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Sedentary behaviour patterns in outpatients with severe mental illness: a cross-sectional study using objective and self-reported methods

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Abstract

This study aimed to quantify and compare sedentary behaviour patterns in patients with severe mental illness as stratified by gender, age, body mass index, distress, illness duration and antipsychotic medication using both objective and self-reported methods. Sedentary behaviour patterns were measured in 90 outpatients (mean age±SD: 41.6±9.2 years, 20% women) with severe mental illness (primarily schizophrenia, n= 63) using the SenseWear Armband and the Sedentary Behaviour Questionnaire. They spent 58% of waking time sedentary, primarily watching television. Differences between methods were not significant for the overall group or for stratified groups. Both methods showed significant correlation for weekday for the overall group. According to the stratified groups, youngers showed a significant correlation for weekday and average day sedentary time, and the high illness duration and low antipsychotic medication groups for weekday. Significant differences in sedentary behaviours between stratified groups were only detected with the SenseWear. Patients with severe mental illness had high levels of sedentary behaviours, with watching television being the most prevalently reported. We found a low validity in the self-reported estimates of sedentary time by this population, being higher on weekdays for the overall group and for the younger, high illness duration and low antipsychotic medication groups.

List of abbreviations:

BMI = Body mass index; SBQ = Sedentary Behaviour Questionnaire; SWA = SenseWear Armband

Keywords: Severe Mental Disorders; Measurement; Activity Monitoring; Sedentary Lifestyle, Surveys and Questionnaires; Outcome Assessment; Health Behaviour

1. Introduction

Sedentary behaviour is defined as any waking activity characterized by an energy expenditure ≤1.5 metabolic equivalents while in a sitting or reclining posture (Sedentary Behaviour Research, 2012). High levels of sedentary behaviour are associated with an increased risk of morbidity and all-cause mortality independently of a lack of physical activity in the general population (Biswas et al., 2015). A recent meta-analysis found that patients with severe mental illness engaged in significantly more sedentary behaviour than did the general population (Stubbs et al., 2016b). Considering the high levels of cardiometabolic abnormalities (Vancampfort et al., 2016a; Vancampfort et al., 2015) and the negative impacts of sedentary behaviour in patients with severe mental illness such as increased inflammation (Stubbs et al., 2015) and impaired cognition (Stubbs et al., 2016a), reducing excessive sedentary behaviour represents an important strategy for maintaining health in this population.

A key factor for improving our understanding of the impact of sedentary behaviour on the health of patients with severe mental illness and the effectiveness of interventions aimed to reduce sedentary time is to use objective and self-reported methods for accurately quantifying sedentary behaviour patterns. Few studies have objectively measured sedentary in patients with severe mental illness, and all studies used accelerometers (e.g., (Janney et al., 2013; Lindamer et al., 2008; Stubbs et al., 2016a)) except for two small-sample studies (Leutwyler et al., 2014; Vancampfort et al., 2016d) which employed multisensor armbands; however, both studies made an important conceptual mistake in considering sleep as a sedentary behaviour (Sedentary Behaviour Research, 2012). Other studies utilized self-report measures (Schuch et al., 2017; Stubbs et al., 2016b; Vancampfort et al., 2016b), but only two employed domain-specific questionnaires to measure sedentary behaviours (Chapman et al., 2016; Fraser et al., 2016). Self-report measures of specific sedentary behaviours (e.g., watching television) can provide useful information to identify high-risk sedentary behaviours. Nevertheless, there is no domain-specific sedentary behaviour questionnaire that has been validated in patients with severe mental illness (Soundy et al., 2014). Thus, the validation of domain-specific sedentary behaviour questionnaires in this population is urgently needed.

The identification of high-sedentary behaviour subgroups and the factors that influence the suitability of sedentary behaviour questionnaires are of clinical and public health interest and may inform potential interventions for reducing sedentary time among patients with severe mental illness. The validity of sedentary behaviour questionnaires in these patients stratified by gender, age, body mass index (BMI),

level of distress, illness duration and antipsychotic medication use subgroups and the ability of objective and self-reported measurement methods to distinguish between sedentary time levels remain unexplored.

The aim of this study was to quantify and compare the sedentary behaviour patterns in patients with severe mental illness stratified by gender, age, BMI, distress, illness duration and use of antipsychotic medication using both objective and self-reported methods. We also investigated if objective and self-reported methods can identify differences between stratified groups in the amount of time spent in sedentary activities.

2. Methods

2.1. Participants and procedures

This was a cross-sectional study. A convenience sample of patients with severe mental illness was recruited from 13 different outpatient mental healthcare settings in Southern Spain. Patients with a range of ICD-10 diagnosis (see Table 1) established by experienced psychiatrists were included if they aged 18 years or older and were stable on antipsychotic medication during the last month. Patients were excluded if they had clinical instability, co-morbid substance abuse and evidence of uncontrolled cardiovascular, neuromuscular and endocrine disorders. Patients were asked to wear a multisensor armband for 9 consecutive days, starting the same day they received the monitor. At day 9, patients returned the monitor to the researchers and completed a domain-specific sedentary standardized questionnaire. Subsequently, distress level, height and weight were assessed. The study procedure was approved by The Universidad Pablo de Olavide Ethics Committee. All patients gave their informed written consent prior to enrolling in the study and after receiving information about the aims and protocol. There was no compensation for participation in the study.

