Lessons Learned After 10 Years of IPAQ Use in Brazil and Colombia

Pedro C. Hallal, Luis Fernando Gomez, Diana C. Parra, Felipe Lobelo, Janeth Mosquera, Alex A. Florindo, Rodrigo S. Reis, Michael Pratt, and Olga L. Sarmiento

Background: To describe the lessons learned after 10 years of use of the International Physical Activity Questionnaire (IPAQ) in Brazil and Colombia, with special emphasis on recommendations for future research in Latin America using this instrument. Methods: We present an analytical commentary, based on data from a review of the Latin American literature, as well as expert consultation and the authors’ experience in administering IPAQ to over 43,000 individuals in Brazil and Colombia between 1998 and 2008. Results: Validation studies in Latin America suggest that the IPAQ has high reliability and moderate criteria validity in comparison with accelerometers. Cognitive interviews suggested that the occupational and housework sections of the long IPAQ lead to confusion among respondents, and there is evidence that these sections generate overestimated scores of physical activity. Because the short IPAQ considers the 4 physical activity domains altogether, people tend to provide inaccurate answers to it as well. Conclusions: Use of the leisure-time and transport sections of the long IPAQ is recommended for surveillance and studies aimed at documenting physical activity levels in Latin America. Use of the short IPAQ should be avoided, except for maintaining consistency in surveillance when it has already been used at baseline.

Keywords: motor activity, questionnaires, developing countries, epidemiologic measurement

Physical inactivity has been recognized as an independent risk factor for the development of cardiovascular disease, type 2 diabetes, metabolic syndrome and some types of cancer. In addition, physical inactivity, along with unhealthy diets, is considered among the most important preventable causes of mortality due to chronic disease. The burden of chronic diseases is growing and 80% of the worldwide mortality due to chronic diseases occurs in low and middle-income countries like those in Latin America, generating premature deaths as well as significant social and economic burdens. Given the importance of physical activity for health, it is essential to develop valid tools aimed at measuring this behavior. To achieve this objective, several instruments have been designed throughout several decades of research.

Soon after IPAQ was created studies using this instrument were carried out in Latin America. From the beginning of its use, Latin American researchers realized the need to make cultural adaptations and changes
to the instrument to produce more accurate and reliable information regarding physical activity patterns of the Spanish and Portuguese speaking populations. In this paper, we describe the lessons learned after 10 years of the use of IPAQ in 2 countries from Latin America, placing a special emphasis on recommendations for future use of the instrument for research purposes in the region.

Methodological Approach

An expert consultation and a literature search were conducted to synthesize the lessons learned from the use of IPAQ in Brazil and Colombia. In October 2008, the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) Collaborating Center for Physical Activity and Health convened a workshop for building evaluation capacity for urban health promotion in Latin America in Bogotá, Colombia. A multidisciplinary group of researchers from the United States and Latin America attended this workshop and discussed some of the lessons learned from administering and validating IPAQ in Latin American countries. Our literature search included reports of surveys and field materials used in Brazilian and Colombian studies that were not published in peer-reviewed literature, as well as scientific articles.

Results

IPAQ has been administered to over 15,000 adults in Pelotas, a Southern Brazilian city, and to more than 27,000 adults in Colombia. In addition, it was used in several other studies in Brazil and other areas of Latin America. In the next sections, we discuss the main challenges faced by Colombian and Brazilian researchers when administering IPAQ.

Challenge 1—Mode of Administration

IPAQ was originally created to be administered by self-administration or telephone interviews. These administration modes are ideal for use in high-income countries in which telephone coverage and education levels are high. However, public health surveys in Latin America typically use face-to-face interviews for data collection. This is due to several factors. First, a high proportion of the population has low education and literacy levels, making it difficult to use self-administration techniques. Second, the low coverage of telephone lines in large areas of most of the countries in the region is problematic. Third, increasing nonresponse rates to telephone surveys compared with household surveys are seen in Latin America, probably related to widespread telemarketing in the region. Fourth, personal safety is a concern, because telephone calls are commonly used as a ploy for initiating financial scams. And lastly, the quality of the answers may be poor when self-reported techniques are used, with participants often skipping some questions, for example, which is rarely done during face-to-face interviews.

