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Time use among individuals with persistent mental illness: identifying risk factors for imbalance in daily activities.

Leufstadius, Christel; Eklund, Mona

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PO Box 117
221 00 Lund
+46 46-222 00 00

Title: Time use among individuals with persistent mental illness - Identifying risk factors for imbalance in daily activities

Running head: Time use and daily rhythm, persistent mental illness, relationships to sociodemographic and clinical variables

Authors:

Leufstadius, Christel, MSc, OT Reg. *]

Eklund, Mona, PhD, OT Reg., Professor *]

*] Department of Health Science, Division of Occupational Therapy,
Lund University, P.O. Box 157, SE- 221 00 Lund, Sweden

Address for correspondence:

Christel Leufstadius

Department of Health Science, Division of Occupational Therapy

P.O. Box 157

SE-221 00 LUND

Sweden

E-mail: Christel.Leufstadius@med.lu.se

Tel: +46 46-222 1898

Fax: +46 46-222 1959

ABSTRACT

The aim of the study was to investigate associations between time use in daily activities of individuals with persistent mental illness [PMI] and sociodemographic and clinical factors in order to identify individuals at risk of having an imbalance in daily activities, as reflected in their time use and daily rhythm. The study had a cross-sectional design and 103 subjects were selected from a psychiatric outpatient unit using a randomised stratified selection procedure. Inclusion criteria were >2 years contact with psychiatric services and an age of 20 to 55 years. Data were collected using a) an activity diary b) a sociodemographic and care-related questionnaire and c) instruments designed to identify psychiatric symptoms and psychosocial functioning. The main findings indicated that time spent in daily activities increased with age, and that older individuals more often had a beneficial daily rhythm. Women and individuals living with children spent more time in self-care/self-maintenance than men and individuals living without children. Individuals with a diagnosis of psychosis spent less total time in daily activities than individuals with non-psychosis.

General psychiatric symptoms explained most of the risk of spending low time use in work/education as well as the risk of spending long periods asleep and having an adverse daily rhythm. A diagnosis of psychosis and high levels of general symptoms together explained most of the risk of having low total time use in activity. Sociodemographic factors such as age and living with children or not, and the clinical factors of diagnosis and general symptoms, seemed to be important factors in relation to time use and daily rhythm.

KEY WORDS: Daily Occupations, Daily rhythm, Psychiatry

INTRODUCTION

In an evaluation of the Swedish Mental Health Reform it was highlighted that a large proportion of people with psychiatric disabilities had no regular daily activity structuring their days and weeks [1]. Some individuals were satisfied with few structured activities during the day, while others with persistent mental illness (PMI) reported a significant need and wish for have more structured activities in terms of work, studies, leisure and social activities, at day-care units or other places. This study sought to identify factors indicative of an imbalanced pattern of daily activities, which could be used to identify those in special need of support.

Theoretical considerations

There is a relationship between participation in daily activities and wellbeing, and in order to maintain health and wellbeing individuals strive to create and perceive a balance between the activity categories of work, play and rest [2-5]. Recent research has focused on gaining more knowledge on what constitutes the optimal pattern of activities for individuals with PMI, in relation to health and wellbeing [6-12]. The most developed method for investigating activity patterns is the time-use method, measuring the time spent in different categories of daily activities by using an activity diary [2, 13-15]. The individuals report the activities they have been engaged in, when and for how long during the day, and sometimes also how the activity was perceived. Individuals with PMI have been found to perceive difficulties in maintaining a daily rhythm and find it difficult to maintain a normal daily rhythm and not reverse night and day [16]. Individuals develop their personal daily rhythm within different rest-activity cycles by choosing a variety of activities within different contextual settings, as well as rest and sleep at certain points in time [17-18]. In the present study, the daily rhythm is viewed as the rest-activity cycles composed of time spent resting or sleeping and the time spent in the activities work/education, self-care/self-maintenance and play/leisure. This categorisation of

activities was inspired by Llorens [19]. Time spent in these activities, and the daily rhythm developed from this pattern of time use, are used in this study as an operationalisation of imbalance in daily activities.

