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COPD in primary care: Towards simple prediction of quality of life, exacerbations and mortality

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CHAPTER 5

VALIDITY AND REPRODUCIBILITY OF A PHYSICAL ACTIVITY QUESTIONNAIRE FOR OLDER ADULTS

QUESTIONNAIRE VERSUS ACCELEROMETER FOR ASSESSING PHYSICAL ACTIVITY IN OLDER ADULTS

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Abstract

Background

Physical activity (PA) is important for older adults to maintain their functional ability. Assessing PA may be difficult. Few PA questionnaires have been compared to activity monitors. We examined reproducibility and validity of the self-administered LASA [Longitudinal Ageing Study Amsterdam] Physical Activity Questionnaire (LAPAQ) against a triaxial accelerometer (ACTR) in older adults.

Methods

Participants wore the ACTR (Sensewear® Pro) continuously for two weeks. After two (T=1) and four (T=2) weeks, participants completed LAPAQ. Since LAPAQ asks back two weeks, ACTR and LAPAQ coincided at T1. T2 was used for reproducibility of LAPAQ only. We calculated Pearson's correlation coefficients (PCC) to examine reproducibility and validity. For visualization, we used scatterplots and Bland-Altman plots. With a Receiver Operating Characteristics (ROC) curve we assessed how well LAPAQ identifies older adults whose activity level is below/above official recommendations.

Results

89 persons were included. 48% were men, median age was 72 and median BMI was 25. The two-week mean total duration of activity was 2,788 (ACTR, T=1), 2,439 (LAPAQ T=1) and 1,994 (LAPAQ T=2) minutes. As a reference, two full weeks contain 20,160 minutes. Reproducibility of LAPAQ was moderate (PCC 0.68, 95%CI 0.55-0.80). The median difference between LAPAQ at T=1 and the ACTR (LAPAQ minus ACTR) was -510 minutes and the PCC 0.25 (95%CI 0.07-0.44). The area under the ROC curve was 0.73 (95%CI 0.59-0.86).

Conclusions

LAPAQ underestimates PA and seems unsuitable for exact measurement in older adults. However, it may be used to determine if a person's PA level is below/above the recommended level.

Background

Physical activity (PA) is important to maintain health and functional ability, especially in older adults. It may also be an important predictor for the course of chronic diseases such as, for example, chronic obstructive pulmonary disease [1-3]. Several studies showed that lack of PA is a risk factor for the development of many chronic diseases [4-6]. Regular PA can play an important role in the prevention and management of cardiovascular disease, hypertension, diabetes and other chronic diseases [4]. Warburton et al found that there is strong evidence that regular PA is effective in the primary and secondary prevention of several chronic diseases and premature death [7]. The American College of Sports Medicine (ACSM) and The American Heart Association (AHA) have PA guidelines. The basic ACSM and AHA recommendations for people over 65 years of age are moderate exercise for at least 30 minutes a day, five days a week or vigorous exercise for at least 20 minutes a day, three days a week in combination with strength training exercises [8].

However, the assessment of PA remains difficult, especially in older adults [9-11]. A number of questionnaires have been validated to assess PA in older adults but all have several limitations. For example, the Zutphen Physical Activity Questionnaire does not include household activities, one of the main activities in older adults [12]. The Modified Baecke Questionnaire for Older Adults does not include walking and bicycling, common daily activities [13]. The International Physical Activity Questionnaire (IPAQ) includes walking and bicycling for transportation purposes and household activities but has only been validated among 18-65 year-old adults [14]. The Longitudinal Ageing Study Amsterdam Physical Activity Questionnaire (LAPAQ) was developed and validated keeping these limitations in mind but has, nevertheless, some limitations itself [15]. First, the questionnaire is interviewer-administered, which requires training and substantial resources for its application in practice and studies. A self-administered LAPAQ has been developed recently but has not undergone a validation process yet. Second, the LAPAQ was compared with a diary and pedometer as validation instruments. The diary, however, was not validated. The pedometer, a device that counts the number of steps, does also not represent an optimal way of measuring PA. Third, with regard to reproducibility, the LAPAQ was administered twice, one year apart. One year is probably too long to assess test-retest reliability because a person's PA pattern can change substantially in one year. Nevertheless, if LAPAQ turns out to have good measurement properties, it would facilitate practical PA assessment in older adults. Although, at face value, LAPAQ appears to be a promising tool to measure PA, uncertainty about its measurement properties remains.

