Validity and reliability of the International Physical Activity Questionnaire among adults in Mexico

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ABSTRACT

Objective. *To determine the test-retest reliability and validity of the Spanish version of the short-form International Physical Activity Questionnaire (IPAQ) among adults in Mexico.*

Methods. *This was a cross-sectional study of a convenience sample of 267 adult factory workers in Mexico City. Participants were 19–68 years of age; 48% were female. Participants wore an accelerometer for 9 consecutive days and were administered the Spanish version of the short form IPAQ on two occasions (IPAQ1 and IPAQ2, separated by 9 days). The relation and differences between moderate-to-vigorous physical activity (MVPA) measures obtained from IPAQ1, IPAQ2, and the accelerometer were determined using correlations, linear regression, and paired t-tests.*

Results. *IPAQ1 and IPAQ2 measures of MVPA were significantly correlated to each other (*r *= 0.55,* P *< 0.01). However, MVPA was 44 ± 408 minutes/week lower in IPAQ1 than in IPAQ2, although this difference did not reach statistical significance (*P *= 0.08). The (min/week) measures from IPAQ1 and IPAQ2 were only modestly correlated with the accelerometer measures (*r *= 0.26 and* r *= 0.31,* P *< 0.01), and by comparison to accelerometer measures, MVPA values were higher when based on IPAQ1 (174 ± 357 min/week,* P *< 0.01) than for IPAQ2 (135 ± 360 min/week,* P *< 0.01). The percentage of participants who were classified as physically inactive according to the World Health Organization guidelines was 18.0% in IPAQ1, 25.1% in IPAQ2, and 28.2% based on the accelerometer.*

Conclusions. *Similar to what has been observed in other populations, the short form IPAQ has a modest reliability and poor validity for assessing MVPA among Mexican adults.*

Key words Motor activity; questionnaires; self report; measurement equipment; Mexico.

Physical inactivity is an important public health issue and is the seventh most prevalent risk factor for cardiovascular disease globally (1, 2). In addition to cardiovascular disease, physical inactivity is a leading risk factor for premature mortality, type 2 diabetes, osteoporosis, and certain types of cancer (3, 4). According to the World Health Organization (WHO), in developing countries such as Mexico, almost half of the adult population does not accumulate enough physical activity for health benefits (2, 5).

Because of its importance to chronic disease prevention, physical activity is a key behavioral risk factor that is measured in most general health surveys (3, 6, 7). Questionnaires are the most practical and economically feasible tool researchers can use to measure physical activity in large population-based studies (8–11), and there are several physical activity questionnaires available (9, 12–15). One of the most commonly applied is the International Physical Activity Questionnaire (IPAQ), developed in 1996 as an instrument for use in adults across diverse countries and populations (16). The IPAQ can be used to assess activities of different intensities and sed-

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entary behaviors during work, transportation, and leisure-time.

Currently, the IPAQ is used for surveillance purposes in several countries (16–18). The reliability and validity of the short form IPAQ has been tested in more than 12 countries (16–25). Across these countries, the pooled correlation of repeated moderate-to-vigorous physical activity (MVPA) measures obtained by the IPAQ is 0.76; and the pooled correlation between MVPA measures obtained by the IPAQ and accelerometer is 0.30 (16).

The reliability and validity of the IPAQ and other physical activity questionnaires for Mexico was previously unknown, though there had been studies in similar areas, such as southern California, Guatemala, and Brazil (16). These study results indicated a poor validity (i.e., $r < 0.13$ when compared to accelerometer) and a modest reliability (i.e., $r \geq 0.25$ between multiple IPAQ surveys). Nonetheless, Mexico has its own distinct culture and geography, so these findings may not have applied. Therefore, the purpose of this study was to determine the test-retest reliability and validity of the IPAQ among Mexican adults.

MATERIALS AND METHODS

Design and participants

This was a cross-sectional study conducted in 2011 with participants who were employed at a factory in Mexico City. The study collected data on 272 Mexican men and women, 18–69 years of age, who were full- or part-time employees at the factory and held a variety of occupational positions (e.g., administrative assistants, executives, factory workers, janitorial staff, security guards, etc.). The convenience sample numbered 267 after five potential participants were excluded by either a severe physical disability (that prohibited activity) or incomplete questionnaire/accelerometer data. All participants provided their informed consent prior to participating. The National Public Health Institute Ethics Review Board of Mexico approved the study.