2.2. Measures

The multisensor SenseWear Pro3 Armband (SWA; BodyMedia Inc., Pittsburgh, PA, USA), was used to objectively assess sedentary behaviour that involves any activity characterized by an energy expenditure ≤1.5 metabolic equivalents during waking hours. Energy expenditure was estimated combining data recorded from multiple sensors (a two-axis accelerometer and sensors measuring heat flux, galvanic skin and near body-temperature) and using specific algorithms developed by the manufacturer (SenseWear Professional software, version 8.1). The SWA has been shown to accurately estimate energy expenditure (Johannsen et al., 2010) and was previously used to measure sedentary behaviour in non-clinical (Barone Gibbs et al., 2016) and clinical populations (Bond et al., 2013). Patients were required to wear the SWA on their left arm triceps muscle, over the whole day (24 hours), for 9 consecutive days, except when

showering or swimming. The first and last days were excluded from the analysis to minimize Hawthorne effect (Corder et al., 2008). A total of 7 days of recording with a minimum of 1368 minutes of registration per day (95% of a 24-hour period) was necessary to be included in the study analysis.

Self-reported sedentary behaviour was measured using the Spanish version (Munguia-Izquierdo et al., 2013) of Sedentary Behaviour Questionnaire (SBQ) (Rosenberg et al., 2010). The SBQ asks about amount of time spent doing 11 sedentary behaviours (specified in Table 1) of a usual weekday and weekend day. Time in hours of each behaviour were summed separately for weekdays and weekend days, and time for an average day was calculated as (weekday hours ×5 + weekend day hours × 2)/7. Patients with more than 18 hours/day reported by the SBQ were excluded as previously done (Van Cauwenberg et al., 2015). The SBQ shown acceptable measurement properties in overweight adults (Rosenberg et al., 2010) and in Spanish patients with fibromyalgia (Munguia-Izquierdo et al., 2013).

Distress in the previous week was assessed using the Spanish version (Andreu et al., 2008) of the Brief Symptoms Inventory-18 (Derogatis, 2001), which has demonstrated satisfactory psychometric properties in outpatients with severe mental illness (Andreu et al., 2008). Scores range from 0-72, with higher scores indicating a higher level of distress.

Weight and height (used to derive BMI) were measured following standard procedures with a scale (TANITA BC-420; Tanita, Tokyo, Japan) and a wall-mounted stadiometer, respectively.

Age, diagnoses, illness duration and antipsychotic medication were retrieved from patient's medical records. Antipsychotic medication was converted into a daily equivalent dosage of chlorpromazine (Gardner et al., 2010).

2.3. Statistical analysis

The characteristics of patients who completed the SWA, SBQ and both the SWA and SBQ with valid data sets were compared with either a one-way ANOVA with Bonferroni corrections or with chi-squared tests. However, only patients who completed both measures with complete, valid data sets were included in final analysis. Patients were classified as either non-obese (BMI <30) or obese (BMI ≥30), and into groups according to high or low levels of age, distress, illness duration, and chlorpromazine equivalent dose low levels of age, distress, illness duration, and chlorpromazine equivalent dose using a median split procedure. Due to non-normality in data distribution, log-transformed data of sedentary time was used for analyses. Systematic differences between methods were calculated by means of paired t-test. Concordance between methods was studied with Concordance correlation coefficient (Lin, 1989). Pearson's correlation coefficient was used as additional information to compare to existing validity studies for sedentary behaviour questionnaires. Agreement between methods was assessed using Bland-Altmant plots (Bland

and Altman, 1986) including the 95% levels of agreement. The association between the difference and the magnitude of the measurement was examined by regression analysis. Differences between weekday and weekend sedentary time were estimated with one-way ANOVA repeated measures. Differences between groups in the amount of time spent in sedentary activities were analysed with a one-way ANOVA. Time required to complete the SBQ was recorded and floor and ceiling effect were calculated. Data were analyzed using SPSS Statistics for Windows, Version 22.0 (Armonk, NY: IBM Corp) with statistical significance set at $P<0.05$.

3. Results

Of the 124 patients who provided written consent, 103 (83%) and 104 (84%) completed the SWA and SBQ with valid datasets, respectively. Reasons for invalid SWA data included refusal to wear the SWA (n=4), unregistered data attributed to technical problems (n=5) and unmet wear-time criteria (n=12). Reasons for invalid SBQ data included refusal to fill out the SBQ (n=3), incomplete questionnaire (n=4) and more than 18 hours/day of sedentary time reported (n=13; one of them reported more than 24 hours/day). Finally, the characteristics of the 90 patients (73%) who fulfilled both SWA and SBQ requirements are summarized in Table 1. A comparison of patients who completed the SWA, SBQ and both SWA and SBQ with valid datasets showed no significant differences in any variable (data not shown).

Across all days, sitting while eating and watching television were the most frequently reported behaviours. The five most frequently reported behaviours accounted 70% of the total self-reported daily sedentary time. The least frequently reported sedentary behaviour was playing a musical instrument. The behaviour with the highest reported amount of sedentary time was watching television. A total of 27% of patients reported spending more than 3 hours per day watching television. The behaviour with the lowest reported amount of sedentary time was playing a musical instrument (Table 1). The mean time required to complete the SBQ was 6.5 (SD=3.9) minutes per patient (range 1-20 minutes), and no floor (0%) or ceiling (1%) effects were observed.

