# Original

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**Objectives.** To examine walking capacity in patients with schizophrenia and the relation with quality of life and physical activity level.

Methods. Functional exercise capacity was measured with the 6 Minute Walk Test (6MWT). To asses quality of life and physical activity levels, we used respectively the SF-36 Questionnaire and the Baecke Physical Activity Questionnaire.

**Results.** Walking capacity was strongly related to BMI and quality of life. Physical Activity (PA) was positively related to walking capacity.

**Conclusion.** Present findings confirm that walking capacity could be a good indicator of quality of life and PA level in patients with schizophrenia.

Key words: Schizophrenia, physical activity, quality of life.

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La capacidad de marcha está asociada a la calidad de vida (relacionada con la salud) y nivel de actividad física en pacientes con esquizofrenia: estudio preliminar

**Objetivos.** Examinar la capacidad de marcha (caminar) en pacientes con esquizofrenia y la relación con calidad de vida y nivel de actividad física.

Métodos. La capacidad de ejercicio funcional fue medida con el test de los 6 minutos caminando (6 Minute Walk Test (6MWT)). Para evaluar la calidad de vida y

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University Psychiatric Centre Catholic University Leuven, Campus Kortenberg Leuvensesteenweg 517, B-3070 Kortenberg, Belgium Tel.: +32 2 758 0511; Fax: +32 2 759 9879 E-mail: Davy.Vancampfort@uc-kortenberg.be los niveles de actividad física, usamos respectivamente el cuestionario SF 36 y el cuestionario Baecke de Actividad Física habitual.

**Resultados.** La capacidad de marcha está fuertemente relacionada con el índice de masa corporal (IMC) y la calidad de vida. La actividad física está positivamente relacionada con la capacidad de caminar.

**Conclusión.** Los resultados confirman que la capacidad de marcha podría ser un buen indicador de la calidad de vida y nivel de actividad física en pacientes con esquizofrenia.

Palabras clave: Esquizofrenia, actividad física, calidad de vida.

## INTRODUCTION

Schizophrenia is one of the most debilitating psychiatric disorders.<sup>1</sup> According to the Global Burden of Disease Study, it accounts for 1.1% of the total disability-adjusted life years (DALY's) and 2.8% for men and 2.6% for women of years lived with disability (YLD's). Schizophrenia is listed as the 5<sup>th</sup> leading cause of DALY's worldwide in the age group 15-44 years (World Health Organisation, "The Global burden of disease: 2004, update: Geneva 2008). Patients with schizophrenia have an up to 25 years lower life expectancy than the general population<sup>2-6</sup> and have higher risk for metabolic disorders and cardiovascular disease.<sup>7- 12</sup> In part these cardiometabolic risk factors are attributable to the intake of some of the antipsychotic medication.<sup>6, 8, 13, 14</sup>

Not only medication has an impact in the cardiovascular risk; patients with schizophrenia, smoke more, have unhealthy eating habits and a more sedentary lifestyle than the general population.<sup>12, 15</sup>

Physical activity (PA), understood here as "any bodily movement produced by skeletal muscles that results in Ana Martín-Sierra, et al.

caloric expenditure",<sup>16</sup> should therefore be an important component within a multidisciplinary treatment protocol. According to the WHO, there is now strong evidence showing that physical activity has beneficial effects on the pathogenesis of all metabolic syndrome-specific disorders including all important heart and vascular diseases.<sup>17-23</sup>

Furthermore, PA is known to be protective against weight gain and obesity.<sup>24-26</sup> This protective role could be relevant for patients with schizophrenia as overweight patients are more likely to experience an impaired quality of life.<sup>27, 28</sup>

Walking entails PA and walking capacity may be a good indicator of the health related quality of life (HRQL) due to the fact that it is related to the performance of daily activities. To the best of our knowledge the relationship between walking capacity and HRQL has never been investigated before in patients with schizophrenia. The purpose of the present pilot study therefore was to examine if the walking capacity in patients with schizophrenia is related to their HRQL. A secondary aim was to observe if walking capacity is related to a patient's PA level.

## METHODS

#### **Participants**

Inpatients between 18-65 years old, with schizophrenia or a schizoaffective disorder, were recruited from August 2009 till December 2009, at the University Psychiatric Centre of Kortenberg in Belgium. Exclusion criteria included a DSM-IV co-morbidity (anxiety disorders and/or depressive disorders, substance dependence). Somatic exclusion criteria included evidence of significant cardiovascular, neuromuscular and endocrine disorders that according to the American College of Sports Medicine might prevent safe participation in the study.<sup>29</sup>

#### Instruments

## Six-Minute Walk test (6MWT)

The 6MWT is a sub maximal test measuring one's functional exercise capacity.

The test was performed in a quiet hallway within the hospital facilities. The distance was marked with cones separated 25 meters. Following the American Thoracic Society Guidelines,<sup>30</sup> patients were told to walk as far as possible within 6 minutes without running or jogging. Standardized encouragement phrases were used each minute during the test. Patients were allowed to stop if they need to during the test. The test is known to well reflect the functional exercise

level during daily physical activities.<sup>30</sup> The 6MWT has been demonstrated to be a reliable test to measure functional capacity in patients with schizophrenia.<sup>31</sup>

Blood pressure and heart rate were recorded after the 5 minutes resting before and immediately after the test using an OMRON 6 (HEM-7001-E).

