

**Nature Prescriptions as a Health Promotion Opportunity in Low-Income Communities: A
Literature Review Table**

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Abstract

Nature prescription programs have emerged as a useful health promotional method to reduce chronic disease and increase healthy behaviors. However, most nature prescription programs do not focus on low-income communities. Low-income communities face a higher risk of chronic diseases than other income groups in the United States.¹ This report aims to discuss existing literature on nature prescription studies administered in low-income areas. A literature search was conducted to find low-income-specific nature prescription programs in the United States from 2014 to 2024. The search narrowed down nine main studies that specifically tailor their programs to the needs of low-income communities in the United States. The studies demonstrated nature prescription programs have positive impacts on park usage, perceptions of nature, increase in physical activity, and stress reduction in low-income contexts. While most of the studies focus on both children and caregivers, there is a promising foundation for nature prescriptions to be used as a health promotional tool in low-income areas. More studies need to be performed across the United States with a greater focus on adults, chronic disease metrics, and changes in long-term health outcomes. Public health professionals can use these studies as a foundation to improve health promotion programming for low-income Americans in the future.

Introduction

Chronic disease is commonly seen throughout the United States. The Centers for Disease Control and Prevention (CDC) reports that six out of ten Americans are living with at least one chronic disease.¹ As of 2020, 41.9% of the U.S. population was obese.² Additionally, cardiovascular disease is the leading cause of death in the United States with one person dying from heart disease every 33 seconds.³ Sedentary behaviors have been linked to negative health outcomes like cardiovascular disease mortality.⁴ Mood disorders are also important

considerations in chronic disease prevention. Over 16 million adults have a depressive episode each year.⁴ Low-income Americans face higher rates of chronic disease than any other income group.⁵ Limitations in infrastructure, time, healthcare coverage, and other socioeconomic factors can make it difficult to implement chronic disease prevention methods in low-income communities. There is a growing need for preventative measures regarding chronic disease in the United States.

Low-income areas often have limited access to safe parks or green spaces. Physical activity also takes time and energy which people may not have after working all day or taking care of families. There are many barriers to physical activity in low-income communities that may not be considered in studies working with middle- or high-income households.⁴ There are numerous reasons why the park prescription studies in the past may not be applicable in low-income settings. Analyzing nature prescription programs that focus on low-income communities is crucial to understanding unique circumstances and looking for areas of improvement.

Nature prescription programs are meant to increase physical activity and reduce chronic disease risk.⁴ A healthcare provider gives a patient a "prescription" to spend time in nature. Nature prescriptions can be structured or unstructured. Structured nature prescriptions have formal instructions such as outdoor sports, games, nature walks, or picnics.⁴ Unstructured nature prescriptions refer the patient to a location, but the patient can decide their activity of choice.⁴ For instance, the healthcare provider could encourage the patient to simply go visit the local park.⁴ Previous studies have largely focused on nature prescription programs as a whole without considerations on income level. The literature search conducted in this project specifically focuses on the implementation of nature prescriptions in low-income communities. Although nature prescriptions have been shown to improve health outcomes, low-income communities

face special social circumstances that may limit their ability to partake in physical activity or other healthy behaviors. Analyzing nature prescription programs customized for low-income communities is useful to better understand health promotion options. Due to the high risk of chronic disease for low-income communities, nature prescriptions could be an inexpensive disease prevention method that can be implemented across the United States.

Methods

The literature search looked at nature prescriptions in low-income areas in the United States. Due to time limitations, the literature search was conducted over four months. To be eligible for the project, the literature had to be published from 2014 to 2024. Anything before 2014 was excluded to find the most relevant material. Literature using the following terminology was included in the search: “nature prescriptions”, “park prescriptions”, “outdoor prescriptions”, and “low-income”. Multiple terms were used to account for variations in the concept of "nature prescriptions." Due to the specific focus on low-income communities, nature prescription programs that did not include low-income groups were excluded. No restrictions were placed on age groups because nature prescriptions can target families of wide age ranges.

