

Bridging the gap between research and practice: an assessment of external validity of community-based physical activity programs in Bogotá, Colombia, and Recife, Brazil

Diana C Paez, MPH,^{1,2} Rodrigo S Reis, PhD,^{3,4} Diana C Parra, PhD,^{1,5,6} Christine M Hoehner, PhD,^{7,8} Olga L Sarmiento, PhD,² Mauro Barros, PhD,⁹ Ross C Brownson, PhD

¹Prevention Research Center in St. Louis, Brown School, Washington University in St. Louis, St. Louis, MO, USA

²Department of Public Health, Universidad de los Andes, Bogotá, Colombia

³School of Health and Biosciences, Pontificia Universidade Católica do Paraná, Curitiba, Brazil

⁴Department of Physical Education, Federal University of Paraná, Curitiba, Brazil

⁵Program in Physical Therapy, School of Medicine, Washington University in St. Louis, St. Louis, MO, USA

⁶Center for Epidemiological Studies in Health and Nutrition—University of São Paulo (NUPENS-USP), São Paulo, Brazil

⁷Division of Public Health Sciences, Washington University in St. Louis, Saint Louis, MO, USA

⁸Alvin J. Siteman Cancer Center, Washington University in St. Louis, Saint Louis, MO, USA

⁹School of Physical Education, Lifestyles and Health Research group, Universidade de Pernambuco, Recife, Brazil

Correspondence to: D Paez
paez.d.carolina@gmail.com

Cite this as: *TBM* 2015;5:1–11
doi: 10.1007/s13142-014-0275-y

ABSTRACT

For more than a decade, physical activity classes have been offered in public places at no cost to the participants in some Latin American cities, however, internal and external validity evidence of these programs is limited. The goals of this study were to assess, report, and compare the external validity of the Recreovia program (RCP) in Colombia, and the Academia da Cidade program (ACP) in Brazil. Interviews to assess external validity of the RCP and ACP were conducted in 2012. The interview guide was developed based on the RE-AIM framework. Seventeen key informants were selected to participate in the study. Interviews were recorded and transcribed verbatim. Transcripts were analyzed using a constant comparative qualitative method and experts validated common themes. RCP and ACP key informants reported that both programs reach underserved population. There is no information available about effectiveness. Both programs take place in public spaces (e.g., parks and plazas), which are selected for adoption mainly based on community demand. RCP and ACP offer free physical activity classes with educational and cultural components, have a strong organizational structure for implementation, and differ on schedule and content of classes. Funding sources were reported to play an important role on long-term maintenance. Facilitators and barriers were identified. Programs are similar in the reach and adoption elements; the main differences were found on implementation and maintenance, whereas information on effectiveness was not found. Reporting external validity of these programs is useful to bridge the gap between research and practice.

Keywords

Community programs, Dissemination, Exercise, External validity, Physical activity, Public health, Colombia, Brazil

INTRODUCTION

Physical inactivity is estimated to be the cause of more than 5.3 million deaths worldwide in 2008, and is positively associated with the incidence and

Implications

Research: Qualitative methods help to bridge the gap between research and practice for public health interventions that have the potential to be widely adopted and scaled up.

Practitioners: Physical activity community programs are sensitive to cultural context (e.g., regions of a country) and need political and community support to be maintained.

Policymakers: Evaluators of regional and national physical activity policies should assess a range of external validity elements to help determine how easily an effective intervention can be translated from one setting to another.

prevalence of chronic diseases [1]. The physical inactivity pandemic requires urgent actions to equitably promote physical activity [2]. Interventions to increase physical activity have a variety of informational, behavioral, social, political, and environmental approaches that consider the complexity of the adoption and maintenance of healthy behaviors [2]. More recently, innovative approaches at the community level have been found to be successful for physical activity promotion in numerous countries [3].

Among these approaches, community programs developed in Latin American cities have been recognized because of the uniqueness of combining the use of available environmental resources and social support, to offer free physical activity classes and health counseling to high risk groups (e.g., low socioeconomic status, women, and those with limited access to recreational facilities) [4]. Systematic reviews conducted by the Guide for Useful Interventions for Activity in Brazil and Latin America (Project GUIA) identified these programs (physical activity classes in community settings) as new and promising interventions for

promoting physical activity at the community level [5–7]. Examples of this type of intervention are: the Recreovia Program (RCP) in Bogota, Colombia and Academia da Cidade Program (ACP) in Recife, Brazil [8, 9].