The SBQ slightly overestimated the amount of sedentary time (from 5% to 8% for weekdays, weekend days, and an average day) compared to the SWA, but the differences between measures were not significant. The SBQ and SWA data showed a low but significant correlation with one another for weekday sedentary time (r=0.21, P=0.044), and a borderline significant trend in average day sedentary time (r=0.20, P=0.053) for the total sample (Table 2). The Bland-Altman plots and the wide limits of agreement between the SBQ and SWA measurements for weekdays (8.37, -6.82), weekend days (9.44, -8.53) and average day sedentary time (8.23, -6.89) are shown in Fig. 1. There was no association between

the difference and the magnitude of the SBQ and SWA measurements for weekday, weekend day, and average day sedentary time. According to stratified groups, no significant differences in sedentary time between the measures were found for weekdays, weekend days, and average day. The younger group showed significant correlation coefficients for weekday and average day sedentary time (all $P<0.05$). High illness duration and low antipsychotic medication groups showed significant correlation coefficients for weekday sedentary time (both $P<0.05$) (Table 2).

Table 3 summarizes sedentary time data according to the SWA and SBQ by gender, age, BMI, distress, illness duration and antipsychotic medication. No differences between weekday and weekend day total sedentary time were found, except for those with low distress who spent more time on sedentary activities on weekend days ($P=0.034$). Obese and high distress groups showed greater weekday and average day sedentary time than did their respective counterparts (all $P<0.05$). These significant differences were only encountered using the SWA.

Additional analysis that included only schizophrenia patients showed no significant differences between measures and no significant differences between weekday and weekend day sedentary time according to the SWA and SBQ; however, significant correlations were found among weekday, weekend day, and average day sedentary time (r values, 0.31, 0.25 and 0.32, respectively; all $P<0.05$; data not shown).

4. Discussion

4.1. General findings

This is the first study to quantify and compare sedentary behaviour patterns using the SWA and a standardized domain-specific sedentary behaviour questionnaire among patients with severe mental illness; it is also the first study to evaluate if objective and self-reported methods can identify differences in the amount of time spent in sedentary activities in this population. The findings indicate that the questionnaire presents low validity but acceptable agreement at the group level when compared against sedentary time data from the SWA. This questionnaire may, therefore, be appropriate for identifying high-risk sedentary behaviours and quantifying sedentary behaviour patterns in large-scale studies of patients with severe mental illnesses; additionally, this questionnaire requires little time for completion and does not exhibit floor or ceiling effects (Terwee et al., 2007). However, our results also suggest that the SWA, but not the questionnaire, can identify differences between groups in the amount of time spent in sedentary activities.

In the present study, objective measurement showed that patients spent 58% of their waking time engaged in sedentary behaviours. These findings are similar to those reported by a previous study in outpatients with severe mental illnesses (Chapman et al., 2016; Lindamer et al., 2008). However, another study found

that outpatients with schizophrenia spent an average of 81% of their waking time in sedentary activities (Janney et al., 2013). The different diagnoses of patients in these studies may have contributed to these differences in their respective data. The SBQ provides information regarding specific sedentary behaviours of patients with severe mental illnesses. The five most frequently reported behaviours accounted for 70% of the total self-reported daily sedentary time. One of the most prevalent and frequently reported behaviours was watching television. This is an important finding as excessive television viewing is associated with adverse health effects (Biswas et al., 2015). Nearly a quarter of our patients reported spend more than 3 hours per day viewing television, a behaviour that was found by a recent meta-analysis (Grontved and Hu, 2011) to increase the relative risk of all-cause mortality. Consequently, watching television may be an important modifiable behaviour for reducing total sedentary time in patients with severe mental illness.

Our finding that the questionnaire slightly overestimated the amount of time spent in sedentary behaviour compared with that found by the objective measure is consistent with the findings of a recent study (Chapman et al., 2016) but was inconsistent with three meta-analyses among patients with severe mental illness (Schuch et al., 2017; Stubbs et al., 2016b; Vancampfort et al., 2016b). These discrepancies may be because the three meta-analyses included studies that measured sedentary behaviour with either an objective or a self-report measure and thereby compared objective and self-reported sedentary time data from different samples with each other. Therefore, more research that combines both objective and self-reported sedentary behaviour assessment methods in patients with severe mental illness are needed before any firm conclusion can be made.

The present study showed no differences in sedentary behaviour time between measures; however, it did show a low but significant correlation between measures except weekend days, suggesting that the SBQ may be more suitable for weekday use. When analysing only the data gathered from patients with schizophrenia, a significant correlation for weekend days was found, although the correlation coefficient was lower for weekend days than for weekdays. Consistent with a study that used the same measurement tools in other clinical populations (Bond et al., 2013), these findings may be explained by the less structured nature of weekend activities that may make them more difficult to recall than weekday activities. One potential reason for the low relationship between measurement methods might be that patients with severe mental illness have difficulties recalling sedentary time (Chapman et al., 2015; Soundy et al., 2014), partly due to cognitive impairments (Hill et al., 2013), which are even more pronounced in patients who are more sedentary (Stubbs et al., 2016a). In addition, the small mean differences and the wide limits of agreement between the two measurement methods suggests that the SBQ may be most appropriate for quantifying sedentary behaviour patterns in large-scale studies of

patients with severe mental illness, rather than for studies requiring accurate estimates at an individual level, concurring with previous studies using the same measurement tools and similar methodologies in other populations (Bond et al., 2013; Munguia-Izquierdo et al., 2013).