Procedures

Participants visited the factory's clinic twice. During the first visit, trained staff collected anthropometric data. Weight and height were measured to the nearest 0.1 kg and 0.1 cm, and body mass index (BMI) was calculated as kg/m^2. Waist circumference was measured using fiberglass tape to the nearest 0.1 cm at the midpoint between the iliac crest and the lower rib.

During the first clinic visit, participants answered the short form version of the Spanish IPAQ and received an accelerometer. They were instructed on accelerometer placement and asked to wear it using an elastic belt at all times (except in the water) for the following 9 days. They were also given a daily log to track when the accelerometer was removed and an illustrated instruction pamphlet on how to wear the accelerometer, along with frequently asked questions and support contacts. Accelerometers were initialized to start recording at midnight. Nine days after their initial clinic visit, participants returned the accelerometers to the clinic, and at that point a second IPAQ was administered.

IPAQ

The IPAQ was developed by an international group of experts to estimate physical activity patterns of populations from different countries and sociocultural contexts (16). The questionnaire was already translated into Spanish and had been used previously by other Latin American populations (26). The short form IPAQ contains nine items that can estimate the time spent in MVPA in at least 10 minute bouts over 7 days. In this study, the IPAQ was administered in face-to-face interviews during the two clinic visits. It took approximately 8–10 minutes to complete each IPAQ.

The IPAQ questionnaire data was cleaned in accordance with IPAQ protocol (27), such that: (a) physical activity duration data collected in hours was converted into minutes, (b) results reported as a weekly frequency were converted into an average daily time, and (c) "do not know," "refused," or "missing data" for duration or frequency were removed from the analysis. Truncation was performed for all daily duration values exceeding 180 minutes. Based on the reported time spent in moderate (including walking) and vigorous physical activity weighted by two, participants were categorized as being active (≥ 300 min/wk), moderately active (150–299 min/wk), or inactive (< 150 min/wk)—according to WHO physical activity guidelines (28).

Actical® accelerometer

The Actical® (Mini Mitter Company, Bend, Oregon, United States) is an omnidirectional sensor that measures physical activity by acceleration in multiple directions in the range of 0.35–3.5 Hz. The activity counts are summarized over 1-minute periods of time or "epochs." After the accelerometer data were collected, they were downloaded and inspected using the manufacturer's software, Actical V2.12. The accelerometer data were then cleaned and managed using the Personal Activity and Location Measurement System (University of California, San Diego, California, United States) and IBM SPSS Statistics software, version 20 (SPSS Inc., an IBM company, Chicago, Illinois, United States). All periods of 60 or more consecutive minutes with zero epoch counts were removed prior to calculating wear time for a given day (29). A valid wear day was defined as at least 10 hours of wear time (30). Only 12% of the days collected in the entire sample did not meet the 10-hour wear time criteria, and these days were removed from the dataset. Of the 267 participants, 262 (98%) had at least four valid wear days (31), and 227 had at least seven (85%).

Established cut-points were used for each epoch (minute of physical activity data) to determine if the participant was engaged in activity of moderate (3.0–5.9 (metabolic equivalents [METs], 1535–3961 accelerometer counts) or vigorous intensity (≥ 6 METs, ≥ 3 962 accelerometer counts) (30). Because the IPAQ assessed MVPA accumulated in bouts of at least 10 minutes, all moderate and vigorous intensity minutes that occurred in at least 10 consecutive minutes (with a 2-minute allowance below the 1 535 epoch cut-point per 10-minute bout) were summed for each valid day and averaged to determined weekly moderate, vigorous, and MVPA values. As with the IPAQ data, participants were subsequently categorized as being active, moderately active, or inactive according to the WHO physical activity guidelines (28).

