overlooked relevant factors of community accessibility. This exploratory study investigated environmental factors affecting people with motor impairments and people with visual impairments in urban neighborhoods.

Methods: Quantitative and qualitative methods were used with a nonrandom sample (n=134) of users of four types of assistive mobility technologies: guide dogs, long canes, and motorized and manual wheelchairs. From July 2005 to August 2006, the sample participated in two telephone surveys. Between the surveys, a stratified random subsample (n =32) engaged in an ethnographic phase of observation and interviews.

Results: Most participants in all groups using assistive mobility technologies rated their neighborhoods as accessible, although they also reported many specific barriers. Users of assistive mobility technologies differed in the amount of reported physical activity and on specific barriers. Problems with sidewalk pavement and puddles/poor drainage were the most frequently mentioned environmental barriers, by 90% and 80%, respectively. Users of assistive mobility technologies were more similar on main strategies for dealing with barriers. All groups reported having to plan routes for outings, to alter planned routes, to go more slowly than planned, or to wait for a different time.

Conclusions: Despite legislative requirements for accommodation, people with disabilities face barriers to physical activity, both in the built and social environments. Determined people with disabilities were able to overcome barriers, but required additional expenditure of resources to do so. Community design that can include people with disabilities requires detailed understanding of barriers specific both to types of impairments and to different types of assistive mobility technologies.

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Background

Compared to the general public, the nation's estimated 50 million people with disabilities[1] get less exercise, have higher obesity rates,[2,3] and more often are in poor health.[3] The traditional "individual deficit model" of disability explained those outcomes as inherent in people's impairments. Contemporary "social model" theory posits that social barriers—built environment, discriminatory attitudes, and economic disadvantage—account for much of their health disadvantage.[4,5] Given accessible conditions, many people with disabilities can be physically active and in good health.

Research on community factors in physical activity generally overlooks or excludes people with mobility limitations; it usually includes only those who can walk and see. Emphasizing "walkability" is exclusionary, so the concept needs to be redefined to include wheelchairs and other assisted means of getting around.[6] Researchers are beginning to investigate barriers/facilitators (termed environmental "pressers"/"buoys") that affect the physical activity of those with disabilities.[7,8] No studies were found that focused on how assistive mobility technologies—themselves environmental factors—are related to access to, and activity in, the built environment.

The WHO's International Classification of Functioning, Disability, and Health (ICF)[9] distinguishes "impairments" (characteristics of body structure and/or function) from "activities/participation" (social behaviors).

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Those concepts are confounded in the commonly used term "mobility impairments," which unwittingly deflects attention from barriers that affect many people with disabilities. The present study used ICF concepts to examine limitations in mobility (physical activity and social participation) related to types of assistive mobility technologies used by people with "motor" (movement) impairments and people with vision impairments. Until 2001, ICF[10] did not include a dimension for the "environment." The present study contributes to developing that dimension.

The objectives of this pilot study were (1) to specify environmental factors affecting the activity of people with disabilities in urban neighborhoods that are (2) associated with two assistive mobility technologies for two types of impairments (motor and visual). The findings can be used methodologically to develop measures of barriers related to assistive mobility technologies; conceptually to elaborate ICF's environmental dimension; and substantively to guide policies that will reduce barriers.

Methods

In 2005–2006, quantitative and qualitative methods were used with a nonrandomly selected sample of people with disabilities, recruited through advocacy and service agencies in all New York City boroughs, excluding those who were homebound. Because the sample volunteered in response to flyers and other outreach methods, a response rate cannot be calculated. Of the 188 who completed the first telephone survey, 134 (78%) completed the second survey about 6 months later. That final group is the basis for data reported here, divided as follows among users of four assistive mobility technologies: guide dogs (33), long canes (40), manual wheelchairs (20), and motorized wheelchairs (41).

Questionnaires included items modified from relevant studies[11–14] and original items. A form was designed for coding observations of barriers and strategies. Survey 1 was designed to classify respondents as high/low on their (perceived) physical activity and neighborhood accessibility. A stratified random subsample drawn from each assistive mobility technology (4 types × 8 people=32) then engaged in an ethnographic phase, with face-to-face interviews and observations lasting 2–3 hours while each participant conducted an outdoor activity that s/he identified as typical. Survey 2 (of the initial group) asked about barriers and strategies for outdoor activity, with closed-end responses to item-lists that were derived from the ethnographic phase. Statistical tests were not used, given the nonrandom sample and exploratory focus on descriptive results.

Results

Perceived neighborhood accessibility was tapped by a survey item referring to participants' "immediate vicinity—10–15 blocks around your home," with response options of "completely accessible," "mostly . . . ," "mostly not . . . ," or "not at all . . . ." At that general level, accessibility was rated surprisingly high (90% chose "mostly accessible" or better), but only 19% rated their neighborhood "**completely** accessible" and nearly all respondents reported several barriers (see below and Table 1).

