

BMJ Open Cognitive screening and behavioural observation of functional ability in patients with multiple episode schizophrenia: an exploratory study

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ABSTRACT

Objectives To evaluate the usability of a neuropsychological screening instrument and two observation scales of everyday behaviour to describe cognitive and functional capacity of patients with multiepisode schizophrenia and considerable care needs, who frequently refuse to participate in cognitive testing or performance-based functional measurement.

Setting One psychiatric unit specialised in severe mental illness at the Sahlgrenska University Hospital, Gothenburg, Sweden.

Participants Patients were included consecutively from date of admission to the unit. Inclusion criteria: age 18–65 years, International Classification of Diseases 10 diagnoses F20.0–F20.9 (schizophrenia) or F25.0–F25.9 (schizoaffective disorder) since at least 5 years. Exclusion criteria: acute serious psychotic episodes or physical illness, alcohol or drug abuse during the year before the study, diagnosed cerebral disorder at admission to the unit, and insufficient ability to speak Swedish. 64 patients filled the criteria and 19 accepted participation: 14 males, 5 females, median age 56 years.

Outcome measures Barrow Neurological Institute Screen for Higher Cerebral Functions (BNIS) scores, measured by a psychologist; Frontal Systems Behaviour Scale (FrSBe) Family Version and Functional Independence Measure (FIM) V.4.0 scores, measured by nursing staff. Non-parametric statistics were consistently applied to process the data.

Results Failure analysis showed differences regarding gender and subdiagnoses between participants and non-participants. All participants had BNIS scores indicating cognitive dysfunction. FrSBe group medians showed apathy and executive problems, indicating possible frontal lobe disturbance. FIM showed dependency on others for linguistic and social communication, everyday problem solving, and remembering persons and daily routines. Correlations between FrSBe and FIM ($p \leq 0.01$) suggested executive dysfunction being crucial to explain difficulties in performing activities of daily functioning.

Conclusions Indications of considerable cognitive and functional difficulties found among the participants suggested that the instruments are clinically applicable for tentative assessment of cognitive and functional ability among patients with multiepisode schizophrenia and considerable care needs.

Strengths and limitations of this study

- The study shows that cognitive screening and observational methods concerning behavioural disturbances and activity limitations of daily living, the latter performed by nursing staff, are usable assessment tools in clinical work with patients with multiple episode schizophrenia diagnoses and comprehensive care needs, who are often unwilling to undergo neuropsychological testing and performance-based functional activity measurement.
- The study data may be useful in future research where assessment methods of cognitive ability, behaviour characteristics and capacity of everyday living that are less demanding for patients are further explored.
- As nearly two-thirds of the patients filling the criteria refrained from participation, the actual study group is small and cannot be considered fully representative, and there is no control group consequently used for the assessments.
- The absence of data about medication and comorbidity in the patient group is a limitation from a scientific perspective, since their inclusion could have contributed to the understanding about whether the cognitive and functional impairments are actually related to schizophrenia, or if they could be related to pharmacological side effects or to other diseases.

INTRODUCTION

The nature and number of symptoms and functional capacity disturbances in schizophrenia vary throughout the course of the disorder,¹ and accompanying psychosocial consequences need to be met accordingly.² Memory and attention impairments, reduced executive function and social communication problems are common among adults and older patients with multiple episode schizophrenia^{3–5} and are related to problems in everyday functioning.^{6,7} Also, negative symptoms characterised by behavioural disturbances such as avolition, social

withdrawal and reduced emotional responsiveness often appear in this group.^{7–10} Some studies compare cognitive decline and negative symptoms in schizophrenia to frontotemporal dementia.^{11 12} Frontotemporal hypoperfusion measured by single-photon emission CT in patients with schizophrenia has been shown,¹¹ and functional MRI has revealed prefrontal cortical hypoactivation during task performance.¹³ In MRI studies, bilateral prefrontal cortex volume reduction has been found to correlate with executive dysfunction in patients with schizophrenia.¹⁴

Recognising and assessing cognitive impairment, behavioural disturbances related to negative symptoms and reduction of everyday functional capacity are clinically important in patients with multiple episode schizophrenia and considerable care needs.¹⁵ An extensive need for care and support is common, where adequate strategies for treatment and rehabilitation have to be chosen.^{9 16 17} In clinical practice, these patients often decline from participating in neuropsychological testing or performance-based functional measurement, or leave before the investigations are completed. Stigma of mental illness, distrust in research and researchers, illness severity and lack of acceptance of illness have been identified as barriers to participation in mental health studies, as well as language difficulties and immigration status.^{18 19} Age, long duration of illness and long treatment duration have been found to be associated with dropout from psychosocial treatment studies among persons with schizophrenia spectrum disorder.²⁰ It has been proposed that caregivers should be engaged in the recruitment procedures for studies involving persons with mental health problems.¹⁸ Facilitating factors may also include the choice of measurement methods. Neuropsychological screening, with a limited number of relatively easy tasks representing different cognitive areas, does not require much time and effort from the person investigated. Thus, it may be a useful tentative assessment tool of cognitive ability. Behavioural observations in authentic clinical or housing settings performed by nurses and housing facility staff may be applied to measure everyday behaviour and functional capacity. Assessment methods that use their knowledge¹⁶ without requiring the patients' presence during assessment sessions may be suitable when patients are unwilling to take an active part in functional activity assessment.