Therefore, we examined reproducibility and validity of the self-administered LAPAQ, using a modern triaxial accelerometer as a validation instrument [16-19].

Methods

Setting, participants and design

All persons ≥ 65 years from one primary health care centre registered in the research network of the Department of General Practice of the University of Amsterdam in the Netherlands were identified through the electronic patient charts by the general practitioners (GP). Around 850 persons aged 65 years or older received study information and a written invitation letter from their GP to participate in the study. They were invited to return a reply card only if they were interested to participate. We contacted by phone around 150 potential participants, who had indicated their interest, and invited them for a first visit. For organizational reasons, we could only include a maximum of 100 participants. Inclusion criteria were Dutch language as native language and the ability to walk independently, with or without assistive devices. Exclusion criteria were dementia, psychosis or other psychiatric comorbidities that may invalidate the assessment of self-reported parameters such as the LAPAQ. These criteria were evaluated by GPs before invitations were sent and checked by study personnel at the first visit. During the first visit (T0) all potential participants received study information and written informed consent was obtained. Patient characteristics such as age, sex, body mass index (BMI; weight(kg)/height(m)2) and information about comorbidities were collected and elaborate instructions for wearing the accelerometer (ACTR) were given. Participants wore the ACTR (Sensewear® Pro) continuously for two weeks. After two (T=1) and four (T=2) weeks, participants completed LAPAQ. Since LAPAQ asks back two weeks, ACTR and LAPAQ coincided at T1. T2 was used for reproducibility of LAPAQ only. *Appendix Figure 5.1* contains a flow chart of the study. The study was approved of by the Medical Ethics Committee (MEC) of the Academic Medical Centre and was funded by the Dutch Asthma Foundation.

LAPAQ

The LAPAQ contains 18 questions, covering the frequency and duration of six activities during the previous two weeks: walking outside, bicycling, gardening, light and heavy household activities and sports activities. The participants were also asked if their physical activity pattern in the previous 2 weeks had been representative for the rest of the year. Stel and colleagues validated the interviewer administered LAPAQ and adjusted this original version to obtain a less time-consuming and more practical self-administered version [15]. First, some sentences were reformulated to improve comprehension. Second, only the 9 most common sports activities were mentioned in the new version. Third, questions about moving around in a wheelchair were omitted. Finally, the last question ('were the previous two weeks representative for the rest of the year' with answer possibilities 'Yes' and 'No, I did less because…') received an additional answer possibility ('No, I did more because…'). No changes with respect to the

Table 5.1. Intensity levels of LAPAQ activities

Activity	Intensity (METs)	MET category
Walking	2.5	2-2.99
General bicycling	4.0	3-5.99
Gardening	4.0	3-5.99
Sports		
Gymnastics	4.0	3-5.99
Hometrainer cycling	7.0	≥ 6
Cycling tour	8.0	≥ 6
Walking tour	6.0	≥ 6
Swimming	6.0	≥ 6
Badminton/tennis	7.0	≥ 6
Wintersports	7.0	≥ 6
Cardio-fitness	5.5	3-5.99
Light household activities	2.5	2-2.99
Heavy household activities	4.0	3-5.99

MET=Metabolic Equivalent Task

content of the questions were made and it is unlikely that the activity measurements are affected by the adjustments. *Appendix Figure 5.2* shows the self-administered LAPAQ that was used in this study. It takes 5-10 minutes to complete. The original LAPAQ is available in Dutch, German and English. Total duration scores can be measured for each activity and summing up the scores across all activities provides a total PA duration score (in minutes/2 weeks). The intensity for each activity can be expressed as Metabolic Equivalent Tasks (MET). One MET is defined as the ratio of work metabolic rate to a standard resting metabolic rate of 1.0 kilocalories per kilogram body weight per hour [20;21]. To compare the LAPAQ with the accelerometer, PA was classified into three MET-categories: 2-2.99 MET (mild PA), 3-5.99 MET (moderate PA) and ≥ 6 MET (vigorous PA). We translated LAPAQ-reported PA into MET-values using a compendium [20;21]. (*see Table 5.1*). According to the ACSM guidelines, cut-offs for different intensity levels are: 0-3 METs mild PA, 3-6 METs moderate PA, 6-9 METs vigorous PA and 9-12 METs very vigorous PA. The reason we use 2-2.99 instead of 0-3 and above 6 instead of 6-9 and 9-12 is that the PA intensity, as measured with LAPAQ, ranged from 2.5 to 8 METs.