The high general rating of accessibility is explained partly by the inclusion criterion (not homebound) and

Table 1. Percentage of people using four types of AMTs who mentioned community environmental barriers to physical activity, New York City, 2005–2006

Barriers	All 4 types of AMTs n=134	Manual wheelchairs n=20	Motorized wheelchairs n=41	Guide dogs n=33	Long canes n=40
Problems with sidewalk pavement	91	100	88	94	88
Problems with puddles or poor drainage	81	80	77	91	78
Problems with construction	70	80	61	75	67
Problems with snow removal	64	75	63	63	60
Problems with curb cuts	62	80	73	44	55
Narrow sidewalks	53	60	56	50	50
Attitudes of the public	52	70	49	53	46
Problems with scaffolding	51	40	42	63	57
Problems with noise	50	20	56	50	53
Problems with crosswalks	50	40	54	47	53
Problems with crowds	45	35	54	41	45
Lack of curb cuts	44	65	61	22	35
Too much street furniture	44	30	44	44	50
Open manholes or basement doors	42	25	37	53	47
Cars parked on sidewalk	38	35	34	38	42
Problems with street vendors	30	25	34	31	28
Problems with hills	27	55	22	28	18
Lack of stop signs	26	20	32	28	19
Inadequate or poor lighting	25	20	27	13	35
Too few or no people around	23	20	20	16	33

AMTs, assistive mobility technologies

especially by self-selection of people who are active in their communities and knowledgeable about accessibility rights. Forty-one percent reported advocacy as part of their job and others reported individual advocacy. Also, New York City is relatively "livable" for people with disabilities[15]; sidewalks pervade, public transportation is extensive (**all** buses are wheelchair-accessible), and many services are available. The low level of **complete** accessibility indicates, however, that even this successful group faces considerable barriers.

Survey 2 asked: "Thinking about roughly the past year, have you encountered any of the following problems or conditions in the 10–15 block vicinity around where you live?" Responses were "Yes" or "No" to each of 20 options shown in Table 1.

Several barriers were identified by at least 50% of participants (Column 1, Table 1). Problems with sidewalk pavement and puddles/poor drainage were the most frequently mentioned environmental barriers, by 90% and 80%, respectively. More than 60% identified problems with construction, snow removal, and curb cuts. About 50% experienced narrow sidewalks, public attitudes, scaffolding, and crosswalks as environmental barriers. Given the broad effects of these barriers across the four types of users of assistive mobility technologies, they should be given the highest priority for remediation. Improvements in sidewalk design and maintenance would address several major barriers. Policies requiring construction projects to ensure safe passage by people with disabilities emerged as a high priority.

Ten of the 20 barriers in Table 1 drew similar rates across types of assistive mobility technologies, so improving crosswalks, stop signs, and street furniture could benefit all these subgroups of people with disabilities. Of the four barriers that varied widely across types of assistive mobility technologies, three were highest among manual wheelchair users. The need for curb cuts was a particularly strong finding for this group, and all the manual wheelchair users reported poor sidewalk pavement quality as a barrier. Ensuring that sidewalks and curbs are adequate for wheelchair users is a top target for policy implementation that would likely benefit users of other assistive mobility technologies as well as the population without disabilities. Although hills will remain a barrier, the city could prepare maps identifying routes that avoid hills to help users of assistive mobility technologies to plan their outings.

During the ethnographic phase, participants were observed using strategies to overcome barriers, and also were asked about their strategies. All groups reported relying on planning details of outings, altering planned routes, going more slowly than planned, or waiting for a different time. Educational materials could be prepared to share the strategies developed by this successful group of users of assistive mobility technologies to assist other people with disabilities in venturing outdoors more often.

Limitations

The sample was small, nonrandom, and from one metropolitan community that is atypical, especially because it lacks "car culture." Similar studies need to be conducted in other types of communities to evaluate generalizability and identify barriers specific to community types. Objective measures were lacking to quantify environmental barriers.

Conclusion

Barriers to physical activity by people with disabilities persist in spite of legislative requirements and existing accommodations. Lack of action may reflect weak policies or insufficient knowledge of usability considerations for people with disabilities by urban policymakers, planners, and builders. Many barriers reflect inadequate maintenance of basic facilities (e.g., sidewalks) or accommodations (e.g., curb cuts). Barriers include lingering negative public attitudes.

Independent-minded people with disabilities are undeterred from many activities, in spite of community barriers, because they devise individual strategies. However, these adaptive strategies take more time, effort, or cost than for people without disabilities. Specific strategies require attention to types of assistive mobility technologies, not only types of impairments. If communities do not "design to include," they will continue to "design to deter." The present findings identify opportunities to improve community environments so they enable people with disabilities to become more physically active.

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