AIMS

To investigate whether a neuropsychological screening instrument and two rating methods, using knowledge from behaviour observation in daily activities, may be useful to assess cognitive capacity and functional ability in a group of patients with multiple episode schizophrenia and comprehensive care needs.

To describe the results regarding cognition and functional ability found in the patient group by the application of the instruments.

MATERIALS AND METHODS

Settings

Patients from a psychiatric care unit with multiple episode schizophrenia at the Psychosis Clinic, Sahlgrenska University Hospital, Gothenburg, Sweden, were included in the study. The unit is organised as a modified Assertive Community Treatment team¹⁹ with a basic goal to support and facilitate life outside psychiatric institutions. Each patient has a case manager from the psychiatric care unit coordinating interventions and staying in contact with patients, families, social service, housing facilities and other social authorities. Some patients live in houses or apartments they own or rent with part-time support from community staff. Other patients live in accommodations with continuously present caregiving staff.

Inclusion and exclusion criteria

Patients aged 18–65 years with International Classification of Diseases diagnoses F20.0–F20.9 (schizophrenia) or F25.0–F25.9 (schizoaffective disorder) were included. Further, patients had to have been diagnosed at least 5 years before the study began. Time since onset of severe mental illness was defined as the number of years between the date of the first admission to inpatient psychiatric care and the date for the first assessment in the study.

Excluded from participation were patients with acute serious psychotic episodes with hallucinations or disorganised thoughts that seriously impaired their ability to communicate, acute severe physical illness requiring hospitalisation and affecting their capacity to communicate, such as stroke or pneumonia requiring intensive care. Other exclusion criteria were ongoing alcohol or drug abuse during the last year before the start of the study, other diagnosed cerebral disorder at admission to the unit or insufficient ability to communicate in Swedish.

Measurements

Barrow Neurological Institute Screen for Higher Cerebral Functions
Barrow Neurological Institute Screen for Higher Cerebral Functions (BNIS) is a screening instrument intended to get a basic apprehension of cognitive functions in neurological disorders, irrespective of diagnosis. The test–retest and inter-rater reliability of the BNIS total scores have been investigated.²¹ Construct validation has been performed comparing BNIS with the Mini-Mental State Examination.²² BNIS sensitivity has been tested and found to be 88% in a study where patients with known cerebral dysfunction (n=41) performed worse than patients with various psychiatric diagnoses (n=22) and general medical patients (n=22).²³ None of the six psychiatric patients with psychosis diagnoses could correctly estimate their performance on a memory item: five overestimated and one underestimated their capacity. A Swedish study differentiating brain damaged patients from controls found BNIS sensitivity at 88% and specificity at 78%.²⁴ BNIS is available in Swedish and has Swedish norms and manual.²⁵ In the present study, comparisons have been made between the participating 19 patients' BNIS scores and those of a

Swedish control group (n=92)²⁶ from a study undertaken at University of Gothenburg as part of the data collection process for the Swedish BNIS norms and approved by the Ethics committee of University of Gothenburg. The control group was recruited mainly from staff from different vocational categories within a university hospital setting. Inclusion criteria were: no history of brain dysfunction, psychiatric illness or substance abuse; no dyslexia; having Swedish as first language; no serious visual or hearing impairment and no acute illness. The group was divided into age groups: 19–59 years, 60–69 years and 70–87 years, respectively. Gender distribution was 41 males and 51 females.

BNIS starts with a prescreen assessing degree of consciousness/alertness, basic language function and degree of cooperation in order to decide whether further screening is feasible. The seven subscales of BNIS include speech and language, orientation, attention/concentration, visuospatial ability and visual problem solving, memory, affect and self-awareness of memory performance. On the self-awareness of capacity scale, test persons are asked to estimate the number of words they will later remember on one of the memory items. If the number estimated and actual remembered words are the same, 1 point is given. Zero point is given if patients estimate more or fewer words than they actually remember.

