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A question of time: A study of time use in people with schizophrenia

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ABSTRACT

Background: Loss of functioning is a core feature associated with the diagnosis of schizophrenia. Several measures are used to assess this domain including activity measures assessing time use which has been demonstrated to be a valuable indicator of recovery. However there is limited information on the magnitude and the domains where time use may differ between people with schizophrenia and the general population.

Method: One hundred and seventy people with a diagnosis of schizophrenia and 1124 people from the general population were assessed and compared on the Time Use Survey. This estimates the time spent in everyday activities in ten domains. The influence of symptom severity and clinical variables on time-use was examined in people with schizophrenia.

Results: People with schizophrenia spent less time in functional but also in social and leisure activities and more time resting and “doing nothing” compared to the general population. When compared with unemployed individuals and people with a physical disability, people with schizophrenia spent comparable time in functional activities but significantly less in leisure, socialising activities and travelling. Negative symptom severity was associated with time spent in passive activities and negatively influenced time in social and leisure activities.

Conclusions: Alongside significant effects on functional economic activities schizophrenia has also a profound impact on activities that make life enjoyable. Mapping time use will be a useful additional tool to assess progress towards recovery.

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1. Introduction

The diagnosis of schizophrenia is associated with a severe and debilitating loss of social and occupational functioning. This has been linked to a range of factors including symptoms, cognitive and social cognitive problems (Chang et al., 2014; Galderisi et al., 2014; Robertson et al., 2014). Research conducted from the service users' perspective has also shown that loss of functional capacity is considered one of the most debilitating problems associated with the illness (Bonney and Stickley, 2008). While there is an ongoing debate on the definition of recovery there is consensus that it does not equate to symptomatic remission (Harvey, 2009; Rose, 2014). Improvements in functionality, including independent living, work, relationships and social contact are increasingly considered essential for recovery (Emsley et al., 2011; Liberman and Kopelowicz, 2005).

Measures of functioning for people with schizophrenia have considered different types of activity including real-world functioning (Schneider and Struening, 1983a), social behaviour (Cella et al., 2014b; Wykes and Sturt, 1986), social and occupational functioning

(Schneider and Struening, 1983b), functional capacity (Heinrichs et al., 2006) and functional milestones (Harvey et al., 2012). More recent studies have focused on the ecological validity of functional assessment and introduced measures based on task performance and simulation of real life environments (Ruse et al., 2014). The vast majority of functioning assessments aim to measure people's difficulties in performing everyday life behaviours. An alternative method is to measure activity which has the advantage of a wider mapping of functionality including information such as low frequency activities (e.g. socialising) or activities that are over-represented (e.g. watching TV). Studies conducted using this method in inpatient settings highlighted reduced inactivity as a predictor of symptomatic improvement (Olbrich et al., 1993; Wing and Brown, 1970).

The Social Functioning Scale (SFS) (Birchwood et al., 1990) was designed to assess activity frequency in people with schizophrenia in community settings, but did not capture time spent in each activity (Birchwood and Smith, 1987; Barrowclough and Tarrier, 1990). More recently Jolley et al. (2006) developed the time budget which aimed to assess the amount of time people spend in different activities. This measure records activities in four daily time blocks with the activity demand in each block rated between 0 and 4 (i.e. passive or active). This measure allows a relatively easy mapping of people's activity level and time but it is designed for an inpatient population and has limited relevance to community service users.

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Time is a resource we all share in equal amounts and its allocation may reflect a wide range of factors including not only well-being but also societal, dispositional and environmental factors. One main advantage of assessing time in relation to activities is the possibility of comparing it across different periods and between different populations. In people with schizophrenia time-use mapping may also highlight potential contributing factors to reduced functioning such as poor sleep (Afonso et al., 2014). Time spent on activities may be a valuable holistic indicator of the magnitude of functional problems and could help to track recovery goals.

Over the last three decades organisations in different countries have conducted research to map time use e.g. American Time Use Survey (Basner et al., 2007). In the UK, the Office of National Statistics (ONS) has conducted surveys in multiple waves to map people's use of time (Lader et al., 2006). Information was collected on how long people spend in activities, such as working, studying, leisure activities, socialising, but also resting, doing household chores and sleeping.

Fowler et al. (2009) used the time-use survey developed by the ONS, for the first time, to assess activity level as part of an intervention study exploring the possible benefits of cognitive behavioural therapy for people with psychosis (CBTp). These authors found that CBTp was effective in increasing time spent in structured activities. This demonstrates that the time-use survey is sensitive and can capture functional change after treatment. However, the study reported aggregate measures of time-use such as time spent in structured and economical activities providing only limited insight into areas where people with schizophrenia may differ from the general population. The same authors, more recently, conducted another study using the same time use measure in people at different stages of psychotic illness and found that illness severity negatively impacted on time use domains (Hodgekins et al., 2015).