Validation instrument

We used the Sensewear® Pro Armband Accelerometer (BodyMedia, Inc, Pittsburgh) from APC Cardiovascular as the reference, a device that was validated with dou-

bly labeled water and indirect calorimetry [16-19]. It is an ambulant body monitor system, which records the metabolic and physical activity continuously. It gives an exact overview of energy expenditure, duration (minutes) and intensity of daily activities (MET scores). The device is attached to the right upper arm with a band, is 88×56×21 mm and weighs 82 grams. Participants wore the device 24 hours a day (except when showering or swimming) for two weeks. The mean time that the device was actually worn was calculated. The software provided information about the time spent in the above mentioned MET-categories.

Statistical Analysis

Many studies use correlation coefficients (CC) for the validation of questionnaires but limitations of correlation coefficients are well documented in the literature [22]. For example, since CCs are dependent on the true between-subject variation in the given study population, extrapolating results to other populations can be misleading. And, since CCs are measures of association but not of agreement between a questionnaire and its reference criterion, CCs can not detect systematic errors. We calculated correlation coefficients but our primary interest was a comparison by graphically visualizing aspects of agreement in scatter plots and Bland Altman plots [23]. Difference scores and Pearson Correlation Coefficients (PCC) between LAPAQ and accelerometer (validity) and between the two LAPAQ measurements (reproducibility) were calculated for three intensity categories (2-2.99 METs, 3-5.99 METs and ≥ 6 METs). Usually Intraclass Correlation Coefficients (ICC) are used for measuring reproducibility. We used the PCC, which is related. A major difference is that the ICC centres and scales by a pooled mean and standard deviation (SD) while the PCC centres and scales by the mean and SD of each variable. Since the activity pattern may have been different in the second time period, we preferred the PCC. We used logistic regression and the area under the Receiver Operating Characteristics (ROC) curve to assess how well LAPAQ discriminates between persons whose activity level is or is not in accordance with ACSM and AHA recommendations. All statistical analyses were performed with Stata/SE 10.1 and SAS 9.2.

Results

Subject characteristics

During September and October 2010, a total of 92 subjects were recruited of which 3 were excluded because of PA scores on LAPAQ of 9,170 minutes and 14,280 minutes (highly improbable in 20,160 minutes [two weeks]) and even a score of 22,680 minutes. In addition, one LAPAQ at T=1 was missing and two LAPAQs at T=2 were missing. Thus, we had 86 complete records. Of the total of 89 included subjects, 48% were male, median age was 72 years, median BMI was 25. Participants actually wore the accelerometer on their body during 98.7 percent of the time (interquartile range from 97.8% to 99.2%). This percentage was mea-

Table 5.2. Subject characteristics (n=89)

Sex	
Male	43 (48.3)
Age	
Median, range	72.4, 65.4 - 87.6
BMI	
Median, range	25.0, 17.0 - 35.7
Number of diseases	
0	32 (35.9)
1	38 (42.7)
≥ 2	19 (21.3)
Cardiovascular disease	31 (34.8)
Musculoskeletal disease	17 (19.1)
Diabetes Mellitus	6 (6.7)
Neurologic; CVA/TIA	4 (4.5)
Respiratory disease	4 (4.5)
Malignancy	1 (1.1)
Other disease	14 (15.7)

- Unless otherwise specified, numbers are absolute numbers and percentages, n(%)
- BMI=Body Mass Index (weight(kg)/height(m)^2), CVA=Cerebrovascular Accident, TIA=Transient Ischemic Attack

sured as the actual on-body-time divided by the theoretically maximal on-body-time, which is 14 days. *Table 5.2* shows subject characteristics including their diseases; 36% did not report any disease, 43% reported one and 21% two or more diseases. Cardiovascular disease was reported most often (35%).