Time use in individuals with persistent mental illness

Individuals with PMI, especially people with schizophrenia, often have difficulties initiating activities and structuring their time. Recent studies [6, 7, 12, 20] have revealed that people with PMI sleep a lot during a 24-hour period, and long periods spent sleeping have been shown to be associated with lower levels of health, mastery, quality of life and social interaction [9]. The findings in this latter study indicated that the daily rhythm of some individuals sometimes became imbalanced, and those who turned their daily rhythm around [sleeping during the day-time and being active at night], or had a daily rhythm characterised by low levels of activity, seemed to have lower perceived levels of mastery and social interaction than two other groups, identified as a high-activity group and a balanced group. That study also demonstrated that individuals with PMI who spent a large proportion of their time working or studying had better health and wellbeing, which has also been found in previous research [8, 21]. Furthermore, individuals with PMI who spent a great deal of time in all of the activity categories work/studies, self-care/self-maintenance and play/leisure, seemed to have better perceived health, mastery, quality of life and social interaction than those who devoted shorter times to these activities. Eklund and co-workers [22] also found that individuals engaged in regular work or studies were more satisfied with their daily occupations than individuals participating in structured day-care activities and those with no structured daily activities. Provencher and colleagues [23] found that employment provided a sense of purpose and improved the individual's self-esteem. Thus, according to recent

research findings, it seems that daily activities that give structure to the day are important for the perception of health and wellbeing among people with PMI. Daily occupations composed of various activities could give meaning and satisfaction to the individual and help him or her to maintain a balanced daily rhythm, and work or studies seem to be the activity category with the strongest relation to health and wellbeing [21&22].

Since certain time-use variables and types of daily rhythm seem to be related to several wellbeing factors, it would be valuable to know how sociodemographic and clinical factors influence time use among those with PMI. This could help identify individuals who could be at risk of developing an imbalance in their daily activities, and who could be in special need of support.

A number of factors, such as age, physical status, habits, physical and social environment, and role expectation can influence the use of time. Shimitras and co-workers [12] found that among individuals with schizophrenia, younger people spent more time socialising than older people, and women performed more domestic activities than men did. These authors showed in another study [24] that those with schizophrenia who lived alone often reported more passive leisure time than those who were cohabiting. However, concerning participation in productive activities (paid and unpaid work) the study suggested that neither sex, social opportunities at home, nor negative symptoms were of importance. Studies investigating possible relationships between time use and clinical aspects, such as type of diagnosis, psychosocial functioning and symptom severity, have shown these to be rare, although these aspects could potentially influence time use in the daily activities of individuals with PMI. It is necessary to match the desired activities and the individual's skills if he or she is to be able to perform the activities required in daily life [25]. Individuals with a psychosocial

dysfunction may have difficulties in achieving this. The skills of an individual are influenced by, among other things, diagnosis and the kinds of symptoms he or she has to cope with in everyday life. Regarding diagnosis, Henry and Coster [26], referring to Cawthron et al., [27], reported that individuals with psychoses such as schizophrenia exhibited poorer social and occupational function and greater symptom severity than those with affective disorders. Psychiatric symptoms tend to vary both over time and between individuals with PMI, and can be clustered and described in terms of positive, negative, depressive and general symptoms [28]. Examples of general symptoms are anxiety, self-blame and difficulties cooperating with others, while negative symptoms include emotional withdrawal and blunted affect. It has been proposed that especially negative symptoms influence the individual's time use in daily activities [29-30]. Mc Gurk and Mueser [31] conducted a review of research regarding the relationship between cognitive function, symptoms and competitive employment in individuals with severe mental illness, and found that cognitive function and symptoms were strongly related to work. Although not all of the studies described above were conducted as time-use studies, research so far indicates that sociodemographic and clinical factors may influence time use, daily rhythm and the ability to perform daily activities among individuals with PMI. The purpose of this study was to deepen our knowledge about how time use and daily rhythm are influenced by these factors, as this is important in identifying people at risk of experiencing occupational imbalance, which in turn affects their perception of health, wellbeing and social interaction.

The specific aim of the present study was to investigate how balance in daily activities, operationalised as the time spent in the activity categories of work/education, self-care/self-maintenance, play/leisure, rest/sleep, as well as the daily rhythm they develop, was associated with sociodemographic and clinical factors in people with persistent mental illness.