The RCP and ACP are aimed at providing the general community with the opportunity to engage in regular exercise, by offering free physical activity classes (three to five times a week). The classes are usually conducted by trained instructors in public places (e.g., parks, community centers, shopping centers, and sports facilities) [8, 9]. These programs also promote the adoption of healthy lifestyles by participants, increase awareness about the health benefits of physical activity, encourage the use of available recreational spaces in their respective cities of implementation, and increase social capital among community [10, 11]. Both programs are ongoing and have been maintained and institutionalized by governmental entities since 1995 in the case of Bogota, Colombia [10], and 2002 in Recife, Brazil [11].

Despite limited evidence on their effectiveness (i.e., internal validity) [8, 12–14], this type of physical activity program has expanded rapidly in the region. For instance, in Brazil, this model was used to develop a national program known as Academia da Saude which is being implemented in 4,000 cities in the country from 2010–2014, at a cost of 1 billion USD [15]. In Colombia, physical activity classes in community settings are a key component of the Healthy Lifestyle Habits Program of Coldeportes (Colombian Institute of Sports), a national program implemented in 32 departments of the country at a cost of 9.3 million USD for the years 2012 and 2013 [16]. The RCP and ACP are examples of the practice-based evidence field advancing faster than the research/evidence-based field; therefore, they represent unique opportunities to learn more about external validity elements that can inform effective planning and research translation into practice.

External validity refers to the degree in which findings from a study can be generalizable to populations, settings, and times other than those of the original studies [17]. Among commonly used models in translational research [18], the RE-AIM framework recognizes five external validity elements: (1) reach; (2) adoption; (3) implementation; (4) effectiveness; and (5) maintenance [19]. Reach refers to the penetration of the program within the intended target population. Adoption refers to the adoption process of the program by target staff, settings, or institutions. Implementation refers to how the program is implemented (schedule, settings, delivery agents), its consistency and cost. Effectiveness refers to the effects of the program on participant's physical activity levels and health outcomes, as well as differences in effect among sub-groups. Maintenance refers to the continuation of intervention effects on individuals and settings over time [19]. The report of these elements is crucial for public health practice, contributing to the translation

of research into action [20]. Reporting these elements may aid in designing future research studies and inform decision making about public health interventions, yet elements of external validity are rarely reported [21, 22].

When assessing the Latin American literature on physical activity, the external validity elements most frequently identified were reach, adoption, and implementation [6]. However, elements such as the background of instructors, representativeness of settings and funding resources were less frequently reported [6]. Considering that the majority of the studies on physical activity interventions failed to report external validity elements and that physical activity classes in community settings are interventions with extensive practice-based evidence but limited research-based evidence, the aim of this study was to assess, report and compare external validity elements of the RCP and ACP. Thus, this study aims to bridge the gap between research and practice in physical activity promotion in Latin America.

METHODS

Programs selection

We selected the RCP and ACP based on three main criteria; (1) they have been shown to be promising strategies for the promotion of physical activity at the community level based on existing evidence [7], (2) they have limited evidence on external validity [6], and (3) they are being scaled up in Colombia and Brazil [23, 12, 15], and replicated in North America [24]. In addition, cross-sectional studies have suggested the promising effect of ACP on increasing physical activity levels of the population [9], thus the need for evaluating its external validity [25]. Also, RCP is a good example of a multisectoral collaboration, a much needed approach in the physical activity promotion field [26].

Key informants selection process and classification

We identified 17 key informants, 10 for the RCP and 7 for ACP (Table 1). The following criteria were used to select informants: (1) knowledge of the program's functioning by prior experience with the program; and (2) current experience on the program's coordination and implementation. Consequently, we classified selected key informants into five categories that reflected the role they played within the programs based on the elements of the RE-AIM framework as: current period coordinator, adoption period coordinator, past period coordinator, unit coordinator (i.e., staff in charge of the coordination of a specific site for the program implementation), and physical activity instructors or delivery agents (Table 1).

Participants who met inclusion criteria and represented at least one of the categories were chosen as the initial informant group. In order to select more key informants, a snowball process (e.g., the first informant

Table 1 | Key informant categories and corresponding external validity elements for Academia da Cidade program (ACP) and Recreovia program (RCP)

Key informant category	Number of key informants		External validity element assessed ^a				
	ACP	RCP	R	E	A	I	M
Current coordinator	1	1	X	X	X	X	X
Adoption period coordinator	1	2			X		X
Past period coordinator	1	3		X	X	X	X
Unit coordinator	2	1	X	X		X	X
Physical activity instructor	2	3	X			X	X
Total (17)	7	10					

^a R Reach, E Effectiveness, A adoption, I Implementation, M Maintenance

indicated other people who may add more meaningful information) was used with the initial informants as starting point. Through this process, other participants were identified and invited to participate in the study. The criterion to set the final number of informants was theoretical saturation [27]. Hence, when the point at which little or no new information emerged from the interviews, no more participants were recruited.