BNIS is constructed so that healthy persons should get maximum or near maximum BNIS scores, hence the distribution for healthy people is skewed (maximum score=50; mean=47, SD=2). A total score of <47 points indicates possible cognitive dysfunction. The screening takes about 30 min to perform. BNIS measures operationally defined impairment aspects of capacity on the International Classification of Functioning, Disability and Health (ICF) level of function.²⁷

Frontal Systems Behaviour Scale

The Frontal Systems Behaviour Scale (FrSBe) contains 46 items, each with a 5 point scale, measuring three dimensions of observed dysfunctional behaviour in everyday life connected to frontal lobe dysfunction, the higher the value the more severe the problem.²⁸ The apathy dimension refers to reductions of activation, spontaneous behaviour and motivation, and the disinhibition dimension concerns impulse control problems, and the dysexecutive dimension describes difficulties with planning, shifting, sequencing and other disturbances in everyday problem solving. The scores for the three dimensions are added to generate a total score. There are two versions, a Self and a Family Rating Scale. FrSBe has been tested for internal consistency and found to be acceptable for all subscales and total scale, especially the Family Rating Scale. Convergent and discriminant validity have been investigated, including factor analysis²⁹ in the USA. American norm groups are described in the Psychological Assessment Resources (PAR) Professional Manual of the FrSBe.²⁸ In this study, a Swedish translation of the Family Rating Scale made by ENB following the

procedure required by the editor PAR, and approved and licensed by them, was used. Since no Swedish norms exist for FrSBe, raw scores for the three subscales and the total score of each patient were transformed to T-scale scores for the American norm group of corresponding age, gender and educational level. According to the manual, FrSBe T-scale scores of ≥ 65 are considered to indicate frontal system functional impairment, scores of 60–64 are interpreted as a borderline disturbance, whereas scores < 60 are considered to reflect normal function. FrSBe measures authentic behaviour in everyday situations on the ICF level of activity and participation.²⁷

Functional Independence Measure V.3.0

Assessment of activities of daily living (ADL) function was made with the FIM,³⁰ measuring authentic behaviour in everyday situations on the ICF level of activity and participation.²⁷ FIM is an observation scale for activity and activity limitations of daily living, reflecting what a person actually does. A state without activity limitations is considered as independent, and there are no norms for the FIM. The reliability and validity of FIM have been investigated.^{31 32} FIM is used as a standard measure of activity by most North-American healthcare systems for assessment of rehabilitation. It has been translated into Swedish and validated on a Swedish population.³³ FIM has been used with many conditions and disorders in rehabilitation settings³⁴ and is intended to be used by different professions after receiving training by certified staff. The FIM consists of 18 behavioural domains, 13 on a Motor Scale and 5 on a Social-Cognitive Scale.³⁵ The Motor Scale has subscales for personal care, elimination and mobility, and the social-Cognitive Scale has subscales for communication and social interaction. Each domain is evaluated on a 7 point scale with descriptions of requirements for each point. Seven points are defined as total independence, and 1 point means total dependence. Six points indicate modified independence, requiring the need of an assistive device. ADL dependence is defined at ≤ 5 points, where supervision, set-up or assistance from another person are required in order to perform the activity.³⁶ Maximum for the Motor Scale is 91 points and for the Social-Cognitive Scale 35 points.³⁰ In this study, the cut-off limit for ADL subscale dependence is defined as number of subscale domains $\times 6 - 1$, meaning ≤ 77 for the Motor Scale, ≤ 29 for the Social-Cognitive Scale, ≤ 35 for personal care, ≤ 11 for communication and ≤ 17 for social interaction.

Besides total Motor and Social-Cognitive Scale scores, the Motor subscale Personal Care Score and the domain Grooming Score are analysed in this study. On the Social-Cognitive Scale, each of the five domain scores for comprehension, expression, social communication, problem solving and memory are analysed.

Procedure

Flow chart is shown in figure 1.

Consecutive patients chosen according to the inclusion and exclusion criteria were included. All patients were

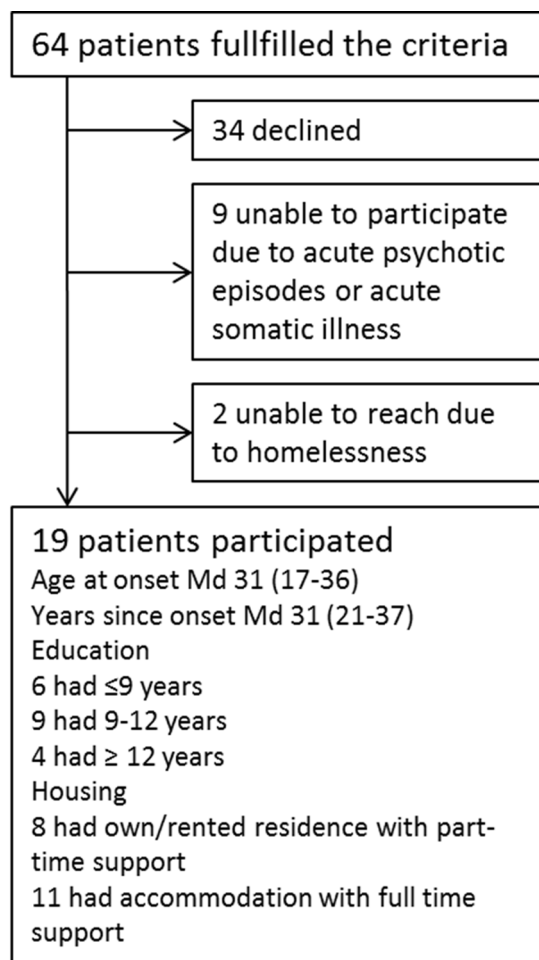


Figure 1 Flow chart. Md, median.

given oral and written information about the study by their case managers and gave written consent to participate in the study and to the publication of data collected about them. The data collection for each patient started within 2 weeks after the date of written consent and was completed within a 3-week interval.