PubMed, Science Direct, and Google Scholar were used to conduct a wide search or account for sources on other databases. The management tools for the sources were Zotero, Microsoft Excel, and Publish or Perish. Also, PRISMA guidelines were used to guide the protocol for the project. Figure 1 depicts the identification process for the studies. As seen below, the initial search consisted of 534 results and the final review includes only nine relevant sources after accounting for the inclusion and exclusion criteria. Following the literature search, a table for the relevant literature found was created. As seen in Table 1, the purpose, research design, findings, and limitations for each source were listed.

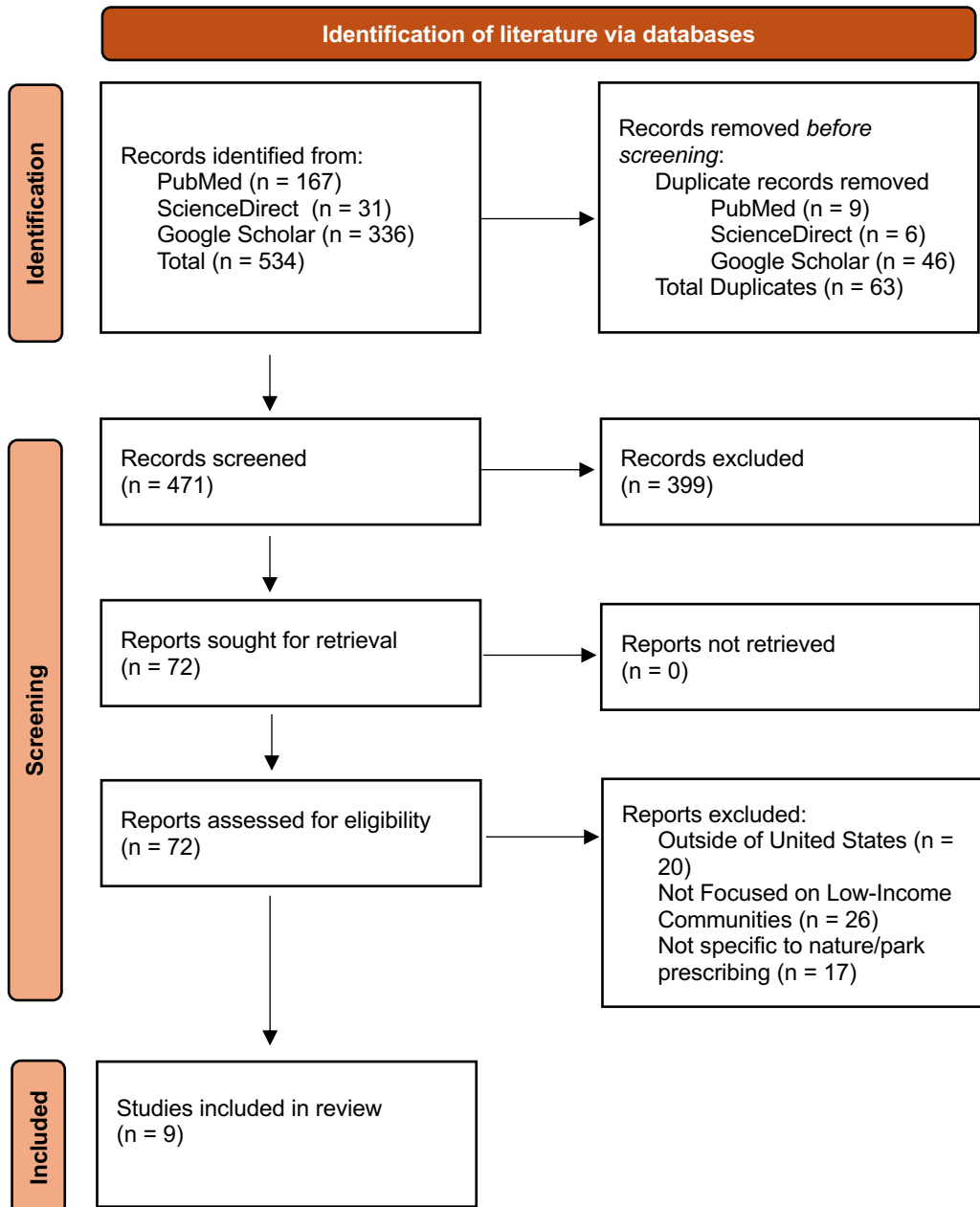


Figure 1. PRISMA Flow Diagram for Search of Databases

Table 1.
Existing Literature on Nature Prescriptions in Low-Income Communities

Article	Purpose	Research Design	Findings/Themes	Limitations	Citation
Park Prescription (DC Park Rx): A New Strategy to Combat Chronic Disease in Children (2017) ⁶	DC Park Rx is a community health initiative aimed at increasing physical activity in children to prevent chronic diseases. The program targeted low-income families in Washington, D.C.	This was an experimental study. A partnership with Unity Health Care was used to target low-income residents. Healthcare providers wrote park prescriptions with details on physical activity intensity, frequency, and duration. Surveys were given to participants (N = 225 families) to record changes in behavior and attitudes surrounding physical activity before the program compared to 3 months after enrollment.	<ul style="list-style-type: none"> The proportion of parents reporting that their child visited a park that year increased from 82% to 93% (P < 0.01) The proportion of parents who believed that physical activity affected their child's health and focused on this regularly as a family increased from 32% to 42% (P < 0.03) The weekly average for physical activity increased from 150 to 172 minutes, and the number of days spent at the park each month for 30 minutes or longer went up from 7 to 8 days 	One of the limitations of the study is that Washington, D.C. is highly regarded for its park equitability which may not be applicable in other areas of the United States. Additionally, distrust in medical providers may be a potential barrier in other communities.	