Before time-use measures can be employed more widely in clinical settings it is important to characterise typical time use patterns in different populations. Despite a wealth of data on time use in the general population limited information is available on how people with schizophrenia, who live in the community, spend their time. This is essential if time use is to be used in further treatment evaluations or as a clinical assessment for recovery. The main aim of this study is therefore to provide normative information on time use that can be used as reference for future studies exploring the merit of this measure in assessing recovery progress. By comparing time use in people with schizophrenia and different socio-demographic strata of the general population we also aim to highlight areas where time use is different. In addition we aim to characterise the relevance of symptom dimensions and demographic characteristics to over- or under-represented time use domains in order to provide relevant information for this measure to be used in clinical trials.

2. Method

2.1. Design

This design is cross-sectional and longitudinal. In the cross-sectional phase participants with a diagnosis of schizophrenia are compared with participants drawn from the general population. A sub-group of the participants with schizophrenia were assessed twice following a 6 months period where they receive standard care.

2.2. Participants

Participants with schizophrenia were recruited from Community Mental Health Teams in the South London and Maudsley NHS Trust in the UK. Inclusion criteria were: (i) DSM-IV diagnosis of schizophrenia, (ii) aged 18–65. Exclusion criteria: (i) recent medication change (i.e. in the last month) or plan to change medication in the month following this research assessment, (ii) poor literacy or learning disability preventing informed consent, (iii) a DSM-IV diagnosis of substance

abuse or substance dependence. Diagnoses were made using participants' electronic health records and confirmed by the treating psychiatrists. All eligible participants who were considered suitable for participation by their care coordinator were approached and invited to take part in the study. Participants were assessed in a time period between 2009 and 2014. All participants signed a consent form confirming their willingness to take part in the research.

Data from the general population were extracted from "The Time Use Survey" (Lader et al., 2006). This is a national survey conducted in 2005 in the UK from the Office of National Statistics assessing how people spend their time. The Survey was designed to acquire information from a representative sample of the population. Sampling was conducted using postcode sectors initially and then accounting for population density and social-economic status. The survey collected data on a sample of 20,981 people from the general UK population. From this database we selected cases with the same age range (i.e. 18–65) and geographical location (i.e. South London) to our clinical sample. The survey also provided data on economic status (e.g. employed, unemployed, student).

2.3. Measures

2.3.1. Time use

The time use survey is a semi-structured interview asking participants to retrospectively report the time spent in a variety of activities. Less frequent activities are assessed over a longer period of time (e.g. time spent looking for a job in the last month) and more frequent activities are assessed using a shorter time reference (e.g. sleeping hours in the last week). Activities enquired about include: work, education, voluntary work, leisure, sports, socialising, hobbies, resting, housework/chores, childcare and sleep. Time spent in each activity is then calculated in number of hours per week. The interview schedule takes between 30 and 45 min for participants to complete. This measure has been used in previous research with people with schizophrenia and was found feasible and acceptable (Fowler et al., 2009; Hodgekins et al., 2015).

2.3.2. Demographics and clinical information

We assessed demographic and clinical information in participants with schizophrenia using a semi-structured interview template. This collected information on illness length, number and length of hospitalisation instances, current and past living arrangement, current and past job status, and the number of contacts with care team members and other NHS services. Current medication regime was also recorded and chlorpromazine equivalents levels calculated (Woods, 2003). All the information was cross-checked with the electronic patient records and confirmed with a relevant care figure if incongruent (e.g. care coordinator).

2.3.3. Symptoms

We measured symptom severity in participants with schizophrenia using the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987). This is a 30-item measure of symptom severity for people with schizophrenia. The measure is administered as a clinical interview by a trained researcher or clinician. Each item requires a symptom to be scored on a 7-point scale ranging from 1 = not present to 7 = extremely severe. For this study we extracted five factors from the PANSS: Positive Symptoms (Pos), Negative Symptoms (Neg), Disorganised (Dis), Excited (Exc) and Negative Emotion Depressed (Emd) (Wallwork et al., 2012). We chose this solution over the conventional three factor model as it has proven to represent more homogeneous symptom clusters (Cella et al., 2014a).

2.3.4. Analysis

Time use data from a representative stratum of the British adult population were extracted from the Time Use survey reports (Lader et al., 2006). Only cases with completed data were considered. All time data were transformed into hours per day format. Normality assumptions

were checked with Shapiro–Wilks test and non-significant data were transformed, using Log transformation, to allow the use of parametric statistics. Time use data were compared using between groups ANCOVAs controlling for age and gender. When more than two groups were compared differences between pairs were assessed using Tukey's Honest Significant Difference test. Pearson bivariate correlations were used to assess the association levels between continuous variables. Paired *t*-tests were used to assess the temporal stability of time use categories. All tests were two tailed and significance level was set at $p < 0.05$.