Statistical analysis

Simple descriptive statistics (means, interquartile ranges, 95% confidence intervals [95%CI]) were used to describe the sample. Skewness and kurtosis were used to test normality, and variables that

were not normally distributed were logarithmically transformed prior to subsequent analyses. For the reliability analyses, mean differences in physical activity between IPAQ1 and IPAQ2 were examined using paired Student's t-tests. Intraclass correlation coefficients were used to determine the correlation between the IPAQ1 and IPAQ2 measures. For the validity analyses, paired t-tests were used to compare the means of the IPAQ and accelerometer measures. Pearson's correlation coefficients were used to assess the strength of the relationship between the IPAQ and accelerometer measures, and multiple linear regression analyses were used to assess the association between them after adjusting for sex, age, and BMI. The intercepts and slopes of the regression lines and their associated 95%CI were examined to see if the values were different from 0 and 1, respectively.

Finally, the sensitivity and specificity of adhering to the WHO physical activity guidelines based on IPAQ1 and IPAQ2, with accelerometer measures as the gold standard, were calculated. Sensitivity referred to the ability of the IPAQ to correctly identify the percentage of active, moderately active, and inactive individuals, based on the accelerometer values. Specificity referred to the ability of the IPAQ to correctly identify the percentage of non-active, non-moderately active, and non-inactive individuals.

RESULTS

Descriptive characteristics

Characteristics of the sample are presented in Table 1. Of the 272 participants, 267 answered the IPAQ on both occasions and 262 had valid accelerometry data. The mean age was 36.7 years ± 10 (range = 19–68 years), and 138 (51.7%) were male. The mean BMI was 26.9 kg/m^2 ± 4.1 with 46.6% classified as overweight (18.5–24.9 kg/m^2) and 19.7% as obese (≥30 kg/m^2).

Reliability

The mean and median minutes per week for the physical activity variables are presented in Table 2. On average, participants reported a higher MVPA on IPAQ1 (402 ± 369 min/week) than on IPAQ2 (359 ± 359 min/week), although this difference did not reach statistical significance (P = 0.08). The mean difference between IPAQ1 and IPAQ2 MVPA measures was 44 ± 408 min/week, with an interquartile range of -100–170 min/week (Table 3). The differences between IPAQ1 and IPAQ2 measures were more pronounced among women than among men (64 ± 376 vs. 24 ± 438 min/week) and among those ≤ 40 years of age than among those > 40 years (57 ± 423 vs. 20 ± 379 min/week).

Table 4 provides the intraclass correlation coefficients for the MVPA data obtained from the two IPAQ surveys. Independent of physical activity intensity, gender, and age, the IPAQ1 physical activity measures were significantly (P < 0.01) related to the IPAQ2 physical activity measures with r values ranging from 0.31–0.57.

The distribution of participants across the three physical activity groups was different in IPAQ1 and IPAQ2 (P < 0.01), with fewer men and women being categorized into the more active categories in IPAQ2 (Table 5). Based on IPAQ1, 18.0% were inactive, 24.0% were moderately active, and 58.1% were active. The corresponding values for IPAQ2 were 25.1%, 26.2%, and 48.7%, respectively.

Validity

Compared to the accelerometer measures, the MVPA values were 174 ± 357 min/week higher based on IPAQ1 and 135 ± 360 min/week higher based on IPAQ2 (P < 0.01). These differences are further described in Table 3 according to physical activity intensity, gender, and age.

Within the total sample, the correlation between the accelerometer and questionnaire measures of MVPA were r = 0.26 for IPAQ1, and r = 0.31 for IPAQ2. Similar correlations were observed among men and women, and among those ≤40 years of age and those >40 years (Table 4).

In multiple regression analysis, IPAQ1 and IPAQ2 MVPA measures were associated with accelerometer measures after controlling for age, gender, and BMI. As shown in Figure 1, when IPAQ1 and IPAQ2 values of MVPA were used to predict accelerometer measures, the intercept of the regression line was > 0 (intercept = 1.38–1.14, P < 0.01) and the slope was < 1 (slope = 0.49 to 0.53, P < 0.01). This indicates that participants with low MVPA levels over-reported their MVPA in IPAQ1 and IPAQ2 relative to the accelerometer measures, with the level of over-reporting diminishing as MVPA levels increased such that the regression line and line of identity crossed at 323 min/week for IPAQ1 and 295 min/week for IPAQ2.

