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To Identify and Compare ActivPAL Objectively Measured Activity Levels With Self-Reported Activity From the International Physical Activity Questionnaire in Older Adults With Intellectual Disability

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ABSTRACT

Background: The positive impact of physical activity on health is widely known. A comparison between activPAL objective measures and International Physical Activity Questionnaire short form (IPAQ-SF) self-reported activity levels was completed with older adults with intellectual disability. Understanding differences between the two methodologies will better support the interpretations of findings and recommendations.

Methods: ActivPAL measures including intensity, time and type were considered for 72 participants. Similarly, the IPAQ-determined measures were investigated. Implications of different numbers of activPAL valid days were considered. Comparisons between the activPAL and IPAQ-SF scores were examined using multiple correlation coefficients.

Results: Low to moderate agreement was found between the activPAL and IPAQ-SF using Spearman's Rho and Pearson's correlation coefficients.

Conclusions: The IPAQ-SF may not be the optimal tool for the accurate determination of activity levels in this population.

1 | Introduction

In the general population, the benefits of physical activity (PA) for all have long been researched: immediate benefits include the regulation of blood sugars, which is important in a population where diabetes is 1.5 times more prevalent, whereas longer term benefits include reduced risks of developing chronic diseases (Warburton, Nicol, and Bredin 2006; Cuypers et al. 2021; Jacob et al. 2023). General population studies have shown that physical inactivity was associated with a 20%–30% increased mortality risk (Kannel and Sorlie 1979; WHO 2022). Similar relationships were seen with adults with an intellectual disability where PA conferred lifestyle and overall health benefits such as reduced obesity levels, as well as reduced mortality (Diaz 2020; Oppewal, Maes-Festen, and Hilgenkamp 2020; St. John, Borschneck, and Cairney 2020). Activity intensity is also important. Higher intensity activity has been associated with better life expectancy even in those who had risk factors for cardiovascular disease (CVD) and a dose–response relationship was evident (Hoevenaars et al. 2023; Warburton, Nicol, and Bredin 2006). Most activity performed by adolescents with intellectual disability was at a low intensity level and over 90% of adults with intellectual disability did not meet minimum PA guidelines, at least 150 min of moderate or vigorous activity a week, compared to 25% of the general population (Dairo et al. 2016; Oppewal and Hilgenkamp 2019; WHO 2020; Zhu et al. 2020). Adults with intellectual disabilities age prematurely and die almost 20 years younger, compared to the general population, which is a concern especially considering the importance of physical activity and fitness for health (McCarron et al. 2015; Doyle et al. 2021).

Physical activity levels have been positively associated with improved motor competence, which is the ability to execute fundamental gross movement skills, e.g., jumping and throwing a ball (Stodden et al. 2008; Taylor et al. 2023). For people with an intellectual disability who are often unfit and have low motor competence, increased PA could have multiple benefits including quality of life, reduced mortality and functional capacity improvements, through improved motor competence (Carmeli et al. 2008; Diaz 2020; Farías-Valenzuela et al. 2022). Hence, it is critical that the activity levels are accurately determined so that appropriate interventions may be designed to achieve the associated health benefits.

Self-report is one of the predominant mechanisms used to assess PA in adults with intellectual disability, although recall accuracy has been questioned (Lynch et al. 2021). Although there will always be a place for subjective measurements especially in large population surveillance, the characteristic over-reporting of PA may restrict belief in results (Shoemaker et al. 2021). Furthermore, cognitive issues may impair self-report results (Finger et al. 2015). The aim of this study is to accurately determine the activity level of a cohort of older adults with intellectual disability, using an activPAL, an objective measurement tool, and to compare to self-reported activity levels using the IPAQ-SF questionnaire. The study's objectives are to:

- Determine the activity levels of a cohort of older adults with intellectual disability using both an activPAL objective measurement device and the IPAQ-SF self-report activity questionnaire.
- Compare the results of the two measurement tools.

The results will provide insight into the relationship between two assessment tools for the determination of activity levels for this vulnerable population.

2 | Method

Several relevant definitions for this article are explained below:

2.1 | Inactivity

Inactivity is when the minimum amount of activity as specified by the WHO, i.e., 150 min moderate intensity activity or 75 min vigorous intensity activity per week or a combination of both, is not achieved (WHO 2020).