On the basis of results from previous research it was hypothesized that:

- i) younger individuals would spend more time engaged in daily activities than older individuals, and women would spend more time on self-care/self-maintenance than men,
- ii) individuals cohabiting and/or having children living at home would spend more time in daily activities and maintain a more balanced daily rhythm than individuals living alone, and
- iii) individuals with a high level of psychosocial function, with a non-psychotic diagnosis, a short period of contact with psychiatric services and few psychiatric symptoms would spend more time in work and other daily activities and maintain a more balanced daily rhythm than individuals with a low level of psychosocial function, diagnosed as having a psychotic illness, more psychiatric symptoms and a long period of contact with psychiatric services

A further aim was to identify the sociodemographic and clinical factors with the strongest relationships to time use in different activity categories and type of daily rhythm.

MATERIALS AND METHODS

Study design and selection procedure

The study had a cross-sectional design and was a part of a larger project [22]. The participants were selected from the register at a psychiatric outpatient unit in southern Sweden. Inclusion criteria were >2 years contact with psychiatric services and an age of 20 to 55 years. These criteria were set to obtain a sample of working age with lasting severe illness. Exclusion criteria were comorbidity of developmental retardation or dementia, being committed to psychiatric care, or being too confused to participate in the study. This combination of inclusion and exclusion criteria identified 400 individuals with PMI. These were subsequently grouped into three strata, representing daily activities with different types of occupational structure. No rating concerning type of occupational structure (work and attendance at a day-care unit) could be established for 11 individuals, and therefore the three strata comprised 389 participants. Individuals engaged in employment or studies for 10 h/week or more formed one group (n=111). The second group comprised 55 individuals attending community-based activity centres for 10 h/week or more. The third group consisted of 223 individuals without regular or structured activities or activities comprising less than 10 h/week. The participants included in the study were randomly selected from these strata, until 35 participants from each group had agreed to participate. This number was based on power calculations according to Altman [32], suggesting that 35 participants from each stratum would be sufficient to detect a moderate effect with 80% power at $p < .05$. This stratified randomised procedure was performed to obtain a sample with even representation of three types of daily occupational structure, which would not have been possible in a randomised sample without stratification. However, the grouping was not further used in the present part of the project. Two participants had to be excluded from the study after data collection, because of diagnosis of mental retardation. Thus, the study was based on 103 subjects who agreed to participate

(60%). An analysis showed that the individuals participating in the study were somewhat younger than the non-participants (39/42 years, $p=.021$) and contained fewer women (45/61%, $p=.04$). No differences between participants and non-participants were found regarding diagnosis. The sociodemographic and clinical characteristics of the men and women included in the study are given in Table I.

Insert Table I here

Data collection

Sociodemographic and clinical variables

Sociodemographic data, such as age, sex, cohabiting and having children, were collected through a questionnaire, as was information regarding mental health care, such as the number of years since the first contact with psychiatric services. The Global Assessment of Functioning (GAF) [33] was employed as a gross screening measure of *psychosocial functioning*. GAF combines psychopathology (mainly symptoms) in combination with social, occupational and psychological functioning into a single rating. The reliability and validity vary from acceptable to good in different studies [34]. The assessment is made on a 100-point scale, divided into 10 equal intervals, where the two intervals formed by 81-100 indicate positive mental health, and not only absence of mental dysfunction. When making the assessment the rater first selects the interval that best describes the participant's ability to function. Then the exact rating is determined in relation to how close the participant is to the adjacent intervals. *Psychiatric symptoms* were rated using the 18-item version of the Brief Psychiatric Rating Scale (BPRS) [28, 35]. Both a verbal report and observation of the patient during the interview are considered in the assessment. Symptom severity is assessed on a

seven-point rating scale. The total score ranges from 18 to 126, and higher scores indicate more severe symptoms. The symptoms may be divided into sub-scales: general symptoms, depressive symptoms, negative symptoms and positive symptoms. In the present study, the mean values for each of the sub-scales were used. Good inter-observer and intra-observer reliability has been demonstrated, especially with specialised training and a structured interview guide [36]; both measures being employed in this study. The psychiatrists in charge of the participants made *diagnoses* according to the ICD-10 system [37].