Zarr R, Cottrell L, Merrill C. Park Prescription (DC Park Rx): A New Strategy to Combat Chronic Disease in Children. Journal of Physical Activity and Health. 2017;14(1):1-2. doi:10.1123/jpah.2017-0021
Prescribing Outdoor Play: Outdoors Rx (2017) ⁷	The Outdoors Rx program was developed to promote physical activity outdoors in underserved urban areas of Massachusetts through pediatric healthcare professionals.	The study used an experimental design. Two communities in metropolitan areas of Boston were focused on, and pediatric professionals (N = 28) were used to participate in the program and submit surveys on the results of their patients. Prescriptions were written to the parents of the pediatric patient (ages 2 to 13 years) including details of nature walks, soccer games, and beach time. Families were followed up with within two weeks of the prescription date. At the end of the program, providers were given a survey asking about referral patterns,	<ul style="list-style-type: none"> Of the 28 participating providers, 23 surveys were completed (82%) Providers were more likely to prescribe to children considered overweight or obese compared to those in the healthy weight category Out of 23 providers, 18 considered the program to be a useful counseling tool (78.3%) About 60.9% of providers reported that Outdoors Rx increased physical activity counseling rates Around 13.0% of providers said all families prescribed were interested, 56.5% reported most families were interested, and 	Response and survey bias may be a limitation when using self-reporting surveys. Additionally, the sample size is small with only 23 respondents. Attrition bias may be present due to the lack of participation from five providers. Also, the patient's opinions and progress were not included in the study. Surveys	James AK, Hess P, Perkins ME, Taveras EM, Scirica CS. Prescribing Outdoor Play: Outdoors Rx. Clin Pediatr (Phila). 2017;56(6):519-524. doi:10.1177/0009922816677805