2.2 | Cadence

Cadence is walking speed. It represents the number of steps per minute and hence the intensity. A cadence of > 100 represents moderate intensity physical activity and > 130 represents vigorous intensity physical activity in adults up to 60 years (Tudor-Locke et al. 2020).

2.3 | Metabolic Equivalent (MET)

A MET is a representation of activity level. It is the amount of energy burned by the body at rest and is the equivalent of 1 kcal/kg/h (Jetté et al. 1990). Ainsworth and colleagues propose METs as the basis for calculating PA intensities (Ainsworth et al. 2011). The three MET intensity levels of interest are mild (3.3METs), moderate (4METs), and vigorous (8METs) so that calculations may be made in line with the WHO recommendations (WHO 2020). The MET equivalent of the minimum WHO recommended activity level is 600–1200 METs/week of moderate, vigorous (or a combination of both) (MVPA) activity levels.

2.4 | Study Design and Participants

This is a cross-sectional study positioned within a longitudinal study (2019–2020), which researches the health and well-being of older adults with intellectual disabilities, with a view to promoting healthier aging. A nationally representative sample of adults aged over 40 years, of all levels of intellectual disability and living circumstances were invited to participate (McCarron et al. 2022). All participants with an intellectual disability who were registered on the country's national disability register, approximately 20,000, were eligible to partake, of which 739 participated in this study and 72 participants wore an activPAL (Health Research Board 2023). Ethical approval was obtained from the university and all service providers, who provide a range of day and residential respite services to people with intellectual disability, involved in the study. Written informed consent or proxy consent by carers who knew the participant more than 6 months was obtained from all participants. Easy read materials and consent forms were used to facilitate informed consent. Almost 32% of responses were proxy respondents with participants.

2.5 | Data Sources

There were two data sources for this study, a computer-assisted personal interview (CAPI) and the activPAL objective measure. The CAPI is a face-to-face interview with a trained researcher and the participant, and a proxy if required. The IPAQ-SF questionnaire was administered to participants as part of the CAPI interview. Separately, as part of a suite of 22 objective health measures, a miniature accelerometer, an activPAL device was offered to participants, to garner activity levels. If accepted, the activPAL was attached mid-thigh and requested to wear for 7 days and only removed for swimming or baths.

2.5.1 | IPAQ-SF Questionnaire

The IPAQ-SF, a 7-item questionnaire, is an international measurement tool based on a 7-day recall of any mild, moderate or vigorous PA level performed by people aged 15–69 years (Craig et al. 2003). The six IPAQ-SF questions used in this study determine the type, intensity and quantity of PA completed. Two questions were asked on each activity intensity to determine how many days per week and how much time per day was committed to each. Activities were classified into three intensity categories (mild, moderate and vigorous). The IPAQ-SF MET level for the three activity levels was calculated using the formula:

$$(\text{no of days doing activity}) \times (\text{no of minutes doing activity}) \times (\text{MET activity level}) = \text{IPAQ} - \text{SF METs}$$

The IPAQ-SF output variables investigated as part of this study were total METs and METs by two categories, less than and greater than/equal to 600, which represented being inactive or active (Ding et al. 2020).

2.5.2 | activPAL Device

The activPAL, a miniature accelerometer was used extensively in older populations and proved to be a reliable, convenient, user-friendly and accurate measure in large studies (Kozey-Keadle et al. 2011; Lyden et al. 2012; Alothman et al. 2022; Bellettiere et al. 2021; Carlson et al. 2021). The accurate measurement of activity intensity by the activPAL has been confirmed (Dowd, Harrington, and Donnelly 2012; Lyden et al. 2017). Although multiple variables were available from the activPAL, only those in common with the IPAQ-SF were used for this study: activity intensity level, as represented by cadence, and metabolic equivalents (METs) per day. The activPAL provides cadence information in four levels: <75 represents mild activity intensities, 75–100 represents mild to low intensity activity, >100 and up to 125 moderate intensity and >125 steps per minute represents vigorous intensity activity level.

2.5.3 | Valid Days

Generally, 3–4 days accelerometer wear is recommended for all populations, including those with intellectual disabilities (Healy et al. 2011; Migueles et al. 2017; Leung, Siebert, and Yun 2017). The comparison of this study's results using all activPAL valid day's data, compared to only three valid days showed negligible differences meaning that less days may be used to draw accurate conclusions. Similarly, 3 days wear was sufficient to accurately predict SB in older adults and those with less functional capability and only 1 day's measurement was found to be comparable to over 5 day's results (Matthews et al. 2008; Hart et al. 2011; Wolff-Hughes et al. 2016; Prescott et al. 2020).

