Functional outcomes and patient satisfaction following inpatient treatment for childhood-onset schizophrenia spectrum disorders vs non-psychotic disorders in children in the United Kingdom

Hayley Galitzer[1], Nefeli Anagnostopoulou[1] , Anca Alba[1] , Jorge Gaete[1,2,3] , Danai Dima[4,5] , Marinos Kyriakopoulos[1,6]

1National and Specialist Acorn Lodge Inpatient Children's Unit, Child and Adolescent Mental Health Clinical Academic Group, South London and the Maudsley NHS Foundation Trust, London, UK
2Faculty of Education, Universidad de los Andes, Santiago, Chile
3Millennium Nucleus to Improve the Mental Health of Adolescents and Youths, Santiago, Chile
4Department of Psychology, School of Arts and Social Sciences, City, University of London, London, UK
5Department of Neuroimaging, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK
6Department of Child and Adolescent Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK

Correspondence
*Dr Marinos Kyriakopoulos, MD, PhD, FRCPsych, Department of Child and Adolescent Psychiatry, Institute of Psychiatry, King's College London, P066, De Crespigny Park, London, SE5 8AF, UK. Email: marinos.kyriakopoulos@kcl.ac.uk

Funding information
This project was supported by South London and Maudsley NHS Foundation Trust. JG is supported by the Millennium Science Initiative of the Minister of Economy, Development and Tourism, grant "Millenium Nucleus to Improve the Mental Health of Adolescents and Youths, Imhay", Sandiago, Chile.

Abstract

Aim: The aim of this study was to compare clinical characteristics and treatment out- comes between children with Childhood-onset schizophrenia spectrum disorders (COSS) and children with other severe non-psychotic psychiatric conditions (non- COSS), all admitted to a national mental health inpatient children's unit.
Methods: We conducted a retrospective study of all children discharged from a national children's inpatient unit in the United Kingdom, between 2009 and 2018. We compared functional and treatment outcomes and satisfaction with treatment in COSS with non-COSS in the whole sample and separately for male and female patients.
Results: A total of 211 children (55% boys) were included in the sample. The mean age on admission was 129.7 months (10.8 years; age range, 6-12). Twenty cases were diagnosed with COSS (9.5%). In the whole sample, COSS patients had significantly lower Children's Global Assessment Scale (CGAS) scores on admission compared to non-COSS (P = .006). There was a trend towards children with COSS as a group hav- ing a longer admission (M = 194.6 days, SD = 125.4) compared to non-COSS (M = 135.8 days, SD = 86.2), (P = .053). Females with COSS seemed to have more significant differences compared to females with non-COSS, in particular, longer admissions (P = .016) and worse CGAS scores at discharge (P = .04), whilst in males, these differences seemed to be attenuated.
Conclusions: Children with COSS have lower functioning at the point of inpatient admission and possibly longer admissions, but similar satisfaction with treatment at discharge from hospital compared with non-COSS. Females with COSS may have worse functional outcomes compared to non-COSS at discharge.

KEYWORDS
admission, children, functional outcomes, satisfaction, schizophrenia

1. INTRODUCTION

Childhood-onset schizophrenia is a very rare condition with an estimated prevalence of one in 40 000 (Gochman et al., 2011). Although childhood-onset schizophrenia spectrum disorders (COSS) may be somewhat more common as they represent a broader category, they remain very rare with an estimated 1-year incidence in the UK of 0.21/ 100 000 (Tiffin and Kitchen, 2015). Diagnostic criteria for COSS are the same as in adult-onset types (American Psychiatric Association, 2013), with the only difference being children failing to meet the expected level of functioning for their age (American Psychiatric Association, 2013). COSS is neurobiologically (Loeb et al., 2018) and phenomenologically (Frazier et al., 2007) continuous with the adolescent and adult-onset types, but compared to these, is more severe, with worse prognosis, poorer psychosocial outcomes and more frequent treatment resistance (Kyriakopoulos and Frangou, 2007; Tiffin and Kitchen, 2015).