The distribution of participants across the three physical activity groups was different when based on IPAQ rather than on accelerometer measures (P < 0.01), with fewer participants being categorized into the more active categories with the accelerometer measures (Table 5). Based on the accelerometer, 28.2% of the participants were inactive as compared to 18.0% for IPAQ1 and 25.1% for IPAQ2. The sensitivity of IPAQ1 to capture active, moderately active, and inactive individuals was 70.1%, 23.4%, and 18.9%. The corresponding specificity values were

TABLE 1. Characteristics of participants in a study on the validity and reliability of the International Physical Activity Questionnaire among adults, Mexico, 2011

	Total (n = 267)		Males (No. = 138)		Females (No. = 129)		≤ 40 years (No. = 172)		> 40 years (No. = 95)	
	Mean	SD[a]	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (years)	36.7	10.0	36.4	10.0	37.2	10.0	30.6	6.0	47.9	6.0
Weight (kg)	70.9	13.2	76.1	12.0	64.8	11.5	69.7	13.2	73.1	12.8
Height (m)	1.62	0.1	1.68	0.1	1.55	0.1	1.63	0.09	1.60	0.1
Body mass index (kg/m^2)	26.9	4.1	27.1	3.6	26.9	4.6	26.1	3.8	28.4	4.3
Waist circumference (cm)	89.6	10.9	92.7	9.7	86.4	11.3	86.9	10.2	94.4	10.6

[a] Standard deviation.

TABLE 2. Mean and median for moderate, vigorous, and moderate-to-vigorous physical activity levels (minutes per week) as measured by the International Physical Activity Questionnaire (administered twice: IPAQ1, IPAQ2) and the accelerometer, among adults (*n* = 267), Mexico, 2011

	Total		Males		Females		≤ 40 years of age		> 40 years of age	
	Mean (SD)[a]	Median (IQR)[b]	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
IPAQ1										
Moderate PA[c]	311 (326)	210 (90-420)	323 (340)	210 (89–428)	300 (313)	210 (98–410)	322 (345)	210 (81–420)	292 (290)	198 (101–386)
Vigorous PA	91 (162)	30 (0–120)	118 (154)	60 (0–60)	62 (166)	0 (0,65)	105 (174)	50 (0–150)	65 (136)	0 (0–90)
MVPA[d]	402 (369)	300 (150–510)	441 (385)	333 (170–548)	361 (349)	280 (128–443)	427 (35)	335 (160–540)	357 (348)	257 (150–427)
IPAQ2										
Moderate PA	286 (310)	190 (90–330)	312 (356)	195 (90–333)	258 (251)	180 (85–340)	290 (321)	180 (90–330)	279 (292)	200 (85–340)
Vigorous PA	73 (152)	10 (0–80)	104 (187)	43 (0–120)	39 (92)	0 (0–40)	80 (151)	20 (0–90)	59 (154)	0 (0–60)
MVPA	359 (359)	250 (120–430)	416 (423)	280 (140–453)	297 (263)	240 (100–385)	370 (372)	270 (120–450)	337 (336)	240 (130–415)
Accelerometer										
Moderate PA	197 (112)	178 (114–257)	224 (120)	200 (138–285)	171 (96)	157 (90–242)	208 (57)	189 (123–273)	176 (96)	173 (96–239)
Vigorous PA	28 (50)	11 (1–32)	40 (64)	19 (5–49)	15 (26)	5 (0–18)	31 (57)	12 (2–33)	22 (35)	6 (0–26)
MVPA	226 (140)	197 (126–287)	264 (157)	237 (156–337)	186 (107)	170 (101–264)	239 (151)	209 (136–306)	197 (113)	187 (101–263)

[a] Standard deviation.
[b] Interquartile range.
[c] Physical activity.
[d] Moderate-to-vigorous physical activity.