2.5.4 | Statistical Procedure

Relationships were explored initially using ANOVA for normally distributed bivariate relationships and Kruskal–Wallis for the nonparametric relationships. Values of less than 0.05, to ensure 95% confidence in results, were used to identify significant associations.

The IPAQ-SF MET level for each activity type was manually calculated. The MET level was also evaluated by two categories, i.e., <600 and ≥ 600, which represented the WHO recommended minimum PA level of ≥ 150 min of MVPA per week for health (WHO 2020).

The strength and direction of the relationship between the activPAL and IPAQ-SF was explored using Spearman's Rho correlation coefficient and Pearson's correlation coefficient. Lastly a dataset was constructed with only the paired-samples ($n = 72$ of activPAL and IPAQ-SF original data) to facilitate a paired-sample *t*-test to investigate differences between measures. The effect size of the difference was evaluated with Cohen's d, where a small effect is represented by 0.2, a moderate by 0.5 and a large effect by 0.8 (Sullivan and Feinn 2012).

2.5.5 | Missing Data

Data imputation using Multiple Imputation Chained Equation (MICE) was completed on the IPAQ-SF METs data permitting up to 20% of missing data, to reduce bias and improve the model fit (Peng et al. 2006; Azur et al. 2011; Biering, Hjollund, and Frydenberg 2015). Appendix 1 shows the missingness for the relevant IPAQ-SF variables. The maximum level of missingness observed was 19.4%.

2.5.6 | Sample Size

A power analysis completed with six variables in the model indicated that 98 participants were necessary for a statistically significant result. However, the final MET model only had one variable which suggested a sample size of 58 was sufficient.

3 | Results

3.1 | Demographic Profile of Study Sample

Table 1 shows the demographic profile and sedentary level by step count of the 739 randomly selected study participants and the 72 activPAL participants. Slight differences in the demographic profile of activPAL participants compared to the overall study may be attributed to data collection ceasing prematurely in March 2020 due to the COVID-19 pandemic. More females (66.7% versus 53.5%), fewer with Down syndrome (13.9% versus 21.9%) and less with severe/profound intellectual disability (10.3% versus 27.9%) were represented here.

3.2 | ActivPAL Activity Descriptives

3.2.1 | Activity Descriptives Using activPAL Step Intensity

The activPAL outputs showed breakdowns of time in four intensity levels, as measured by the number of steps per minute (cadence). Table 2 summarises the time at each intensity level and maximum and minimum values. Activity was predominately in the mild to low intensity level.

TABLE 1 | Demographic profile of overall participants and those who engaged with ActivPAL and sedentary level as determined by activPAL step count (< or > 5000).

	Overall study		ActivPAL		Sedentary (< 5000 steps)		Not Sedentary (> 5000 steps)	
	n	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Total participants (N)	739		72		72		72	
Sex								
Male	344	46.5	24	33.3	13	54.2	11	45.8
Female	395	53.5	48	66.7	23	47.9	25	52.1
Down syndrome	145	21.9	10	13.9	4	40	6	60
Level of ID								
Level ID not verified	13	1.9	2	2.9	—	—	—	—
Mild	204	29.6	25	36.8	11	44	14	56
Moderate	293	42.5	34	50	17	50	17	50
Severe or profound	192	27.9	7	10.3	6	85.7	1	14.3
Age								
Age (< 50)	135	18.3	9	12.5				
Age(50–64)	407	55.1	40	55.6				
Age (< 65)	—	—	—	—	22	45.9	27	55.1
Age(65+)	197	26.7	23	31.9	14	60.9	9	39.1
Age years (min)	37	n/a	41	n/a				
Age years (Max)	89	n/a	87	n/a				
Age yrs.(Mean)	58.51 (SD ± 10.13)	n/a	60.57 (SD ± 9.6)	n/a				
Living circumstances								
Independent/Family	126	17.3	11	15.5	3	27.3	8	72.7
Community Group Home(CGH)	358	49	34	47.9	17	50	17	50
Residential care	246	33.7	26	36.6	16	61.5	10	38.5
BMI								
BMI: Underweight	11	1.8	0	0				
BMI: Normal	199	32.7	22	31				
BMI: Overweight/Obese	399	69.5	49	69				

Note: Missing obs: Living circumstances $n = 9$, level ID $n = 37$, BMI $n = 130$. activPAL missing: Living circumstances & BMI $n = 1$, level ID $n = 4$.