BNIS assessments for each patient were performed by a psychologist (ENB). Following the patients' wishes, some of them were visited in their homes. For others, the screening was performed at the unit.

The FrSBe Family Ratings were made by the patient's case manager together with a staff member from housing support working with the patient on an everyday basis. A manual was produced by ENB to guide the ratings, stressing the importance of estimating the patient's actual behaviour compared with a healthy person of the same age, sex and educational level, and to choose the highest value in case of disagreement about an item.

FIM scores for each patient were compiled by the occupational therapist of the unit at an assessment session together with the patient's case manager and the same staff member from housing support who made the FrSBe rating.

The study has received ethical approval from the Regional Ethical Review Board in Gothenburg, number 704-10.

Table 1 Demographic data for the patient group, n=19

Gender, M/F (n)	14/5
Age in years, Md (min/max)	56 (48/63)
Diagnosis, schizophrenia/schizoaffective	15/4
Educational level, ≤9/9-12/>12 years	6/9/4
Age at onset in years, Md (min-max)	25 (17-36)
Years since onset, Md (min-max)	31 (21-37)
Housing situation, own/sheltered	8/11

Md, median.

Statistics

Since the study group was small, the measurements were ordinal scales, and the results could not be expected to be normally distributed, non-parametric methods were applied for statistical analysis. Medians (Md) and minimum-maximum values (range) were used as descriptive measures, and Spearman's rho was chosen for correlation between the instruments. Comparisons of BNIS scores between the patient and control groups were made with Mann-Whitney U test. For all correlations and difference calculations, significance levels of $p \leq 0.01$ were chosen. Statistic calculations were made using SPSS V.22.

RESULTS

Demographic data

Demographic data are shown in table 1.

No difference was found between patients with schizophrenia and patients with schizoaffective syndrome according to the median age at date of first admission to inpatient care. Two women had schizophrenia diagnoses, and three women had schizoaffective diagnoses. Supplementary basic antipsychotic medication data from the patient charts were collected after the study was completed. Seventeen patients had antipsychotic medication on the date of their first assessment for the study. Of those, 10 received injections and seven were ordained oral administration. One patient had no medication, and for one patient, medication information was no longer available. None of the patients in the participant group were married and none lived with a partner or with children.

Comparisons according to age, gender and diagnosis between study participants, non-participants and all patients from Sahlgrenska University Hospital Register for psychotic disorders 2014 are shown in table 2.

Barrow Neurological Institute Screen for Higher Cerebral Functions

BNIS total score distributions for the patient group and the Swedish control group are shown in figure 2.

Significant differences were found for the total score and for each of the seven subscales, $p < 0.001$ (table 3).

On the two visual problem solving items, 16 patients scored 0 points on visual sequencing and 18 scored 0 points on pattern analysis. On the affect items, nine patients

Table 2 Characteristics of participants, non-participants and Sahlgrenska University Hospital register patients 2014

Demographic	Participants (n=19)	Non-participants (n=34)	Register patients (n=536)
Age in years, median (range)	56 (48–64)	54 (37–64)	Mean 52.8 (19–88)
Female gender, n (%)	5 (26)	15 (44.1)	227 (42.3)
Schizophrenia	2 (10.5)	13 (38.2)	149 (27.7)
Schizoaffective	3 (15.8)	2 (5.9)	78 (14.5)
Male gender, n (%)	14 (74)	19 (55.9)	309 (57.6)
Schizophrenia	13 (68.4)	15 (44.1)	269 (50.1)
Schizoaffective	1 (5.2)	4 (11.8)	40 (7.5)
Diagnoses			
Schizophrenia/ n	15/4	28/6	418/118
Schizoaffective %	79/21	82/18	78/22
Schizophrenia, n(%)			
Paranoid	1 (5.3)	6 (17.6)	162 (30.2)
Hebephrenic	4 (21.1)	0	9 (1.7)
Undifferentiated	1 (5.3)	3 (8.8)	41 (7.6)
Residual	3 (15.8)	3 (8.8)	35 (6.5)
Simplex	0	0	4 (0.7)
Other specified	0	0	8 (1.5)
Unspecified	6 (31.6)	16 (47.1)	159 (29.7)
Schizoaffective, n (%)			
Manic type	0	1 (2.9)	5 (1.0)
Depressive type	0	0	16 (2.9)
Mixed type	0	1 (2.9)	26 (4.9)
Unspecified	4 (21.1)	4 (11.8)	71 (13.2)

scored 0 points on affect expression, seven scored 0 on affect perception and 11 scored 0 on spontaneous affect, whereas two scored 0 on affect control. Fifteen patients scored 0 points on the item awareness of memory problems; all except one estimating that they would remember more words than they actually did. The medians on the Orientation Scale are the same for patients and controls; however, the results for the two groups are significantly different because there was no variation in the control group distribution as all participants scored 3.

