

# Perceived Barriers to Physical Activity Among North Carolinians With Arthritis: Findings From a Mixed-Methodology Approach

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## Abstract

**Background:** A goal of the North Carolina Arthritis Plan is to reduce arthritis burden through regular physical activity. We identified community and personal factors that influence physical activity in individuals with arthritis.

**Methods:** In 2004 and 2005, 2479 individuals (53% self-reported arthritis) from 22 North Carolina communities completed a telephone survey (59.5% response rate) assessing health status, neighborhood characteristics, health attitudes, and demographic variables. Qualitative discussions (N=32) were conducted to further examine understanding of community and health and were enhanced with photographs.

**Analysis:** Descriptive analyses were conducted. A 2-sided binomial test (for each reason given for not being physically active) was used to test for significance between individuals with arthritis and the general population, using a Bonferroni test for multiple comparisons. Interviews and photographs were analyzed using qualitative software ATLAS.ti Version 5.0.

**Results:** Quantitative results show similar community-level reasons for physical inactivity (rural environment, heavy traffic, and lack of sidewalks) despite arthritis status. Yet personal reasons differed as individuals with arthritis more often cited physical inability and illness. In qualitative discussions, walking surfaces emerged as a primary barrier for those with arthritis.

**Limitations:** Findings from this exploratory study may have limited generalization and warrant further study.

**Conclusions:** The built environment and personal barriers should be considered when examining physical activity in individuals with arthritis.

**Key words:** Physical activity, community, neighborhood, perceived barriers, mixed-methodology, focus groups.

Currently 27% or 1.75 million North Carolinians report some form of arthritis.<sup>1,2</sup> Estimates suggest that over 46.4 million adults in the United States (21.6%) report doctor-diagnosed arthritis,<sup>3</sup> with an estimated financial burden of \$128 billion in 2003.<sup>4</sup> Additionally, about 19 million Americans (8.8%) have activity limitations caused by their arthritis,<sup>3</sup> and in 2005 activity limitations due to arthritis affected approximately 11% of adults in North Carolina.<sup>2</sup> Arthritis is the most frequently cited chronic condition for limiting activity among working-age and older adults.<sup>5</sup>

Both Healthy People 2010 and the North Carolina Arthritis Plan 2007-2010 set goals of increasing the amount of physical activity for the general population and for individuals with arthritis so as to decrease risk of chronic disease and increase both mental and physical benefits.<sup>2,6</sup> People with arthritis are encouraged to engage in regular physical activity to gain benefits of prolonged and increased function, increased mobility, flexibility, and decreased pain.<sup>7-10</sup> Yet recent studies have found that physical inactivity levels range from 24% to 39% in adults with arthritis.<sup>11-15</sup> These high rates of physical inactivity may

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demonstrate the complexity of a behavior that is influenced not only by individual beliefs and perceptions of personal barriers but also by the built and social environments.

Public health researchers linked the environment to health and health outcomes long ago.<sup>16-21</sup> Recent research has focused on identifying and measuring characteristics of the built environment that influence physical activity levels using both subjective<sup>22-26</sup> and objective<sup>27-29</sup> methods. One review focused on the built environment found that access to facilities, availability of physical activity options, crime and safety, weather, and aesthetics were most often associated with physical activity in adults.<sup>30</sup> Few studies have examined the role of the built environment on physical activity in individuals with arthritis. However, known barriers to physical activity in individuals with arthritis are financial cost and lack of access to exercise facilities,<sup>15</sup> no transportation, lack of programs, and poor environmental conditions (eg, weather, congested parking, concrete surfaces, presence of dogs, lack of sidewalks).<sup>31</sup>

The aims of this study are twofold: (1) to understand the difference between people with and without arthritis when examining the perception of community built environment's influence upon physical activity; and (2) to identify the issues related to the built environment that are influential to the physical activity levels of individuals with arthritis. This study uses mixed methodology to evaluate both quantitative and qualitative data related to physical activity. Data were obtained through telephone surveys about general health and well-being and qualitative discussions.