In contrast to our results, the aforementioned study (Chapman et al., 2016) found that self-reported sedentary time was significantly higher than objectively measured sedentary time and that the two were not significantly correlated. The conflicting results with this study may be because they employed different self-reported and objective measurement tools of sedentary behaviour. The previous study used a non-standardized domain-specific questionnaire with fewer types of sedentary behaviour than measured by the SBQ that might not have accurately captured data regarding sedentary time. Furthermore, the authors of that study used accelerometers as an objective indirect estimation of sedentary behaviour by measuring periods of reduced movement during waking hours identified from diaries and with accelerometer consecutive zero counts ≥60 minutes, which could misclassify sedentary time. However, considering sedentary behaviour as the absence of whole-body movement is an error (Sedentary Behaviour Research, 2012) and, therefore, the use of an accelerometer for measuring sedentary behaviour may be questioned. We use the SWA to identify sedentary behaviour according to energy expenditure (≤1.5 metabolic equivalents) during waking hours through multiple sensors.

According to stratified groups, the younger group showed a significantly higher correlation coefficient between self-report and objective measurement methods for weekday and average day sedentary time than did their counterparts in the older age group, demonstrating higher levels of validity between the measurement methods. Consistent with other studies (Ferrari et al., 2007), these results indicate that younger participants have fewer difficulties accurately reporting their sedentary behaviour levels. Low antipsychotic medication and high illness duration groups showed significant and higher correlation coefficients for weekdays than did their counterparts. The finding that lower doses of antipsychotic medication correlated with more accurate recall of sedentary behaviour could be expected because low doses are associated with high cognitive functioning (Elie et al., 2010) that can facilitate recall; the result of high illness duration correlated with more accurate recall may be explained by a higher awareness of sedentary behaviour patterns over the course of their illness due to more structured daily activities that are easier to report. Further studies should confirm whether illness duration influences the validity of sedentary behaviour questionnaires across patients with severe mental illness.

Although significant differences in sedentary behaviour were only found in those with lower levels of distress, time spent in sedentary behaviour tended to be higher on weekend days than on weekdays, consistent with previous studies in patients with severe mental illness (Yanos and Robilotta, 2011) and in the general population (Burton et al., 2012). The present study also found significant differences in

sedentary behaviour between groups stratified by BMI and levels of distress, agreeing with other studies in patients with severe mental illness (Vancampfort et al., 2012; Vancampfort et al., 2016c) and in the general population (Kikuchi et al., 2014). This finding highlights that these groups may have an increased risk for engaging in high levels of sedentary behaviours. Significant differences were only encountered using the SWA, indicating that the SBQ failed to identify differences in the amount of time spent in sedentary activities by patients with severe mental illness. However, our study suggests that the use of both tools may be appropriate to obtain assessments of total sedentary time, as well as time spent in specific behaviours such as sitting and lying.

4.2. Study limitations and strengths

A limitation of the present study is that it included a convenience sample of diagnostically heterogeneous patients with severe mental illnesses that were predominantly men. This limitation may affect the ability of these findings to be generalized to other groups. Future research should use samples of patients who are diagnostically homogeneous and determine whether results are also applicable to women. Another limitation is that the current study was cross-sectional in design. Longitudinal studies are needed to identify any casual relationships and to examine the responsiveness to change of objective and self-reported measures of sedentary behaviour patterns. The absence of a control group without severe mental illness in our study is an additional limitation. The objective sedentary measurement utilized in this study also has its limitations. The SWA is unable to differentiate body position (i.e., sitting, lying, and standing). However, it may solve the main limitations of accelerometers and inclinometers through heat production measurements, differentiating between sleep and waking time, and placement on the upper arm. Future studies using the SWA and inclinometers simultaneously would be an interesting method to objectively measure sedentary behaviour.

Despite these limitations, the present study has several strengths. The main strength of our study is the strict criteria used in measuring sedentary time. All patients wore the SWA during 7 consecutive days with at least 1368 minutes/day of registered time, and the Hawthorne effect was minimized. Although the minimum wear-time was the most exigent of the criteria applied in this population, few patients were excluded by invalid or incomplete SWA data (17% of sample recruited). Taking into account that the SBQ showed a similar amount of invalid or incomplete data, its quick administration and lack of floor and ceiling effects, our study demonstrates the feasibility of using both objective and self-report methods for measuring sedentary behaviour patterns in patients with severe mental illness. The examination of a sedentary behaviour questionnaire that included an extensive list of specific sedentary behaviours, is another strength. However, to minimize the patient burden and shorten the completion time, we do suggest

refining the SBQ further to remove or combine certain questions that had very few responses (e.g., playing a musical instrument).

4.3. Clinical implications

The present study could help to increase health professionals' knowledge of the impact of sedentary behaviour on the health of patients with severe mental illness. It provides a valid, inexpensive, quick and easy to administer tool to assess sedentary behaviour patterns in large-scale studies of this population, primarily in patients with schizophrenia. However, the current findings suggest that the SBQ should be used with caution, particularly when the aim is to calculate an accurate and global measure of sedentary behaviour in patients with severe mental illnesses.