This challenge was discussed in the multicenter IPAQ validation paper. In 2 of the countries, South Africa and Guatemala, a telephone script was used to administer IPAQ by means of personal interview. The option was considered to be promising by the authors: “Administering the questionnaire this way [face-to-face interviews] may be the preferred option as some participants completing the questionnaire by self-administration skipped some questions.” From the beginning, IPAQ administration in Latin America was primarily accomplished by means of face-to-face interviews. Self-administration is restricted to studies that include samples with high levels of education, such as college students.

Telephone coverage in Latin American countries increased markedly from the 1970s to the 1990s, making it feasible to consider the possibility of administering IPAQ by telephone in some areas. A recent study which used the leisure-time and transport-related sections of the long version of IPAQ showed very high agreement between face-to-face and telephone data, for both continuous and categorical indicators of physical activity.

Based on the experience acquired by researchers during the last 10 years, administration of IPAQ through face-to-face interviews is highly recommended in the Latin American context. Use of telephone interviews may be encouraged in areas with high phone line coverage, but further data on the feasibility of this approach are needed.

Challenge 2—Questions, Instructions and Examples

Questionnaires used in population surveys are designed based on the assumption that the interviewer will understand the question as the researcher intended them to be comprehended. However, this is not always the case, and this is particularly problematic when the instrument needs to be translated into languages different from the one for which it was originally created. In Colombia, experience using qualitative methods such as cognitive interviews before data collection showed that in many cases, interviewees do not completely understand the meaning of questions, particularly people with low levels of education. This could be due to the length and complexity of the questions. For example, in the IPAQ short version, each question inquires about physical activities performed combining all domains, which may generate difficulties for respondents both in understanding the domains and summing across them. In addition, the length of the interview, particularly for the long IPAQ, can cause respondent fatigue and respondents may lose focus, thus reducing the ability to effectively interpret the questions.

A Colombian research team developed a manual for training interviewers in the application of IPAQ, based on the results from cognitive pretesting. Some of the steps from cognitive pretesting used to adapt the IPAQ questionnaire in Colombia were strategies such as “thinking out loud,” verbal testing and paraphrasing. On average 2 pre-testing questions per each item were designed. However, more questions were allowed accord-
IPAQ in Latin America

Survey Instructions. It was suggested to the respondents to place emphasis on the practice of daily physical activity rather than on structured fitness routines. One of the most common problems understanding IPAQ is the inability to make distinctions between the 4 different domains included in the long version. For instance, participants usually thought that the questions had been previously asked. Therefore, there was a need to clearly explain was the purpose of each question was, and that the set of questions were referring only to specific domains (occupational, transportation, leisure-time or housework). One of the recommendations was to incorporate specific job related activities examples, depending on the person’s occupation to improve understanding of the questions on occupational physical activity.

Questions With a Time Dimension. There were some difficulties determining exact reference times; for example, when asked about the last 7 days, some interviewees referred to the last week, from Monday to Sunday regardless of the day that the interview took place, or to the last 8 days including the day of the survey. The original intention of the developers of IPAQ was to determine the levels of physical activity over the 7 days before the interview. One of the recommendations from the cognitive pretesting process was to provide the interviewers with a small calendar that they could show to the respondents to provide them with a clear time reference.

Intensity of Physical Activity. IPAQ includes questions about 3 different types of physical activity: walking, moderate, and vigorous intensity. Participants had difficulties distinguishing between moderate and vigorous intensity activities. It was recommended that specific examples of different intensity activities be provided and that they be linked to physiologic signs such as breathing or heart rate. Interviewers felt this would help distinguish between these 3 types of activities. It is also very important to provide culturally relevant examples; tennis and squash, for example, are not very commonly practiced in Latin America. Instead, activities such as playing soccer or dancing can be included. The original IPAQ proposal already addresses the need for cultural adaptations in the examples of activities given to respondents. One of the recommendations from the cognitive pretesting process was the use of photos that portray different activities that are culturally relevant.