Assessment of daily time use

The participants participated in an interview with an activity diary [38] covering the past 24 hours, a method often used to assess the time during which different activities have been performed during a specific period. Since activities differ between weekdays and weekends, especially considering time spent in leisure and sleep [39], the present study considered activities undertaken on weekdays. The diary was divided into four columns: performed occupation, point in time, whether the occupation was perceived as meaningful or not (yes/no), and comments about why. The yesterday activity diary has been shown to be a useful instrument when studying activity patterns and time use, especially when evaluated by interview [38, 40]. To ensure the validity of the collected data the participants were asked after the interview how well they felt that day represented a normal day. They answered on a five-point scale, from 5 = "very well" to 1 = "not at all". Ninety percent gave ratings of three to five for this question (Mdn= 4), suggesting that the data collected represented normal weekdays for the participants. After the interview, the yesterday activity diaries were typed word for word and the reported activities were categorised into five predetermined activity categories, inspired by Llorens [19]. *Self-care and self-maintenance* represents activities such as eating, dressing, cleaning the house, transportation, and making telephone calls. Activities

pertaining to productivity, such as studying, going to regular work, voluntary work or attending a day-care unit regularly are categorised as *work/education* activities. Activities such as meeting friends, watching television or hobbies were categorised as *play/leisure*. *Rest/relaxation* and *sleep* were recorded as reported by the participants. The time spent in each of these categories during the 24-hour period was summed. Some expressions describing time use could not be categorised into the predetermined activity categories. These concerned periods of anxiety and counselling by verbal therapeutic contact, and both were very rarely reported, giving medians of zero.

Periods of self-care/self maintenance, work/education and play/leisure were summed in order to define the total time devoted to activities (TTA), while rest/relaxation and sleep were summed to describe rest and sleep (RS) during three time spans: the diurnal period (6 a.m.-6 p.m.), the nocturnal period (6 p.m.-6 a.m.), and the whole 24-hour period. In order to identify groups of individuals with different kinds of daily rhythm, the TTA diurnal variable and the RS nocturnal variable were dichotomised at the median value and combined to define four daily rhythm groups, as described by Leufstadius and associates [9]. Two of them, the balanced group and the high-activity group, were combined in the present study to form a group, called the *beneficial group* in the light of the findings that these groups were associated with better mastery and social interaction in a previous study [9]. The other two groups, the low-activity group and turned-around group, were combined to form the *adverse group* in the present study, since they were characterised by lower levels of mastery and social interaction. Twenty-five percent of the diaries were randomly selected for an inter-rater reliability check between the first author and an independent researcher. The inter-rater agreement between the categories derived from these selected diaries was 91%.

Procedure

The local Research Ethics Committee approved this study and the principle of informed consent was applied. The prospecting participants were first sent a letter with information about the study, and a few days later an occupational therapist at the psychiatric unit contacted them by telephone and asked if they were willing to participate. If they agreed, a date was set for an interview. An experienced occupational therapist carried out the data collection in a secluded room at the psychiatric outpatient unit. The interviews with the yesterday activity diary were performed on weekdays, Tuesday to Friday. The questionnaire concerning sociodemographic factors was completed first and then the interview was carried out. After the interview the other instruments identifying psychiatric symptoms and psychosocial function were completed.

Statistics

The participants were categorised into two groups regarding diagnosis: psychoses and non-psychoses. The first group (n=60) consisted of individuals with schizophrenia and other psychoses. The second group (n= 43) was mixed and consisted mostly of individuals with mood disorders, neurotic disorders, Asperger's syndrome and personality disorders. The time-use variables, which comprised the five activity categories, TTA, RS and daily rhythm groups, were the basis for further analysis.

The statistical analyses were performed with SPSS software, version 11.5, and the level of significance was set to $p < .05$. Spearman's correlation test was used to calculate relationships between the time-use variables and continuous variables. When comparing two groups with regard to continuous variables the Mann-Whitney U-test was used. The chi-squared test was used to compare the two daily rhythm groups with regard to categorical variables. Logistic regression analysis was carried out in order to identify the sociodemographic and clinical

variables that explained the variance in the time-use variables and the daily rhythm groups. The clinical variables were dichotomised at the median value. The age variable was divided into three intervals: 20-33, 34-42 and 43-55 years, each comprising roughly equal numbers of participants. The time-use variable of work/education was dichotomised into spending no time in work/education and spending time in work (Mdn= 0), and the time-use variable TTA was dichotomised according to the median cut. The time-use variable sleep was divided according to normal and abnormal amount of sleep. The normal interval was set at 7 hours sleep +/-3 hours and the abnormal intervals fell below and above these limits. Regression analysis was carried out with the time-use and daily rhythm variables as dependent variables and was performed on those time use and daily rhythm variables that had shown to be statistically significantly ($p < .05$), associated with at least one sociodemographic or clinical variable. Independent variables included in the regression analyses were all variables showing a relationship with the dependent variable with a p-value $< .10$.