Survey development

We created a structured interview guide based on the External Validity Assessment Tool (EVAT) developed by Project GUIA in order to assess external validity of published literature on physical activity interventions in Latin America using the RE-AIM framework (Table 1) [6, 28]. In addition to the RE-AIM framework, we included questions about factors to be considered for replication (e.g., transferability) of the programs such as: *What factors have contributed to maintaining the program?*; *What are the main barriers or challenges encountered by the program?*; *If another community wanted to replicate the program: What conditions are needed, what obstacles should be considered, and what are your recommendations?*

Three researchers reviewed and produced questions to assess each external validity element based on the key informant's categories. Thus, five different interview guides were developed (i.e., current period coordination, adoption period coordination, past period coordination, unit coordinators, and physical activity instructors). All the questions were compared for consistency and were conciliated by a fourth reviewer when needed. After a triangulation process, the final questionnaires were revised and approved by researchers from Project GUIA and the Epidemiology Group at the Universidad de los Andes in Bogota, Colombia [29]. The interview guides were first produced in Spanish and then translated and adapted into Portuguese; consequently, they were pilot tested with key informants in Bogota (Colombia) and Recife (Brazil). The interview guides are available at the Project GUIA Website [28].

The protocol for the study was approved by the Institutional Review Board at Washington University in St. Louis, United States and Universidad de los Andes, Colombia.

Data collection

From June to September 2012, 17 selected key informants were invited to participate by email and after their acceptance; a call was made to schedule the interview. None of those contacted refused to participate. A verbal informed consent was used. The interviews were conducted in person from September to December 2012 by trained researchers. They were recorded (audio) and transcribed, keeping them on their original languages (i.e., Spanish and Portuguese).

Only questions about maintenance were asked to all participants, the other components were tailored to the specific group being interviewed (i.e., current period coordination, adoption period coordination, past period coordination, unit coordinators, and physical activity instructor). This was decided because not all of the informants would be familiar with all of the items from the RE-AIM framework (reach, effectiveness, adoption, implementation, maintenance); for instance, current coordinators did not take part in the creation of the program and might not have reliable information about implementation. The interview guides focused on the particular information key informants were able to provide (Table 1). For instance, those classified as the current period coordinators, unit coordinators and instructors were asked about the reach of the program. Current and past period coordinators, as well as unit coordinators, were asked about effectiveness. Those who took part in the coordination of the program (past or current) were asked about adoption. Finally, current and past period coordinators, unit coordinators and physical activity instructors were asked about implementation of the program. The length of interviews ranged from 30 to 90 min.

Data analysis

To analyze the data, we used the constant comparative method described by Corbin and Strauss [30]. Two team members separately identified common themes applicable to each external validity element. The method of analysis included the initial organization of the data, followed by the conceptualization and categorization using open, axial, and selective coding approaches. In case of discrepancies a third team

member was required. We validated the identified common themes through a member validation process, also called member and expert checking [31], in which a key informant (source of data during the data collection phase) and one expert with extensive expertise on the area validated the identified information independently for each program.

RESULTS

RCP informants characteristics

Among the ten subjects interviewed for the RCP, two were part of the adoption period coordination; three from the past coordination period, and five were current staff (the current coordinator of the program, one unit coordinator and three physical activity instructors) (Table 1). The main activities reported by coordinators were: human resources and budget management, planning and follow up of the offered activities, and program dissemination and promotion. Unit coordinators are in charge of the logistics (i.e., setting up the locations to conduct the classes), supervise and provide guidance to physical activity instructors, report attendance to the classes and develop strategies to maintain and increase participation in the program. Physical activity instructors implement the classes and support unit coordinators' activities. Both unit coordinators and physical activity instructors provide health counseling to program participants. Most of the RCP informants have been involved or were involved in the program for about 10 years and currently have a graduate education level. Participant's backgrounds were related to health sciences; most of them are physical educators and have completed sports-related specializations. Previous experience before joining the RCP included: leading physical activity classes in health clubs (i.e., aerobics), activities in academia (i.e., faculty and/or research), and sports administration.

ACP informants characteristics

Among the seven subjects interviewed for the ACP, one was part of the adoption period coordination, one from the past period coordination, and five informants were part of the current staff (one from the current period coordination, two unit coordinators and two physical activity instructors). The main activities reported by coordinators were: program management, intersectoral networking of the program and logistics of the events. Unit coordinators are in charge of the logistics of the settings to implement the program, assist the organization of the activities, disseminate the program and built alliances with other programs from the municipality. Physical activity instructors implement the classes and provide counseling to participants. All of the ACP informants have been or were involved in the program for more than 4 years and have at least a bachelor degree education level. Participants' backgrounds were related to health sciences, six out

of seven are physical education professors and one is a physician. Previous experience before working for ACP included teaching physical education in elementary and middle schools, working on other health community interventions, doing public health policy advocacy, as well as teaching and research in academia.