TABLE 3. Differences in mean and median for moderate, vigorous, and moderate-to-vigorous physical activity (minutes per week) as measured by the International Physical Activity Questionnaire (administered twice: IPAQ1, IPAQ2) versus the accelerometer, among adults (*n* = 267), Mexico, 2011

	Total		Males		Females		≤ 40 years		> 40 years	
	Mean (SD)[a]	Median (IQR)[b]	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
IPAQ1 vs. IPAQ2										
Moderate PA[c]	25 (376)	10 (105–150)	11 (400)	3 (–120–146)	41 (348)	15 (–105–155)	31 (396)	7.5 (–123–154)	14 (337)	15 (–65–130)
Vigorous PA	18 (168)	0 (0–60)	14 (183)	13 (–23–75)	23 (151)	0 (0–5)	25 (176)	0 (–11–64)	6.2 (152)	0 (0–20)
MVPA[d]	44 (408)	20 (–100–170)	24 (438)	20 (–100–181)	64 (376)	20 (–108–175)	57 (423)	20 (–104–209)	20 (379)	20 (–70–155)
IPAQ1 vs. accelerometer										
Moderate PA	110 (312)	21 (–98–213)	90 (308)	–1 (–112–177)	131 (316)	61 (–73–239)	112 (335)	4 (–117–240)	107 (267)	49 (–62–173)
Vigorous PA	64 (158)	6 (–6–88)	79 (154)	40 (–5–112)	47 (161)	0 (–8–40)	75 (171)	17 (–6–108)	43 (130)	0 (–7–63)
MVPA	174 (357)	93 (–59–281)	170 (362)	78 (–61–272)	178 (354)	97 (–53–289)	187 (375)	98 (–74–328)	150 (324)	68 (–34–250)
IPAQ2 vs. accelerometer										
Moderate PA	90 (309)	6 (–103–174)	90 (356)	–22 (–117–163)	89 (252)	17 (–87–177)	83 (317)	–2 (–115–175)	103 (294)	26 (–63–183)
Vigorous PA	45 (151)	0 (–11–60)	65 (191)	9 (–14–79)	24 (88)	0 (–8–21)	51 (149)	0 (–11–74)	35 (156)	0 (–13–29)
MVPA	135 (360)	37 (–99–112)	156 (433)	30 (–108–207)	113 (261)	44 (–76–221)	133 (369)	36 (–107–232)	138 (343)	48 (–56–202)

[a] Standard deviation.
[b] Interquartile range.
[c] Physical activity.
[d] Moderate-to-vigorous physical activity.

TABLE 4. Interclass correlation between physical activity as measured by the International Physical Activity Questionnaire (administered twice: IPAQ1, IPAQ2) and the accelerometer, among adults (*n* = 267), Mexico, 2011

	Total	Males	Females	≤ 40 years	> 40 years
IPAQ1 vs. IPAQ2					
Moderate PA[a]	0.49	0.39	0.56	0.46	0.54
Vigorous PA	0.50	0.31	0.56	0.48	0.48
MVPA	0.55	0.48	0.57	0.56	0.54
IPAQ1 vs. accelerometer					
Moderate PA	0.25	0.30	0.22	0.25	0.29
Vigorous PA	0.24	0.11[b]	0.15[b]	0.28	0.13[b]
MVPA	0.26	0.27	0.21	0.25	0.27
IPAQ2 vs. accelerometer					
Moderate PA	0.26	0.21	0.26	0.27	0.26
Vigorous PA	0.34	0.27	0.25	0.37	0.25
MVPA	0.31	0.22	0.32	0.33	0.27

[a] Physical activity.
[b] Not significant. All correlation values were statistically significant ($P < 0.05$) unless noted.

47.0%, 75.4%, and 82.4%. Table 5 provides the sensitivity and specificity values for IPAQ2.

DISCUSSION

The purpose of this study was to determine the test-retest reliability and validity of the short form IPAQ among Mexican adults. Key findings are that MVPA measures obtained from two IPAQ surveys are only modestly correlated ($r = 0.55$), and the values obtained from the second survey tended to be lower than those obtained from the first. Moreover, IPAQ measures of MVPA were poorly correlated ($r = 0.26$–0.31) and considerably higher (402 ± 369–359 ± 359 min/week) than those obtained by accelerometer. The specificity to correctly classify participants as inactive was acceptable (> 70%), whereas the sensitivity was low (< 30%).

