PREDICTORS OF CHANGE IN GLOBAL PSYCHIATRIC FUNCTIONING AT AN INPATIENT ADOLESCENT PSYCHIATRIC UNIT

Authors: Jane Kennedy, Philipa Hembry, Daniel Green, David Skuse, Simon Lewis

Jane Kennedy, University College London, UK
Dr Philipa Hembry, Simmons House Adolescent Unit, Whittington Health NHS, London, UK
Dr Daniel Green, University College London, UK
Professor David Skuse, Institute of Child Health, University College London, UK and Great Ormond Street Hospital for Children, London, UK

Dr Simon Lewis, Simmons House Adolescent Unit, Whittington Health NHS, London, UK and University College London Hospitals, London, UK

Corresponding author:
Dr Simon Lewis, Simmons House Adolescent Unit, Whittington Health NHS, London, UK and University College London Hospitals, London, UK

Abstract:

Background: Psychiatric inpatient treatment for children is sometimes beneficial, but predictors of who benefits, and in what circumstances, are largely unknown. This study aimed to identify personal and environmental factors that influence outcome in an adolescent unit that accepts both emergency and planned admissions.

Methods: Routine standardized intake and outcome measures were analysed for the period 2009-2018. Potential predictors assessed included the Children's Global Assessment Scale (CGAS), engagement with treatment, behavioural attitudes, and peer relationships on the Unit.

Findings: 112 admissions were tracked. Mean age of admission was 16 years, 71% were female. 61% had higher (better) CGAS scores on discharge than on admission; 34% of inpatients fully engaged with their treatment. Median admission duration was 118 days for males, 196 days for females. Although group sizes were small, admission lengths were much shorter for ethnic minority patients. Longer admissions led to greater improvement. Poor outcomes were associated with failure to engage with treatment and a deterioration in peer relationships.

Interpretation: Compliance with treatment is an important predictor of positive change during admission, as is being female. The establishment of good and supportive peer relationships during the admission constitutes a potent indicator of benefit.

Key Words: adolescent(s), inpatients, psychiatric, outcome, predictor(s), admission length, peer relationships, ethnicity, engagement.

Introduction

Inpatient admissions to adolescent mental health units are challenging for young people (YP) and their families, and expensive for the National Health Service (NHS) (Green et al., 2007). Measuring the impact on YP's mental health and identifying factors that predict a positive change in psychiatric functioning is key to identifying areas for improvement, highlighting gaps in service provision and understanding where an inpatient approach will have the greatest potential benefit.

Research amongst inpatient populations presents many challenges. There is no equivalent alternative treatment to inpatient care, if such care is clinically indicated. Ethical and moral considerations preclude the use of a concurrent control arm. Thus, determining a causal relationship between treatment-related variables and outcome is problematic (Blanz & Schmidt, 2000; Green et al., 2001). Prior studies have usually been located in single inpatient units, so generalisation of results is limited. Information about longer-term outcomes after discharge can be difficult to obtain, because of ethical and practical considerations around re-contacting ex-patients.

Despite these design challenges, previous studies have demonstrated there are benefits from inpatient treatment, with objective evidence of improved mental states at outcome for the majority (Green et al., 2007; Hayes, Simmons, Simons, & Hopwood, 2018; Lee, Martin, Hembry, & Lewis, 2018; Pfeiffer & Strzelecki, 1990).

There is little published evidence on factors that influence outcomes from inpatient care, or about the processes that lead to a good or poor outcome. Some studies have considered whether patient characteristics might predict a better outcome, but there is no clear relationship to YP's demographic characteristics, age at admission or gender (Hanssen-Bauer et al., 2011; Mathai & Bourne, 2009; Pfeiffer & Strzelecki, 1990). Greater severity of symptoms at admission consistently predicts a less positive outcome, but the nature of the mental health disorder is not itself a significant predictor (Hanssen-Bauer et al., 2011; King, Hovey, Brand, & Ghaziuddin, 1997; Pfeiffer & Strzelecki, 1990; Setoya et al., 2011).