Reporting of External Validity Elements

In Table 2, we highlight the identified similarities and differences on each external validity element for both programs in order to allow comparison. The following section provides a description of each external validity element, including some relevant quotes from key informants.

Reach

Similarities

The target population for both programs was the general public, and no inclusion or exclusion criteria were mentioned. The primary means of advertising for the programs was word of mouth (i.e., participants invite friends and colleagues to attend the program). Program's websites, Facebook pages, and radio were other social media tools commonly reported. Participants of the programs were reported to be primarily adult women, although this varied according to day and time of the week. For instance, the participation of older adults was reported to be higher during morning classes whereas young adults attended predominantly night classes. Perceived reasons for participating in the programs included maintaining or promoting physical health and conditioning, fitness, leisure and socialization (Table 2).

Differences

Different advertising strategies were reported. The RCP is disseminated through the Ciclovía program (a well-known physical activity intervention implemented in Bogota) [32], while ACP dissemination is imbedded in other programs delivered by the local government as part of the Family Health Strategy, one the pillars of the Brazilian Unified Health System [33]. Population reach also differed between the programs. The RCP was reported to reach primarily low- and middle-income groups; children were only recently defined as a target group. ACP was reported to reach low-, middle-, and high-income groups, depending on the setting location. RCP informants cited promoting mental health as a reason to attend the program; ACP informants reported maintaining physical appearance as the main reason for attendance. Attendance reports are filled by the RCP through a daily class attendance report stratified by gender and age, whereas

Table 2 | Academia da Cidade program (ACP) and Recreovia program (RCP) external validity elements

EXTERNAL VALIDITY ELEMENT	ACP	RCP
<i>REACH</i>		
Target population	All community in general. No inclusion or exclusion criteria ^a	
Recruitment	Word of mouth and social media tools	
Representativeness	Mainly women and adults	Disseminated by the Ciclovía program
	Social status varies according to the location of the ACP unit	Low- and middle-income population and children
Participation report	No	Yes
Participation rate ^b	Not assessed	
Attendance reasons	Physical health, conditioning and fitness, leisure and socialization	
	Physical appearance	Mental health (stress relief)
<i>EFFECTIVENESS</i>		
Significance – Benefits	Yes, data available	No data available
Adverse consequences	No records have been found	
Moderator effects ^c	Gender, age, socioeconomic conditions, safety	
Dose response effects	No data available	
Cost	The cost was \$2.7 million USD in 2011 Funds provided by the federal government through the ministry of health ^d	The cost was \$1.3 million USD in 2011 Funds provided by the local government of the city
<i>ADOPTION</i>		
Target setting	Parks and plazas Beaches, parks and plazas	Ciclovía program corridor, shopping and community centers, parking lots
	31 units Settings are physically modified and adapted	34 units Settings are not physically modified, but adapted.
Recruitment of setting	Accessibility, connection to public transportation	Accessibility through Ciclovía program Private sector support on setting—partnerships/alliances
Participation rate ^b	Not assessed	
Representativeness	Public places	
	All socioeconomic strata are covered	Low and middle socioeconomic strata locations
Processes of adoption	Personal interest and commitment of the Health Secretary	
Previous experience with the program “Exercise and Health”	Local government initiative to complement the Ciclovía program and recover public places.	
<i>IMPLEMENTATION</i>		
Intervention characteristics	Physical activity classes with an educational and cultural approach	
	Walks and interunit trips	Classes for children
Frequency of exposure	Monday to Friday from 5:30 a.m.–8:30 a.m./5 p.m.–8 p.m.	Tuesday to Friday from 6 a.m.–9 a.m./6 p.m.–9 p.m. during. Sundays and Holidays 8 am–1 p.m. Each session lasts 60 min
Organizational structure	Coordinators, administrative assistants, unit coordinators, and instructors	
	Imbedded within Family Health Strategy.	Imbedded within Ciclovía program
Physical activity instructors	Expertise in leading PA classes, good fitness level and workgroup skills	
	Selected through a public process Should have 4 years of college degree.	Selected through the school of instructors Should be coursing at least second year of bachelor studies related to health sciences
	Adaptation from the program “Exercise and Health”	Original/ no adaptation