## METHODS

### Participants and Data Collection

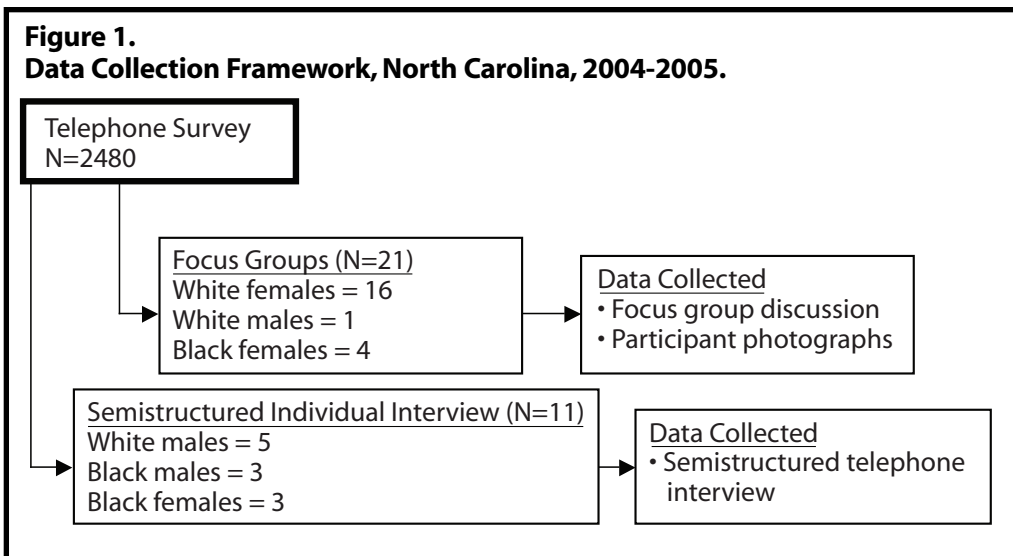
A cohort of 6700 participants were recruited from the NC Family Medicine Research Network.<sup>32</sup> The NC Family Medicine Research Network is a practice-based patient cohort for primary care research that was established in 2001 and enriched in 2004 and 2005. It currently consists of 25 practice sites. All consecutive patients (for 20 working days) seeking care at a North Carolina Family Medicine Research Network site were informed of the North Carolina Health Project. Eligible participants were those aged 18 years and older who spoke English or Spanish fluently. All study components were approved by the Medical Institutional Review Board of the University of North Carolina at Chapel Hill and all participants gave oral consent. Data sources are depicted in Figure 1.

### Telephone Survey

**Recruitment.** Of the 6700 NC Family Medicine Research Network participants enrolled in 2001 and 2004, 4442 gave consent for follow-up. Participants meeting eligibility criteria (current address, telephone number, and the ability to speak English fluently) were initially mailed an introductory letter and later telephoned. A total of 277 individuals were ineligible because they lived outside the US, had no telephone, had a language barrier, were medically unable, were active military, were incarcerated, or had died. The telephone survey was completed by 2479 individuals, 59.5% of eligible participants. The 30-minute survey contained open- and close-ended questions assessing health status, chronic health conditions, community and neighborhood characteristics, health attitudes and beliefs, and demographics.

**Measures.** For this study, demographic measures, comorbid conditions, body mass index (BMI), community characteristics, and reasons for physical inactivity were analyzed. We calculated age using date of birth and date of the telephone interview. Education was recorded as highest grade of school completed and converted to 5 categories: less than high school, high school degree, some college, college degree, and postgraduate. Race and ethnicity data were categorized as non-Hispanic white, non-Hispanic black, and other. Participants were asked if they had ever seen a health professional for 18 different chronic conditions. The number of comorbid conditions is a sum of all self-reported comorbid conditions including arthritis. Arthritis status was determined according to the Behavioral Risk Factor Surveillance System definition of self-reported doctor diagnosis of arthritis.<sup>33,34</sup> For the purpose of this study, anyone self-reporting any type of doctor-diagnosed arthritis (eg, osteoarthritis, gout, rheumatoid arthritis, fibromyalgia) was included as having arthritis. Body mass index (BMI) was calculated from self-reported height and weight using the US Customary System to Metric (BMI=kg/m<sup>2</sup>).