The treatment of COSS poses many challenges (Tiffin and Kitchen, 2015), whilst treatment response and recovery from an acute episode with multimodal interventions in a clinical setting has not been adequately evaluated. Considering how devastating a diagnosis of COSS is for families, we aimed to compare the functional gains associated with initial recovery relatively to other conditions with severe functional impairment in need of inpatient treatment. This was driven by our clinical experience of children with COSS improving substantially with intensive input in an inpatient setting.

To that end, we examined the clinical characteristics and treatment outcomes of children admitted to a national mental health inpatient children's unit. Considering that community mental health services may have fewer resources to treat such severe conditions and in line with our clinical experience, we hypothesized that COSS will be associated with lower functioning at admission and a greater change in functioning at discharge compared to non-psychotic disorders (non-COSS). As children needing inpatient treatment are generally very affected by their mental health difficulties (Kyriakopoulos et al., 2015), we expected that functional outcomes at discharge would be similar between the groups. We also hypothesized that satisfaction with treatment would be similar between the groups, as there is no published data to suggest otherwise.

2. METHODS

2.1 Participants

We conducted a retrospective analysis of children admitted in Acorn Lodge, a national children's inpatient unit in the UK. Acorn Lodge provides inpatient assessment and treatment for children between the ages of 6 and 12 with severe and complex mental health and neurodevelopmental disorders from across the UK. The service is one of only eight child inpatient units in the country funded by NHS England and children are discharged when they are clinically deemed to be ready without time restrictions. All children discharged from the unit over a 9-year period between September 2009 and June 2018 were included in this project which was part of a wider service evaluation on the use of outcome measures and users' satisfaction approved by South London and Maudsley NHS

Foundation Trust Child and Adolescent Mental Health Services Clinical Governance Committee.

2.2 Assessments

The following data were analysed, all collected from the children's electronic clinical notes: age on admission, diagnosis, medication on admission and discharge, length of inpatient admission, Children's Global Assessment Scale scores (CGAS) (Shaffer et al., 1983) on admission and at discharge, being in education on admission and at discharge, and satisfaction data from parents and children using the Acorn Satisfaction Questionnaire(ASQ; Kyriakopoulos et al., 2015).

Diagnoses were made in accordance with the Multiaxial ICD-10 classification of child and adolescent psychiatric disorders (World Health Organization, 1996) and confirmed as part of this study using the ICD-10 diagnostic criteria for research (World Health Organization, 1993). The COSS group included cases meeting criteria for schizophrenia, schizotypal and delusional disorders (ICD 10 F20-F29) and the non-COSS group included all other children (eg, autism spectrum disorder, severe depression and eating disorders).

Separate analyses were conducted for any medication on admission and at discharge (including antipsychotics, antidepressants, mood stabilizers, stimulants, atomoxetine and alpha 2 agonists) and antipsychotics at any point and at discharge.

The CGAS was originally created as an adaptation of the Global Assessment Scale for adults (Endicott et al., 1976) and designed to reflect the lowest level of functioning for children during a specified time period. It has values from 1, representing the lowest level of functioning, to 100, representing the highest. Scores over 70 represent nor- mal functioning. The questionnaire is divided into different categories of impairment every 10 points, which the rater first decides on (eg, 31- 40: Serious Problems), before assigning a score within the category. The CGAS has been used extensively in clinical and research settings.

The ASQ is a 9-item questionnaire, with 7 items responded by parents and 2 by children, which has been previously used in this population (Kyriakopoulos et al., 2015). Each item is scored from 1 to 5, and the total score can be calculated separately for parent-responded items and children-responded items. The highest score (indicating highest satisfaction) is 35 for the parent-responded items and 10 for the children-responded items.

Children not being in education was defined as them not attending school for more than 50% of the time for at least 2 weeks prior to admission, or not having an identified educational placement at discharge.

2.3 Statistical analyses

All admissions were included in the analysis. Categorical variables were analysed with Pearson's chi-square, or Fisher's exact test if the values in any of the cells of contingency tables were below 5, and continuous variables were analysed with the t-test. Separate analyses were also conducted for male and female patients, and younger and older patients

using as cut-off the median age for the total sample. The IBM Statistical Package for Social Sciences (SPSS) version 26.0 was used.