RESULTS

Time use within the different activity categories, and the distribution of time use according to sex, diagnosis and age group, are given in Table II. In general, the variation was wide, as indicated by large standard deviations.

Insert table II here

Time use during the 24-hour period and sociodemographic variables

There was a statistically significant positive correlation between age and time spent on self-care/self-maintenance ($r_s = .265$, $p = .007$), suggesting that time spent in this activity category increases with age. There was also a positive association between age and TTA during

24hours ($r_s=.2$, $p=.043$), and a negative correlation between age and time spent sleeping ($r_s = -.211$, $p=.033$), indicating that younger people spent more time asleep. The results also showed that women spent more time than men on self-care/self-maintenance ($p=.038$). Statistically significant differences were also found between those who had children living at home and those who did not, showing that the former spent more time on self-care/self-maintenance ($p=.014$) and had a longer TTA ($p=.016$). There were no differences in any of the time-use variables between groups based on cohabitation.

Time use during the 24-hour period and clinical variables

There was a statistically significant difference between the two diagnostic groups and time spent in work/education ($p=.009$), indicating that individuals with psychoses spent less time in work/education than those with non-psychotic conditions. Furthermore, there was a statistically significant difference between the two diagnostic groups regarding the time spent asleep ($p=.015$), showing that individuals with psychoses spent more time asleep than the others. There was also a statistically significant difference between the two diagnostic groups regarding TTA ($p=.003$). Individuals with psychoses spent less total time engaged in activities than individuals with other diagnoses. Relationships between clinical variables and the time-use variables are given in Table III. Concerning psychosocial function, statistically significant positive associations were found with time spent in work/education, and TTA. Associations were also found with the number of years of contact with psychiatric services and time spent on self-care/self-maintenance.

Insert table III here

Analyses of relationships between the different sub-scales of BPRS and the time-use variables revealed statistically significant negative correlations between negative symptoms and time

spent in work/education and between negative symptoms and TTA. Thus, those with fewer negative symptoms spent more time during the 24-hour period in the activity category of work/education and had a longer TTA. Furthermore, a statistically significant correlation was found between more negative symptoms and more time spent asleep. The only statistically significant correlation between positive symptoms and the time-use variables was found in the activity category of work/education, where a negative association indicated more time in this category with less positive symptoms. Concerning general symptoms, statistically significant negative correlations were found with time spent in work/education and TTA, and a positive association was found with high time use in sleep, suggesting that individuals with many general symptoms were inactive and spent much time asleep during the 24-hour period. Moreover, a statistically significant correlation was found between time spent in work/education and depressive symptoms, showing that those with fewer depressive symptoms spent more time in work/education.

Comparisons between daily rhythm groups regarding sociodemographic and clinical variables

Statistically significant differences were found between the two groups of daily rhythm concerning general symptoms ($p=.002$). Differences were also found regarding the time since first contact with psychiatric services ($p=.010$), indicating that the individuals with a beneficial daily rhythm had had more years of contact with psychiatric services. Statistically significant differences between the two groups of daily rhythm concerning the sociodemographic variables were found concerning age ($p=.015$), in that the subgroup with a beneficial daily rhythm was older. No other differences were found between the two daily rhythm groups concerning the sociodemographic and clinical variables.

Sociodemographic and clinical variables regressed on the time-use variables and daily rhythm

The results of the logistic regression analyses are given in Table IV. The analyses showed an almost three times increased risk of spending short periods engaged in the activity category of work/education with high levels of general symptoms. Furthermore, individuals having more severe general symptoms showed an almost five times higher risk of belonging to the abnormal group concerning time spent asleep during the 24-hour period. Having children living at home decreased the risk of spending abnormal periods asleep about five times. Individuals with a diagnosis of psychosis had a roughly three times increased risk of belonging to the group showing short total time spent on activities (TTA). The results also showed an almost four times increased risk of short TTA with high levels of general symptoms. In addition, individuals with high levels of general symptoms showed an increased risk of having an adverse daily rhythm. A longer period of contact with psychiatric services decreased the risk of having an adverse daily rhythm.