Questions regarding community and personal reasons for physical inactivity came from the 2000 Behavioral Risk Factor Surveillance System Questionnaire. Participants were asked in an



open-ended question to list up to 3 things in their community or neighborhood that kept them from being more physically active. Participants were then asked, "Do you have access to places to be physically active?" with 4 response options.<sup>35</sup> Several questions assessed their perception of safety from crime and the presence of neighborhood characteristics such as sidewalks, walking/jogging/biking trails, heavy traffic, street lights, and unattended dogs.<sup>36</sup>

### Focus Groups

Focus groups were conducted to enrich the quantitative telephone survey data by further examining community influences on health.

**Recruitment.** We recruited participants who had completed a telephone survey from 6 of the 25 sites specifically chosen for geographic and demographic diversity. They were contacted first by letter and then followed up with telephone invitations.

**Photograph Component.** To prepare for the focus groups, we asked participants to take pictures of objects and scenes in their communities that—on a typical day—either helped or hindered their health. The pictures were used to stimulate discussions of different aspects of community and health. We mailed participants a package containing a disposable camera and camera use instructions. Taking photographs was encouraged but not required for participation.

**Conducting the Focus Group.** Seven focus groups were held in the southeast, central, and western parts of North Carolina in urban and rural communities with 21 total participants (Range: 2-5 participants per group; average 3). Focus groups lasting 1.5 hours met at well-known community buildings (eg, senior centers, libraries) and were cofacilitated by 2 trained leaders with digital audio-recordings and hand transcription conducted at each session.

Participants were asked to describe their community and neighborhood and then discuss those community factors that they believed influenced their health. They were specifically probed on 7 topics: community connectedness, crime/safety, eating habits, environment, occupation, physical activity, and services/resources available in their community.

Focus group leaders invited participants to share their photographs if the participants believed the picture represented the topic being discussed. Participants received \$20 for their participation.

### Semistructured Individual Interviews

**Recruitment.** Because our focus groups were small and composed mostly of white women, we purposefully recruited an additional 11 individuals who were demographically underrepresented (3 black men, 3 black women, and 5 white men) in order to incorporate their perceptions into our qualitative findings. Semistructured interview participants were recruited from the same contact list we used for recruiting focus group members. Prospective interviewees were contacted consecutively by telephone and invited to participate in a semistructured individual (telephone) interview. Study staff described the interview process, discussion topic, and the \$20 incentive.

Interviews lasted an average of 30 minutes. As with the focus groups, participants were queried on 7 community factors and their relation to health.

### Data Analyses

**Telephone Survey.** Demographic variables for participants with and without arthritis were examined for differences using Pearson chi-square and t-statistics for dichotomous and continuous variables, respectively. (See Table 1.) Descriptive analyses were conducted on community resource variables and key community and personal reasons for not being more physically active. Frequencies were used to numerically rank the community and personal reasons listed by respondents for not being physically active and Bonferroni tests for multiple comparisons were conducted. For a particular reason for not being physically active, a binomial test was used to see if a significant difference existed between the proportions reporting the reason in the general population and those reporting the reason in the arthritis subgroup.

**Qualitative Interviews.** The focus groups and semistructured individual interviews were transcribed verbatim, and transcripts were uploaded into ATLAS.ti Version 5.0. The questions asked at both the focus groups and semistructured individual interviews served as a basis for the development and definition of codes representative of converging themes. Calibration coding was conducted by independently coding 2 transcripts and comparing results to ensure interrater reliability. Any discrepancies were discussed by 2 coders with a third party brought in for resolution when needed. Transcripts from the focus groups and the semistructured individual interviews were first read independent of each other, and it was determined that there were no major thematic differences in content. Therefore, focus group and semistructured individual interviews were analyzed together and were examined for common themes within and across interviews. The constant comparison method<sup>37</sup> was used to identify other emerging themes, with all transcripts being reread to ensure consistent coding of the emerging themes. In addition, subanalyses were conducted by theme to examine whether differences existed by arthritis status.