Table 5.3 shows mean, median and interquartile range of PA scores in each MET category for the accelerometer, LAPAQ at T=1 and LAPAQ at T=2. As a reference, two full weeks contain 20160 minutes (336h). According to the accelerometer our population spent around 14% of their time (2748/20160 minutes) on PA and 10% (2058/20160 minutes) was mild PA (walking and light house hold activities).

Reproducibility

For reproducibility analyses, LAPAQ scores at T=1 were compared with LAPAQ scores at T=2 (n=86). PCCs, mean and median difference scores for all cate-

Table 5.3. Descriptive statistics for duration of physical activity in minutes in two weeks

	Accelero meter	LAPAQ at T=1	LAPAQ at T=2
Number (n)	89	88	87
2-2.99 METs			
Mean (SD)	1892 (827)	1630 (1194)	1299 (1070)
Median	2058	1275	1050
p25/p75	1325/2433	720/2520	420/2000
3-5.99 METs			
Mean (SD)	865 (665)	630 (740)	539 (563)
Median	663	440	440
p25/p75	343/1178	105/840	60/850
≥ 6 METs			
Mean (SD)	32 (119)	180 (386)	160 (298)
Median	3	0	0
p25/p75	0/15	0/170	0/210
All METs (≥ 2)			
Mean (SD)	2788 (1265)	2439 (1678)	1994 (1367)
Median	2748	1945	1760
p25/p75	1902/3713	1230/3540	890/2820

- SD=standard deviation, p25/p75=25th and 75th percentile
- Note that, on average, scores were higher for accelerometer than for LAPAQ at T=1 and for LAPAQ at T=1 than for LAPAQ at T=2
- As a reference, two full weeks contain 20160 minutes
- MET=Metabolic Equivalent Task

gories are shown in *Table 5.4*. The PCC for total PA (≥ 2METs) was 0.68 (95% CI 0.55-0.80) and the mean and median difference (LAPAQ T=1 minus LAPAQ T=2) was 436 and 248 minutes respectively.

PCCs were also calculated for the 'representative' group (n=50), the persons who claimed that their PA pattern was stable (2x 'yes' on question 18 ("were the previous two weeks representative for the rest of the year?"). For this group (≥ 2MET), the PCC was 0.73 (95% CI 0.59-0.88) and for the 2-2.99 MET, 3-5.99 MET and ≥ 6 MET, the PCCs were 0.69 (95% CI 0.54-0.84), 0.81 (95% CI 0.69-0.93) and 0.81 (0.49-0.93) respectively. In the scatter plot in *Figure 5.1*, the regression line is less steep than the line of equality. In general, average LAPAQ scores at T=1 are higher than at T=2. The Bland-Altman plot shows again that

Table 5.4. Pearson correlation coefficients (PCC) and difference scores for all MET categories

	2-2.99 METs	3-5.99 METs	≥ 6 METs	All METs (≥ 2)
PCC LAPAQ T=1/T=2 (95% CI)	0.58 (0.42-0.72)	0.79 (0.69-0.88)	0.75 (0.47-0.87)	0.68 (0.55-0.80)
Mean difference score (SD) (LAPAQ T1 minus LAPAQ T2)	309 (1004)	102 (436)	23 (258)	436 (1260)
Median difference score (LAPAQ T1 minus LAPAQ T2)	70	0	0	248
PCC LAPAQ T=1/accelerometer (95% CI)	0.05 (-0.16-0.24)	0.27 (0.07-0.48)	0.01 (-0.07-0.25)	0.25 (0.07-0.44)
Mean difference score (SD) (LAPAQ T1 minus accelerometer)	-267 (1423)	-234 (852)	148 (403)	-354 (1830)
Median difference score (LAPAQ T1 minus accelerometer)	-363	-277	0	-510

• SD=standard deviation, 95% CI= 95% confidence interval
MET=Metabolic Equivalent Task

the higher the PA score, the larger the difference score between LAPAQ at T=1 and T=2, *see Figure 5.1*.