3 RESULTS

3.1 Whole sample

A total of 211 children (55% boys) with a wide range of diagnoses and comorbid conditions were included in the sample. The mean age on admission was 129.7 months (10.8 years). Twenty cases were diagnosed with COSS (9.5%). Comparison data are detailed in Table 1. COSS patients had significantly lower CGAS scores on admission compared to non-COSS patients ($t = 2.767$, $df = 209$, $P = .006$) whilst scores at discharge were not statistically different between the groups ($t = 1.300$, $df = 209$, $P = .195$). There was a trend towards children with COSS having a longer admission (M = 194.6 days, SD = 125.4) compared to non- COSS (M = 135.8 days, SD = 86.2), ($t = -2.049$, $df = 20.924$, $P = .053$). There was no difference in satisfaction with the service or being in education on admission and at discharge between the two groups. Children with COSS were more likely compared to non-COSS to be on medication at discharge (Fisher's exact test $P = .009$), antipsychotic medication at any point (Fisher's exact test $P < .001$) and antipsychotic medication at discharge (Fisher's exact test $P < .001$). Details of the results for the whole sample can be found in Table 1.

3.2 Analyses in males and females

In the analyses by gender (Tables 2 and 3), the above differences seemed to be more pronounced in female patients, where COSS was associated with a higher proportion of girls not being in education on admission (Fisher's exact test $P = .025$), statistically significantly longer admissions (M = 193.4 days, SD = 104) compared to non-COSS (M = 127.7 days, SD = 87.1), ($t = -2.462$, $df = 93$, $P = .016$), and a statistically significant difference in CGAS scores at discharge (COSS CGAS = 51.5, non-COSS CGAS = 61.7; $t = 2.085$, $df = 209$, $P = .04$). In males, these differences were attenuated (Table 2). In the whole sample, a higher proportion of boys had autism spectrum disorders (ASD: Males 65.5%, Females: 38.9%, Pearson's chi square = 14.823, $df = 1$, $P < .001$), attention deficit hyperactivity disorder(ADHD: Males 34.5%, Females 17.9%, Pearson's chi square = 7.289, $df = 1$, $P = .007$) and anxiety disorders other than obsessive-compulsive disorder (OCD) (Males 42.2%, Females 24.2%, Pearson's chi square = 7.554, $df = 1$, $P = .006$) whilst a higher proportion of girls had OCD(Males 9.5%, Females 22.1%, Pearson's chi square = 6.468, $df = 1$, $P = 0.011$) and eating disorders (Males 3.4%, Females 13.7%, Pearson's chi square = 7.387, $df = 1$, $P = .007$). There were no statistically significant differences in the rates of learning disability, depression or psychosis between the groups. One boy was not receiving antipsychotic medication at discharge, which influenced the total scores given the small number of cases.

3.3 Analyses in younger and older children

The median age for the whole sample was that of 134 months. In the analyses by age (Tables 4 and 5), older children seem to have similar results with the whole sample whilst the differences in the younger age group seem to be attenuated. It is of note that the older COSS group consists almost exclusively of female patients (Table 5). The mean CGAS on discharge was the lowest (47.6) in older children with COSS. In our sample, older children

were more likely to have learning disability (Younger 10.5%, Older 20.8%, Pearson's chi square = 4.224, df = 1, P = .04) and depression (Younger 8.6%, Older 27.4%, Pearson's chi square = 9.707, df = 1, P = .002) and less likely to have ADHD (Younger 37.1%, Older 17%, Pearson's chi square = 10.875, df = 1, P = .001). There were no statistically significant differences in the rates of ASD, anxiety disorders, eating disorders, OCD or psychosis between the groups.