3. Results

The general population group was composed of 1124 participants (483 male, 641 female; average age 38.12, SD 12.6) and the clinical group was composed of 170 participants (117 male, 53 female; average age 40.1, SD 10.6) with a diagnosis of schizophrenia. All participants were recruited and lived, at the time of the survey, in South London, UK. Table 1 reports the daily mean number of hours spent in each of the time use domain for both groups. A comparison of the means between people with schizophrenia and the general population across the time use categories revealed significant differences for: Rest/nothing $F(3, 1289) = 393.5, p < 0.0001, p < 0.0001$; Work $F(3, 1289) = 41.3, p < 0.0001$; Social/Leisure $F(3, 1289) = 36.1, p < 0.0001$; Hobbies $F(3, 1289) = 34.1, p < 0.0001$; Childcare/housework $F(3, 1289) = 71.5, p < 0.0001$; Other/Travel $F(3, 1289) = 61.9, p < 0.0001$.

Over 90% of the people with schizophrenia considered in the current study were not in any form of employment and this may affect the distribution of time spent in different activities. We therefore compared time use data for different economic status categories within the general population to identify if there were differences between employment status categories. In our general population sample we had the following data: Employed (full and part-time, $N = 704$), Unemployed ($N = 60$), Student ($N = 62$), Full time family carer ($N = 99$) and people with a physical disability ($N = 34$). The remaining 135 cases were categorised as other or missing and were not used for this analysis. Table 1 shows the mean time use for the activities considered. These categories were validated in our analyses which showed that people in employment spent significantly more time working ($F(7, 1123) = 43.6, p < 0.0001$), students spent more time studying ($F(7, 1123) = 38.1, p < 0.0001$) and family carers spent more time caring for the family ($F(7, 1123) = 48.1, p < 0.0001$). People with schizophrenia spent more time in hobbies compared to all the other groups $F(7, 1123) = 15.3, p < 0.0001$. Similarly, time spent resting and doing nothing was significantly higher in people with schizophrenia compared to all other groups ($F(7, 1123) = 144.6, p < 0.0001$). Time spent socialising and in leisure activities was significantly lower in the schizophrenia group compared to all other groups considered ($F(7, 1123) = 23.1, p < 0.0001$). Time spent in other activities including travelling was also lower in people with schizophrenia compared to all other groups ($F(7, 1123) = 29.9, p < 0.0001$). For volunteering, time spent doing sport and sleeping there were no significant differences.

3.1. Correlation with clinical variables

Negative symptoms alone correlated positively with rest and “doing nothing” ($r = 0.22, p < 0.0001$) and negatively with social and leisure time ($r = -0.3, p < 0.0001$). Medication levels were not associated with any time use domain.

3.2. Time-use domains stability

From the original sample 60 participants with schizophrenia were invited to repeat the time use survey after 6-months. During this period participants received standard care. Fifty-seven participants completed the survey again. Comparisons revealed no significant change in any of the time-use categories between the two assessments (all $p < 0.05$).

4. Discussion

This study sets out to explore differences in time use patterns between people with schizophrenia and the general population and to evaluate the contribution of symptoms dimensions to time use domains. The results show that people with schizophrenia use their time differently from the general population even after taking into account employment status, and suggest that negative symptoms are a significant influence on time use allocation.

In line with previous research this study found that functional/productive activities including work, studying and caring for children are reduced in people with schizophrenia (Hodgekins et al., 2015). The large majority of the people with schizophrenia recruited were not in employment or studying at the time of assessment (with this prospect appearing relatively stable). Over 60% of participants in the clinical group had schizophrenia for over 5 years. This is considered a more chronic and stable phase of the illness where cognitive and negative symptoms become more relevant in determining prognostic outcomes and where change may be more difficult to achieve (Rabinowitz et al., 2012). It is important to note that when productive activities were controlled for by removing people in work, students and full time carers from the general population sample, people with schizophrenia still retain lower levels of social engagement and leisure, travelled less and spent more time resting and “doing nothing”. This further suggests that the illness has a severe impact in all spheres of life including social and leisure opportunities (Cichocki et al., 2015).

Only four people (i.e. 2.3%) in the schizophrenia group worked >16 hours per week, which is the maximum number of hours a person can work in order to be able to claim disability benefit in the UK. The fact that this figure is no news to most mental health professionals should not detract from its significance. The large majority of the people involved in this study, after >5 years from the onset and despite receiving standard care, did not have a substantive change in their employment status.