Validity

For validity analyses, accelerometer scores were compared with scores on LAPAQ at T=1 (n=88). PCCs, mean and median difference scores for all categories are shown in *Table 5.4*. PCC was 0.25 (95% CI 0.07-0.44) for total PA (≥ 2METs) and the mean and median difference (LAPAQ T=1 minus accelerometer) was -354 and -510 minutes respectively. In the scatter plot the regression line is less steep than the line of equality. Below 2000 minutes of PA, average LAPAQ scores are higher than average accelerometer scores but above approximately 2000 minutes of PA,
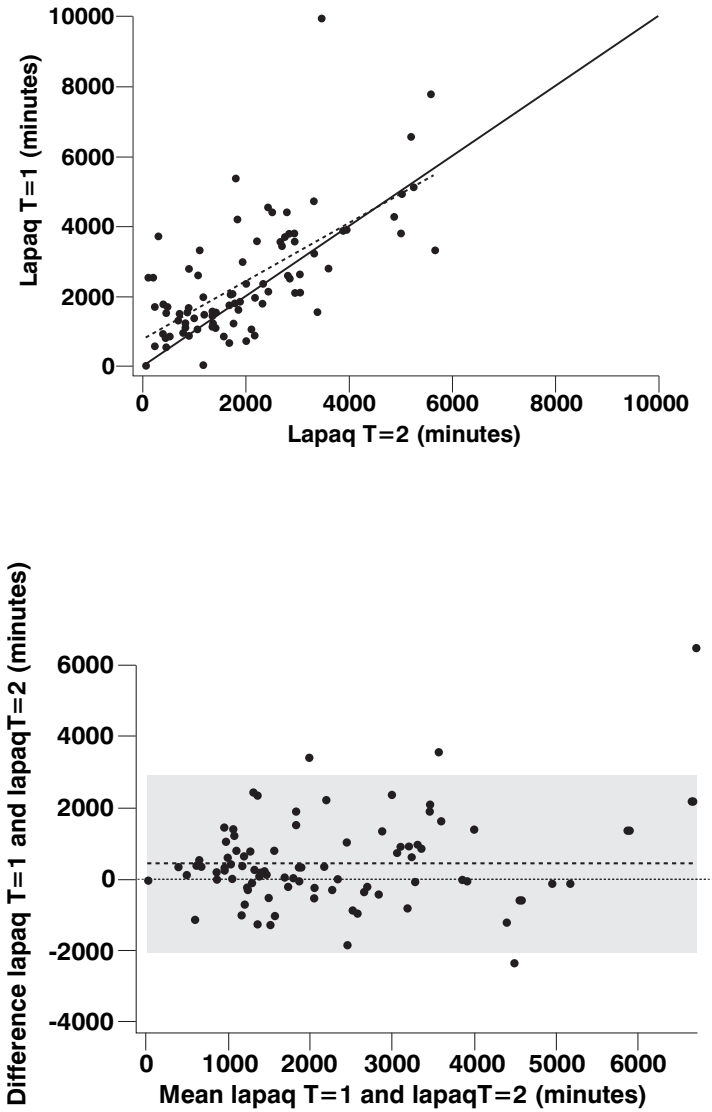
Figure 5.1. Scatter plot (upper panel) and Bland Altman plot (lower panel)
- Solid line=reference line (scatter plot: x=y and Bland-Altman plot: y=0)
- Dotted line=regression line
- Marked field=limits of agreement (± 2SD)
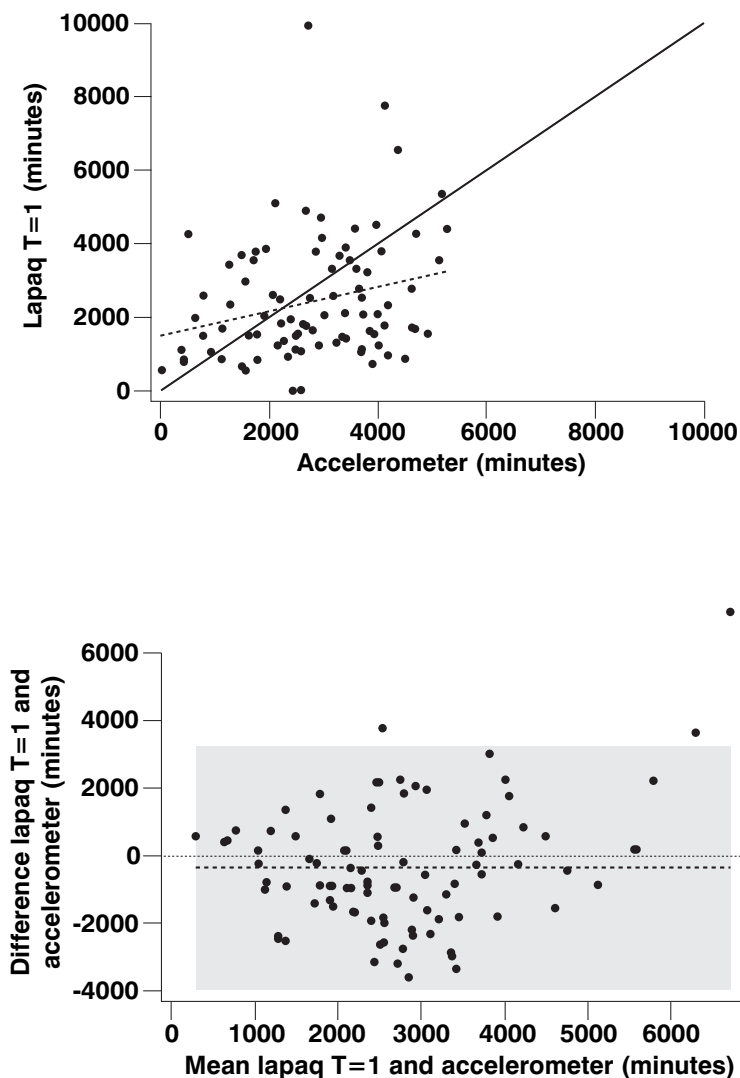- Bland-Altman plot: mean=(lapaq T=1 plus lapaq T=2)/2, difference=lapaq T=1 minus lapaq T=2