## RESULTS

The characteristics of the telephone survey sample and the qualitative participants are presented in Table 1 by arthritis status. Telephone survey participants with arthritis significantly differed from participants without arthritis in that they were generally older, had more chronic comorbid diseases, and had a higher body mass index. (See Table 1.) Those with arthritis also had significantly less education and lower income levels. Among the qualitative participants, only the number of chronic comorbid conditions significantly differed by arthritis status.

**Telephone Survey.** The response frequencies of both community and personal reasons for not being more physically active are ranked for the total group as well as for those with and without arthritis. (See Table 2.) Many participants (n=1749) responded that there was no community reason that

**Table 1.**  
**Demographic Characteristics of Study Participants, North Carolina, 2004-2005**

	Telephone Survey Participants (N=2479)				Qualitative Participants (N=32)		
	Total Mean (SD, N)	Arthritis Mean (SD, N)	Nonarthritis Mean (SD, N)	p-value	Arthritis Mean (SD, N)	Nonarthritis Mean (SD, N)	p-value
<b>Age (years)</b>	52.8 (15.3, 2454)	57.0 (13.9, 1292)	48.1 (15.4, 1145)	p<0.001	58.8 (11.6, 19)	51.8 (16.0, 13)	p=0.162
<b>Body Mass Index (BMI)</b>	29.4 (7.1, 2349)	30.4 (7.4, 1246)	28.3 (6.6, 1086)	p<0.001	31.2 (8.1, 19)	31.3 (7.7, 13)	p=0.969
<b>Mean # of Comorbid Conditions</b>	3 (2.2, 2479)	4 (2.1, 1307)	2 (1.6, 1154)	p<0.001	4 (1.6, 19)	2 (1.2, 13)	p=0.004
	% (N)	% Arthritis (N)	% Nonarthritis (N)	p-value	% Arthritis (N)	% Nonarthritis (N)	p-value
<b>Female</b>	52.8 (15.3, 2454)	57.0 (13.9, 1292)	48.1 (15.4, 1145)	p<0.001	58.8 (11.6, 19)	51.8 (16.0, 13)	p=0.162
<b>Non-Hispanic White</b>	75.4 (1838)	75.0 (967)	75.7 (858)	p=0.346	68.4 (13)	61.5 (8)	p=0.937
<b>High School Degree and Above</b>	86.7 (2127)	82.1 (1058)	92.1 (1055)	p<0.001	84.2 (19)	92.3 (13)	p=0.512
<b>&lt;\$45 000 Annual Household Income</b>	60.5 (1359)	66.9 (796)	53.2 (554)	p<0.001	83.3 (15)	66.7 (8)	p=0.306
<b>Currently Married</b>	62.6 (1538)	61.2 (791)	64.3 (737)	p=0.117	68.4 (13)	53.9 (7)	p=0.419

\* N varies due to missing data

kept them from being more physically active. These participants more often cited personal reasons such as being ill, not having enough time, being too tired or being lazy as reasons for not being more physically active. The top 4 most frequently listed community reasons for participants with and without arthritis were not enough sidewalks, a rural environment, not enough recreational facilities, and unattended dogs. Two community reasons for inactivity reached statistical significance for those reporting versus those not reporting arthritis: heavy traffic (p=0.004) and high crime (p=0.008).

In contrast, ranking of personal reasons greatly differed by arthritis status. Those with arthritis reported that they were ill or otherwise physically unable to be physically active as the most common reason for not being more physically active (p<0.001) far more often than those without arthritis. Not enough time (p<0.001), already getting enough physical activity (p<0.001), and being a caretaker (p=0.018) were more often reported by those without arthritis as primary reasons for not being more physically active.

Although many of the pairwise comparisons were significant at the  $\alpha=0.05$  level, we adjusted for multiple comparisons. For the 20 community reasons, Bonferroni adjustment would indicate no significant differences for the arthritis group. Similar adjustment for the 13 personal reasons shows "caretaker" losing significance while the other 3 reasons retain significance. Therefore, while the findings for community reasons may be of general interest, the findings for personal reasons are far more compelling.

#### *Focus Group and Semistructured Individual Interview Results.*

Main themes that emerged from the qualitative interviews were related to accessibility of community resources, community and personal barriers to physical activity, and quality of walking surfaces. Subanalyses by arthritis status revealed that quality of walking surfaces was the only theme unique to individuals with arthritis. Embedded throughout the 7 themes was a discussion of walking for physical activity. Quotations from qualitative discussions that illustrate the primary barriers to physical activity are presented in Table 3.