The national Child and Young Person Inpatient Evaluation (CHYPIE) (Green et al., 2007) (funded by the UK Department of Health) examined the impact of admission duration on treatment success in a sample of eight inpatient psychiatric units, with a broad range of lengths of stay (mean length of stay 16.6 weeks, standard deviation 12.5). After accounting for potential confounding variables, a positive correlation was found between longer exposure to treatment and better outcomes. Their study combined data from both child and adolescent units, and there were substantial differences between them in terms of demographic profiles of patients, and in associated diagnoses. Green et al. (2007) recommended more developmentally sensitive studies should be conducted. More recent studies have been conducted in adolescent psychiatric units with a high proportion of acute admissions. In two such units there was no clear association between length of admission and outcome, although acute psychiatric symptoms did decrease over time (Hanssen-Bauer et al., 2011; Mathai & Bourne, 2009). Both units had relatively short lengths of stay (median lengths of stay 8.5 and 6 days respectively). Mathai and Bourne (2009) suggest that any measured improvement in mental state could reflect a reduction in the crisis-related behaviours (such as suicidal ideation) that led to the admission. It did not necessarily mean the underlying mental health of the young person had improved. They concluded that data from acute psychiatric units do not capture the complexity of inpatient care. No further studies to our knowledge have examined the impact of admission length on patient outcomes in treatment-focused units despite the need for data on clinical outcomes to inform clinicians, families/carers, YP and commissioners.

Integral to the treatment model in most psychiatric units is the therapeutic milieu (the physical environment and everything within it). For YP in an adolescent unit, a key constituent of the therapeutic milieu is the opportunity for social interaction with peers within communal areas as well as in school, community meetings, and during specific group activities. Developmental theory recognises adolescents increasingly value their peer relationships over and above other key relationships in their lives (Erikson,

1963). Neuroscientific investigations have found that adolescence is a time of particular brain sensitivity to social environmental cues; social signals can motivate certain behavioural patterns and have a major impact on the adolescent's life course (Blakemore & Mills, 2014). The CHYPIE study found that confiding relationships that were established with peers on the unit predicted a better outcome at discharge. *'A robust predictor of health gain is the extent to which the patient establishes peer relationships in the unit'* (Green et al. 2007).

Treatment success is widely considered to be associated with the degree to which YP engage with their treatment programme (Becker, Boustani, Gellatly, & Chorpita, 2018), yet engagement is rarely measured by inpatient studies (Kroll & Green, 1997). Few studies have measured comprehensive attitudinal and behavioural aspects of engagement (Becker et al., 2018), although some components are known to be associated with outcomes; for instance, Green et al., (2001) found that a better therapeutic alliance with the child predicted a better outcome on discharge and the degree to which parents formed a collaborative alliance with treatment predicted outcome at one year (Green et al., 2007). The frequency with which the child attended group therapy predicted a better outcome in a Japanese study of children under 15 years old (Setoya et al., 2011). These findings suggest that accounting for engagement in inpatient studies is important.

We have analyzed routinely collected data, from an adolescent inpatient unit in North London (Simmons House www.simmonshouse.org) which offers outcome-focused psychiatric treatment. Our primary aim was to test the hypothesis that a longer duration of inpatient care and the formation of valued peer relationships predicted a better outcome. The research builds on the UK CHYPIE study (Green et al., 2007) by focusing on the adolescent developmental stage while accounting for demographic factors, severity of illness, level of functioning and the engagement of the young person with their treatment.

Methodology
The Setting: Simmons House
Simmons House (SH) provides inpatient care for up to 12 adolescents aged 13-17 years inclusive with a wide range of psychiatric difficulties (at age 18 they are transferred to adult services). YP are are admitted for planned treatment or for emergency treatment if they are in a crisis. An emergency treatment admission may convert to an outcome focused treatment admission if clinically indicated. The difference being that an emergency admission is focused on managing a current crisis while an outcome focused treatment admission is focused on treatment that improves the trajectory of a YP with person specific treatment goals identified for that admission. All young people are invited to attend all of the group programme. The unit is staffed by a multidisciplinary team which is led by a psychiatrist. It has an on-site school, and offers individual and group therapies, family therapy and medication, as well as community meetings. The unit provides a therapeutic milieu as the construct within which evidence-based treatments are utilised.