## Borg Scale (CR10)

Before and after each 6MWT the Borg CR10 was used. This scale measures the perceived exertion.<sup>32</sup> The scale goes from 0 to 10, being 0 "nothing at all" and 10 "extremely strong". The Borg scale has been demonstrated to be one of the most reliable and valid measures of perceived exertion.<sup>32</sup>

## Questionnaires

Questionnaires were filled in before performing the first 6MWT.

## The MOS 36-item Short form health survey (SF 36)

The SF-36 HRQL questionnaire was designed to examine eight different items of functioning: physical functioning, role limitations due to physical problems, vitality, bodily pain, social functioning, role limitations due to emotional problems, mental health and general health. The four domains: physical functioning, role limitations due to physical problems, bodily pain and general health are the summarized into a Physical Component Score (PCS), whereas the four domains: vitality, social functioning, role limitations due to emotional problems and mental health constitute the Mental Component Score (MCS). This items support the validity of the SF 36 since, comparing with other instruments, SF-36 includes eight of the most frequently measured health concepts.<sup>33</sup> Scores for the SF-36 range from 0 to 100, with higher scores indicating a better health state. Tunis et al. (1999) found that the SF-36 exhibited good reliability and validity among people with schizophrenia.34

## Baecke Physical Activity Questionnaire

The 16-items Baecke questionnaire measures the habitual physical activity.<sup>35</sup> It focuses mainly on three dimensions of physical activity: physical activity during work, and leisure time and habitual physical activity during leisure time excluding sport. Baecke demonstrated that these three dimensions were reliable to measure habitual physical activity.<sup>35</sup>

Most of the questionnaire is scored on a 5-point Likert scale, with descriptors ranging from never to sometimes or very often. Three additional questions required reporting the type of sporting (exercise) activity and both the number of hours per week and the number of months per year in which the respondent participated in that activity. The scoring of the questionnaire included specific scoring criteria for each of the 3 sections: work, sport, and leisure indexes. Each section could receive a maximum score of 5 points, with a maximum of 15 points for the total activity index.

Since some of the patients were living at the hospital, "physical activity at work" was considered as the physical activity patients were performing at the hospital during the therapy programme and the "physical activity during leisure time" as the activities patients were doing outside the hospital or outside the therapy programme (during the evenings, weekends, etc.). The questionnaire demonstrated previously a high internal consistency in patients with schizophrenia.<sup>36</sup>

## Statistical analysis

Descriptive statistics are tested for normality using the Kolmogorov-Smirnov test and presented as mean  $\pm$  standard deviation (SD). Pearson correlations were used to compute associations between the 6MWT and demographical data and other variables. A priori, a two sided level of significance was set at p<0.05. Statistical analyses were performed using the SPSS program version 16.0 (SPSS Inc., Chicago, IL).

## RESULTS

## Participants

57 individuals with schizophrenia or schizoaffective disorder were initially recruited. Five individuals with comorbid substance dependence and one patient with comorbid anxiety disorder were excluded. Two patients were excluded as a consequence of a neuromuscular disorder. From the 49 included individuals, nine persons did not agree to participate (five were not interested in performing a walking test, four could not be motivated). 40 participants completed the test (20F, 20M). Mean age was 40.5 years ( $\pm$ 9.2), mean BMI (Body Mass Index) was 26.2 ( $\pm$ 4.8). Mean duration of illness was 11.8 $\pm$ 8.5 years.

The medication participants were taking is reported in table 1.

Mean distance accomplished on the 6MWT by the participants was 558.5m (112.2m): male 593.50m (108.45m); female 508.38m (85.18m). As can be noticed in table 2,

Table 1	Medication of the patients at the moment of performing the 6MWT		
Medication		N (%)	
No antipsychotic		1 (2.5%)	
Monotherapy antipsychotic		14 (35%)	
First-generation antipsychotic		3 (7.5%)	
Aripiprazole		2 (5%)	
Amisulpride		1 (2.5%)	
Clozapine		5 (12.5%)	
Quetiapine		1 (2.5%)	
Risperidone		2 (5%)	
Olanzapine		3 (7.5%)	
Combination of antipsychotics		25 (62.5%)	
First-generation		0 (0%)	
Second-generation		22 (60%)	
First- and second generation		3 (7.5%)	
Other medication			
Anticholinergic		7 (17.5%)	
Antidepressant		12 (30%)	
Benzodiazepine		11 (27.5%)	
Mood stabiliser		8 (20%)	
Somatic medication		9 (22.5%)	

6MWT demonstrated a significant correlation with the BMI but not with age.

There was also a correlation between the 6MWT and duration of illness.

Quality of life (SF-36) scores indicated significant correlation for physical functioning, vitality, bodily pain and general health levels. 6MWT furthermore showed a significant correlation with the habitual PA level (Baecke) total score and the sub-domains leisure time and sport PA level.