		impact, patient interest, barriers, and recommendations.	<p>30.4% reported that some families were interested.</p> <ul style="list-style-type: none"> • Of the families uninterested in Outdoors Rx, time and transportation were the major barriers • The most common barriers for the physicians included forgetting to prescribe and time limitations to appointments, and 95.5% of providers listed at least one barrier to prescribing 	given to families could be useful for the patients and providers.	
Effect of park prescriptions with and without group visits to parks on stress reduction in low-income parents: SHINE randomized trial (2018) ⁸	SHINE aimed to assess the effect of park prescriptions on stress and other health outcomes of low-income parents in Oakland, California	A randomized trial was used to assess health behaviors in low-income child-parent pairs (N = 78 pairs). Child-parent pairs were randomized into two groups. The first group got counseling through a pediatrician, a map of local parks, a journal, a pedometer, and no further intervention. The second group received the same, but they were also invited to group nature outings on Saturdays. Perceived Stress Scores (PSS10) were measured and physical activity was self-reported.	<ul style="list-style-type: none"> • Both groups assessed showed a significant decline in stress and improvements in park visits, loneliness, minutes of moderate physical activity, cortisol levels, and nature affinity. • Stress levels for all participants decreased by 1.71 points on the PSS10 scale (95% CI -3.15, -0.26) • A 1.22 increase in visits to the park in a week was seen overall (95% CI 0.57, 1.86). • There was a 24-minute increase in moderate physical activity per week (95% CI 11.05, 36.82) • The independent park prescription participants did not significantly differ from the nature group park prescription participants • With each unit of increase in park visits per week, a 0.5 decrease in stress was seen over three months (p = 0.005) 	One of the potential limitations is response bias because participants oversee reporting their physical activity times. Survey bias may also be a concern because the participants took the survey multiple times. Additionally, there was a 10% loss to follow-up. Also, there was no control group included which could be an area to explore in future studies.	Razani N, Morshed S, Kohn MA, et al. Effect of park prescriptions with and without group visits to parks on stress reduction in low-income parents: SHINE randomized trial. Beiki O, ed. PLoS ONE. 2018;13(2):e0192921. doi:10.1371/journal.pone.0192921
Perceptions of Nature and Access to Green Space in	The purpose of this study was to analyze attitudes	A qualitative descriptive design was used to conduct six focus groups with guardians	<ul style="list-style-type: none"> • Managing diabetes and obesity, facilitating playtime, increasing playfulness, and improving mental 	The racial backgrounds of the participants were	Sefcik JS, Kondo MC, Klusaritz H, et al. Perceptions of

Four Urban Neighborhoods (2019) ⁹	regarding nature, green space, and nature prescriptions in low-income, urban areas of Philadelphia.	and caretakers of children (N = 42). Of the participants, 73.8% were Black. Participants were recruited from four urban neighborhoods. In the focus groups participants were asked to share their perceptions of physician-initiated nature prescriptions for children.	<p>health were all listed as perceived benefits of nature by the participants.</p> <ul style="list-style-type: none"> • Barriers to spending time outdoors that were mentioned by participants were safety concerns like crime, dislike of aspects found in nature like bugs or allergens, finances to travel, weather, medical conditions, or quality of outdoor spaces • Participants expressed that they want cleaner and safer outdoor spaces, especially for the youth • When asked about perceptions of pediatrician-facilitated nature prescriptions, some participants expressed interests • Most participants were unsure if they would be able to execute the prescription due to safety and travel to local parks 	mostly homogenous which could limit its generalizability to all low-income populations. Additionally, the participants recruited were interested in talking about nature and health which may influence the perceptions of nature prescriptions. Focus groups before and after being given a nature prescription may be a future area of study.	Nature and Access to Green Space in Four Urban Neighborhoods. IJERPH. 2019;16(13):2313. doi:10.3390/ijerph16132313
Clinic and park partnerships for childhood resilience: A prospective study of park prescriptions (2019) ¹⁰	The study aimed to analyze the association between park prescription participation and resilience in children from low-income families.	A prospective study design was used with children ages 7 to 17 years along with a guardian for each child (N = 54 families). Each family was given a park prescription and ordered to visit a park at least three times a week. Two-thirds of the families were randomly invited to three group park events, and this intervention group was provided transportation, food, and programming. Baseline data for resilience, pediatric stress, and park visits per week were	<ul style="list-style-type: none"> • Group outings did not have an effect on childhood resilience over the three months • The number of weekly park visits had a significant positive association with resilience over time • Regardless of the child's adverse childhood experience (ACE) score, every increase in park visits per week guided a significant increase in childhood resilience • With every additional weekly park visit, a 0.04-point increase in resilience was found in children (p = 0.02) 	A small sample size is a limitation of the study. Additionally, there may be response bias because parents were responsible for reporting park visits for their children.	Razani N, Niknam K, Wells NM, et al. Clinic and park partnerships for childhood resilience: A prospective study of park prescriptions. Health & Place. 2019;57:179-185. doi:10.1016/j.healthplace.2019.04.008