5. Conclusions

Patients with severe mental illness spent more than a half of their waking hours engaged in sedentary behaviours, with watching television being the most reported sedentary activity. We found a low validity of self-reported estimates sedentary time in patients with severe mental illness, although the validity of self-reported estimates was higher on weekdays than on weekend days. According to the stratified groups, we found higher validity among younger patients, those with higher illness duration and those with low antipsychotic medication use than their respective counterparts. The questionnaire utilized can be appropriate for identifying high-risk sedentary behaviours and for quantifying sedentary behaviour patterns in large-scale studies of patients with severe mental illness; additionally, it required little time for completion and did not exhibit floor or ceiling effects. However, the objective measurement method, but not the questionnaire, can identify differences in the amount of time spent in sedentary activities between groups. Therefore, objective and self-reported sedentary measurements are complementary tools to assess sedentary behaviour in patients with severe mental illness.

Conflict of interest

None.

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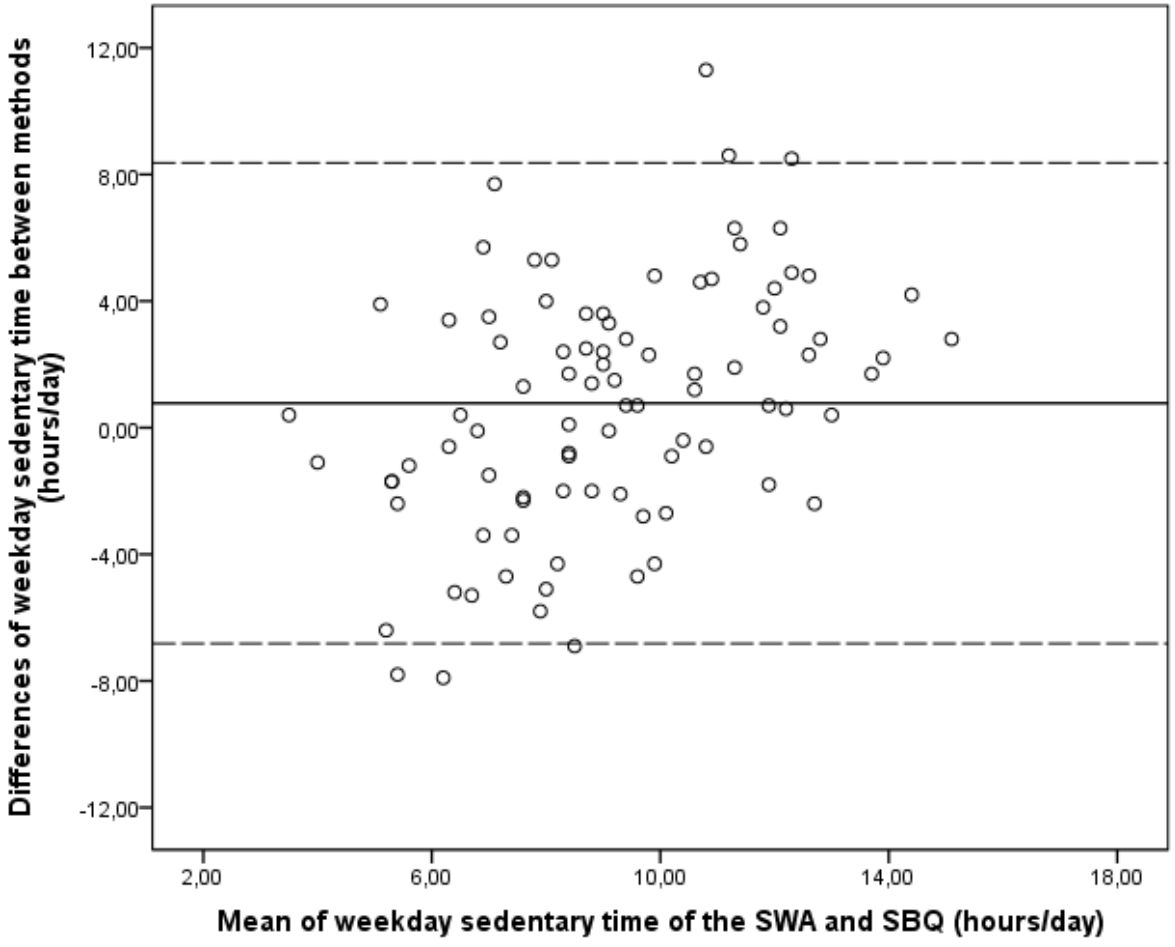
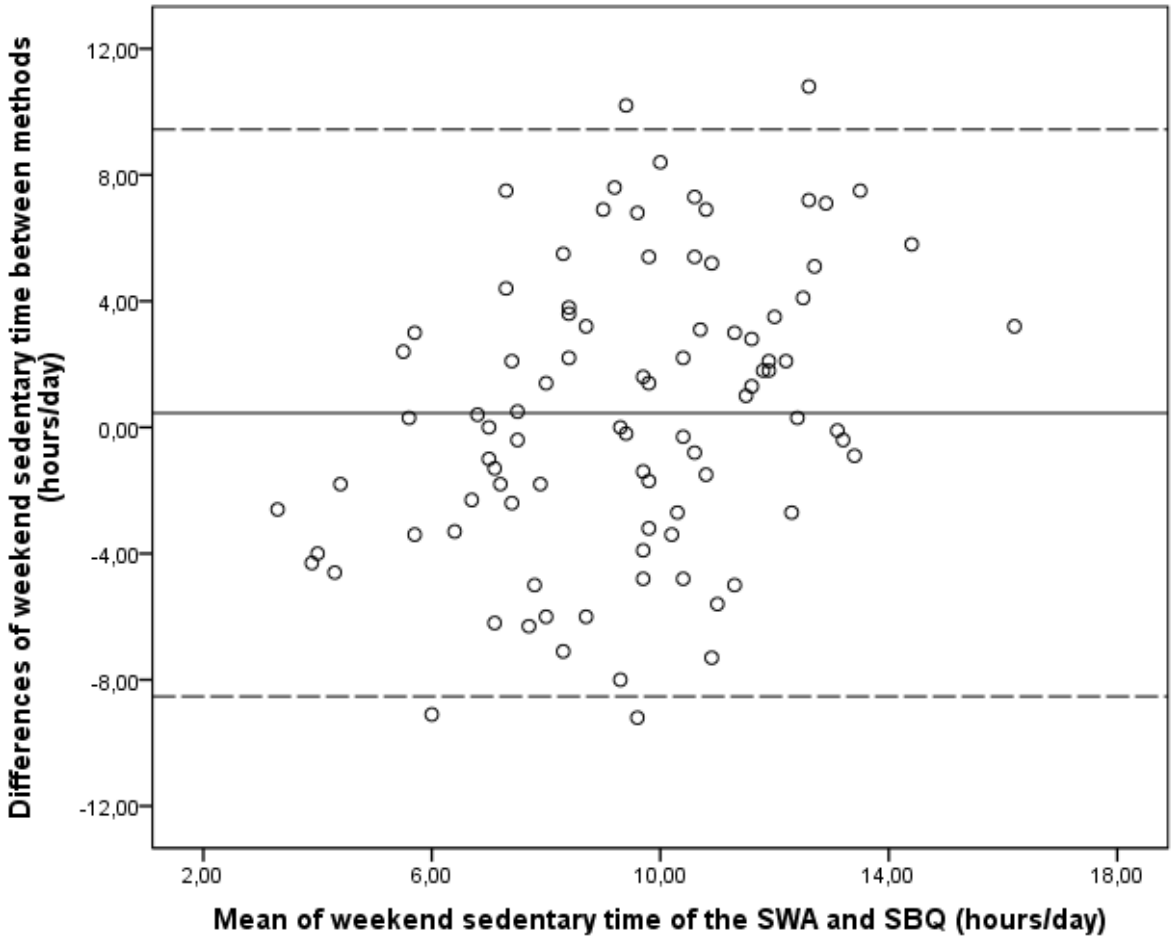
Fig. 1. Bland-Altman plots for the sedentary time for the SenseWear Armband (SWA) and the Sedentary Behaviour Questionnaire (SBQ), separately for a) weekday, b) weekend, and c) average day. The means of the differences (solid lines) and limits of agreement (dashed lines) within ± 1.96 standard deviations are shown.