The observation made by this study, that the MVPA values reported on two IPAQ surveys administered approximately 1 week apart are only modestly correlated ($r = 0.55$), is consistent with observations made by other authors who studied participants in a variety of settings and countries (16–19, 23, 24, 32–38). This result could be explained by the true differences in the MVPA levels from week to week (39), overestimation of the true MVPA due to an incorrect perception of activity, misinterpretation of the questions that led to measurement error in both IPAQ surveys (39), and/or the inability to correctly recall all activities performed when completing the surveys (39, 40).

The amount of MVPA reported on IPAQ2 was 12% lower than that reported on IPAQ1, and the prevalence of those in the active group decreased from 58.1% to 48.7%. Others have reported similar findings (41). It is possible that participants learned about MVPA when completing IPAQ1, and were subsequently more aware of and better able to report their MVPA for IPAQ2. These results suggest that caution should be used when classifying physical activity based on a single IPAQ, as is common practice in most large health surveys.

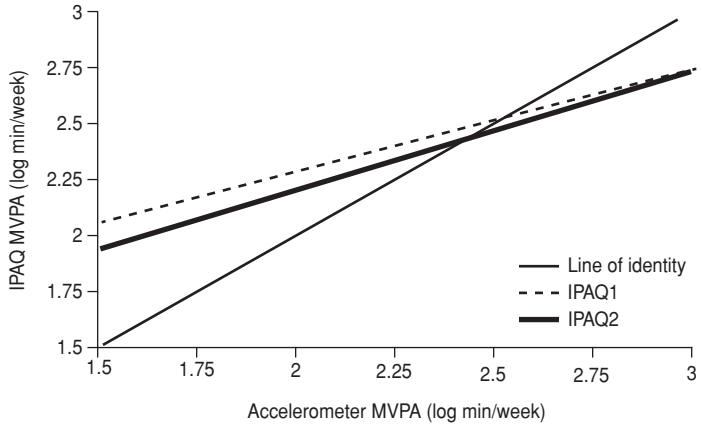
Although statistically significant, the correlations between the IPAQ and accelerometer MVPA measures were poor ($r \sim 0.30$). This result is consistent with the correlation ($r = 0.31$) reported by several authors based on their IPAQ validity studies conducted with 2 721 adults from 12 countries (16 –18, 35). In addition to being poorly correlated to the objective measures, the IPAQ MVPA measures were considerably higher (78% for IPAQ1, 59% for IPAQ2) than the accelerometer MVPA measures. This finding supports the well-documented observation that the IPAQ and other physical activity questionnaires overestimate physical activity (16, 18, 21, 35, 42, 43). Reasons that can explain these results include individuals over-perceiving (and subsequently over-reporting) MVPA, a social desirability bias, and the fact that accelerometers do not fully capture aspects of physical activity that are not step based/involve only upper-body movements. Indeed, carrying extra weight was one of the main activities performed by study participants in the factory, and this type of activity could not have been accurately captured by the accelerometers.

These study finding have important implications for the way physical activity is being measured and reported among the population in Mexico. The recently completed Mexican National Health and Nutrition Survey (ENSANUT 2012) (44) used the IPAQ to estimate physical activity levels. The IPAQ was administered on one occasion in face-to-face interviews with 11 228 adult participants. According to the ENSANUT 2012 results, 70.7% of Mexicans were classified as being active (44), compared to 29.4% measured by this study using an accelerometer. The findings of the present study suggest that ENSANUT 2012 participants over-reported their physical activity,

TABLE 5. Classification into three physical activity categories, and sensitivity and specificity of the International Physical Activity Questionnaire to identify inactivity, moderately active, and active participants (*n* = 267), Mexico, 2011

	Prevalence, %			Sensitivity			Specificity		
	Inactive	Moderately active	Active	Inactive	Moderately active	Active	Inactive	Moderately active	Active
IPAQ1	18.0	24.0	58.1	18.9	23.4	70.1	82.4	75.4	47.0
IPAQ2	25.1	26.2	48.7	35.1	20.7	61.0	78.7	69.5	56.7
Accelerometer	28.2	42.4	29.4	—	—	—	—	—	—

FIGURE 1. Log transformed to minutes-per-week of moderate-to-vigorous physical activity (MVPA). Differences between the International Physical Activity Questionnaire administered the first time (IPAQ1) and the second time (IPAQ2) and accelerometer (10-minute bout) for the total sample (*n* = 267) Mexico, 2011



and that the true prevalence of physical activity among Mexican adults is likely to be far less than that estimated by ENSANUT 2012.