		compared to data from one month and three months after enrollment.	<ul style="list-style-type: none"> • Park visits were associated with reduced stress in children ($p = 0.04$) • A mediation model was created to show that decreased childhood stress mediated a relationship between increased resilience and park visits over time 		
Screening for Park Access during a Primary Care Social Determinants Screen (2020) ¹¹	The study analyzed what sociodemographic inequities exist that pose a barrier to nature prescriptions and park access	A cross-sectional survey method was used by administering surveys to low-income families ($N = 890$ caregivers) in Oakland, California. Caregivers of children were given a 14-item questionnaire asking about housing, food and income insecurity, child needs, transportation, employment, legal needs, health insurance, mental health, and park access. These questions were used to rank social needs.	<ul style="list-style-type: none"> • Many caregivers who participated were female (88.9%) • 21% of caregivers reported four or more needs • Families living under the poverty line more commonly had a lack of park access ($p = 0.005$) • Lack of access to parks was ranked as the sixth most common social need, placed above no health insurance and unhealthy living environments • Of the 17% of respondents who expressed the lack of park access, 22% placed parks in the top three for social needs • Families living at or below the poverty line were twice as likely to have a lack of park access compared to those living above the poverty line • Poverty and low parental education were connected to the lack of park access as an unmet need • Families with unmet needs in housing, food, and employment were more likely to rank park access as an unmet need lower 	Due to there being predominantly female respondents, generalizability may be low. Additionally, the cross-sectional survey method could limit causal inference. Relying on participants to self-report could also be a source of response bias	Razani N, Long D, Hessler D, Rutherford GW, Gottlieb LM. Screening for Park Access during a Primary Care Social Determinants Screen. IJERPH. 2020;17(8):2777. doi:10.3390/ijerph17082777

<p>The Association of Knowledge, Attitudes and Access with Park Use before and after a Park-Prescription Intervention for Low-Income Families in the U.S (2020)¹²</p>	<p>The goal of this study was to compare barriers and attitudes toward park use before and after being given a park prescription in low-income families.</p>	<p>The study design was a clinical trial conducted with pediatric patients and their caregivers (N = 78 families) in Oakland, California. Participants were randomized into two groups: one was instructed to visit parks on their own and the other was invited to three group outings. Caregivers were expected to conduct baseline surveys followed by surveys at one and three months.</p>	<ul style="list-style-type: none"> • As knowledge, attitudes, and perceived access improved during the study, park visits significantly increased • Increased knowledge about park locations led to a 0.27 [(95% CI 0.05, 0.50), p = 0.016] increase in park visits per week. • Caregivers who found themselves having more time to spend in nature saw a 0.48 increase in park visits per week (p < 0.001) • Caregivers who reported having more money to spend in nature saw a 0.24 increase in park visits per week (p = 0.013) • As nature affinity increased, park visits increased as well 	<p>Limitations include small population size, reporting bias, and the fact that the study was done in an urban area with limited access to green spaces.</p>	<p>Razani N, Hills NK, Thompson D, Rutherford GW. The Association of Knowledge, Attitudes and Access with Park Use before and after a Park-Prescription Intervention for Low-Income Families in the U.S. IJERPH. 2020;17(3):701. doi:10.3390/ijerph17030701</p>
<p>3 WINS Fitness: A pilot study of a park-based program for low-income communities Prescribing Time in Nature for Human Health and Well-Being: Study Protocol for Tailored Park Prescriptions (2021)¹³</p>	<p>The 3 WINS Fitness program aimed to increase physical activity and improve health outcomes in a low-income community of Los Angeles County by creating exercise prescriptions.</p>	<p>A single group pre-post study design was used to see participant BMI over 10 weeks. Participants were prescribed an exercise session at the local park led by student volunteers. Out of 169 people who showed up to classes, pre and post-data were collected from 66 participants (N = 66 participants).</p>	<ul style="list-style-type: none"> • 78.8% of participants attended at least half or more of the exercise sessions provided. • Participants saw a significant decrease in BMI from baseline to follow-up (p = 0.001) • The greatest decrease in mean BMI was seen in the overweight participants followed by those falling into the obesity group • The normal weight group has the lowest decrease among the three weight groups 	<p>Due to the non-experimental nature of the study, a causal relationship cannot be drawn between the prescription program and decreased BMI. Additionally, the community was 90% Latino which makes the generalizability low. Also, classes were offered in the morning which may conflict with those who work.</p>	<p>Spear SE, Xie H, Hernandez D, et al. 3 WINS Fitness: A pilot study of a park-based program for low-income communities. Jkinwellness. 2021;10:31-39. doi:10.56980/jkw.v10i.89</p>