a)



b)


Differences of weekend sedentary time between methods (hours/day)
12,00
8,00
4,00
0,00
-4,00
-8,00
-12,00
2,00
6,00
10,00
14,00
18,00
Mean of weekend sedentary time of the SWA and SBQ (hours/day)

c)

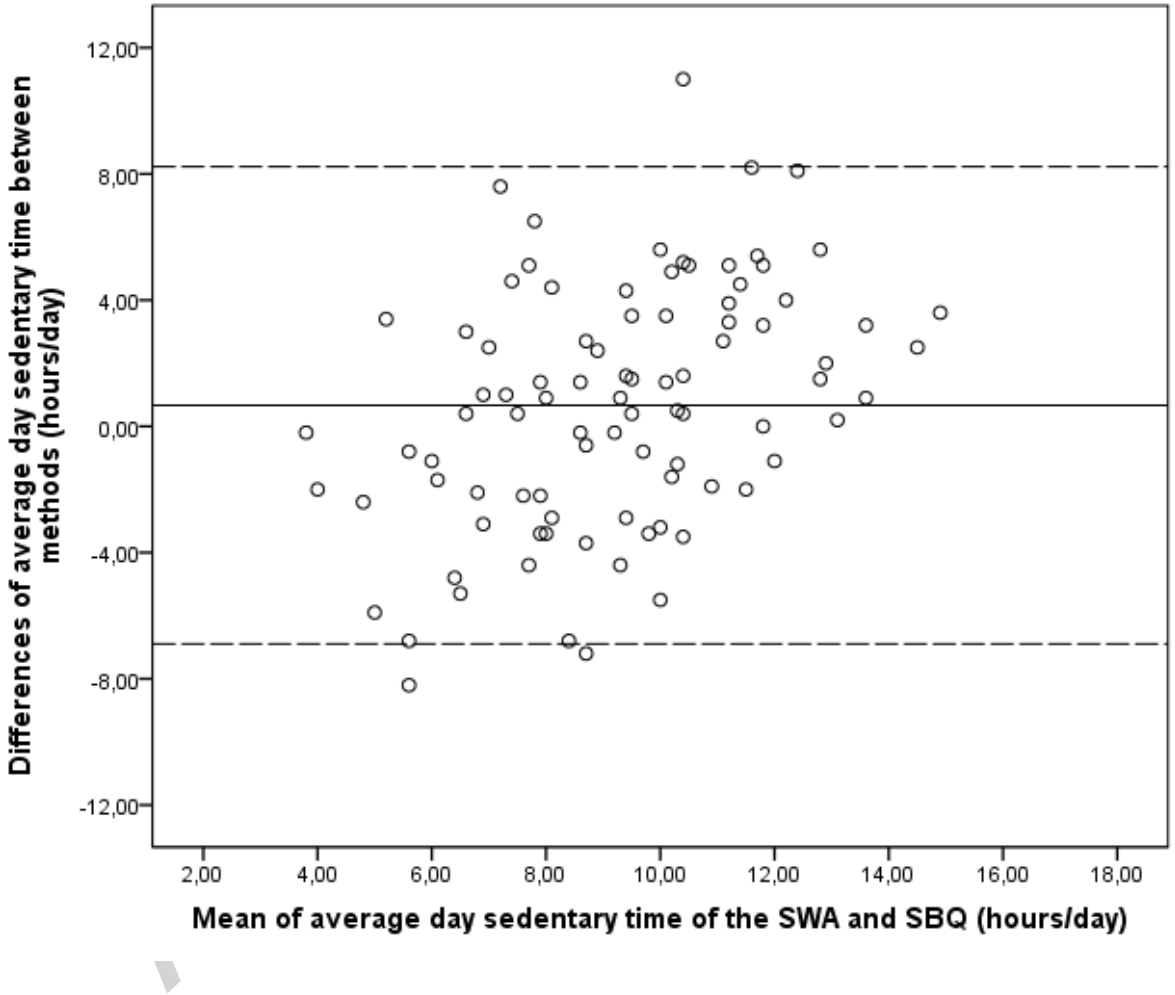


Table 1. Patients' characteristics (*n*=90).

Variable	Value
Age (years)	41.6 ± 9.2
BMI (kg/m^2)	30.0 ± 5.8
Distress[a,b]	17.8 ± 13.2
Illness duration (years)[a]	16.2 ± 9.3
Chlorpromazine equivalent dose (mg/day)[a]	620.2 ± 524.3
Total objective sedentary time (hours/day, % of waking time)	8.9 ± 2.4 (58.8)
Total self-reported sedentary time (hours/day)	9.2 ± 3.6
Specific sedentary behaviours (hours/day, % cases)	
Watching television	2.2 ± 1.8 (93.3)
Eating	0.8 ± 0.6 (98.9)
Lying/resting	2.0 ± 1.8 (88.9)
Playing computer/video games	0.4 ± 0.9 (27.8)
Listening to music	1.1 ± 1.5 (68.9)
Talking with others	0.8 ± 1.1 (87.8)
Doing paper/office work	0.4 ± 1.0 (40.0)
Reading	0.5 ± 0.8 (61.1)
Playing a musical instrument	0.1 ± 0.4 (6.7)
Doing arts and crafts	0.5 ± 1.0 (35.6)
Driving/travelling in a motor vehicle	0.8 ± 0.8 (83.3)
Women	18 (20.0)
Diagnoses[a,c]	
Schizophrenia, schizotypal and delusional disorders	63 (71.6)
Mood [affective] disorders	11 (12.5)
Disorders of adult personality and behaviour	8 (9.1)
Neurotic, stress-related and somatoform disorders	3 (3.4)
Mental retardation	2 (2.3)
Mental and behavioural disorders due to psychoactive substance use	1 (1.1)
Marital status	
Married	6 (6.7)
Unmarried	72 (80.0)
Separated/divorced	12 (13.3)
Educational status	
Unfinished studies	18 (20.5)
Primary school	47 (53.4)

Secondary school	13 (14.8)
University degree	10 (11.4)
Occupational status	
Working	6 (6.7)
Unemployed	31 (34.4)
Retired	53 (58.9)

Note. Values are in mean ± SD or *n* (%). Sedentary data is for an average day.