Frontal Systems Behaviour Scale

The median T-scores for the patient group were apathy Md=74 (38–131), disinhibition Md=58 (40–96), dysexecutive Md=71 (44–106) and total score Md=71 (44–103) (figure 3). Thus, group medians for the Apathy Scale, the Dysexecutive Scale and the total score indicated possible frontal system disturbance, whereas the median for the Disinhibition Scale lay within normal limits. Of the four patients with the highest scores on the Disinhibition Scale, three were women. One of these had schizoaffective syndrome, the others had schizophrenia. The raw scores are shown in table 4.

Functional Independence Measure

The cut-off limits for ADL subscale dependence are defined as ≤ 77 for the Motor Scale, ≤ 29 for the Social-Cognitive Scale, ≤ 35 for personal care, ≤ 11 for communication and ≤ 17 for social interaction (table 5).

The FIM median Motor Scale score showed independence for the patient group, Md=86 (47–91). Further analysis of the Motor subscale personal care showed that seven patients scored ≤ 35 , indicating dependence on others. On the grooming domain of the personal care subscale, 10 patients were rated as dependent.

Three of the five women in the study group managed their personal care independently. These women all had schizoaffective diagnoses.

Correlations

BNIS total score correlated with the number of years since onset of severe mental illness ($\rho = -0.638$, $p < 0.01$). Thus, the longer the time since onset the more cognitive dysfunction was found. The correlations between FrSBe and FIM are shown in table 6.

DISCUSSION

The application of the BNIS, FrSBe and the FIM indicate possible considerable cognitive dysfunction, behavioural disturbances, executive difficulties and ADL problems in a group of patients with multiple episode schizophrenia spectrum disorders and comprehensive care needs. The methods may be used in clinical work with patients unwilling to participate in more comprehensive investigations, thus providing data important for the psychosocial treatment and rehabilitation. By the use of observational methods of functional ability, nursing staff knowledge about patients' behaviour in daily activities is utilised. The low number of included patients is a study limitation, impeding the generalisability of the results.

Comparative data show differences between study participants, non-participants and all patients with schizophrenia and schizoaffective diagnoses from the Sahlgrenska University Hospital Register of psychosis 2014. The participants and non-participants are mainly middle aged, whereas the age distribution of the register patients is considerably broader, including both younger and older adults. Female gender is less common among participants and non-participants than in the local register. Hebephrenic and residual schizophrenia diagnoses, both characterised by negative symptoms such as blunted affect, passive and apathetic social withdrawal, lack of spontaneity and difficulty in abstract thinking, are more common in the participant group, whereas paranoid schizophrenia is less common. Thus, the results of the participant group cannot be generalised to patients with multiple episode schizophrenia spectrum disorders, or schizophrenia spectrum disorders in general.

The BNIS results indicate possible cognitive impairment for all patients. The median BNIS total score is lower than the means for clinical groups with traumatic