Leisure and socialising was another area where people with schizophrenia spent less time compared to the general population. Our analysis showed that people with schizophrenia also spent less time in this activity than people with physical disabilities. This stresses the illness

Table 1

Shows the average number of hours per day spent in different activity domains for the general population (and its subgroups) and people with schizophrenia.

	Work	Study	Travel	Rest/nothing	Sleep	Social/leisure	Childcare/housework	Volunteering	Sport	Hobbies
Schizophrenia	0.22	0.35	0.55 ^a	5.17 ^b	8.73	2.07 ^a	1.99 ^a	0.22	0.21	1.30 ^b
General Population	2.89	0.28	1.95	0.76	8.42	4.27	2.99	0.27	0.22	0.33
Employed	3.93 ^b	0.10	2.08	0.74	8.45	3.93	2.65	0.20	0.20	0.30
Unemployed	0.56	0.22	1.67	0.80	8.57	5.30	3.78	0.17	0.25	0.66
Student	0.82	2.23 ^b	1.84	0.80	8.11	5.16	1.27	0.34	0.37	0.55
Family Carer	0.32	0.11	1.37	0.79	8.43	3.97	5.94 ^b	0.52	0.21	0.24
Physical Disability	0.00	0.33	2.28	0.80	7.83	6.31	2.97	0.61	0.20	0.02

^a Significantly lower compared to other subgroups.

^b Significantly higher compared to other subgroups ($p < 0.05$).

implications not only for functional attainments but also for opportunities to engage in social and leisure activities. It appears that schizophrenia can have a greater impact on these activities compared to physical disabilities which can carry with them more obvious barriers to engagement (e.g. restricted mobility). The results also replicate the association between negative symptoms and social and leisure activities underscoring the importance of this symptom domain for functional outcomes (Foussias et al., 2011; Loas et al., 2009).

4.1. Strengths & limitations

Individuals with schizophrenia have well-documented memory deficits e.g. (Aleman et al., 1999) which may limit the accuracy of their recollection for activities carried out in the past week. This may have contributed to the increased reporting of time spent resting and “doing nothing”. Indeed it seems that precisely accounting for all the time in a week is a difficult task and therefore the scores are, at best, estimates in both groups. Participants included in the ONS were not screened for mental state and mental health conditions. As this sample is considered representative of the general population we must assume that approximately 1% of the people in the sample could be affected by schizophrenia. The general population sample contains more women while the sample of people with schizophrenia has more men. This limits the possibility for controlling for gender and gender related factors in our analysis. However higher prevalence of males is often found in studies involving participants with schizophrenia and this may suggest that our sample represent the gender distribution typically observed in this group (Cascio et al., 2012; Longenecker et al., 2010). Lastly, the comparison between unemployed individuals in the two groups is unbalanced with only 60 individuals being available for this analysis from the general population sample. This is because the prevalence of unemployment in the two groups considered is highly different. The result of this comparison should be therefore interpreted with caution. Time use is a quantitative measure of time and not a subjective measure of the quality. In some instances the quality of the time spent in an activity may be more important than quantity. Yet it is unlikely that the addition of qualitative elements to the data currently presented would substantially alter the current results. The Time Use Survey maps time using objective indicators (e.g. number of hours) and excludes, as far as possible, subjective judgments (e.g. pleasantness) as these may be affected by interpretation biases.

4.2. Future directions and clinical implications

The Time-Use Survey includes many of the characteristics that would be desirable in a measure of functional remission or recovery (Harvey, 2009). It assesses activities with marked societal benefit (e.g. childcare, work) but also activities important for quality of life (e.g. socialising, leisure). By including such a range of activities it limits the number of value judgments made when producing functioning scores and perhaps produces a more comprehensive index.

The results of this study identify leisure, socialising, work and study as key areas in which individuals with schizophrenia experience limitations compared to the general population. It also highlights that people with schizophrenia report a considerable amount of unaccounted time often described as resting and “doing nothing”. Individual time mapping can be useful to assess the global impact of a recovery intervention in the context of clinical trials. Mapping and highlighting time-use in people with schizophrenia may be also useful in the context of a clinical assessment. An immediate beneficial aspect of conducting this assessment could be in improving individual's awareness of how they spend their time. People with schizophrenia have poor insight (Ayesa-Arriola et al., 2014; Cella et al., 2014c) and increased awareness could be a first step towards formulating a recovery goal, as part of an intervention, which may aim to reduce the time spent in areas that hinder patients' recovery and quality of life.

Conflict of interest

None.

Contributors

MC study idea and conducted preliminary analysis. CE and MC prepared the database and conducted the final analysis. MC and TW wrote the first draft of the paper. All authors contributed to the final version and have approved the final manuscript.

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