*Availability of Community Resources.* There was consensus among members in all focus groups that there were a variety of physical activity options available in their communities. Participants listed community resources such as gyms, pools, exercise classes, and malls, and offered photographs of these resources. In each focus group, members discussed the wide range of outdoor options that were available to them (eg, walking tracks and community areas). The opinions expressed in the focus groups are reinforced by the telephone survey findings. The majority of participants, 67.6% (1647 of 2436), reported having places to be physically active both indoors and out. Few stated that they had access to indoor places only (6.2%), access to outdoors only (14.0%), or did not have access to any places to be physically active (12.2%).

*Accessibility.* While participants were in general agreement over the availability of community places to be physically active (especially those at little or no cost), opinions were mixed

**Table 2.**  
**Community and Personal Reasons Given in Telephone Survey Interviews for Not Being More Physically Active, North Carolina, 2004-2005**

Reasons Given for not Being More Physically Active	Total Group Rank (N**)	Arthritis Rank (N)	Nonarthritis Rank (N)
<b>Community Reasons</b>			
No community reason	1 (1749)	1 (894)	1 (855)
Not enough sidewalks	2 (212)	2 (123)	2 (89)
Rural environment	3 (154)	3 (84)	3 (70)
Not enough recreation facilities	4 (153)	4 (83)	4 (70)
Unattended dogs	5 (126)	5 (74)	5 (52)
Heavy traffic	6 (84)	6 (58)*	8 (26)
Not enough physical activity programs	7 (83)	8 (48)	7 (35)
Bad weather	8 (75)	9 (38)	6 (37)
High crime	9 (71)	7 (49)*	10 (22)
Too many hills	10 (50)	10 (33)	11 (17)
No street lights	11 (47)	11 (24)	9 (23)
Not enough bike lanes	12 (25)	14 (12)	12 (13)
Fearful for safety	13 (18)	13 (13)	14 (5)
Wild animals or pests	14 (13)	15 (8)	15 (5)
Distance to facilities	15 (11)	17 (6)	16 (5)
Roadway issues	16 (8)	18 (2)	13 (6)
Not enough outdoor options	17 (8)	16 (7)	18 (1)
Foul air from cars	18 (3)	19 (2)	19 (1)
Environmental concerns	19 (3)	20 (1)	17 (2)
Poor scenery	20 (1)	21 (1)	20 (0)
<b>Personal Reasons</b>			
Ill or otherwise physically unable	1 (528)	1 (424)*	4 (104)
Don't have enough time	2 (519)	2 (193)*	1 (326)
Already get enough physical activity	3 (455)	3 (192)*	2 (263)
Too tired, no energy	4 (342)	4 (190)	3 (152)
Laziness	5 (190)	5 (89)	5 (101)
No personal reason	6 (140)	6 (76)	6 (64)
Caretaker	7 (41)	10 (14)*	7 (27)
No one to be active with	8 (36)	8 (17)	8 (19)
Don't enjoy being active	9 (33)	7 (18)	9 (15)
Too expensive	10 (22)	9 (15)	11 (7)
Enjoy indoor activities more	11 (21)	11 (9)	10 (12)
Weight	12 (11)	13 (4)	12 (7)
Afraid of injury	13 (10)	12 (8)	13 (2)

\* Proportion of those with arthritis that are statistically different from the total population at  $\alpha=0.05$

\*\* Telephone survey participants were able to give up to 3 answers for this question, therefore sum of N>2479. Total group N=2479, arthritis group N=1307, and nonarthritis group N=1154.

regarding the accessibility of places for physical activity. Several participants mentioned that while there were private gyms in their community, they were expensive and memberships were prohibitive. In addition, these exercise gyms did not provide childcare for parents who used these facilities. Several participants discussed other places for physical activity (eg, YMCA) that were difficult to access due to their physical disabilities.