[a]Missing data: Distress (*n*=7); Illness duration and Chlorpromazine equivalent dose (both *n*=10); Diagnoses (*n*=2).

[b]Distress derived from the Spanish version of the Brief Symptoms Inventory-18; with higher scores indicating a higher level of distress.

[c]Diagnoses consistent with the ICD-10 categories for severe mental illness.

Table 2. Comparison between objective and self-reported methods in outpatients with severe mental illness.

		Weekday				Weekend				Average day			
	n[a]	DM (SD)	CCC	Correlation (*r*)	*p*-value	DM (SD)	CCC	Correlation (*r*)	*p*-value	DM (SD)	CCC	Correlation (*r*)	*p*-value
All	90	0.8 (3.9)	0.20	0.21	0.044	0.5 (4.6)	0.15	0.16	0.132	0.7 (3.9)	0.19	0.20	0.053
Gender													
Men	72	1.2 (3.9)	0.21	0.22	0.058	0.7 (4.6)	0.16	0.17	0.146	1.0 (3.9)	0.21	0.22	0.061
Women	18	-0.9 (3.5)	0.12	0.41	0.088	-0.3 (4.5)	0.10	0.14	0.572	-0.7 (3.6)	0.18	0.31	0.212
Age (years)													
22-41	46	1.1 (3.8)	0.26	0.30	0.040	0.5 (4.4)	0.18	0.20	0.173	0.9 (3.7)	0.25	0.29	0.049
42-69	44	0.5 (4.9)	0.11	0.11	0.473	0.4 (4.8)	0.08	0.08	0.600	0.4 (4.0)	0.10	0.10	0.521
BMI category													
Non-obese (BMI <30)	49	1.1 (4.1)	0.16	0.17	0.247	0.5 (4.6)	0.16	0.17	0.231	0.9 (4.1)	0.15	0.16	0.258
Obese (BMI ≥30)	41	0.4 (3.6)	0.19	0.23	0.150	0.4 (4.7)	0.09	0.10	0.524	0.4 (3.6)	0.18	0.22	0.172
Distress[b]													
0-15	40	0.7 (4.0)	0.13	0.14	0.373	-0.2 (4.7)	0.14	0.08	0.643	0.4 (4.1)	0.10	0.12	0.464
17-57	43	0.4 (3.8)	0.30	0.23	0.133	0.4 (4.3)	0.14	0.24	0.120	0.3 (3.7)	0.28	0.25	0.105
Illness duration (years)													
1-15	39	0.8 (4.2)	0.15	0.16	0.326	0.4 (4.9)	0.19	0.21	0.204	0.7 (4.2)	0.15	0.17	0.311
16-43	41	0.7 (3.5)	0.29	0.31	0.047	0.4 (4.2)	0.01	0.01	0.973	0.6 (3.4)	0.24	0.26	0.100
Chlorpromazine equivalent dose (mg/day)													