Routine Outcome Measures (ROMs) Used

ROMs have been recorded for all patients at SH since 2009. The following standardised outcome measures were collected by clinicians at admission and discharge; standardized measures comprise the Children's Global Assessment Scale (CGAS) (Shaffer et al., 1983), and the Health of the Nation Outcome Scales for Children and Adolescents (HoNOSCA) which comprised four subscales: Behaviour, Impairment, Symptoms and Social (Gowers, Bailey-Rogers, Shore, & Levine, 2000). In addition, the Every Child Matters questionnaire (ECM) which is a non-standardised questionnaire that is based on the Clinical Global Impressions Scale and the Every Child Matters framework, was used for factors of interest for which no standardised measures were available (Department of Children Schools and Families, 2003; Fuggle, 2015)

All relevant routinely collected data from patients discharged between October 2009 and February 2018 were used. They were anonymized by removing names, dates of birth and admission/discharge dates.

Outcome Measure and Factors of Interest

A change in CGAS score between admission and discharge, as rated by clinicians, was chosen as the outcome measure since it reflects global psychiatric and social functioning and it is sensitive to change (Shaffer et al., 1983). Initial scores are obtained after a period of approximately two weeks following admission. A positive change over time (increase in CGAS score) reflects an improvement, a negative change reflects deterioration. The same two consultant psychiatrists each rated their own patients' CGAS scores at admission and on discharge throughout the data collection period.

Demographic factors that might influence outcome included: age, gender, overall functioning (admission CGAS), health of peer relationships on admission and admission length. Ethnicity was included as a factor of interest using grouping definitions from the UK Census (Office of National Statistics, 2011). Because previous research suggested specific diagnoses did not predict the outcome of admission, the HONOSCA sub-scale scores were used as a proxy for diagnostic severity.

A measure of engagement was taken from the ECM questionnaire, comprising both attitudinal engagement and behavioural engagement, and recorded on discharge. There were four question categories: fully engaged in treatment; partially engaged in treatment; compliant but no real engagement; non-compliant and no real engagement. The ECM questionnaire was also used to rate the quality of YP's peer relationships, between admission and discharge, as either improved, no change or deteriorated.

Data Analysis Plan

Defining the Data Set

The following inclusion criteria were applied:
- Where a YP had experienced more than one admission to the unit during the period of the survey only the first admission was included.
- A minimum admission duration of 14 days.

Missing Data and Multiple Imputation

Some demographic and rating data were missing, and were treated as Missing at Random (Sterne et al., 2009) as no non-random reasons for missing data were identified. Multiple imputation was used to impute the missing values and 10 sets of imputations were performed.

Initial Descriptive Statistics

Numerical variables were reported with the mean/standard deviation for those that were normally distributed, and median/interquartile range otherwise. Potential outliers were identified by inspecting graphics and any extreme values were checked for data entry errors. Categorical variables were summarised using frequency and percentage within each category. Parametric significance tests were performed where assumptions were met (Pearson correlation, two-sample t-test, Analysis of Variance (ANOVA) (using the Bonferroni method to make post-hoc comparisons between groups)), non-parametric otherwise (Spearman correlation, Mann-Whitney U test, Kruskal-Wallis ANOVA, and the Fisher's Exact test)(Campbell, Machin, & Walters, 2007). The 5% level (p-value < 0.05) was used for all tests of significance

Regression Models

A model to identify predictors of change was built using linear regression with change in CGAS between admission and discharge as the outcome measure. Each possible predictor was initially tested in a univariable model using linear regression. All the potential predictor variables were then entered simultaneously into a multivariable regression model (irrespective of univariable significance). Any predictor that did not have at least a borderline statistically significant impact on the outcome in the

multivariable model and did not impact the other variables if it was removed, was taken out of the model (unless it was a variable that had not been previously included in research studies).Multicollinearity was assessed using the Variance Inflation Factor (VIF). Regression assumptions were checked by investigating the residuals and any potential outliers. Sensitivity analysis was conducted by excluding any outliers and redeveloping the model to assess any change in conclusions/interpretations. Data analysis used Microsoft Statistical Package for Social Sciences (SPSS) version 22 for Windows (IBM Corp, Released 2013).

Ethics

This project was registered with Whittington Health NHS Trust as a Service Evaluation project (registration number 2017/18-303). On admission, YP and their parents/carers are asked if they would give informed consent for ROMs (including those collected electronically) to be used anonymously for the purposes of audit, service evaluation, and research. Only those who gave consent were included in the data set. Each patient's data was given a unique identity code and all patient identifiable data were removed from the database to preserve patient confidentiality.

Results

The Final Data Set

Over the study period there were 163 admissions, however 23 were repeat admissions which were removed leaving 140 individual cases. Eleven cases that were not yet discharged from SH were removed (no discharge data) together with nine cases which were missing either the admission or discharge CGAS scores (since these were needed as the outcome measure). A further six cases were removed because the admission length was fewer than 14 days. Two cases with no data available (reasons unknown) were also excluded. The final sample size was 112.