Insert table IV here

DISCUSSION

The first part of our first hypothesis, that younger individuals would spend more time engaged in daily activities than older individuals, was not supported by the results. Time spent in self-care/self-maintenance and TTA increased with age, while the time spent asleep decreased with age. There was also a difference between the two daily rhythm groups regarding age, indicating that the subgroup with a beneficial daily rhythm was composed of older individuals. These findings were not in accordance with previous findings from research on subjects with PMI [12], which showed that younger individuals spent more time socialising, and on leisure and domestic activities than older individuals, and that younger individuals

slept less than older ones. However, the oldest participants in the present study were only 55 years old, so the elderly were not represented in this sample. However, a similar result was found in a general social survey study in Canada [42], reporting that individuals without PMI under the age of 35 spent the least amount of time in paid work, housework/ caring for children and self-care when comparing individuals aged between 15 and 55 years. The second part of the first hypothesis, regarding sex in relation to time use, was confirmed. Women spent more time on self-care/self-maintenance, in accordance with previous studies of individuals with PMI [24, 41] as well as in other studies of time-budget data from healthy individuals [43].

The second hypothesis, that individuals cohabiting and/or having children living at home would spend more time engaged in daily activities and maintain a more balanced daily rhythm than individuals living alone, was partly supported. Individuals who had children living at home spent more time in the activity category of self-care/self-maintenance and reported TTA. Since most of the participants with children living at home were women, this finding sheds new light on the result that the women spent more time on self-care/self-maintenance. Thus, not only female gender, but also a family situation with children living at home, was linked to more time spent in this category. This is in agreement with the findings of Singleton and Harvey [42], who studied healthy individuals in Canada and highlighted the fact that activity patterns may be related to the presence or absence of children. Thus, the relationships between time use and family constellations seems to be worth further study, since about 28% of the adults with PMI are responsible for rearing children [44, 45]. No associations were found between cohabiting and any of the time-use variables. Furthermore, there were no differences between the two daily rhythm groups concerning cohabitation or having children living at home. These results concerning the family-related variables must be interpreted with

caution since a study on healthy individuals by Zuzanek and Smale [39], indicated that analyses using life-cycle variations, operationalised as a combination of varying conditions concerning four factors: age, marital status, presence of children and employment status, explained a greater amount of variance in time use than their constituent single-item components. Other results may have been found in the present study if the combinations proposed by Zuzanek and Smale [39] had been used.

The third hypothesis, proposing that individuals with a high level of psychosocial functioning, a diagnosis other than psychosis, a short period of contact with psychiatric services and few psychiatric symptoms would spend more time in work and other daily activities and maintain a more balanced daily rhythm, was partly confirmed. Associations were found between high levels of psychosocial functioning and time spent in work/education and long TTA.

Concerning diagnostic groups, differences were found between the group with psychosis and that with other diagnoses regarding time spent asleep, indicating that individuals with psychosis spent more time asleep. Furthermore, individuals with psychosis reported a shorter TTA than individuals with other diagnoses. These results are in accordance with results found in other studies [29-30]. Findings from the present study also indicated that individuals who had had a long period of contact with psychiatric services (>14 years) spent more time in activities pertaining to self-care/self-maintenance, and they were also more likely to have a beneficial daily rhythm. These results could be interpreted as the result of coping strategies developed over years of illness and that these individuals had managed to adapt and organise their daily life and daily rhythm in a beneficial way. Another explanation might be that these individuals had sufficient support from the psychiatric unit to maintain a beneficial daily rhythm. More research is needed within this area in order to identify how coping mechanisms develop over time, and how they are related to time use and daily rhythm.