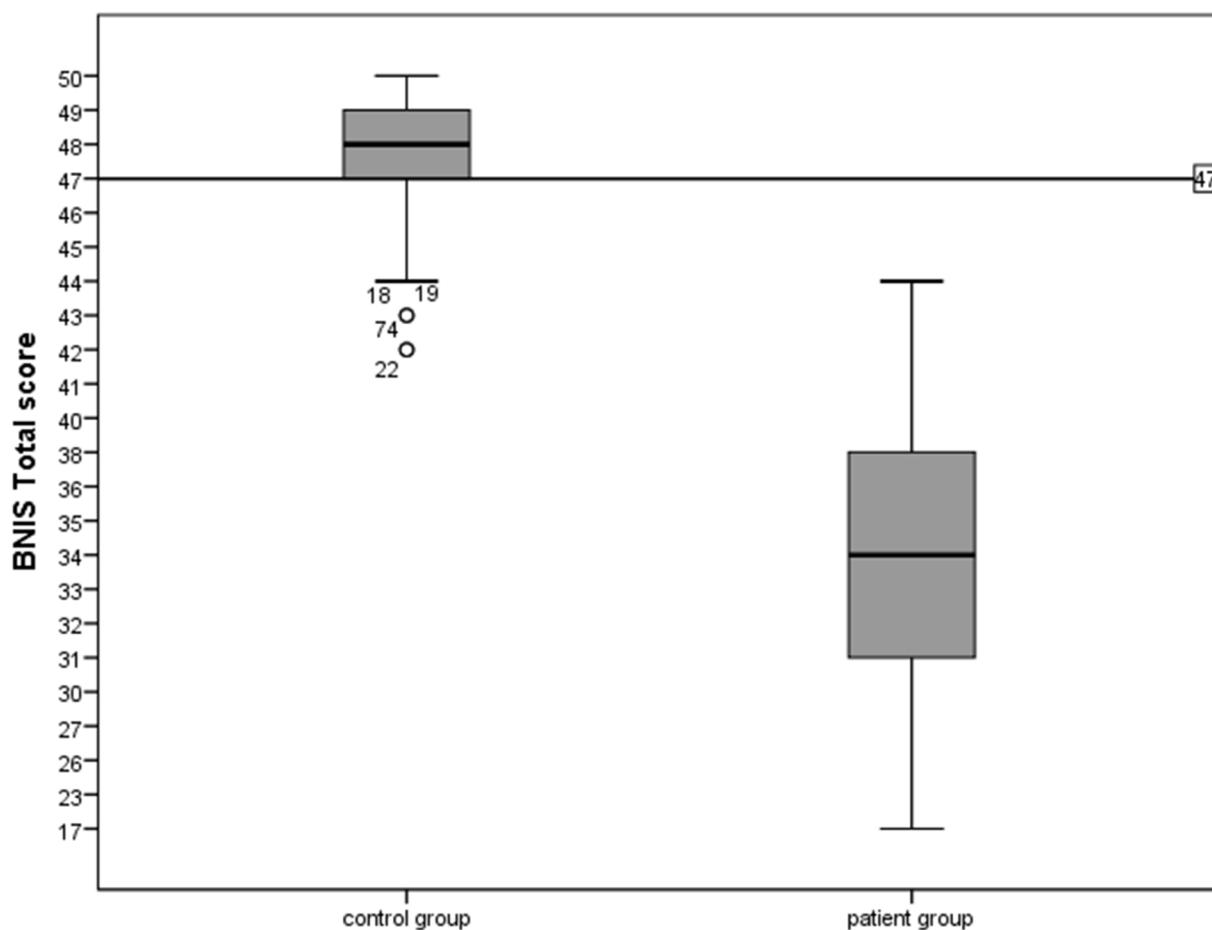


Figure 2 BNIS total score distributions for the study patient group (n=19) and a Swedish control group (n=92). Cut-off line=47 points. BNIS, Barrow Neurological Institute Screen for Higher Cerebral Functions.

Table 3 Barrow Neurological Institute Screen for Higher Cerebral Functions: medians, min/max, means, SD and group differences of the total score and subscales for the patient group and a Swedish control group

	Patients (n=19)			Controls (n=92)			Group differences p Value
	Median	Min/max	Mean (SD)	Median	Min/max	Mean (SD)	
Age	56	48/64		42	19/69	43.3 (13)	
Total	34	17/44	33.4 (6.9)	48	42/50	47.5 (2.0)	<0.001*
Subscales							
Speech and language	13	5/15	12.2 (2.8)	15	14/15	14.9 (0.3)	<0.001*
Orientation	3	1/3	2.6 (1.1)	3	3/3	3.0 (0)	<0.001*
Attention	1	0/3	1.3 (1.1)	3	0/3	2.5 (0.7)	<0.001*
Visuospatial	5	1/7	4.8 (1.5)	7	4/8	7.2 (0.8)	<0.001*
Memory	1	0/6	1.6 (1.7)	7	2/7	6.5 (1.1)	<0.001*
Affect	2	1/4	2.4 (1.1)	4	2/4	3.7 (0.6)	<0.001*
Awareness	0	0/1	0.2 (0.4)	1	0/1	0.8 (0.5)	<0.001*

*Mann-Whitney U test.