TABLE 2 | Summary of activPAL cadence classifications with time and steps in each.

		Steps				Time (mins)			
Activity classification	**Cadence**	**Mean**	**Min**	**Max**	**SD**	**Mean**	**Min**	**Max**	**SD**
Mild	< 75	1661	43	5573	±1237	30.1	1.1	102.7	±22.23
Mild/low activity	75–100	1854	2	4852	±1298	21.4	0	56.6	±14.9
Moderate	100–125	1319	1	8217	±1476	11.99	0	71.4	±13.1
Vigorous	> 125	205	0	2028	±457	1.58	0	16	±3.5

3.2.2 | Participant Activity Explored Using activPAL-Measured METs

The activPAL METs/day reported were consistent across participants, with a mean value of 32.5 (SD ± 1.6) METs. The maximum daily MET value observed was 37.1 and the minimum was 29.6. This was representative of activity in the sedentary or light activity range.

3.3 | Activity Type and Quantity as Examined by the IPAQ-SF

Table 3 shows the number of participants and the type and frequency of IPAQ-SF self-reported activity over the past 7 days. Most participants, almost 30% (n = 218/729), reported doing mild intensity activity 7 days per week.

The mean weekly calculated METs total for all IPAQ-SF activity was 916-METs, with a maximum value of 7290-METs (SD ± 1074) (n = 541). The mean weekly imputed METs was 901 with a range of 8 to 4599 (SD ± 937). Appendix 2 shows the comparison between the original and imputed dataset descriptives.

3.4 | Comparison of Activity as Measured by the activPAL and IPAQ-SF (N = 72)

Only information from the 72 people who wore the activPAL was compared to the IPAQ-SF self-report. A comparison of equivalent time in the three activity intensity levels of mild, moderate and vigorous and the respective results from the activPAL and IPAQ-SF is shown in Appendix 3. ActivPAL activity intensity was represented by the number of steps per minute and reflected in cadence level. The activPAL captured time in four cadence levels which equated to the three intensity levels available from the IPAQ-SF. Compared to the activPAL, the time spent in moderate intensity activity was overreported by 30% by the IPAQ-SF (17-min versus 12 measured by activPAL). Similar differences were seen with mild intensity activity time which was underreported by approximately 57% (22-min compared to 51 measured by activPAL) by participants. The biggest measurement difference seen was with time in vigorous activity where, compared to activPAL results, participants overreported vigorous activity time in the IPAQ-SF by almost 93% (23-min versus 1.6 measured by the activPAL).

3.4.1 | IPAQ-SF and activPAL Comparison Using MET Levels

The IPAQ-SF and activPAL MET levels were different measures and could not be directly compared. However, the availability of time in the three different activity intensity levels for the activPAL facilitated the manual calculation of activPAL MET values, where mild activity intensity was assumed to be equivalent to 3.3-METs, moderate activity 4-METs and vigorous activity 8-METs as per the IPAQ-SF calculations. Compared to the activPAL, mild intensity activity was underestimated by the IPAQ-SF by 57% (169.7 activPAL METs compared to 62.5 IPAQ-SF METs). Similarly, compared to the activPAL, the IPAQ-SF overestimated moderate activity by 30% (48 activPAL METS versus 69 IPAQ-SF METs) and vigorous activity by almost 83% (12.6 activPAL METs versus 72.6 IPAQ-SF METs).

3.4.2 | ActivPAL And IPAQ-SF Correlations Using Activity Intensity Time and METs Data

Measurements for the three activity intensity levels of mild, moderate and vigorous were compared for the two measurement techniques. Correlations using Spearman and Pearson were examined. Low-level significant correlations were observed with the IPAQ-SF and activPAL mild activity intensity time for Spearman and Pearson, see Table 4. Correlations for the imputed dataset were completed with the manually calculated activPAL total METs and total IPAQ-SF METs and showed significant low-level correlations for Pearson and Spearman. Similarly, correlations with the activPAL MET.h variable saw low significant correlations with Pearson and Spearman's rho, see Table 4. Comparisons were rerun using only the participants who had a minimum of three valid days. The results were unchanged.