The main results concerning associations between psychiatric symptoms and time spent on activities and daily rhythm indicated that individuals with more negative and/or general symptoms spent less time in work/education and had a shorter TTA. Furthermore, the results also indicated that individuals with more negative and/or general symptoms seemed to spend more time asleep. Similar results, indicating that individuals with high levels of negative symptoms and cognitive impairment were less active in daily activities, such as work, and had poorer outcome regarding social function, have also been reported in previous studies as well [29, 46]. However, according to the correlations between general symptoms and time spent in work/education and TTA in the present study, general symptoms were more strongly related to time spent in work/education and TTA than negative symptoms. These findings could be interpreted in several ways. One explanation could be that the sub-scale measuring general symptoms consisted of more items than the other sub-scales of BPRS and this could have affected the reliability of the measurement. Another interpretation could be that general symptoms indeed are an important factor in relation to time spent on activities, which is in accordance with some previous studies [47-49] indicating that general symptoms in individuals with PMI were related to having work. Moreover, Huppert and colleagues [50] found that general symptoms were more strongly associated with a better subjective quality of life than any other symptoms, and that higher anxiety ratings according to the BPRS were associated with less satisfaction with, e.g., daily activities, family and social relationships, even when the other symptoms on the BPRS were taken into account.

The results of the logistic regression analyses strengthen the latter interpretation, since general symptoms were the strongest contributor in explaining the risk of spending less time in work/education, and also contributed to explaining the risk of belonging to the short TTA

group. General symptoms also explained most of the risk of having an adverse daily rhythm. Negative symptoms did not explain any of the time-use variables or belonging to either of the two daily rhythm groups. Regarding time spent asleep, general symptoms explained most of the risk of belonging to the abnormal group. Having children living at home was the main variable in explaining a decreased risk of spending abnormal time asleep. Having a diagnosis of psychosis and/or high levels of general symptoms explained most of the risk of having a short TTA. Concerning the daily rhythm, general symptoms seemed to explain most of the risk of having an adverse daily rhythm, and there was an additional decreased risk for individuals who had had a long period of contact with psychiatric services.

Limitations

The present study had a cross-sectional design and the data collection was based on a one-time measurement. Cross-sectional designs are limited in that they can not explain any causal relationships or predict outcomes, but can serve to obtain more knowledge and to identify subgroups and variables worth further investigation in future research. The concept of risk factors was used in the present study, but the design of this study does not allow prediction, so the findings should be interpreted with caution. The sample in the present study was selected from patients attending a psychiatric outpatient unit, grouped into three strata from which the sample was randomly taken. In doing this, some of the problems concerning internal validity such as selection bias [51] were avoided. Concerning attrition, the dropout analysis showed that there were no substantial differences between participants and non-participants, and since the sample was randomised the findings of the study could be generalised to similar types of populations. The geographic area from which the sample was drawn was a city with a highly educated population and all of the participants attended the same psychiatric unit, which

limits the possibility of generalising the findings. Moreover, most of the participants with PMI were living alone, and it is important to bear this in mind when generalising the findings.

The instruments used in the present study have been tested for reliability and validity.

However, the GAF-scale is a quite blunt instrument, depending greatly on how well trained the interviewers are [34]. Furthermore, two of the four subscales in the BPRS consist of very few items, and therefore the precision within these measurements could differ between subscales, affecting the internal validity of the study. The yesterday activity diary is considered to be a useful method when evaluated by interview [40], and the validity of the data collected here was good, as reflected in how representative the reported day was for the participants. However, using the yesterday activity diary for one weekday by recall could have influenced the internal validity and thereby the external validity, in some respects. The data collected reflected subjective recollections of the activities performed during the previous 24 hours and the participants' recollections may have been selective. Furthermore, the assessment could have been obtrusive since the participants knew they were being assessed. Difficulties in recalling all events during the interview when using the yesterday diary have also been highlighted by Pentland and McColl [15]. Furthermore, the categorisation of the reported activities, made by the first author, implies a subjective interpretation of the activity to fit a specific category. However, the inter-rater agreement was good, rendering some reliability to the method of categorisation.

The statistical methods used in the present study were non-parametric methods, since all data except the time-use variables were ordinal data. Power calculations were performed in order to increase the likelihood of detecting a true difference and avoiding type II errors. The correlations were low to moderate and may not have any clinical significance. Furthermore, several of the variables were dichotomised at the median cut point, in order to analyse data

with the logistic regression method, which inevitably means that much of the variation within these variables was lost. However, the logistic regression analysis was considered the most appropriate method since most of the variables were ordinal and did not have a normal distribution [32]. Thus, the results should be interpreted with caution and should be replicated. Moreover, some factors of potential importance were not addressed in the present study, such as socioeconomic factors. Furthermore, duration in years since onset of symptoms and age at onset have been found to be predictive of functional outcome [26] but these factors were not investigated in the present study.