4 DISCUSSION

To our knowledge this is the first naturalistic study evaluating the functional outcomes and satisfaction with treatment of children with COSS compared to non-COSS in a clinical setting. It has demonstrated that the level of functioning was on average similar in both groups at discharge from hospital despite the greater functional deficit in COSS on admission. In the whole sample, both groups had mean CGAS scores in the range of 51-60 points (Some Noticeable Problems), in the same category of overall functioning as defined by this scale(Shaffer et al., 1983).Female COSS patients seem to have overall worse functional outcome compared to non- COSS patients, whose CGAS score marginally reaches on average the range of 61-70 points (Some Problems), whilst older COSS patients, who were 90% females, seem on average to have the worst average CGAS score in the range of 41-50 (Obvious Problems). These differences may also be explained by the more significant functional impairment in females with COSS on admission compared to non-COSS (CGAS score P < .001; Education on admission P = .025) and the possibly higher proportion of children with neurodevelopmental disorders in the male non-COSS group which may be associated with worse outcomes and smaller differences compared to COSS. Nevertheless, the identification of an overall similar average functioning in the COSS and non-COSS groups has significant clinical implications. Although earlier age at onset (Hayes and Kyriakopoulos, 2018) and in particular childhood onset (Rabinowitz et al., 2006; Remschmidt et al., 2007) in psycho- sis are associated with poor outcomes, significant functional improvement, not dissimilar to other mental health conditions requiring inpatient treatment, can still be possible.

In our sample, children with COSS more commonly required medication treatment and seemed to need longer admissions. The latter indicates that more extended clinical input in an inpatient setting is needed in COSS compared to non-COSS for similar functional improvement to be achieved. Satisfaction with treatment did not differ between the groups which suggests that the input offered was in accordance to the needs of individual children and families regardless of medication or length of admission. Although inpatient mental health treatment is generally avoided in childhood, it can be very beneficial for children who need it, and its length can predict better long- term outcomes (Green et al., 2007). This may be particularly relevant for children with COSS, potentially contributing to an improved course and prognosis.

A limitation of our study is the relatively small size of the COSS sample due to the low prevalence of this disorder in the population. Studies in COSS, including the national UK surveillance study mentioned above (Tiffin and Kitchen, 2015) are inherently affected by this limitation, and naturalistic studies with larger samples are very difficult to conduct. In

addition, the fact it took place in a healthcare system that allows for long-term inpatient care of children may make it difficult to generalize to other settings. However, this has allowed us to evaluate through a unique naturalistic design the importance of additional input in COSS in order for optimal outcomes to be achieved. As a result, it can be argued that more resources may be necessary in other healthcare systems to meet the clinical needs of these severely affected children and families.

In conclusion, our study has demonstrated that children with COSS have overall similar short-term functional outcomes and satisfaction with treatment following inpatient admission compared with children severely affected by other non-psychotic disorders. Although their functional gains were possibly associated with higher level of input as evidenced by longer admissions, our findings could be a message of hope for children and families affected by this devastating condition.

REFERENCES

- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Endicott, J., Spitzer, R. L., Fleiss, J. L., & Cohen, J. (1976). The global assessment scale: A procedure for measuring overall severity of psychiatric disturbance. Archives of General Psychiatry, 33(6), 766–771.
- Frazier, J. A., McClellan, J., Findling, R. L., Vitiello, B., Anderson, R., Zablotsky, B., ... Sikich, L. (2007). Treatment of early-onset schizo- phrenia spectrum disorders (TEOSS): Demographic and clinical charac- teristics. Journal of the American Academy of Child and Adolescent Psychiatry, 46(8), 979–988.
- Gochman, P., Miller, R., & Rapoport, J. L. (2011). Childhood-onset schizo- phrenia: The challenge of diagnosis. Current Psychiatry Reports, 13(5), 321–322.
- Green, J., Jacobs, B., Beecham, J., Dunn, G., Kroll, L., Tobias, C., & Briskman, J. (2007). Inpatient treatment in child and adolescent psy- chiatry: A prospective study of health gain and costs. Journal of Child Psychology and Psychiatry, 48(12), 1259–1267.
- Hayes, D., & Kyriakopoulos, M. (2018). Dilemmas in the treatment of early-onset first-episode psychosis. Therapeutic Advances in Psycho- pharmacology, 8(8), 231–239.
- Kyriakopoulos, M., & Frangou, S. (2007). Pathophysiology of early onset schizophrenia. International Review of Psychiatry, 19(4), 315–324.
- Kyriakopoulos, M., Ougrin, D., Fraser, C., Thomas, G., & McMahon, R. (2015).Emergencymentalhealthadmissionsforchildren:Anaturalistic study. Clinical Child Psychology and Psychiatry, 20(1), 8–19.
- Loeb, F. F., Zhou, X., Craddock, K. E. S., Shora, L., Broadnax, D. D., Gochman, P., ... Liu, S. (2018). Reduced functional brain activation and connectivity during a working memory task in childhood-onset schizo- phrenia. Journal of the American Academy of Child and Adolescent Psy- chiatry, 57(3), 166–174.
- Rabinowitz, J., Levine, S. Z., & Hafner, H. (2006). A population based elab- oration of the role of age of onset on the course of schizophrenia. Schizophrenia Research, 88(1–3), 96–101.