Duration of Physical Activity. The questions about duration of particular physical activities require difficult calculations of time, type of activity, days of the week, and remembering the 10 minute bout criterion (which will be introduced later in the paper). It was concluded that recall processes should be supported by other resources or materials such as: the use of calendars, allowing the interviewee to see what is being recorded in the answer sheet, and, finally, make the questions in a more conversational way rather than a strict structured one. Eventually, a table was added with 7 columns and empty cells that allowed the interviewer to record activity type and time in minutes for each day of the week. This process served as a diary that facilitated comprehension and the averaging process for respondents.

Challenge 3—The 10-minute Bout Concept

To be consistent with the physical activity recommendations for health, the IPAQ was developed so that it was possible for participants to report activities that last for at least 10 continuous minutes. If at least 3 bouts are achieved during the day, the person meets the minimum requirement of at least 30 minutes of moderate physical activity per day.22 However, this concept poses many challenges for the person being interviewed as it is difficult to keep track of bouts of only 10 minutes, and perception of bout length may well be inaccurate.

In addition to this problem, issues such as social desirability and low levels of education of the respondents could lead to overestimation of the 10-minute bout. This overestimation is more apparent in household and occupational activities. To decrease overestimation, interviewers should be trained to clearly explain the 10-minute concept and constantly remind interviewees about the 10-minutes bouts. To assess over estimation, a group of Colombian researchers used accelerometers to validate the self report information from the modified version of IPAQ (conducted after cognitive pretesting). They found a modest agreement between the reporting on the 10-minute bout and accelerometer data.22 Moreover, the median value of METs minutes week of IPAQ was 10.2 times higher than the median value of METs minutes week estimated by the accelerometers.22

Challenge 4—Over Reporting of Occupational and Household Physical Activity

From the beginning of the IPAQ use in Latin America, researchers were concerned about the clear tendency for over reporting of occupational and household physical activities. The 10-minute bout concept and misperception of intensity seem to be the main reasons for this problem. In contrast to leisure-time and transport-related activities, occupational and household ones have considerable variation from day to day and even within the same day in terms of types, intensity, bout lengths and periods of rest. When asked about household or occupational activities respondents often provide answers such as: “I take care of a child the entire day, thus I do 8 hours of
moderate-intensity physical activity per day,” or “I walk around my office all day, thus I do 8 hours of walking during the day.”

Even with the changes to the long version of IPAQ made after the suggestions from the cognitive pretesting, occupational and household domains remained difficult to administer. Although the attempt to quantify occupational and household physical activity is interesting for research purposes, the IPAQ structure of the questions is not adequately designed to provide reliable and accurate estimates of physical activity in these 2 domains in low- and middle-income countries, in which these 2 domains represent an important fraction of total physical activity.

**Challenge 5—Duplicate Answers**

One of the common problems during use of the long version of IPAQ was the reporting of the same activity twice or more in the different parts of the questionnaire. To solve this problem, 2 solutions are proposed: (a) at the beginning of the questionnaire, clear instructions should be included stating that an activity should not be reported more than once; (b) when an answer was very similar to a previous one in terms of type, frequency (days per week) and duration (minutes per bout), the interviewer should confirm with the respondent whether this activity was previously mentioned, without adding judgment or personal opinion to the interview. In case of a repetition, the interviewer should ask the subject to clarify in which domain and intensity the activity should be correctly classified.