TABLE 3 | Total study participants IPAQ self-reported PA type, quantity and frequency levels.

	Vigorous		Moderate		Walking/mild	
Exercise frequency	***n***	**%**	***n***	**%**	***n***	**%**
Total activity type[a]					505	68
1 day/week	19	2.6	61	8.3	17	2.3
2 days/week	7	0.9	50	6.8	54	7.3
3 days/week	6	0.8	39	5.3	53	7.2
4 days/week	3	0.4	22	3	45	6.1
5 days/week	3	0.4	56	7.6	89	12
6 days/week	0	0	9	1.2	29	3.9
7 days/week	3	0.4	61	8.3	218	29.5

[a]N = 739.

TABLE 4 | Correlations between activPAL and IPAQ times for three activity intensities and for imputed IPAQ total METS versus activPAL (manually calculated) total METs and activPAL MET/h.

	Intensity type						IPAQ & activPAL METs (manually calculated)		Imputed IPAQ METs & activPAL MET/h	
	Mild	*p*-value	Moderate	*p*-value	Vigorous	*p*-value	Co-efficient	*p*-value	Co-efficient	*p*-value
Spearman's rho	0.415	**0.002**	0.103	0.555	0.609	0.2	0.248	**0.036**	0.248	**0.035**
Pearson	0.369	**0.006**	0.055	0.753	0.72	0.106	0.377	**0.001**	0.346	**0.003**

3.4.3 | Paired Sample Analysis Between activPAL and IPAQ-SF Participants

Lastly, a paired-sample t-test was executed on the 58 participants who had paired-samples of activPAL and IPAQ-SF measurements for total METs. A significant result indicated that there was a difference between the total MET measures ($p < 0.001$). Cohen's *d* was used to calculate the effect size of this difference. A value of −0.798 for the total MET comparison indicated that the difference was moderately important (Sullivan and Feinn 2012).

In summary, a comprehensive comparison of the activPAL and IPAQ-SF activity time and MET results using two correlation coefficients showed that at best a low to moderate significant correlation existed between the activPAL and IPAQ-SF results. Significant differences between the measures were shown by a paired sample *t*-test, the effect size of which was deemed moderately important by Cohen's *d*.

4 | Discussion

This study on activity levels of older adults with intellectual disability comparing the objective activPAL and self-reported IPAQ-SF measurements is a convergent validation of the IPAQ-SF for this population and presents valuable insights about the measurement techniques. The average daily METs and the time spent in mild, moderate and vigorous activity intensities were used to compare the objectively measured activPAL and self-reported IPAQ-SF results. This study showed that compared to the activPAL, the IPAQ-SF overestimated moderate and vigorous activity levels by 30% and 83%, respectively, and underestimated mild intensity activity by almost 60%, in both the exercise minutes and MET measures. Similarly, a study which compared self-reported IPAQ-SF and objectively measured activPAL sitting time found that people underestimated self-reported sitting time by over two-hours/day and that there was very low correlation between the two sets of data (Chastin, Culhane, and Dall 2014). The results from another study also showed better agreement between activity logs and activPAL objectively measured sitting time, compared to IPAQ-SF determined sitting time and activPAL (Mailey et al. 2022). Furthermore, the IPAQ-SF overestimated PA levels in people with physical impairments and desk-based office workers (Veitch et al. 2020). The results here indicate that objective measures would be more accurate at capturing activity levels of older adults with an intellectual disability.

In this study, the activPAL objectively measured daily METs had a mean range of 29.6–37.2 METs/day, which was representative of activity in the sedentary/light activity range. A study which focussed on adults with intellectual disability confirmed MET levels were equivalent to those observed in this study (McKeon, Slevin, and Taggart 2013). The low MET levels displayed by the activPAL are indicative of the low intensities that activity is performed at by the participants in this study. Activity intensity should be a consideration when PA is prescribed because lower all-cause mortality was associated with higher moderate but particularly vigorous activity in the general population (Wang et al. 2021). In fact, only

5 min/day of MVPA has shown improvements in health and physical function in older adults in the general population (Spartano et al. 2019). The mean objectively measured MVPA time seen in this study was 11-min per day, but some people do no MVPA.