Figure 5.2. Scatter plot (upper panel) and Bland Altman plot (lower panel)
- Solid line=reference line (scatter plot: x=y and Bland-Altman plot: y=0)
- Dotted line=regression line
- Marked field=limits of agreement (±2SD)
- Bland-Altman plot: mean=(lapaq T=1 plus accelerometer)/2, difference=lapaq T=1 minus accelerometer
- Note that, in the scatterplot, subjects above the reference line overestimate their duration of PA on the lapaq compared to the accelerometer measurements, while subjects below this line underestimate their duration of PA on the lapaq

it is the other way around. The Bland-Altman plot shows much spread around the regression line and the range between the limits of agreement is wide, indicating measurement error in LAPAQ, *see Figure 5.2*.

The positive predictive value of LAPAQ (correctly predicting that PA levels are above the recommendation level) is 0.88 (46/52). The negative predictive value of LAPAQ (correctly predicting that PA levels are below the recommendation level) is 0.33 (12/36). The area under the ROC curve was 0.73 (95% CI 0.59-0.86).

Discussion

Due to moderate reproducibility and low validity, LAPAQ seems unsuitable for exact measurement of physical activity levels in older adults. Overall LAPAQ underestimates physical activity by 510 minutes (8.5 hours in two weeks, 36 minutes per day). But, for the highest MET-category (sports activities) the LAPAQ scores were higher than the accelerometer's. This may be explained by a simple example; when a person is playing tennis for 1 hour, (s)he might fill in "1 hour" on the LAPAQ questionnaire but the actual time on PA above 6 METs is obviously less than 1 hour. When we compared the two LAPAQ-measurements, scores at T=1 were higher than at T=2 with a median difference of 248 minutes (4 hours in two weeks, 18 minutes per day). This may be a systematic effect caused by participants being more active in the first two weeks because they knew that their activity was being measured by the accelerometer, the so-called 'Hawthorne effect' [24]. To avoid this, participants could have worn the accelerometer for 4 weeks instead of 2 weeks but this might have led to a high drop-out rate since most participants were happy to take off the ACTR after two weeks. If this explanation is true, the reproducibility of LAPAQ is better than we measured.

Although LAPAQ seems unsuitable for exact measurement of physical activity levels in older adults, a more modest aim is to determine if a person's activity level is above the ACSM and AHA recommendation level (moderate exercise for at least 30 minutes a day, five days a week (300 minutes ≥ 3METs in two weeks) or vigorous exercise for at least 20 minutes a day, for three days a week (120 minutes ≥ 6METs in two weeks). For this determination, the positive predictive value of LAPAQ is 88% and the negative predictive value is 33%. This means that LAPAQ incorrectly predicts a PA-level above the recommendation level in only 12%.