0-570	40	1.2 (3.7)	0.38	0.31	0.049	0.9 (4.8)	0.14	0.12	0.455	1.0 (3.8)	0.32	0.27	0.092
574-2675	40	0.9 (3.8)	0.16	0.22	0.179	0.5 (4.7)	0.14	0.19	0.237	0.7 (3.7)	0.16	0.23	0.154

Note: Analyses were conducted with sedentary time logarithmically transformed to obtain a normal distribution, yet crude values are presented in the table for easier interpretation. Boldface indicates statistical significance ($P<0.05$).

[a]*n* varies due to missing data.

[b]Distress derived from the Spanish version of the Brief Symptoms Inventory-18; with higher scores indicating a higher level of distress.

CCC: concordance correlation coefficient; DM: difference mean; *r*: Pearson's correlation coefficient.

Table 3. Objective and self-reported sedentary behaviour in outpatients with severe mental illness by stratified groups.

		Weekday sedentary time (hours/day) DM (SD)		Weekend sedentary time (hours/day) DM (SD)		Average day sedentary time (hours/day) DM (SD)	
	n[a]	SWA	SBQ	SWA	SBQ	SWA	SBQ
Gender							
Men	72	8.6 (2.5)	9.8 (3.6)	9.0 (2.8)	9.7 (4.0)	8.7 (2.5)	9.7 (3.6)
Women	18	9.5 (1.9)	8.7 (4.2)	9.9 (2.5)	9.6 (4.1)	9.6 (1.9)	8.9 (4.0)
p-value		0.106	0.156	0.206	0.789	0.115	0.284
Age (years)							
22-41	46	8.6 (2.4)	9.7 (4.1)	8.9 (2.8)	9.4 (4.1)	8.7 (2.4)	9.6 (3.9)
42-69	44	9.0 (2.5)	9.4 (3.4)	9.5 (2.7)	9.9 (3.9)	9.1 (2.4)	9.5 (3.4)
p-value		0.547	0.942	0.327	0.457	0.457	0.797
BMI category							
Non-obese (BMI <30)	49	8.1 (2.5)	9.2 (3.9)	8.8 (3.0)	9.4 (4.2)	8.3 (2.6)	9.2 (3.8)
Obese (BMI ≥30)	41	9.5 (2.1)	10.0 (3.5)	9.6 (2.5)	10.0 (3.8)	9.6 (2.0)	10.0 (3.4)
p-value		0.003	0.258	0.134	0.381	0.005	0.258
Distress[b]							
0-15	40	8.1 (2.4)	8.7 (3.6)	8.8 (3.0)	8.6 (3.7)	8.3 (2.5)	8.7 (3.5)
17-57	43	9.5 (2.4)	9.8 (3.9)	9.7 (2.6)	10.1 (4.0)	9.6 (2.3)	9.9 (3.7)

p-value		0.010	0.239	0.107	0.115	0.013	0.171
Illness duration (years)							
1-15	39	8.6 (2.7)	9.4 (4.0)	9.2 (3.1)	9.7 (4.3)	8.8 (2.7)	9.5 (4.0)
16-43	41	8.9 (2.2)	9.6 (3.4)	9.0 (2.5)	9.4 (3.4)	9.0 (2.1)	9.5 (3.3)
p-value		0.441	0.615	0.959	0.812	0.565	0.669
Chlorpromazine equivalent dose (mg/day)							
0-570	40	8.5 (2.5)	9.7 (4.1)	9.0 (2.8)	9.9 (4.3)	8.7 (2.4)	9.7 (4.0)
574-2675	40	8.7 (2.4)	9.6 (3.4)	9.1 (2.6)	9.5 (3.7)	8.8 (2.3)	9.6 (3.3)
p-value		0.676	0.776	0.924	0.942	0.721	0.825

Note: Analyses were conducted with sedentary time logarithmically transformed to obtain a normal distribution, yet crude values are presented in the table for easier interpretation. Boldface indicates statistical significance ($P<0.05$).

[a]n varies due to missing data.

[b]Distress derived from the Spanish version of the Brief Symptoms Inventory-18; with higher scores indicating a higher level of distress.

SBQ: Sedentary Behaviour Questionnaire; SWA: SenseWear Armband.

Highlights

- Our patients spend more than a half of their waking hours in sedentary behaviors.
- Watching television is the most prevalent sedentary activity reported.
- Validity of self-reported sedentary time is higher for weekdays than for weekend.
- The self-reported measure presents low validity compared to the objective measure.
- Only the objective measure identified differences in sedentary time between groups.