- Remschmidt, H., Martin, M., Fleischhaker, C., Theisen, F. M., Hennighausen, K., Gutenbrunner, C., & Schulz, E. (2007). Forty-two-years later: The outcome of childhood-onset schizo- phrenia. Journal of Neural Transmission (Vienna), 114(4), 505–512.
- Shaffer, D., Gould, M. S., Brasic, J., Ambrosini, P., Fisher, P., Bird, H., & Aluwahlia, S. (1983). A children's global assess- ment scale (CGAS). Archives of General Psychiatry, 40(11), 1228–1231.
- Tiffin, P. A., & Kitchen, C. E. (2015). Incidence and 12-month outcome of childhood non-affective psychoses: British national surveillance study. British Journal of Psychiatry, 206(6), 517–518.
- World Health Organization. (1993). The ICD-10 classification of mental and behavioural disorders. Diagnostic criteria for research. Geneva, Switzer- land: World Health Organization.
- World Health Organization. (1996). Multiaxial classification of child and adolescent psychiatric disorders: The ICD-10 classification of mental and behavioural disorders in children and adolescents. Cambridge, UK: Cam- bridge University Press.

TABLE 1 Demographic/clinical characteristics and outcomes for the whole sample

	COSS (*n* = 20)	Non-COSS (*n* = 191)	*P* value
Variables			
Age of admission in months (SD)	132.1 (22)	129.4 (19.9)	.573
Female gender (%)	13 (65)	82 (42.9)	.096
Medication at admission (%)	10 (50)	104 (54.5)	.815
Education at admission (%)	11 (55)	116 (60.7)	.638
Mean CGAS score on admission (SD)	19.5 (12)	28 (13.1)	.006**
Comorbid diagnoses—number of cases (%)			
ASD	8 (40)	105 (55)	.242
Anxiety disorder	3 (15)	69 (36.1)	.081
ADHD	2 (10)	55 (28.8)	.109
Depression	1 (5)	34 (17.8)	.209
Learning disability	5 (25)	28 (14.7)	.211
OCD	2 (10)	30 (15.7)	.745
Eating disorder	1 (5)	16 (8.4)	1.0
Outcomes			
Mean CGAS score at discharge (SD)	52.2 (18.9)	57.1 (15.7)	.195
Mean CGAS score change (SD)	32.7 (20.7)	28.8 (19)	.385
Parent satisfaction—mean ASQ score (SD)	30.9 (6.0)	30.4 (5.0)	.72
Child satisfaction—mean ASQ score (SD)	8.0 (2.2)	7.3 (2.4)	.28
Length of admission in days (SD)	194.6 (125.4)	135.8 (86.2)	.053
Medication at discharge (%)	20 (100)	144 (75.4)	.009**
Antipsychotic at discharge (%)	19 (95)	77 (40.3)	<.001**
Antipsychotic at any point (%)	19 (95)	104 (54.5)	<.001**
Education at discharge (%)	19 (95)	182 (95.3)	1.0

Note: With the exception of ASQ data, all other data is complete. Satisfaction data was available for 17 parents (85%) and 15 children (75%) in the COSS group and 164 parents (85.8%) and 141 children (73.8%) in the non-COSS group.

Abbreviations: ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder; ASQ, Acorn Satisfaction Questionnaire; CGAS, Children's Global Assessment Scale; COSS, childhood-onset schizophrenia spectrum disorders; Medication, any medication including antipsychotics, antidepressants, mood stabilizers, stimulants, atomoxetine and alpha 2 agonists; OCD, obsessive–compulsive disorder.

*$P < .05$; **$P < .01$.