## DISCUSSION

To the authors' knowledge, this is the first pilot study demonstrating that there is a relation between walking capacity, HRQL and PA levels in patients with schizophrenia.

A strong correlation was observed between the 6MWT and BMI. A higher BMI indicates a worse walking capacity. The present association confirm previous observations and is of Table 2

Descriptive variables characteristics and relation with 6MWT

	MEAN (SD)	Correlation with 6MWT	P Value
Age	40.5(±9.2)	-0.24	NS
BMI	26.2(±4.8)	-0.48**	0.002
RAND-36			
Physical functioning	67.4( <u>+</u> 28.1)	0.46**	0.003
Social functioning	54.5(±22.3)	0.08	NS
Physical role limitations	50.0(±40.8)	0.08	NS
Emotional role limitations	39.2(±43.9)	-0.65	NS
Mental health	50.2(±20.5)	0.22	NS
Vitality	47.6(±24.5)	0.40*	0.011
Bodily pain	75.8(±26.5)	0.41**	0.009
General health	57.0(±22.0)	0.58***	<0.001
Mental component score (MCS)	48.1(±21.8)	0.07	NS
Physical component score (PCS)	61.5(±21.7)	0.42**	<0.001
Baecke habitual PA			
Total score	8.1(±2.5)	0.35*	0.027
Work	2.8(±1.9)	0.10	NS
Leisuree time	2.8(±0.8)	0.37*	0.020
Sport	2.4(±0.7)	0.58***	<0.001
Duration of illness	11.8( <u>+</u> 8.5)	0.39	0.010

Values expressed as mean  $\pm$  standard deviation, NS = non-significant. BMI= body mass index, \* p <0.05 \*\* p <0.01 \*\*\* p <0.001

interest since this population tend to be overweight.<sup>6</sup> As the performance of the 6MWT is highly associated with performance of daily activities,<sup>29</sup> it may be expected that overweight has a negative impact on patients' daily activities.

Both BMI and 6MWT were associated with the physical component of HRQL but not with the mental component.

As hypothesized previously,<sup>37</sup> the very low mental HRQL score compared with the physical HRQL in schizophrenia patients might indicate a kind of floor effect. As patients with schizophrenia report extremely low mental HRQL, further distinction on this mental HRQL domain is less likely to happen on the basis of other measures including walking capacity and physical activity participation.

The findings that a higher BMI is strongly related to a lower physical quality of life of people with schizophrenia<sup>27</sup> confirms previous observations that BMI can be perceived mainly as a physical problem.<sup>27, 37, 38</sup> It also offers evidence that an increased BMI not only limits the physical daily life activities

such as walking,<sup>27, 36-38</sup> but also limits the perception of one's own physical functioning and the impairments encountered in daily life as expressed in the physical HRQL score.

The results of this study have implications for health care professionals. Health care professionals need to be aware that next to an increased BMI also an impaired walking capacity and physical inactivity may add to the burden of schizophrenia in the form of reduced physical HRQL. As increased body weight and physical inactivity are modifiable risk factors for cardiometabolic diseases,<sup>36</sup> rehabilitation programs focusing on these risk factors should be key. There is evidence in favor of offering physical activity for both prevention and treatment of disease and disablement in patients with schizophrenia.<sup>23, 39</sup>

#### Limitations and future research

The present findings must be interpreted with caution because of some methodological limitations. First of all, the

sample size was rather small and included participants were limited to a single-centre which reduces the generalisability. We also did not include parameters such as severity of illness and duration of current hospitalization in order to increase the external validity.

The use of PA questionnaires has some disadvantages. PA questionnaires are known to be subjective and less reliable than measurements in the laboratory settings, as for example, doubly labelled water, indirect calorimetry, direct observation, and as accelerometers and pedometers.<sup>40, 41</sup> But these measurement are expensive, more invasive, and more difficult to use in clinical settings.<sup>40, 42</sup>

"Self-report" questionnaires, furthermore may have several limitations in population with schizophrenia,<sup>43</sup> including the lack of motivation to fill out the questions and difficulties to specify the duration and intensity of PA. Nevertheless, they provide an assessment on PA by domains that the objective measurement doesn't provide.<sup>42</sup>

A third limitation was the lack of a control group. A study to compare these data with healthy controls is planned.

Lastly, since our data are cross-sectional, they cannot establish cause and effect. Although a better walking capacity would improve HRQL,<sup>44, 45</sup> it is also plausible that patients with a more beneficial well-being would tend to be more physically active and to have an increased walking capacity. So, it was impossible to ascertain if more favorable HRQL was due to or rather the consequence of an improved walking capacity. A longitudinal study with a larger sample size is planned to clarify whether improvements in HRQL are due to a better walking capacity.

## CONCLUSION

This study offers a relevant contribution to the growing body of PA-research in schizophrenia and indicates that the walking capacity could be a good indicator of the quality of life and PA level in patients with schizophrenia. Longitudinal large-scale studies including parameters such as severity of illness and duration of current hospitalization are however needed in order to generalize our results.

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