No significant relationships were seen between the activPAL and IPAQ-SF moderate and vigorous activity intensities which is reflective of the overestimation of higher intensity activity using the IPAQ-SF. However, the mild activity intensity level, which was underestimated by the IPAQ-SF compared to the activPAL, showed muted significant correlations. The imputed MET variable showed a significant but weak correlation with the activPAL data for Spearman's rho and Pearson. The literature shows at best a weak link between IPAQ-SF-determined activity levels and objective measures except when lower intensities were considered, and over-reporting of PA levels by the IPAQ-SF was common, which confirms the results seen here (Lee et al. 2011). Similarly, limited agreement was seen between proxy-completed questionnaires and objective measures in adults with intellectual disabilities including DS, which queries the validity of questionnaires to determine PA levels in this group (Matthews et al. 2011; Moss and Czyz 2018).

The activPAL-measured average time that people spent in mild and moderate intensity activities was 51-min/day and 12-min/day, respectively. Similarly, low intensity activity of an average cadence of < 100 steps per minute was observed in a Scottish intellectual disability study which also used an activPAL to objectively measure PA levels, where participants had a mild/moderate intellectual disability (Finlayson, Turner, and Granat 2011). A mean of < 2-min of vigorous activity/day was seen in this study which confirms observations from another study with a group with intellectual disability and determined that all activity was performed at lower intensities, with no vigorous intensity seen over the measurement period (McKeon, Slevin, and Taggart 2013). Generally, lower activity intensities as seen here are observed in the intellectual disability population which degrade as they age, as also seen in the general population, but PA interventions or training have the potential to reverse this trend (Woo et al. 2006).

The literature shows that people who are more active tend to wear accelerometers for longer periods, so fewer days may be a sufficient proxy to derive conclusions in a less active population without unnecessarily discarding data (Troiano et al. 2008). This concurred with results observed in this study where using all valid days gave equivalent results to using a larger number. The maximum number of valid days wear observed in this study was six and the minimum one. The consistently large inactivity levels observed in the literature for those with intellectual disability may explain the similar results seen using less valid days.

5 | Conclusion

This study identified and compared activPAL objectively measured activity levels with IPAQ-SF self-reported activity in older adults with intellectual disability. The activPAL objective measurement tool demonstrated the low levels of activity that were prevalent. All participants were classified as sedentary or low active and all activity was categorised at a low intensity. Weak but statistically significant agreement was observed between the activPAL and IPAQ-SF measurement tools. Compared to the activPAL, the IPAQ-SF overestimated moderate and vigorous activity time and underestimated mild activity time. The results here suggest that the IPAQ-SF is not the most optimal tool for the determination of activity levels of older adults with intellectual disability. Future research should use objective measurements of activity.

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Ethics Statement

Ethical approval was obtained from the Faculty of Health Sciences, Trinity College, Dublin and all service providers involved in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Appendix 1

Detailed Missingness Present in IPAQ Dependent and Independent Variables

	Count	Percent
Age	0	0.0
Sex	0	0.0
Aetiology	0	0.0
BMI	1	1.4
Living circumstances	1	1.4
Level ID	4	5.6
Tot IPAQ METs	14	19.4
Tot IPAQ Mins	14	19.4

Appendix 2

IPAQ Total Participants and ActivPal Original and Imputed Descriptive Statistics Compared

Dataset type	n	Mean	Minimum	Maximum	SD
Original	541	917	0	7290	± 1074.1
Original	72	903	8	4599	± 1024.6
Imputed	72	901	8	4599	± 937

Note: Descriptive statistics for the original and imputed IPAQ datasets for the 72 participants in comparison to the total participants who completed the IPAQ. Results for the 72 participants were equivalent except for a tighter standard deviation in the imputed data.

Appendix 3

Summary of ActivPAL and IPAQ Average Daily Activity Time in Minutes

Activity source & intensity	activPAL activity cadence	*n*	Minimum	Maximum	Mean	SD
IPAQ: Vigorous minutes	> 125	6	5	51.43	22.50	±19.55
activPAL vigorous minutes		0	0	16	1.58	±3.51
IPAQ: Moderate minutes	100 to 125	35	0.29	90	17.23	±17.90
activPAL moderate mins		72	0	71.4	11.99	±13.1
IPAQ Mild/ walking mins	< 75 & 75 to 100	55	0	120	21.96	±22.11
activPAL mild mins		72	1.1	130.1	51.43	±33.1