Conclusions and clinical implications

The main findings were that time spent in daily activities increased with age, and that older individuals more often had a beneficial rhythm. Women and those living with children spent more time engaged in self-care/self-maintenance. Those working with individuals with PMI may have to help young individuals, perhaps especially young men, in structuring their day such that they are engaged in activities that they find meaningful in order to maintain a balance in their daily activities and daily rhythm. Individuals diagnosed as having psychosis spent less total time in daily activities than individuals with other diagnoses, and general symptoms explained most of the risk of spending short periods in work/education as well as the risk of an abnormal time asleep and an adverse daily rhythm. General symptoms, such as anxiety, self-blame and difficulties in cooperating with others, seemed to explain most of the risks of spending little time in daily activities and adverse daily rhythm. These symptoms have to be taken into account when helping these individuals in their daily life. Engagement in therapeutic and meaningful activities has been suggested to counteract these general symptoms [52-54], and motivating these individuals to further engagement in activities in their daily life might lead to fewer symptoms and to perceptions of better health and wellbeing.

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Table I. *Sociodemographic and clinical characteristics of the women and men included in the study (N=103).*

Sociodemographic and clinical characteristics	Men (n=56)	Women (n=47)
Age, mean (SD)	39.5 (8.4)	39.4 (7.2)
Living alone	40	30
Cohabitant	16	16
Living with their own children	5	16
Duration since first contact with psychiatric services in years, mean (SD)	15.0 (7.8)	15.2 (8.7)
Diagnostic group:		
Group 1 (schizophrenia and other psychoses)	34	26
Group 2 (affective disorders, personality disorders and Asperger's syndrome)	22	21
Psychosocial functioning (GAF), mean (SD)	66.0 (11.6)	68.0 (9.6)
Symptoms (BPRS), mean score (SD)	1.92 (0.52)	1.72 (0.42)

Table II. *Time spent (mean values in minutes) in the various activity categories, distributed according to sex, diagnosis and age group.*

Time-use variables	Sex	Diagnosis	Age group (years)		
	Male/female	Non-psychosis/ psychosis	20-33	34-42	43-55
Self-care/self-maintenance	350/405	357/387	323	369	435
Work/education	131/146	195/97	138	126	150
Play/leisure	328/268	326/283	333	284	287
Rest/relaxation	45/33	24/50	45	36	37
Sleep	558/558	512/590	583	599	482
TTA*	809/818	878/768	795	780	872

*TTA = total time devoted to activities, i.e. the sum of the times spent in the categories work/education, play/leisure and self-care/self-maintenance.

Table III. *Correlations between time-use variables during the 24-hour period studied and clinical variables (N=103).*

Time-use variables	Psychosocial functioning	Years of contact with psych. serv.	Negative Symptoms	Positive Symptoms	General Symptoms	Depressive Symptoms
Self-care/self-maintenance	-.163	.306**	.067	.082	.059	.032
Work/education	.380**	.037	-.325**	-.311**	-.449***	-.340***
Play/leisure	-.147	.157	.049	.177	.094	.157
Rest/relaxation	.119	.103	-.029	.031	-.066	-.066
Sleep	-.155	.178	.269**	.120	.289**	.148
TTA †	.229*	.131	-.302**	-.157	-.366***	-.185

Note. Spearman's correlation test was used.

* $p < .05$. ** $p < .01$. *** $p < .001$

† TTA = see Table 2

Table IV. Results from logistic regression analyses with sociodemographic and clinical variables as independent variables and time-use variables as dependent variables in the models.

	Odds ratio	95% CI	P-value
<i>Time spent in work/education</i>			
BPRS general symptoms	2.99	1.33 - 6.73	.008
<i>Time spent asleep</i>			
BPRS general symptoms	4.64	1.90 - 11.29	.001
Having children living at home	0.18	0.04 - 0.83	.029
<i>Total timespent on activities (TTA)</i>			
Psychosis diagnosis	3.25	1.34 - 7.90	.009
BPRS general symptoms	3.73	1.55 - 8.99	.003
<i>Daily rhythm group</i>			
BPRS general symptoms	2.53	1.14 - 5.64	.021
Duration psychiatric services (years)	0.38	0.17 - 0.87	.021