**Quality of Walking Surfaces.** We did not specifically probe participants for differences in community reasons for physical

inactivity by arthritis status. However, content analyses revealed that among participants with arthritis, a theme related to quality of walking surfaces emerged as a barrier to physical activity. Many described problems they had walking for long periods on cement, uneven sidewalks (eg, cracks), and gravel and pebbles.

**Community Barriers to Physical Activity.** Lack of sidewalks, heavy traffic, and living in a rural area were found to be the 3 main community characteristics that acted as barriers to physical activity. While participants discussed walking as a major source

**Table 3.**  
**Barriers to Physical Activity Identified by Focus Group and Semistructured Interviewees, North Carolina, 2004-2005**

	Age	Arthritis Status	Sex	Quote
<b>Accessibility</b>				
High Cost	55	Yes	F	There's one gym in town but I checked out those prices and they are out of my price range any way.
	35	No	F	But if you're not employed, if you're a stay at home mom or if you're retired or whatever, you don't get the benefit of an employer subsidy. I don't know how much Curves® is, but it tends to be expensive.
Lack of access for those with disabilities	58	Yes	F	My problem with the Y was they didn't want me to take my chair in there because they said they couldn't protect it. So they wanted me to walk from the parking lot through the lobby, down the hallway, into the dressing room, through the dressing room and out to the pool. Before I got to the front door I'd have to stop and take a sit down break. Five breaks to get to the pool. By the time I got there I was so tired I didn't care about working out in the pool.
Lack of childcare	35	No	F	There are two places in town to exercise as far as gym type things. We have a Curves® and it does not have child care, which is a problem. I like it because it's all female and I like the concept, but whenever you have kids, which is another issue with physical activity, you have to either have somebody to watch them or be able to take them with you.
<b>Community Barriers to Physical Activity</b>				
Rural area, lack of sidewalks and heavy traffic	50	No	F	Actually, to tell you the truth I don't walk in my neighborhood, because the area where I live is not a safe place to walk. It's rural, we don't have sidewalks or it's not wide enough streetwise to be able to do that because most of the time it's two lanes cars are coming up and down, so it's just really not safe to walk.
	48	Yes	F	Well actually there are no local parks nearby, and there's constant traffic, you don't get out on the roads. Actually this road could use some speed knots, it's near an old school, but they don't pay any attention.
<b>Personal Barriers to Physical Activity</b>				
Personal health and comorbid conditions	58	Yes	F	...And it's a very quiet little community. It goes in a circle and it will go for almost completely a mile around if you take the circle around and come back out on the street. Up until a few years ago, my husband and I used to walk that mile every day, but then it got to where it was difficult for both of us.
	56	Yes	F	I used to walk quite a bit and since my knees and my hips are really deteriorating, it's harder to walk long distances. But I still make myself walk as much as possible. I park farther from the building at the office and things like that. And make myself get more steps in, try to get as many steps in in a day as I possibly can. But I can't go out and walk a mile any more.
	63	Yes	F	Well, I can't do too much walking on account of my knees. I had a knee replacement and all, but I get out there and clean out my flowers, I work in my flower yard. I used to have a garden, but I don't have that any more because I can't bend over and pick my stuff.
Family obligations/care-giving	56	Yes	F	And I need to be home to cook dinner. My husband has severe diabetes and I have to have dinner on time, his insulin and things like that. So, it was a barrier getting to the Y at 7:00 in the evening, and I can't do the morning class.
<b>Walking Surfaces</b>				
Quality of cement surfaces	58	Yes	F	I do my walking at home because concrete and asphalt are really hard on me. I cannot go very far, I can't get from the first handicapped spot to the door at Walmart. That's too much distance. At home, on the sand and soft grass, I can probably walk that far, especially with my canes...So, when I can I walk at home.
	58	Yes	F	I have but not lately because see it's better walking outside than down yonder at the mall because it's cement. But it's cement out there too. It makes a difference whether you're on ground or on cement.
Uneven surfaces	86	Yes	M	Yeah we have sidewalks on one side. So it depends on which side you want to walk on. The sidewalk really is not all that level, so sometimes you get out on the street. And it's a wide street. It's not bad to walk on.
	64	Yes	F	I have a rough uneven, rocky walkway to my doorway. It makes walking hard.

of physical activity, a lack of sidewalks in the neighborhood emerged in all qualitative discussions as a major barrier for getting outside and feeling safe while walking for exercise. When asked in the telephone survey, 76% (1854 of 2452) stated they did not have sidewalks in their neighborhood and 65% (1580 of 2442) did not have walking/jogging/or biking trails in their neighborhood. Further, 36% (874 of 2448) of those surveyed reported heavy traffic in their neighborhood.