Consistent implementation	Yes, the programs are implemented as intended	
Mechanisms	Activities are not behavioral theory based	
Facilitators	Diverse activities and instructor's quality	
	Health education lectures Physical fitness assessments	Incentives—souvenirs Regularity of the program throughout the year
Partnerships	City's departments and secretaries (Health, Culture, Education, Transport); and Universities.	
	No private partnerships	Some private partnerships and alliances with public schools
Barriers	Poor quality of classes and physical activity instructors, weather conditions, lack of diffusion channels and unsafe public places	
		Community disturbance Different perceptions about fitness among participants
<i>MAINTENANCE</i>		
Long-term effects	No data	
Institutionalization	Institutionalized in 2002	Institutionalized in 1995 Supportive policies: local major plan, constitution, obesity law, international physical activity recommendations
Factors for sustainability	Community demand, commitment from the public sectors, funding allocation, quality of the staff and program's structure and management	
	Program is institutionalized and recognized as a Health Secretary initiative The promotion of physical activity is recognized as a health priority by the Ministry of Health in Brazil	Regularity and continuity of the program Partnerships and alliances with different sectors
Barriers for sustainability	Lack of staff, and the program has limited governance in the budget	
		Lack of continuous private support, change of local administrations and instability of physical activity instructors' employment conditions
Attrition	People quit due to lack time, settings are too far or unsafe, low program's and physical activity instructor's quality	
Acceptability	High community and stakeholders acceptability	
<p>^a Merged cells represent similarities between the programs</p> <p>^b Participation rate regarding users and settings were not assessed, since these interventions are offered to all community in general and the selection of settings depend on several factors discussed in other sections of the article</p> <p>^c Moderator effect considered as a qualitative (e.g., sex, race) or quantitative (e.g., monthly income, number of children) variable that affects the direction and/or strength of the relation between exposure to an intervention and health-related outcome</p> <p>^d Information gathered by personal communication with the current ACO coordinator. Ricardo Menezes. Academia da Cidade Program General Coordinator. Interview conducted by Mauro Barros</p>		

ACP informants did not report any records of attendance (Table 2).

*program is the word of mouth among users. –RCP
Physical activity instructor*

Relevant Quotes:

The ACP is a program that receives and is prepared for the entire population of Recife in all their age stages and socioeconomic status. It is a program for everyone. –ACP Current coordinator

In the last years, internet has been used to disseminate the program, but what really disseminates the

Effectiveness

Similarities

None of the programs have records of adverse consequences. However, key respondents were aware of

potential adverse effects or unintended consequences such as musculoskeletal injuries due to inadequate clothing or shoes, and physical infrastructure (e.g., floor surfaces). Socio-demographic factors were reported as moderator effects. In this sense, women, adults, low- and middle-income populations, and those with high perception of safety of the settings where the programs are implemented were more likely to attend. It was reported that participants' satisfaction was high for both programs (Table 2).

Differences

The RCP has no data about effectiveness, yet it has some process evaluation data (i.e., number of classes implemented, attendant's characteristics and satisfaction with the program) [34]. Informants reported that evaluation of the effects of ACP on participant's physical activity levels was done in 2008, finding that ACP participants were more likely to meet physical activity recommendations for health [9]. However, this was a cross-sectional study. The costs of the programs differ, as well as funding resources; although both programs rely on public funding. The RCP has also created alliances with the private sector aimed at decreasing costs (Table 2). Current program's coordinators provided cost information; this was gathered by personal communication for the ACP and through the interview for the RCP.

Relevant Quotes:

The program was evaluated by the CDC in 2009. The study found that the likelihood of people doing vigorous physical activities was 3 times higher in parks where ACP takes place –ACP Past period coordinator

Musculoskeletal injuries could be among some of the adverse effects of the program, due to the unevenness of the superficies where the program takes place as well as the shoes and clothes with which people exercise –RCP Unit coordinator

Adoption

Similarities

Common target settings reported for hosting the physical activity classes are parks and plazas. All settings are public places. They are selected by program staff and coordinators according to community demand, location availability, and feasibility in terms of safety, access and funding resources. The main factor that sparked the adoption of both programs (RCP and ACP) was the same, the desire of governmental entities to provide recreational programs for the community at no charge (Table 2).

Differences

The RCP was reported to be an original intervention, while ACP has its roots from a previous pilot intervention called "Exercise and Health" which began in

1998. In the case of the RCP, it was part of a local government initiative to complement the Ciclovía program and recover public space implemented in 1994 [34].

Target settings for the RCP also included the Ciclovía corridor, shopping and community centers, and parking lots of supermarkets; as for the ACP, beaches are also used to implement the classes, in addition to park and plazas. ACP informants reported that the physical infrastructure of sites was modified (i.e., plazas and parks were adapted to create more attractive environment, fixed equipment installed, more lighting, embellishment of the areas). On the contrary, RCP only adapts available physical infrastructure by installing temporary equipment such as a removable stage and sound equipment for each event.

