

Research Paper

Criterion-related validity of the short form of the international physical activity questionnaire in adults who are Deaf

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Abstract

Background: To implement appropriate programs for promoting physical activity (PA) in people who are Deaf, it is important to have valid instruments for assessing PA in this population.

Objective: The main purpose of this study was to examine the criterion validity of the short form of the International Physical Activity Questionnaire (IPAQ-S) in Deaf adults.

Method: This study included 44 adults (18–65 years) of both genders (63.6% were females) who met the inclusion criteria. Objective measures of PA were collected using accelerometers, which were worn by each participant during one week. After using the accelerometer, the IPAQ-S was applied to assess participants' physical activity during the last 7 days.

Results: There was no significant correlation between the average time spent in moderate to vigorous physical activity (MVPA) as measured by the accelerometer (40.1 ± 24.5 min/day) and by the IPAQ-S (41.3 ± 57.5 min/day). The IPAQ-S significantly underestimated the time spent in sedentary behavior (7.6 ± 2.7 h/day vs. 10.1 ± 1.6 h/day). Sedentary behavior and MVPA as measured by the accelerometer and the IPAQ-S showed limited agreement.

Conclusions: Our results show some limitations on the use of IPAQ-S for quantifying PA among adults who are Deaf. The IPAQ-S tends to overestimate the MVPA and to underestimate sedentary behavior in adults who are Deaf. © 2016 Elsevier Inc. All rights reserved.

Keywords: Hearing loss; Physical activity; Accelerometry; Physical activity questionnaire; Adults

Regular exercise has physical and psychological benefits, including lower risk of heart disease, diabetes *mellitus*, high blood pressure, obesity and depression.^{1,2} According to the literature, both sedentary behavior and the lack of physical activity (PA) in sufficient quantities to stimulate the physiological mechanisms (e.g., production of leucocytes, reduction of LDL) are related to some health problems.² From a public health perspective, it is important to examine if adults meet the current general recommendation of at least 30 min per day or 150 min per week of moderate or greater PA intensity.^{2,3} Physical activity is known as any bodily movement produced by skeletal muscles that results in energy expenditure.⁴ Physical activity in daily life can be

categorized into occupational, sports, household, or other activities. Exercise is a subset of PA that is planned, structured, and repetitive and has as a final or an intermediate objective.⁴

According to the literature, people with disabilities report lower rates of health-promoting behaviors (e.g., appropriate nutritional intake and PA habits) when compared with the general population.⁵ It has been reported that people with disabilities are much more likely of being physically inactive than are those without a disability.⁶ Thus, physical inactivity is a major health concern for all, but individuals with disabilities seem to be at a higher risk of developing sedentary lifestyles. In this context, it is important to investigate the patterns of PA of persons with disabilities. Furthermore, to implement effective disease prevention programs, policy makers need data on the PA levels of specific populations, including those with a disability.⁷

Currently, there are various methods to assess PA and sedentary behavior in daily life, including objective measures, such as accelerometry, heart rate and pedometry, and subjective measures as recall questionnaires and PA

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diaries. The use of questionnaires is the most frequent method for assessing PA of the general population, mainly due to their ease of use and low cost.⁸ The short version of International Physical Activity Questionnaire (IPAQ-S) is a common and recommended method to assess patterns of PA³ and has been shown to be reliable and valid to evaluate both PA and sedentary behavior in people with and without disability.^{9,10} In Portugal, monitoring of adherence to recommendations for PA has been measured objectively (accelerometry) and subjectively (IPAQ), showing that at least 70% of Portuguese adults aged 18–64 years engage in sufficient physical activity.^{11,12}

Hearing impairment is a global problem, and the World Health Organization estimated that 360 million people worldwide have disabling hearing loss.¹³ According to the 2001 Census¹⁴ it is estimated that .8% of the population is Deaf or have hearing problems. Portuguese Sign Language (PSL) is the primary communication method of Portuguese Deaf people, and is considered a unique language with its own grammar and syntax and it is not a gestured representation of the country's main language. A number of deaf individuals are Deaf from birth or prelingually (generally defined as before the age of 3) and prefer sign language as their first method form of communication.¹⁵ Due to this unique method of communication Deaf individuals face barriers in the interrelation with the surrounding culture that may lead to significant deficits in their health knowledge.¹⁵

In the literature, there is limited research on the PA behavior of people who are Deaf and on the validity of instruments for measuring PA in this disability. One of the few studies that have assessed the PA levels of Deaf or hard of hearing people concluded that they were not sufficiently active and had a greater risk of suffering from health problems related to physical inactivity.¹⁶ However, more studies are necessary to gather consistent information on the PA habits of people with hearing impairment, which could be facilitated by the use of easy and inexpensive self-report questionnaires such as the IPAQ-S. However, to our knowledge, there is no evidence on the use of the IPAQ-S with adults who are Deaf. Therefore, this study examined the criterion validity and the measurement bias of the IPAQ-S in adults who are Deaf using accelerometer as an objective measure of PA.

Method

Participants

The inclusion criteria consisted of being Deaf with a hearing loss between severe to profound, being 18–65 years of age, being a member of an Association for the Deaf, and use the PSL as the first form of communication.

All participants were informed about the objectives of the study and gave their informed consent to participate. The study was approved by the University of Évora ethics committee and was conducted in accordance with the World Medical Association's Declaration of Helsinki on human research.¹⁷

Procedures

Three Portuguese associations for the Deaf (one from the city of Évora and two from the city of Lisbon) were asked to cooperate in this study which was conducted between March and July of 2014. After the agreement from the association's direction board, the associates were contacted and invited to participate. Those who agreed to participate were instructed during the first visit (in the institution's facilities) on the proper use of the accelerometer and completed a demographic and a PA habits questionnaire. After they wore the accelerometer for a week, the IPAQ-S was administered during the second visit. All the procedures that involved communicating with the participants during the interviews were made always with the help of a sign language interpreter. One of the researchers read the questions of the questionnaire and a sign language interpreter translated for the participants. The sign language interpreter then translated the answers from the participants for the Portuguese language.

Instruments

IPAQ-S

The IPAQ-S⁹ was used as self-report measure of PA and sitting time (sedentary behavior). It is a seven-day recall questionnaire that provides information on the time and frequency spent walking, on moderate and vigorous-intensity activity, and also on the time spent in sedentary activity. The total amount of PA was converted to metabolic equivalents (MET minutes per week) according to the guidelines for data processing and analysis of the IPAQ (www.ipak.ki.se), where one metabolic equivalent is equal to the expenditure of energy while resting.

The questionnaire was interviewer-administered by the researchers, with the help of a sign language interpreter during individual interviews with the participants, as explained before. The questionnaire included any PA that the participants did at work; to get from a place to another; as part of housework and yard work; and the spare time spent in recreation exercise, or sports. For data collection on sedentary behavior, the participants were instructed to think about the time they spent sitting at work, at home, while doing the course to and from the workplace, and during leisure time.

Accelerometer

Daily PA was assessed by accelerometers (ActiGraph, GT1M model, Fort Walton Beach, Florida), which are small electronic devices (3.8 × 3.7 × 1.8 cm, or 1.5 × 1.4 × by .55 inches) and light weighted (27 g, or .9 ounce) that measure the acceleration of normal human movements in a numeric value know as count; motion outside normal human movements is rejected by a band-pass filter. The signal is digitized by an analog-to-digital converter and numerically integrated over a pre-

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