**Personal Barriers to Physical Activity.** While qualitative participants were specifically probed on the environmental factors in the community that made it hard to be physically active, many participants offered unsolicited examples of personal barriers to being physically active. They told us that poor personal health and chronic illnesses such as arthritis, diabetes, obesity, and mental illness kept them from being physically active. Nearly all participants discussed their current physical activity level in relation to their current physical health. Most mentioned that they had been more active in the past, but their health problems now limited what they could do. Participants also mentioned that family obligations often prevented them from being physically active.

**Lifestyle Physical Activity.** Participants told us that they were often physically active as part of daily activities and interactions with people. Several participants gave examples of gardening and mowing the yard as well as completing household chores and walking their dogs. Several other participants mentioned they considered physically demanding activities on the job as part of their daily physical activity. Some mentioned that children or grandchildren kept them active and showed pictures to illustrate this point.

**Strategies to Overcome Barriers.** Qualitative participants often discussed what they did to overcome barriers so they could be more physically active. They described how they worked within their physical limitations to maintain and/or increase their physical activity level by keeping active with various lifestyle activities. Some participants mentioned parking further away at shopping centers to increase their daily number of steps and also mentioned driving to places where they could walk safely.

## DISCUSSION

Using quantitative and qualitative methodology, this study set out to examine community factors that North Carolinians perceive to influence their physical activity. Overall, participants reported that they had affordable and accessible community places available to them for physical activity. Participants also described community barriers to activity including no easy access for those with disabilities, lack of childcare, and cost of membership to recreational facilities. In fact, cost has been previously found to be a common reason given among adults with arthritis reporting lack of access to a fitness facility.<sup>15</sup> Qualitative discussions confirmed telephone survey results that a lack of sidewalks, rural environment, heavy traffic, and accessibility were community barriers to physical activity. Quality of walking surfaces emerged as a major built environment

barrier for those with arthritis. Overall, a major theme that emerged was the importance of illness and physical limitations as a reason for physical inactivity, specifically in participants with arthritis. This supports previous research finding that functional and social limitations, anxiety/depression, and pain act as barriers to physical activity in people with arthritis.<sup>15</sup>

While this exploratory study is unique in using multiple methodologies, a few limitations should be noted. Attendance at focus groups was lower than expected despite our best recruitment efforts. Recruitment of men and minorities was particularly difficult. Adding semistructured individual telephone interviews to our methodologies allowed us to incorporate the perspectives of these underrepresented groups into our study and reach a total qualitative sample size of 32. Researchers have indicated that with adequate representation, regardless of qualitative methodologies used, a sample of 30 individuals is enough to uncover the perceptions of the majority of individuals in a population.<sup>38,39</sup>

Because this study lacked a measure of physical activity level for all participants we could not examine how community resources and characteristics influence physical activity level by arthritis status. Arthritis status was not validated by health care professionals but determined by self-reported doctor diagnosis. This has previously been shown to be a reliable method.<sup>33,34</sup> And, while we recognize that reasons for inactivity might vary due to arthritis type or location of affected joint, subanalyses were not conducted by arthritis type because the majority of participants self-reporting arthritis (60%) had osteoarthritis/degenerative arthritis and arthritis site was not collected.

## CONCLUSION

In conclusion, our study suggests that while individuals living with arthritis encounter similar community and personal challenges to being physically active as those without arthritis, they navigate their environment with additional physical limitations. Goals of Healthy People 2010 and the North Carolina Arthritis Plan 2007-2010 are to prevent and reduce the burden of arthritis so as to improve quality of life.<sup>26</sup> It is imperative that the complex interactions between personal and community barriers, social networks, and built environments be better understood and discussed as part of health maintenance for individuals with arthritis. **NCMJ**

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