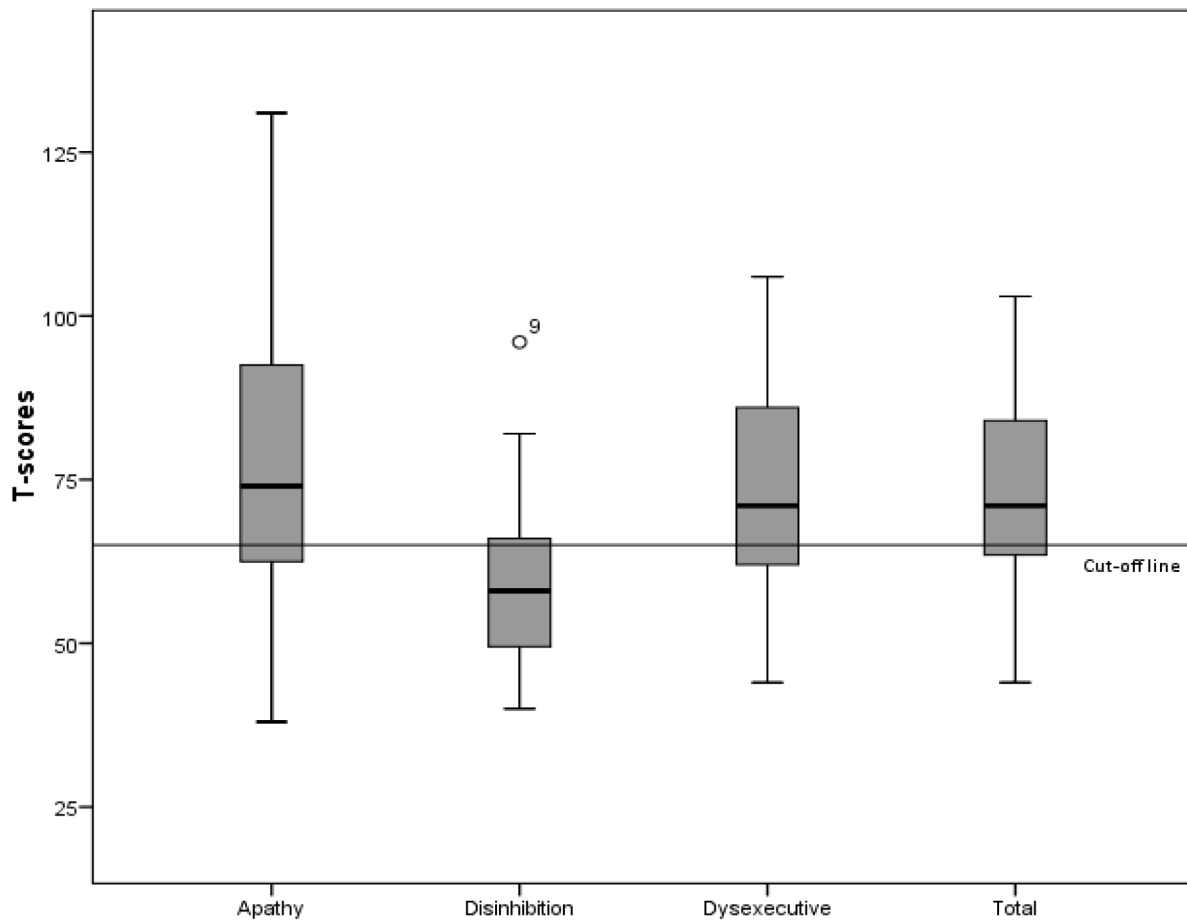


Figure 3 Frontal Systems Behaviour Scale distributions of T-scores for the study patient group (n=19). Cut-off line=60 points.

brain injury, Parkinson’s disease and anoxic brain injury after cardiac arrest.³⁶ BNIS reductions of memory, attention and problem solving are supported by similar results regarding memory, attention and executive function in neuropsychological test studies of middle aged and elderly patients with schizophrenia.^{4 37} BNIS total score and age are not correlated in this study, but BNIS total score correlates with time since onset of severe mental illness, indicating a possible worsening of cognition over the years. Studies of cognitive decline with age in schizophrenia have shown inconsistent results and there are methodological problems.³⁸ Factors such as history of long-term institutional care, persistent positive and negative symptoms, and poor response to conventional

treatment have been considered possible risks for cognitive decline among older patients with schizophrenia spectrum disorders. The results of the BNIS affective items reveal possible difficulties among the participating patients regarding emotional face identification and emotional expressive capacity known from schizophrenia research.³⁹ Most patients failed on the BNIS awareness of memory performance item, all but one overestimating their memory capacity. Some support for this result has been found in a BNIS validity study, where all six patients with psychosis diagnoses in a group of psychiatric patients made the same misjudgement.²³ This indicates awareness problems important to consider in rehabilitation and care interventions. Other research has shown that deficient awareness of symptoms are common among patients with schizophrenia.⁴⁰ High median Frontal Systems Behaviour Scale scores on the Apathy Scale measuring avolition/initiative problems, and on the Dysexecutive Scale measuring problem solving difficulties, indicate possible frontal dysfunction among patients in the study group. The score on the Disinhibition Scale is within the normal range. A similar FrSBe distribution was found in patients with schizophrenia selected for high levels of negative symptoms in a study comparing

Table 4 Frontal Systems Behaviour Scale, raw scores for subscales and total score of the patient group

	N	Median	Min/max	Mean	SD
Apathy	19	37	20/58	37.5	11.2
Impulsivity	19	28	19/45	28.8	6.9
Executive	19	45	28/72	48.6	11.8
Total	19	109	76/156	114.7	21.9

Table 5 Functional Independence Measure: medians, min/max, means, SD and dependency/independency distributions of the patient group, n=19