PA is important for older adults to maintain their health and functional ability. A number of questionnaires have been validated to assess physical activity in older adults but all of them have several limitations and most have not been compared to activity monitors. We compared the LAPAQ with the Sensewear, an ACTR that was validated with doubly labeled water and indirect calorimetry.[16;18] A second strength of our study is that ACTR and LAPAQ measurements

coincided at T=1, implying that the LAPAQ covered the same time interval as the ACTR. With regards to reproducibility, the LAPAQ was administered twice only two weeks apart. This is probably enough to avoid memory effects while at the same time ensure stability of activity levels. A drawback of wearing the ACTR only in the first two weeks is that it may have induced a Hawthorne effect, affecting our reproducibility measurements. A third strength of our study is that our population consisted of 89 persons with variable sex, age, BMI, and comorbidities and this enhances the robustness of our correlation measures. Neilson et al evaluated several validation studies of PA questionnaires and the largest study they found contained 80 subjects, women only [19]. They also found, with regard to our second strength, that in only 4 out of 36 studies the PA questionnaires covered exactly the same time period of activity as the validation instrument. Finally, a fourth strength of our study is the elaborate statistical approach. Ambiguity still exists about the appropriate statistical methods and interpretation of validation studies. In a systematic review of Schmidt and Steindorf, [22] the most common approach in validation studies is still the presentation of correlation coefficients (41 of 46 articles). However, the limitations of correlation coefficients are well documented in the literature [22;23]. The appropriate evaluation methods as recommended by Bland and Altman were found in only 10/46 publications. Schmidt and Steindorf showed that serious bias in questionnaires can be revealed by Bland-Altman plots but may remain undetected by correlation coefficients. In our study, correlation coefficients have been added for comparison with previous studies but our primary interest was comparison by graphically visualizing aspects of agreement in Bland Altman plots. A limitation of our study, as well as it is a strength, is limited sample size. Although it seems one of the largest studies in this field, we still face wide confidence intervals.
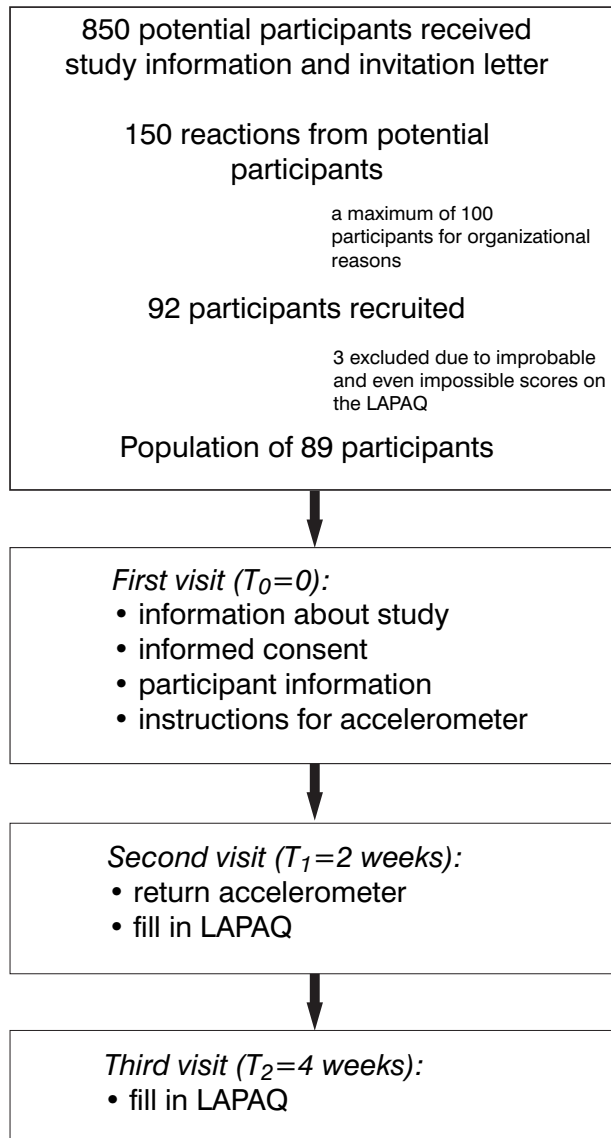
In conclusion, LAPAQ seems unsuitable for exact measurement of physical activity levels in older adults. However, LAPAQ is a fast and practical self-administered questionnaire that can be used in practice and in studies, for example to determine if a person's activity level is above the recommendation level of the ACSM and the AHA.