The modest reliability and poor validity correlation values found by the present study suggest that there is considerable misclassification on self-reported physical activity. The implication that this misclassification has on the reported prevalence of physical activity/inactivity prevalence is obvious. This misclassification would also impact the ability to detect associations between physical activity and its determinants (e.g., gender, age, environment) and outcomes (e.g., obesity, hypertension). Specifically, misclassification of physical activity would lead to underreported associations (e.g., reported prevalence ratios weaker than true prevalence ratios).

Study limitations

A key limitation of this study was related to the fact that the sample was chosen by convenience. Because all the participants were employed, the sample was likely to be healthier than the general population, part of which is unemployed or unable to work due to existing health problems. A second limitation is related to the use of the accelerometers as the "gold standard" measure of MVPA for the validity comparisons. While objective, accelerometers are not perfect gauges of MVPA since they do not adequately capture some activities (e.g., pushing or pulling objects, carrying extra weight, water exercise) (31). Moreover, the accelerometer cut-points for categorizing the intensity of physical activity may be population-specific and not appropriate for Mexicans (45, 46).

Conclusions

In conclusion, among the Mexican population, the IPAQ has modest test-retest reliability and poor validity. Future studies in Mexico should consider employing objective measures of physical activity. Other countries, such as Canada (47) and the United States (48), have successfully used accelerometers in some of their national health measures surveys, and the feasibility of employing such technology in the ENSANUT should be examined.

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Conflicts of interest. None.

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Validez y fiabilidad del Cuestionario Internacional de Actividad Física en adultos de México

RESUMEN

Objetivo. Determinar la fiabilidad en aplicaciones repetidas (test-retest) y la validez de la versión abreviada en español del Cuestionario Internacional de Actividad Física (CIAF) en adultos de México.

Métodos. Se llevó a cabo un estudio transversal de una muestra de conveniencia de 267 adultos que trabajaban en una fábrica de la ciudad de México. Los participantes tenían de 19 a 68 años de edad; 48% eran mujeres. Los participantes llevaron un acelerómetro durante nueve días consecutivos y se les administró la versión abreviada en español del CIAF en dos ocasiones (CIAF1 y CIAF2, con un intervalo de nueve días). Se determinó la relación y las diferencias entre las mediciones de la actividad física de moderada a vigorosa (AFMV) obtenidas mediante el CIAF1, el CIAF2 y el acelerómetro usando análisis de correlación y regresión lineal, y pruebas de la t para datos emparejados.

Resultados. Las mediciones de la AFMV mediante el CIAF1 y el CIAF2 se correlacionaron significativamente entre sí (r = 0,55, P < 0,01). Sin embargo, en el CIAF1 se obtuvo una AFMV inferior a la del CIAF2 en 44 ± 408 minutos/semana, aunque esta diferencia no alcanzó significación estadística (P = 0,08). Las mediciones en minutos/semana del CIAF1 y el CIAF2 solo se correlacionaron moderadamente con las mediciones del acelerómetro (r = 0,26 y r = 0,31, P < 0,01) y, en comparación con las mediciones del acelerómetro, los valores de la AFMV fueron mayores cuando se basaron en el CIAF1 (174 ± 357min/semana, P < 0,01) que en el CIAF2 (135 ± 360 min/semana, P < 0.01). El porcentaje de participantes que se clasificaron como físicamente inactivos según las directrices de la Organización Mundial de la Salud fue de 18,0% mediante el CIAF1, de 25,1% mediante el CIAF2 y de 28,2% mediante el acelerómetro.

Conclusiones. De manera análoga a lo observado en otras poblaciones, la versión abreviada del CIAF presenta una fiabilidad moderada y una validez deficiente para evaluar la AFMV en adultos mexicanos.

Palabras clave Actividad motora; cuestionarios; autoinforme; equipos de medición; México.