Results

A total of nine studies were found regarding nature prescriptions in low-income communities. Of the literature found in Table 1, four were conducted by the Stay Healthy in Nature Everyday (SHINE) program in Oakland, California.^{8,10-12} Another study was conducted in Los Angeles County, California.¹³ Other studies were conducted in Washington, D.C., Massachusetts, and Philadelphia.^{6-7,9} The studies found lacked geographic diversity as they either came from California or the Northeastern part of the United States.

Out of the nine studies, only the 3 WINS Fitness program focused on adults over the age of 18 years using health metrics like BMI.¹³ The remaining studies focused on a caregiver-child nature prescription program. Two of the studies focused on mental health-related benefits of park prescriptions which resulted in reports of lower stress levels in parents and children.^{8,10} In parents, lowered levels of cortisol, loneliness, and stress were found across all experimental groups.⁸ Similarly, park visits were linked to lower stress levels in children.¹⁰ Three of the studies touched on attitudes, beliefs, and perceptions regarding park prescriptions, nature, park access, and the location of nearby parks.^{9,11,12} Increased knowledge regarding park access and nature was linked to increased park visits.¹² Two of the studies conducted with families exhibited an increase in physical activity when introduced to a park prescription program.^{6,8} Additionally, a study surveying pediatricians in their delivery of park prescriptions found that physical activity counseling increased in patients given a prescription.⁷ Overall, the nature prescriptions in many studies resulted in increases in park visits, increase in knowledge about spending time in nature, and increased physical activity and mental destressing.

Conversely, barriers to nature prescription interventions still exist for low-income communities. Crime, transportation to parks, and poorly built infrastructure were all areas of

improvement listed by guardians of children in urban environments.⁹ Some parents said they would be hesitant to follow a physician-ordered park prescription due to the danger in parks and the lack of transportation to get to a safe park.⁹ In another study, parents living below the poverty line were found to have limited access to parks.¹¹ Many parents ranked having access to parks highly on their list of unmet social needs.¹¹ Additionally, families facing housing insecurity, food insecurity, or employment issues were less likely to list access to parks as a top priority on the list of unmet social needs.¹¹ When caregivers felt they had more time or money, park visits increased as well.¹² Additionally, pediatricians listed barriers to disseminating park prescriptions due to time limitations for appointments.⁷ While nature prescriptions had positive impacts on the communities studied, barriers in infrastructure, safety, and healthcare organization still exist for low-income communities.

Discussion

In the existing literature on nature prescribing in low-income communities, many positive impacts were found. Not only were there improvements in physical health such as cortisol levels and BMI, but there were improved behavioral patterns, stress relief, and an increase in park usage.⁶⁻¹³ Nature prescriptions that are particularly aimed at improving health outcomes for low-income communities are rare, but there is a foundation for future public health professionals to build from. Outdoor prescribing can be a valuable tool for low-income communities to engage in healthy behaviors while also improving mental health.