**Challenge 6—The Average Concept**

Another key issue when using IPAQ is the concept of “average time” which arises by asking “How much time did you usually spend on one of those days doing physical activities (eg moderate or vigorous)?” Most people face a recall problem when answering this question. This problem is inherent to most physical activity questionnaires that use recall questions. Recall, or informal retrieval, is one of the cognitive aspects that may influence respondent’s performance on questionnaires. Information may be retrieved from memory as episodic events or in schemas (eg, generalizations). Episodic events are stored as more detailed information while schemas are more generic and stored with less or even no details. This may explain why it is harder for people to provide precise information on walking for transportation than it is for leisure-time walking.

More recently qualitative methods have been employed to analyze respondent’s understanding of physical activity questionnaires, and studies have found that activities which are performed in more than 1 domain (eg, walking) are usually not well classified. In accordance with this evidence, studies have found that IPAQ reliability is higher for vigorous as compared with moderate or walking activities and also higher for leisure time than for transportation physical activity. Another potential problem resulting from such recall bias is under-reporting. The European Physical Activity Surveillance System (EUPASS) compared IPAQ with a 24 hours activity report and found higher scores using this measure. Similar results were found when the short and long versions of IPAQ were compared, but higher scores were observed using the long version.

To deal with these problems it is recommended that a more detailed approach should be used to ask respondents to describe the daily amount of time they spent performing each category of activity by intensity for each domain. This approach has been used both in adult and older adult populations, with adequate reliability.

**Challenges That Were Not Challenging**

Some of the initial concerns about the IPAQ were not particularly challenging in the Latin American context. For example, the intensity-concept was for the most part easily understood by Latin American populations after the inclusion of changes in respiration and heart rate as prompts to define the intensity of activity (see text of challenge 2).

IPAQ was originally recommended for adults age 18 to 65 years. However, several studies in Colombia and Brazil have included older adult, and IPAQ administration among this age group was not more problematic than it was for young and middle-age adults. However, small adaptations pertaining exclusively to this population group are necessary, for instance providing examples that are culturally relevant to the older adult population. In addition, the average concept, discussed in the previous section, poses some problems that are even more significant among this population group due to recall bias. To overcome this limitation, interviewers are trained to ask about usual physical activity for each day of the week as previously described.

**Conclusions and Recommendations**

IPAQ is a widely used instrument for measuring and tracking physical activity levels in Latin American populations. The use of the instrument in Latin America has not been without challenges, and has required several cultural and structural adaptations. It is important to highlight that the creators of the tool were able to foresee these issues and allowed for the tool to be culturally adapted and translated into different languages. Colombian and Brazilian researchers have informed the use and improvement of the questionnaire by using several qualitative and quantitative techniques such as cognitive interviews, pretesting activities, and also validation studies, with the use of test-retest techniques and validation against more
objective measures of physical activity such as accelerometers and pedometers. While the changes introduced into the questionnaire and the administration protocol have technically increased the length of the instrument, in actuality administration has been faster with fewer errors and less need for repetition due to increased clarity of the instrument and process.

One of the main lessons learned from this series of adaptations of the instrument is how essential it is to pretest an instrument even when it has been previously used in a similar population, and also to document any changes made to the instrument. Researchers should always strive to conduct some type of reliability and validity testing of the instrument and to document this process. For IPAQ, the use of test-retest and validation against pedometers or accelerometers is recommended.

To conclude, the use of leisure-time and transportation domains of IPAQ for surveillance and research is encouraged in Colombian and Brazilian populations. It is very likely that this recommendation applies to most other populations from Latin America as well. The inclusion of the housework and occupational sections of the questionnaire is discouraged unless the specific research questions require this information; even in these cases, researchers should consider using other instruments. The use of the IPAQ short version should be limited to time trend studies which used this instrument at baseline. The leisure-time and transportation sections are also the most relevant for categorizing population levels of physical activity and for guiding public health policies and programs. Enhanced interviewer administration of IPAQ is preferred in Latin American populations to selfadministration. Preliminary studies suggest that telephone administration may be feasible and useful in select urban areas in Latin America, and further development of this approach is recommended.

Acknowledgments

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

References