Initial Descriptive Statistics

Sample mean age was 16.0 years (SD 1.3), 71% female, and the majority were of white ethnicity (60%) (Table 1). Median admission 167 days (IQR 51.5-271.3 days). The mean admission CGAS score was 46.8 (obvious problems) and by discharge this had risen to 57.6 (some noticeable problems) ($p<0.001$, Effect Size 1.07), a clinically significant improvement (Jaffa & Stott, 1999). 61% of patients had a higher CGAS score on discharge than on admission, 25% no change, 14% lower. Psychiatric symptoms were rated as improved on the HONOSCA ($p<0.03$ for total scale and all subscales) (Table 1). 34.0% had engaged fully in treatment, 8.7% were not compliant or engaged. Quality of peer relationships was rated as appropriate in only 25% (Table 1).

Characteristic/ Measure		n	Mean (SD)/ Frequency (%) (unless otherwise stated)
Age at admission (years)		112	16.0 (1.3)
Gender	Male Female	112	33 (29.5) 79 (70.5)
Ethnicity	White Mixed/multiple ethnic group Asian/Asian British Black/ African/Caribbean/Black British Other ethnic group Not stated	112	67 (59.8) 9 (8.0) 10 (8.9) 10 (8.9) 7 (6.3) 9 (8.0)
Admission length (days)		112	167 (51.5-271.3)[2]

Admission CGAS		112	46.8 (9.5)
Discharge CGAS		112	57.6 (10.7)
Change in CGAS		112	10.8 (10.9)
Admission HoNOSCA **Total** - **Behaviour sub-scale** - **Impairment sub-scale** - **Symptoms sub-scale** - **Social sub-scale**		109[1]	23.4/52 (5.6)[3] 5.2/16(2.8) 2.7/8(1.7) 6.6/12 (2.3) 8.9/16 (3.1)
Discharge HoNOSCA **Total** - **Behaviour sub-scale** - **Impairment sub-scale** - **Symptoms sub-scale** - **Social sub-scale**		104[1]	18.1/52 (7.7)[3] 4.0/16 (2.9) 2.3/8 (1.6) 4.8/12 (2.3) 7.1/16 (3.4)
Admission type	Treatment Emergency	112	84 (75.0) 28 (25.0)
Engagement /Compliance with treatment	Fully engaged Partially engaged Compliant, no real engagement Non-compliant, no real engagement	106[1]	36 (34.0) 47 (44.7) 13 (12.6) 9 (8.7)
Peer relationships	Has age appropriate peer relationships Moderate problems Severe problems Very severe problems	110[1]	27 (24.5) 29 (26.4) 30 (27.3) 24 (21.8)
			Number changing during admission/ number that could change (%)
Change in peer relationships during admission	Improved Stayed the same Got worse	106[1]	53/80 (66.3) 43/106 (40.6) 10/82 (12.3)

Table 1: Table showing sample characteristics of all variables; [1] any deviations from 112 is due to missing data; [2] Median (IQR)(not normally distributed); [3] number scored/maximum possible score (standard deviation); CGAS = Children's Global Assessment Scale; HoNOSCA = Health of the Nation Outcome Scales for Children and Adolescents.

Associations between variables

A moderately strong positive correlation was found between improvement in CGAS score and admission length ($r=0.413$, $p<0.001$). Figure 1 shows the relationship between admission length and change in CGAS for cases admitted for treatment and emergency cases. Visual inspection suggests that the relationship is less strong for cases that were admitted as an emergency and were discharged within 60 days, especially for cases admitted for planned treatment ($r=0.441$, $p<0.001$). For emergency admissions (including those that were originally admitted for emergency treatment but were converted to treatment cases) the correlation was less strong ($r=0.36$, $p=0.06$).