However, nature prescription programs in low-income communities are scarce around the United States. Out of hundreds of studies, only a few touch on the specific social needs of low-income communities. Due to the limited research on the subject, most studies specifically focus on families with children. While understanding pediatric park prescription programs in low-

income areas is important, only one study discusses adults alone.¹³ Additionally, the healthcare professionals listed in most studies regarding this subject work in pediatrics. Changing health behaviors in adolescents is easier than changing behaviors in adults, so nature prescriptions that may show positive results for children cannot be generalized to adults.¹⁴ The studies found in the literature search are a great starting point for using nature prescribing as a means of health promotion, but more work needs to be done.

The social determinants of health are extremely important to consider in nature prescribing for low-income communities. Many urban neighborhoods lack access to safe parks or nearby green spaces.⁹ Increased staffing or patrolling of parks have been potential recommendations for increasing public park usage.⁹ Additionally, transportation poses a big issue for many people because many cities in the United States are not walkable. Money and time are also of concern for low-income communities because those who work long hours or do not have money may see physical activity as a lower priority.¹¹ Attending a job and then partaking in outdoor physical activity is a time commitment that many low-income families cannot make. All these factors must be considered in nature prescription programs. To change the built environment, policy changes are necessary at the local and state levels. Rebuilding parks and sidewalks requires the support of governmental officials, so public health policy efforts to improve park access are a need. Future nature prescription programs may want to focus on leading classes outside of business hours, and programs with more funding should test if participation is greater when people are provided with transportation to a safe park.

Healthcare providers are crucial to the success of nature prescription programs. Typically, healthcare professionals are the ones to encourage patients to explore nature prescriptions, so making the process as easy as possible for them should be a priority in the future. Pediatricians in

one study listed time constraints and forgetting to write prescriptions as a concern for park prescription programs.⁷ Keeping track of patient progress is also a potential point of concern for healthcare professionals. The GoalRx Prescription Intervention (GPI) proposed a protocol in low-income, rural areas of North Carolina where eHealth technology will be used to instruct and help guide park prescription programs.¹⁵ Electronic tools include fitness trackers, goal setting through direct messaging with healthcare providers, and an electronic medical record system.¹⁵ The study has not been completed and is ongoing, but this approach could be an easier system for healthcare professionals in the future. If successful, this would be particularly useful for patients with limitations on traveling and healthcare providers with time constraints.

A few other factors should be considered when looking at the future of nature prescriptions as health promotional tools for low-income communities. The studies conducted so far have limitations with generalizability due to the lack of geographic diversity and small sample sizes. None of the studies took place in the southern part of the United States where climate may pose an issue. Harsh temperatures, air pollution, and extreme weather events have negative effects on physical activity rates.¹⁶ Nature prescription programs for low-income communities have yet to address the health risks and behavioral patterns linked to climate. Also, distrust in medical professionals may be an area of concern, so building relationships with local community members is essential for healthcare providers. Additionally, most of the studies were conducted in urban populations. Low-income rural populations are often overlooked in terms of health promotional campaigns. While there is an ongoing study on rural areas of North Carolina, there is still a need to include this demographic in future prescription programming.¹⁵ Moreover, much of the existing literature does not use metrics like BMI, blood sugar levels, or other physical health indicators. Long-term health impacts have not been explored in low-income areas

either. While an increase in physical activity was depicted in various studies, a further step could be taken by recording changes in weight at baseline and a year after a park prescription program begins.^{6,8} These metrics would be more beneficial for long-term chronic disease prevention efforts.

Conclusion

Nature prescriptions as a health promotion method in low-income communities have been found to have positive results, but there is much more work to be done. Existing literature on low-income nature prescription programs is geographically and demographically limited. Built environment, socioeconomic stability, and healthcare access are all necessary to address when tailoring nature prescription programs to low-income areas. Nature prescriptions are a start to mitigating sedentary behaviors, but more studies need to discuss metrics related to chronic diseases. With the few existing studies focusing on low-income contexts, there is great potential for nature prescriptions to be utilized in health promotion.

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