Different factors are taken into account to select the settings where the programs will take place. For instance, the ACP considers access via public transportation, while the RCP considers access via the Ciclovía program and the biking infrastructure available in the city (i.e., Ciclorutas). The RCP also considers alliances with the private sector (e.g., shopping centers do not charge for the use of the facilities). There are 31 ACP units in the city of Recife operating during mornings and evenings. In Bogota, 20 out of the 34 current RCP units operate during the weekend, 16 on weekday mornings and 10 on weekday evenings (Table 2).

Relevant Quotes:

In 1994, the Ciclovía corridor was short and had no complementary activities. In addition, there was an absence of public places and the need to serve the population in a program oriented towards recreation and leisure, particularly from low and middle income –RCP Adoption period coordinator

In fact when we implement the program, the space is completely modified, we ensure the unit has the adequate hygiene and physical structure –ACP Current coordinator

Implementation

Similarities

Both programs reported that physical activity classes were implemented as intended (i.e., consistency of delivery by staff, duration and content of activities) and both were complemented by an educational component. The classes include aerobics, with a large cultural dancing component, stretching and strength exercises, and other group classes specific to each program. The classes last around 60 min, 15 min for the warm up and 45 min for the main activity and cool down. Informants reported that the programs are not guided by any particular behavioral theory.

Diverse activities and the quality of the physical activity instructors were reported as facilitator factors that motivate users to continue attending the classes; on the contrary, low quality of classes (e.g., lack of

punctuality, technical problems related to the settings such as sound or equipment), harsh weather conditions, lack of activities' awareness, and the perception of unsafe locations were reported as factors that adversely affect participation rates. No reliable data on intermediate outcomes including target population's perception, motivation, and knowledge are gathered by program staff.

The organizational structure for the ACP and RCP is similar; both programs have a general coordinator and a physical activity instructor for each unit. The coordination of these programs is imbedded within other local programs, the Family Health Strategy for ACP and the Ciclovía–Recreovía for the RCP. City departments and secretaries (i.e., Health, Culture, Education, and Transport) as well as universities were reported to be public partners by informants from both programs (Table 2).

Differences

For the ACP, the classes are implemented Monday thru Friday from 5:30 to 8:30 a.m., and from 5 to 8 p.m.; and for the RCP, Tuesday thru Friday from 6 to 9 a.m. and 6 to 9 p.m. The RCP also takes place on Sundays and Holidays from 8 a.m. to 1 p.m. Both programs offer different and diverse activities. The ACP also offers walking and interunit trips (travel from one ACP unit to another); and the RCP offers yoga, Pilates, and a special session for children, who are encouraged to participate under adult supervision.

The ACP's physical activity instructors are currently selected through a public process; yet to participate; they should have at least 4 years of college education or Bachelor degree equivalent. Physical activity instructors for the RCP are selected through a training process called the "School of instructors" (Escuela de profesores in Spanish). Therefore, those who join the school are trained for approximately 3 months and then selected based on their performance during the training. The main inclusion criteria to be part of the school of instructors and receive training for the RCP are to be enrolled in at least the second year of bachelor studies in a health-related field. There are currently 30 experienced physical activity instructors (with more than 2 years of experience working in the program), 30 junior physical activity instructors (less than or 2 years of experience working in the program) and 20 unit coordinators implementing the RCP. This information was not reported by ACP informants, each ACP site has an assigned physical activity instructor. However, they are not categorized according to their trajectory within the program.

Facilitators and barriers factors were reported differently in the program. Some of the facilitators to increase motivation among ACP participants were: health education sessions and physical fitness assessments offered; and among RCP participants, incentives (e.g., souvenirs, hydration kits), diverse classes, and the regularity of the program throughout the year. As for implementation barriers, RCP informants

identified the following: complaints of disturbance made by neighborhood residents due to the noise of early classes particularly on Sunday and Holidays, and diverse perceptions of fitness by program users. For example, some RCP users prefer vigorous physical activities, but the program is limited to low and moderate intensity due to the basic fitness level of the majority of attendees and the available physical infrastructure. The ACP has not established alliances with the private sector; in contrast the RCP receives regular support from the private sector. For example, shopping centers in the city allow the use of their locations to implement the classes at no cost (cost benefit alliance); the RCP also has alliances with public schools, which allows high school students to attend RCP events (Table 2).

Relevant Quotes:

The main barrier for implementation is the weather, in Bogota, we have seasons throughout the year with a lot of rain, which limits participation and delivery of classes –RCP Physical activity instructor

To motivate people and preserve participation, we offer diverse classes and activities, we conduct walking or hiking trips between ACP units, which makes users change the environment and avoid monotony –ACP Unit coordinator

Maintenance

Similarities

No data was reported about long-term effects (i.e., more than 12 months of implementation) of the programs on participant's physical activity levels or related health outcomes.