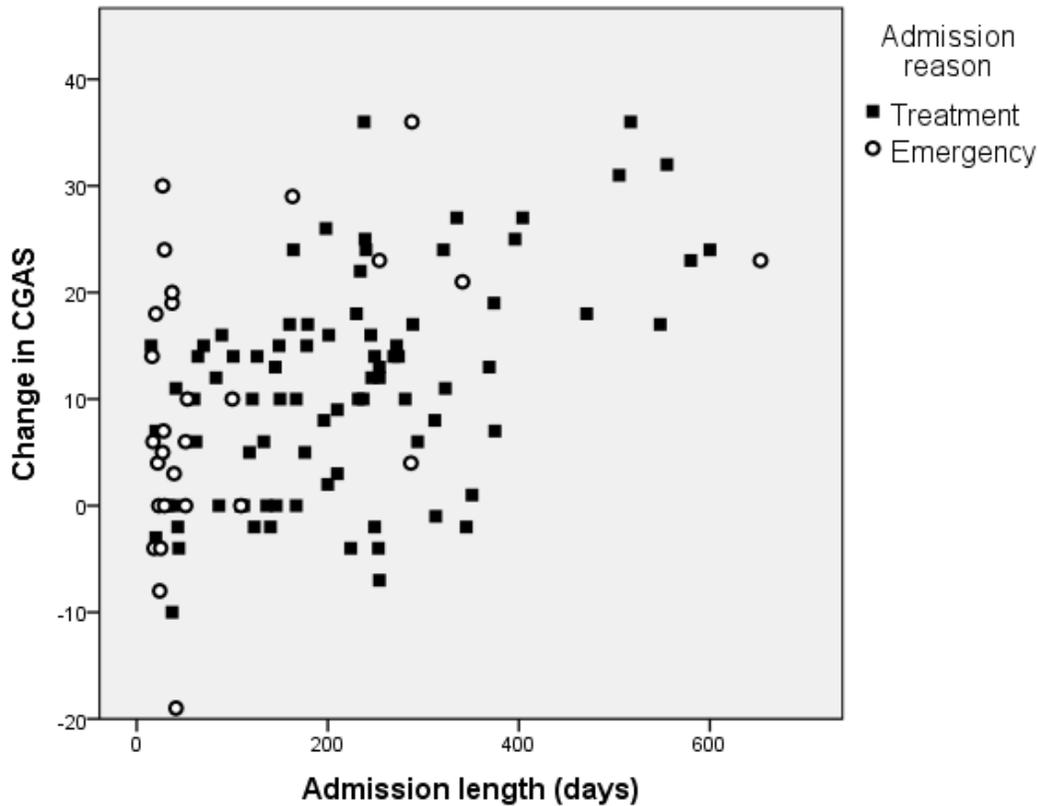**Admission length by Change in CGAS for Treatment and Emergency Cases**

Figure 1: Scatter plot showing admission length by change in CGAS for patients admitted as emergency and treatment cases. CGAS = Children's Global Assessment Scale.

Median admission length was significantly lower for males than for females (males 118 days, females 196, p=0.04) but there was no significant difference between the genders in terms of their admission CGAS score (mean 45.4 and 47.3 respectively), their engagement, or the types of difficulties they experienced on the HoNOSCA sub-scale (all p>0.24).

Large differences in admission length across ethnicities were found; median admission length for white patients was 210 days and for all other ethnicities combined was 134 days (notably black/black British median admission length was only 57 days) but group sizes were small and so power to detect a difference was limited (p=0.061).

Admission lengths were significantly lower for YP who were not engaged or compliant with treatment (p=0.03). Only a small negative correlation (r=-0.182) with borderline significance (p=0.06) was found between admission CGAS and admission length.

Regression model

The multivariable model accounted for 59% of the change in CGAS score (R²=0.59). Admission length significantly predicted the change in CGAS score (p=0.002) with longer stays leading to greater

improvement. Being male, having a better level of functioning on admission (higher CGAS score) and a higher clinician rating of psychiatric difficulties (more difficulties) on the HONOSCA 'Social' subscale all predicted less improvement in CGAS (p=0.003, p<0.001 and p=0.051 respectively). Age and the other types of difficulties measured on the HoNOSCA sub-scales were not significant in the univariable model and had little impact on change in CGAS and so they were removed from the model.

'Not being engaged or compliant' with treatment was a strong negative predictor of outcome (p=0.019 with on average 8 points less improvement in outcome than those who were fully engaged), whilst being 'partially engaged' or being 'compliant but not engaged' did not significantly predict a worse outcome than begin 'fully engaged' once the other variables were accounted for in the full model. The quality of peer relationships on admission to the unit was not a significant predictor of outcome, but was kept in the model to act as a baseline reference for potential change of peer relationships. A worsening of peer relationships was a significant negative predictor of outcome in the full model with, on average, 7 points poorer outcome compared with those whose peer relationships improved (p=0.033). Ethnicity did not significantly influence outcome in this analysis.