TABLE 2 Demographic/clinical characteristics and outcomes for males

	COSS (*n* = 7)	Non-COSS (*n* = 109)	*P* value
Variables			
Age of admission in months (SD)	115 (16.2)	125.8 (21.5)	.195
Medication at admission (%)	2 (28.5)	64 (58.9)	.236
Education at admission (%)	6 (85.7)	57 (52.2)	.123
Mean CGAS score on admission (SD)	25.4 (13.3)	26.4 (13)	.85
Comorbid diagnoses—number of cases (%)			
ASD	5 (71.4)	71 (65.1)	1.0
Anxiety disorder	1 (14.3)	48 (44)	.236
ADHD	1 (14.3)	39 (35.8)	.419
Depression	0 (0)	19 (17.4)	.597
Learning disability	2 (28.6)	19 (17.4)	.609
OCD	0 (0)	11 (10.1)	1.0
Eating disorder	0 (0)	4 (3.7)	1.0
Outcomes			
Mean CGAS score at discharge (SD)	53.6 (15.2)	53.7 (15)	.983
Mean CGAS score change (SD)	28.1 (16.5)	26.8 (17.9)	.847
Parent satisfaction—mean ASQ score (SD)	31.8 (5.5)	30.9 (4.7)	.687
Child satisfaction—mean ASQ score (SD)	8.5 (3)	7.4 (2.4)	.363
Length of admission in days (SD)	196.9 (167.7)	141.9 (85.5)	.422
Medication at discharge (%)	7 (100)	89 (81.6)	.602
Antipsychotic at discharge (%)	6 (85.7)	47 (43.1)	.046*
Antipsychotic at any point (%)	6 (85.7)	66 (60.5)	.25
Education at discharge (%)	7 (100)	103 (94.5)	1.0

Note: With the exception of ASQ data, all other data is complete. In male patients, satisfaction data was available for five parents (71.4%) and four children (57.1%) in the COSS group and 93 parents (85.3%) and 79 children (72.4%) in the non-COSS group.
Abbreviations: see Table 1.
*$P < .05$; **$P < .01$.

TABLE 3 Demographic/clinical characteristics and outcomes for females

	COSS (*n* = 13)	Non-COSS (*n* = 82)	*P* value
Variables			
Age of admission in months (SD)	141.3 (19.4)	134.3 (16.6)	.168
Medication at admission (%)	8 (61.5)	40 (48.8)	.393
Education at admission (%)	5 (38.5)	59 (72)	.025*
Mean CGAS score on admission (SD)	16.4 (10.4)	30.2 (13.1)	<.001**
Comorbid diagnoses—number of cases (%)			
ASD	3 (23.1)	34 (41.5)	.239
Anxiety disorder	2 (15.4)	21 (25.6)	.728
ADHD	1 (7.7)	16 (19.5)	.452
Depression	1 (7.7)	15 (18.3)	.689
Learning disability	3 (23.1)	9 (11)	.362
OCD	2 (15.4)	19 (23.2)	.726
Eating disorder	1 (7.7)	12 (14.6)	.687
Outcomes			
Mean CGAS score at discharge (SD)	51.5 (21.2)	61.7 (15.6)	.04*
Mean CGAS score change (SD)	35.2 (22.9)	31.4 (20.1)	.543
Parent satisfaction—mean ASQ score (SD)	30.5 (6.3)	29.8 (5.4)	.662
Child satisfaction—mean ASQ score (SD)	7.8 (2)	7.2 (2.3)	.445
Length of admission in days (SD)	193.4 (104)	127.7 (87.1)	.016*
Medication at discharge (%)	13 (100)	55 (67.1)	.017*
Antipsychotic at discharge (%)	13 (100)	30 (36.6)	<.001**
Antipsychotic at any point (%)	13 (100)	38 (46.3)	<.001**
Education at discharge (%)	12 (92.3)	79 (96.3)	.451

Note: With the exception of ASQ data, all other data is complete. In female patients, satisfaction data was available for 12 parents (96.3%) and 11 children (84.6%) in the COSS group and 71 parents (86.6%) and 62 children (75.6%) in the non-COSS group.
Abbreviations: see Table 1.
*$P < .05$; **$P < .01$.