Common factors for programs' sustainability reported by informants were: community demand, commitment from the public sector (i.e., City Mayor of Bogota for RCP, and local programs from the municipality of Recife for ACP), continuous funding allocation, program's structure and management, and quality of the staff, particularly physical activity instructors who are in direct contact with the participating community. In addition, lack of funding was identified as a barrier for the sustainability of both programs.

Key informants also reported some of the reasons why program participants stop attending classes, including lack of time, the location of the program being far from the participant's place of residence or unsafe, weather conditions, low quality of program activities (e.g., poor quality of sound equipment), or physical activity instructors (e.g., some physical activity instructors did not fulfill participants' expectations). High levels of acceptability of the program by community and stakeholders were also reported (Table 2).

Differences

The ACP was institutionalized in 2002 and the RCP in 1995. Particular sustainability factors reported by ACP

informants were: program institutionalization and recognition as a health secretary initiative, and the recognition of physical activity as a health priority by the Ministry of Health of Brazil. Reported sustainability factors for RCP were: partnerships and alliances with other sectors, and the regularity and continuity of the program throughout the year. Barriers for sustainability raised by ACP informants were lack of staff to handle the increased community demand as well as limited governance in the available budget by the coordinators of the program due to federal law regulations. RCP informants reported that the lack of continuous private support, the change in local political administrations (budget and priorities changes every 4 years according to elected Mayor and political party), and the instability of the conditions in which physical activity instructors are hired (i.e., short contracts that have long lag times for renewal and lack of benefits) were barriers for program sustainability.

Informants reported the RCP to be supported by the local major policy plan of Bogota called “Bogota mas humana” [35], the national constitution [36], and the obesity and sports laws in Colombia [37]. RCP informants also reported that the program follows international recommendations and guidelines for the promotion of physical activity and health (i.e., PAHO, WHO, and CDC). For this reason, the RCP started to offer classes during weekdays in 2007, enabling users to meet physical activity recommendations for health (i.e., 150 min of moderate physical activity per week) (Table 2) [34].

Relevant Quotes:

Recreo via participants have exercised rights of petition to the District Institute of Sports and Recreation asking to reactivate RCP units that were closed due to budget limitations. The community is very participative, playing a crucial role on the program maintenance –RCP Unit coordinator

The ministry of health has recognized the promotion of physical activity as a health priority to prevent diseases; this political asset is contributing to the program maintenance and replication to other cities –ACP Physical activity instructor

Conditions, obstacles and recommendations for program replication

Key informants were asked about conditions (i.e., facilitators and barriers) that should be taken into account when replicating the programs. The most frequently reported supporting factors were: community demand and preferences, policy support, funding, alliances with the public and private sector, location viability (public space, free access to all community, medical assistance) and quality of the program (satisfaction with the offered activities, selected settings and physical activity instructor performance). Obstacles mentioned included: lack of funding and weather conditions. The final recommendations key informants highlighted for replication were: interventions should

follow national and international recommendations for health and physical activity, dissemination of the program should be set as a priority for the implementation of the program, this type of interventions should be shown as a health priority to policy decision makers, interventions should include an educational component, and users should be considered during the planning and implementation process taking into account the differences between communities. When replicating a program the first step should be a community needs and expectations assessment.

Relevant Quotes:

The program is not only about health and active living it is also about education, social capital, and cultural appropriation. The program must focus on promoting healthy lifestyles during leisure time; it is the perfect time and context to do it –RCP Adoption period coordinator

Political will, qualified staff, a well-adapted physical infrastructure and the community demand are the main factors to consider when replicating the program –ACP Unit Coordinator

DISCUSSION

Interviews with key informants provided valuable information about two sustainable and institutionalized physical activity community programs in Latin America. We found similarities and differences on each of the external validity elements for both programs. The RCP and ACP aim to provide opportunities for physical activity practice to the general community with a particular emphasis on disadvantaged populations; yet they mainly differ in the implementation procedures and maintenance factors. We hypothesize that even when cultural contexts related to physical activity practice are somehow similar between the programs (i.e., Colombia and Brazil), other factors such as political and social environments, bring unique characteristics that may change the way these interventions operate in each setting or country. This is one of the reasons why it is crucial to increase reporting on the external validity of physical activity programs and interventions, in order to accelerate the applicability of research to local conditions and settings [38].

Evidence has previously highlighted the need to change and adapt research perspectives, not only in the design of studies, but also in the reporting of findings [25]. Research should consider the assessment of external validity as equally important as internal validity when evaluating public health interventions [20, 39]. Responsibility to increase evaluation and reporting of external validity ranges from researchers, to funding organizations, and reviewers [40]. However, practitioners should receive adequate training to include the report of external validity elements during the implementation of interventions [38]. This is very important especially on interventions with extensive practice-based evidence and limited research/

evidence-based practice, case in which they are an essential source of information, as shown in this study. This claim is supported by the recognition of the need for research to be responsive to the input and experience of practitioners and local planners [39].