An interaction term added for admission length and treatment/emergency admission reason was not significant (p=0.82), and did not change the overall pattern of findings possibly because of the relatively small number of patients admitted as emergency cases (n=28). Model fit assumptions were met and a sensitivity analysis of remaining outliers showed no difference in model interpretation.

	Univariable Relationships				Multivariable Model (R^2= 0.59)			
	Coef.	p value	95% CI (LB:UB)		Coef.	p value	95% CI (LB:UB)	
Intercept					46.24	**< 0.001**	33.52	58.95
Gender (ref: Female)	-5.31	**0.017**	-9.66	-0.96	-5.65	**0.003**	-9.4	-1.88
Age	-1.33	0.084	-2.84	0.18				
Admission CGAS	-0.52	**< 0.001**	-0.71	-0.33	-0.54	**< 0.001**	-0.72	-0.36
HoNOSCA ss: Behaviour	0.19	0.61	-0.54	0.93				
HoNOSCA ss: Impairment	0.65	0.3	-0.57	1.87				
HoNOSCA ss: Symptoms	0.07	0.874	-0.84	0.99				
HoNOSCA ss: Social	-0.46	0.185	-1.13	0.22	-0.63	**0.051**	-1.26	0
Admission length (days)	0.03	**< 0.001**	0.02	0.05	0.02	**0.002**	0.01	0.03
Ethnicity (ref: White)								
Mixed/multiple ethnic groups	6.31	0.103	-1.29	13.91	5.27	0.087	-0.76	11.3
Asian/Asian British	-1.1	0.767	-8.35	6.16	-3.97	0.166	-9.57	1.64
Black/Black British	-1.6	0.666	-8.85	5.66	0.43	0.884	-5.34	6.2
Other ethnic group/Ns	-2.08	0.516	-8.37	4.2	-0.85	0.743	-5.92	4.23
Engagement (ref: Fully engaged)								
Partially engaged	-4.33	**0.056**	-8.79	0.12	-1.38	0.445	-4.98	2.19
Compliant, not engaged	-6.2	**0.056**	-12.55	0.16	-0.47	0.866	-5.95	5.01
Not compliant, not engaged	-12.62	**<0.001**	-19.62	-5.61	-7.61	**0.019**	-13.98	-1.24
Peer relationships on admission (ref: Age appropriate relationships)								
Moderate problems	1.4	0.637	-4.42	7.22	-2.86	0.261	-7.84	2.13
Severe Problems	-1.34	0.65	-7.18	4.48	-5.2	0.087	-11.15	0.75
Very severe problems	1.26	0.684	-4.82	7.34	-5.05	0.145	-11.83	1.74
Change in peer relationships during admission (ref: Improved)								
Stayed the same	-2.24	0.323	-6.69	2.2	-3.25	0.156	-7.75	1.24
Got worse	-5.56	0.108	-12.34	1.23	-6.98	**0.033**	-13.41	-0.55

Table 2: Univariable and multivariable regression results

Bold = significant/borderline significant at the 5% level; Coef. = Coefficient; CI = Confidence Interval; LB = Lower Bound; UB = Upper Bound; CGAS = Children's Global Assessment Scale; HoNOSCA = Health of the Nation Outcome Scales for Children and Adolescents; ref: = reference variable; Ns = not stated; ss = subscale.

Discussion

Findings of the Research

Our findings were consistent with previous research, indicating inpatient treatment leads to significant improvement in global functioning for most adolescents (Green et al., 2007; Hayes et al., 2018; Lee et al., 2018; Pfeiffer & Strzelecki, 1990). Psychiatric symptoms measured on all four HoNOSCA subscales also reduced significantly. Outcome was influenced strongly by specific measurable factors on admission together with identified experiences whilst in the unit. In an outcome-focused treatment unit with a wide range of lengths of stay, a longer stay predicts a better outcome. This relationship is stronger for patients that are admitted for planned treatment possibly as a result of their increased sense of ownership and empowerment over their situation. Our findings have implications for policy making and for the development and commissioning of adolescent psychiatric units: lengths of stay that might be considered relatively long such as over 100 and up to 300 days as in this sample can achieve better clinical outcomes.