	Median	Min/max	Mean (SD)	Dependent/independent
Motor Scale, total	86	47/91	79.8 (13.7)	5/14
Personal care	38	12/42	33.7 (9.8)	7/12
Grooming	5	1/7	4.8 (2.3)	10/9
Social-Cognitive Scale, total	22	8/30	21.2 (6.1)	18/1
Comprehension	5	2/7	4.8 (1.6)	12/7
Expression	5	2/7	4.7 (1.6)	14/5
Social communication	3	1/7	3.8 (1.9)	14/5
Problem solving	4	1/5	3.3 (1.6)	19/0
Memory	5	1/7	4.6 (1.9)	14/5

their symptoms with those of patients with frontotemporal dementia.¹² Velligan *et al*⁴¹ found impairment on all FrSBe subscales in a larger group of schizophrenia outpatients who were younger and not selected for negative symptoms. MRI studies of schizophrenia have shown connections between bilateral prefrontal cortex volume reduction and the FrSBe Executive Dysfunction Scale.⁴² The median Motor Scale score of FIM showed independence for the study group, whereas the median score for the Social-Cognitive Scale indicated dependence on support and guidance by others for linguistic and social communication, solving of routine everyday problems and recognising and remembering people and daily routines. None of the patients was assessed as independent on the problem solving item; they all needed assistance in order to plan, execute and self-monitor the solution of problems and to make sensible and adequate decisions. A majority of the patients were assessed as dependent on assistance on the personal care item of grooming, possibly indicating difficulties in understanding its importance in social situations. Problems with everyday functioning have been found in schizophrenia research, using methods that in various ways require active communication or interviews with patients.^{43–46} Unlike this, the FIM items measure activity and social communication using staff observations of patient behaviour in authentic everyday life situations. In this way, important ADL-related problems can be addressed in daily clinical work after actually seeing them. The use of FIM has very rarely been reported in

schizophrenia research. Only one published article was found,⁴⁷ where it was used as an outcome measure in the treatment of acute schizophrenia.

The different levels of measurement may explain the absence of correlations between BNIS and FrSBe or FIM results. The BNIS investigates operationally defined aspects of cognitive function on the ICF level of impairment.²⁷ The possibility to explain everyday behaviour from its results may be limited, since everyday activities are different from test items.^{15 48} However, all patients scored below the BNIS cut-off level for possible cognitive difficulties, and the low median score indicated extensive disability for the majority of the patients. Presumably, their capacity limitations entail more difficulties than normally expected to understand and handle problems and life situations, and thus meaning dependency on others. This assumption is confirmed by the fact that 18 patients were assessed as dependent on others on the Social-Cognitive Median Score of the FIMTM. FrSBe and FIM are both observation methods measuring authentic behaviour on the ICF level of activity and participation. The correlations found between them indicate a connection between observed executive problems and Social-cognitive ADL difficulties in the investigated group. Similar results have been found using other methods, measuring negative schizophrenia symptoms and ADL.¹⁵ The associations between the FrSBe and the FIM results suggest that problem solving difficulties may be crucial to explain the incapacity of patients to perform ADL activities central to functional independence.

Table 6 Correlations (Spearman's rho) between FrSBe scores and FIM scores

	FIM Social cognitive scores (p values)	FIM Social interaction scores (p values)
FrSBe Dysexecutive Scale	–0.819**	–0.854**
FrSBe total score	–0.827**	–0.903**

The correlations indicate that the more executive dysfunction the more problems in social interaction and dependency on others.

**p<0.01.

FIM, Functional Independence Measure; FrSBe, Frontal Systems Behaviour Scale.

This explorative study is concerned with basic assessment of possible cognitive and behavioural phenomena among persons who are often unwilling to participate in clinical assessment. The disturbances found may be influenced not only by schizophrenia per se, but also by other factors, such as medication and comorbidities.⁴⁹ Future research should include larger numbers of patients differing in cognitive capacity and functional ability. Detailed data for the severity and distribution of psychosis symptoms among schizophrenia spectrum subdiagnoses, brain scanning data and pharmacological data may contribute to further understanding of the nature of cognitive impairment and problems of everyday functioning among patients with multiple episode schizophrenia and comprehensive care needs.

CONCLUSIONS

The results of this study suggest that the BNIS, the FrSBe and the FIM may be useful assessment instruments in clinical work with middle-aged patients with multiple episode schizophrenia spectrum disorders and comprehensive care needs. Basic knowledge of cognitive capacity can be acquired with a minimum of effort from the patients. The nursing staff's knowledge about the patients' behaviour can be systematised using ratings on the ICF level of activity and participation to measure functional capacity. The individual patient's specific shortcomings and needs are shown, thus facilitating the provision of adequate interventions. The results show signs of considerable cognitive impairment, executive dysfunction and functional disability in the investigated group. They may also indicate that the executive problems found can be connected to frontal lobe dysfunction.

Correction notice This paper has been amended since it was published Online First. Owing to a scripting error, some of the publisher names in the references were replaced with 'BMJ Publishing Group'. This only affected the full text version, not the PDF. We have since corrected these errors and the correct publishers have been inserted into the references.

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Contributors ENB envisioned the project idea, performed and supervised the data collection, processed the collected data and wrote the article. EE and KSS supervised the project through all its phases, offering comments and advice on its content and on the disposition and formulation of the article. P is responsible for the ethics application and for the following of ethical rules and has the overall responsibility for the project. All authors have read and approved the final manuscript.

Competing interests None declared.

Patient consent Detail has been removed from this case description/these case descriptions to ensure anonymity. The editors and reviewers have seen the detailed information available and are satisfied that the information backs up the case the authors are making.

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