The use of the RE-AIM framework has evolved from being useful to evaluate and address key issues important for dissemination and generalizability of interventions [19], to being used in planning stages, assessment of progress, reporting of results, and reviewing the literature in diverse health areas [41–43], including policies and community-based multilevel interventions [44, 21]. A recent systematic review aimed at describing the application and reporting on various external validity elements in published literature from 1999 to 2010 found that the most frequent publications using the RE-AIM framework were on physical activity, obesity, and disease management [45]. However, not all the external validity elements were reported consistently among studies [45]. This highlights the need for studies that effectively report external validity within and across the five RE-AIM elements, to use qualitative methods.

Results from this study highlight the need to take a broader view of evaluation, taking into account both internal validity and external validity, particularly when programs have the potential to be scaled up at regional and national levels. Program evaluation should be considered before, during, and after implementation; unfortunately, this is seldom seen in programs such as the ACP and RCP. Some potential explanations for the lack of evaluation are the scarcity of human resources (program staff have not been trained on process and impact evaluation), and the low priority given to effectiveness and impact of programs when allocating of resources. Some strategies for overcoming this barrier include partnerships with academic and research sectors to support program evaluation, as demonstrated by the work of project GUIA during 8 years of partnership with recognized government and research institutions in the U.S. and Brazil [46, 47]. Formal evaluations of these programs will require natural experiment designs.

This study also provided valuable information about maintenance of these programs as well as specific recommendations for implementation. However, it is also important to recognize the long trajectory of these interventions with physical activity promotion in Colombia and Brazil. Factors such as the strong influence and demand of the community, political support, and the cultural context of recreational activities and socialization give these programs an advantage to promote physical activity in the region.

To our knowledge, this is the first study aimed at assessing and reporting external validity elements of physical activity community interventions in Latin America, using qualitative methods. We met sufficient sample size according to the selected methodology and ensured that all participants were familiar with the programs. In addition, none of the contacted informants refused to participate. The independent

abstraction of the information by different researchers and the validation process by external reviewers and experts in the area are also recognized as strengths. Nonetheless, findings may be limited by our sample selection, which could have biased our results towards benefits and strengths of the programs. A viable way to overcome this barrier in future studies is to also select opponents or critics of this type of programs which can also provide valuable information, particularly for overcoming barriers. Our sample selection could have been a stronger if the participants were more homogeneous for both programs, comparing the same number of past and present instructors, coordinators, etc.; however, our sample selection depended on the information gathered for each program and participant until data saturation was reached. This is the reason why the number of participants differed between programs. Although the questions were framed to avoid personal judgments related to the program, the potential for doing so was still latent. It is also possible that participants, in particular current coordinators and physical activity instructors, were less critical of the program because they did not feel completely free to provide their answers.

CONCLUSION

The use of qualitative methods to assess external validity elements, following the RE-AIM framework, is useful to bridge the gap between research and practice, particularly in public health interventions that are being widely adopted and scaled up. Programs are similar in the reach and adoption elements, highlighting the political and community support as common factors for adoption and sustainability. The main differences were found for implementation and maintenance, reflecting the unique characteristics each setting brings to the development of programs. Although both programs had similarities and differences, they had critical points of convergence that should be identified and could potentially work in other settings from Latin America. Data about the effectiveness of both programs is still limited and being collected.

Acknowledgments: This study was funded through the Centers for Disease Control and Prevention's Prevention Research Centers Program contract U48/DPO01903. The findings and conclusions in this article are those of the author (s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention. The study was also supported by the CNPQ (Conselho Nacional de Desenvolvimento Científico e Tecnológico) scholarship (202418/2011). Dr. Sarmiento was funded by Colciencias Project Number: 1204-569-33567 contract 453-2012. The authors thank all interviewed participants in the study, Edwin Pinzon and Rodrigo Lima for the collaboration during the data collection; Carlos M. Arango for assisting in the development of the survey protocol; Alberto Flórez and Danielle Cruz for validating the information collected, special thanks to Amy Eyles for her valuable input on the data analysis, and all members of Project GUIA for their contributions.

Conflict of Interest: Diana C. Paez, Rodrigo S. Reis, Diana C. Parra, Christine M. Hoehner, Olga L. Sarmiento, Mauro Barros, and Ross C. Brownson declare that they have no conflict of interest. The study was approved by the Institutional Review Board at Washington University in St. Louis and Universidad de los Andes.

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