The quality of peer relationships on admission did not influence outcomes, but patients whose peer relationships deteriorated during admission had worse outcomes, consistent with earlier reports (Green et al., 2007). Patients in most adolescent units have only a small number of peers (SH has 12 beds) and the closeness of the living arrangements does not make it easy for any excluded YP to remove themselves from difficult relationships or to seek out alternative friendship groups elsewhere. The inpatient experience is a unique lived experience among adolescents going through the same emotional pain and sharing this with each other (formally in group therapy and community sessions as well as informally in their day-to-day interactions). This can facilitate the development of meaningful relationships. It is possible that the impact of non-acceptance and exclusion is amplified even more than it might be in a normal teenage environment and that the consequences of a breakdown in these peer relationships on the unit hinders recovery. These findings suggest that to maximize the chance of a good outcome from the admission to the unit, clinicians might usefully harness the benefits of improving peer relationships amongst their inpatients and reacting quickly to support YP who feel that their relationships are deteriorating. Further research to explore this issue would be beneficial for improving practice and subsequent outcomes of inpatient treatment.

In general, males had fewer positive outcomes than females after adjustment for the other factors, which is inconsistent with other reports of inpatient treatment (Mathai & Bourne, 2009; Pfeiffer & Strzelecki, 1990). Males and females did not differ in global functioning on admission or in their engagement with treatment. Although admission lengths for males were shorter than for females, this did not explain the finding. It might be a site-specific finding driven in part by the predominance of female patients (71% versus 29% male) and the difficulties this can cause for male patients fitting in with the peer group and building strong peer relationships. It is also possible that there is an underlying factor that is related to both admission length and gender that has not been measured (for example, an unconscious bias amongst staff rating outcomes) although this cannot be established without further research. Further research to understand the experience of males in predominantly female adolescent inpatient units would be helpful to explore this further. Age at admission did not influence outcome, consistent with most previous literature (Hanssen-Bauer et al., 2011; Mathai & Bourne, 2009; Pfeiffer & Strzelecki, 1990).

Ethnic minority group sizes were small which hindered power to detect differences, but possible trends were noticed towards shorter admissions for ethnic minorities (albeit not reaching statistical significance).

Ethnicity did not significantly influence outcome in the regression model but further investigation with larger group sizes could reveal a more interesting picture of impact on beneficial outcomes.

Global functioning that was rated poor on admission was associated with greater change at discharge. Only some of this change can be accounted for by regression to the mean (Green et al., 2007). Patients who were not engaged with treatment had shorter admissions and were often moved to different services. Their outcomes were poorer than those who did engage with treatment, even allowing for the brevity of their admission, as reported by others (Green et al., 2007; Pfeiffer & Strzelecki, 1990). Patients who were compliant but did not engage fully had similar outcomes to those who fully engaged, implying compliance with treatment, even without attitudinal engagement, is a mechanism of change in an adolescent unit.

Limitations

As with almost all inpatient adolescent research, the lack of a control arm means that a causal relationship cannot be established between admission to the unit and the improvement in outcome. In addition, the outcomes for YP post-discharge is not known and therefore it is not possible to establish the impact of admission length on post-discharge outcome. The study was limited to a single unit, limiting the sample size and preventing detailed analysis as well as preventing generalization of the findings. We did not measure the attitudes to admission of the YP, who may have a different view from clinicians (Lee et al., 2018). The sole use of clinician measures is a key limitation of this study which is likely to be especially relevant for measures such as the quality of peer relationships. In addition, some rater bias is possible in the measures of CGAS, engagement (which was measured by clinicians at discharge) and of peer relationships (Carter & McGoldrick, 1989). The engagement and peer relationships questions were taken from the non-standardised ECM questionnaire meaning their reliability and validity cannot be ensured.

Conclusion and future directions

This study supports the CHYPIE study (Green et al. 2007) in finding an association between a longer admission length and a better outcome for patients in adolescent psychiatric units that offer a therapeutic treatment package to seriously ill adolescents. A deterioration of peer relationships whilst in the unit predicted a worse outcome; the importance of the social environment within adolescent psychiatric units for recovery has been researched very little. Evidence of the importance of peer relationships to adolescent wellbeing has implications for practice within adolescent units. Further research that includes the attitudes and experiences of the YP being treated is needed to confirm these findings and to guide practice. In addition, the development of a standardized measure of engagement in inpatient child and adolescent environments would be useful both clinically and for research purposes.

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