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APPENDIX CHAPTER 5

850 potential participants received
study information and invitation letter

150 reactions from potential
participants

a maximum of 100
participants for organizational
reasons

92 participants recruited

3 excluded due to improbable
and even impossible scores on
the LAPAQ

Population of 89 participants

First visit ($T_0=0$):
- information about study
- informed consent
- participant information
- instructions for accelerometer

Second visit ($T_1=2$ weeks):
- return accelerometer
- fill in LAPAQ

Third visit ($T_2=4$ weeks):
- fill in LAPAQ

Appendix Figure 5.1. flow chart of the study

1. Do you walk outside?
   Explanation: with walking outside we mean walking to go shopping or doing other daily activities, like visiting someone. We do not mean: a walking tour.
   ❏ No (go to question 4)
   ❏ Yes

2. How many times did you walk during the past two weeks?

   |__||__| Times in the past two weeks

3. How long did you usually walk each time?

   |__||__| Hours and |__||__| Minutes

4. Do you cycle?
   Explanation: with cycling we mean cycling to go shopping or doing other daily activities, like visiting someone. With cycling we do not mean: a cycling tour.
   ❏ No (go to question 7)
   ❏ Yes

5. How many times did you cycle during the past two weeks?
   |__||__| Times in the past two weeks

6. How long did you usually cycle each time?

   |__||__| Hours and |__||__| Minutes

7. Do you have a garden (including allotment)?
   ❏ No (go to question 10)
   ❏ Yes

8. How many times did you work in the garden during the past two weeks?

   |__||__| Times in the past two weeks

9. How long did you usually work in the garden each time?

   |__||__| Hours and |__||__| Minutes

10. Do you do sports?
    ❏ No (go to question 12)
    ❏ Yes

11. Which sports did you do during the past two weeks?
    Mark the sports that you did do during the past two weeks and fill in how many times and for how long each time you did those sports.

SPORTS	times in the past two weeks	Duration each time

    ❑ 1. Gymnastics |__||__| |__||__| Hours and |__||__| Min
    ❑ 2. Cycling on hometrainer |__||__| |__||__| Hours and |__||__| Min
    ❑ 3. Distance cycling |__||__| |__||__| Hours and |__||__| Min
    ❑ 4. Distance walking |__||__| |__||__| Hours and |__||__| Min
    ❑ 5. Swimming |__||__| |__||__| Hours and |__||__| Min
    ❑ 6. Tennis / Badminton |__||__| |__||__| Hours and |__||__| Min
    ❑ 7. Wintersports |__||__| |__||__| Hours and |__||__| Min
    ❑ 8. Cardio-fitness |__||__| |__||__| Hours and |__||__| Min
    ❑ 9. Other ………… |__||__| |__||__| Hours and |__||__| Min

12. Do you do light household tasks?
    Explanation: with light household tasks we mean washing the dishes, dusting, making the bed, doing the laundry, hanging out the laundry, ironing, tidying up and cooking meals.
    q No (go to question 15)
    q Yes

13. How many days did you do light household tasks during the past two weeks?

    |__||__| days in the past two weeks

14. How long did you usually do light household tasks each day?

    |__||__| Hours and |__||__| Minutes

15. Do you do heavy household tasks?
    Explanation: with heavy household tasks we mean window cleaning, changing the bed, beating the mat, vacuuming, washing or scrubbing the floor and chores with sawing, carpeting, repairing or painting.
    ❑ No (go to question 18)
    ❑ Yes

16. How many days did you do heavy household tasks during the past two weeks

    |__||__| days in the past two weeks

17. How long did you usually do heavy household tasks each day?

    |__||__| Hours and |__||__| Minutes

18. You just answered questions about your usual activities of the past two weeks.
    Were the past two weeks normal as compared to the rest of the past year?
    ❑ Yes (end of questionnaire)
    ❑ No, I did more because
      good weather
      bad weather
      holiday
      other: . …………………………….
    ❑ No, I did less because
      good weather
      bad weather
      holiday
      illness
      other: . …………………………….

Appendix Figure 5.2. LAPAQ