TABLE 4 Demographic/clinical characteristics and outcomes for the younger sample (Age on admission <134 months)

	COSS (*n* = 9)	Non-COSS (*n* = 96)	*P* value
Variables			
Age of admission in months (SD)	111 (13.4)	113.8 (15.5)	.607
Female gender (%)	3 (33.3)	35 (36.5)	1.0
Medication at admission (%)	2 (22.2)	51 (53.1)	.093
Education at admission (%)	8 (88.9)	60 (62.5)	.155
Mean CGAS score on admission (SD)	22.7 (12.8)	26.8 (14.1)	.405
Comorbid diagnoses—number of cases (%)			
ASD	4 (44.4)	51 (53.1)	.733
Anxiety disorder	2 (22.2)	36 (37.5)	.483
ADHD	1 (11.1)	38 (39.6)	.149
Depression	0 (0)	9 (9.4)	1.0
Learning disability	1 (11.1)	10 (10.4)	1.0
OCD	0 (0)	14 (14.6)	.604
Eating disorder	0 (0)	9 (9.4)	1.0
Outcomes			
Mean CGAS score at discharge (SD)	57.9 (13.1)	59.3 (13.8)	.763
Mean CGAS score change (SD)	35.2 (14.1)	31.9 (18.4)	.599
Parent satisfaction—mean ASQ score (SD)	31.1 (4.9)	30.9 (4.4)	.873
Child satisfaction—mean ASQ score (SD)	8.7 (2)	7.5 (2.3)	.234
Length of admission in days (SD)	193.6 (147.3)	135.7 (69.9)	.276
Medication at discharge (%)	9 (100)	70 (72.9)	.108
Antipsychotic at discharge (%)	8 (88.9)	37 (38.5)	.005**
Antipsychotic at any point (%)	8 (88.9)	53 (55.2)	.076
Education at discharge (%)	9 (100)	93 (96.7)	1.0

Note: With the exception of ASQ data, all other data is complete. Satisfaction data was available for seven parents (77.8%) and six children (66.7%) in the COSS group and 85 parents (88.5%) and 75 children (78.1%) in the non-COSS group.
Abbreviations: see Table 1.
**$P < .01$.

TABLE 5 Demographic/clinical characteristics and outcomes for the older sample (Age on admission ≥134 months)

	COSS (*n* = 11)	Non-COSS (*n* = 95)	*P* value
Variables			
Age of admission in months (SD)	149.4 (7.1)	145.3 (7.4)	.084
Female gender (%)	10 (90.9)	47 (49.5)	.01**
Medication at admission (%)	8 (72.7)	53 (55.8)	.346
Education at admission (%)	3 (27.3)	56 (58.9)	.058
Mean CGAS score on admission (SD)	17 (11.3)	29.3 (12)	.002**
Comorbid diagnoses—number of cases (%)			
ASD	4 (36.4)	54 (56.8)	.219
Anxiety disorder	1 (9.1)	33 (34.7)	.348
ADHD	1 (9.1)	17 (17.9)	.686
Depression	1 (9.1)	25 (26.3)	.287
Learning disability	4 (36.4)	18 (18.9)	.234
OCD	2 (18.2)	16 (16.8)	1.0
Eating disorder	1 (9.1)	7 (7.4)	1.0
Outcomes			
Mean CGAS score at discharge (SD)	47.6 (22.1)	54.9 (17.2)	.2
Mean CGAS score change (SD)	30.6 (25.4)	25.6 (19.2)	.431
Parent satisfaction—mean ASQ score (SD)	30.7 (6.9)	29.9 (5.6)	.689
Child satisfaction—mean ASQ score (SD)	7.6 (2.4)	7.1 (2.4)	.607
Length of admission in days (SD)	195.6 (111.8)	135.9 (100.5)	.068
Medication at discharge (%)	11 (100)	74 (77.9)	.116
Antipsychotic at discharge (%)	11 (100)	40 (42.1)	.005**
Antipsychotic at any point (%)	11 (100)	51 (53.7)	>.001**
Education at discharge (%)	10 (90.9)	89 (93.7)	.547

Note: With the exception of ASQ data, all other data is complete. Satisfaction data was available for 10 parents (90.9%) and nine children (81.8%) in the COSS group, and 79 parents (83.2%) and 66 children (69.5%) in the non-COSS group.
Abbreviations: see Table 1.
**$P < .01$.