HONOSCA IN AN ADOLESCENT PSYCHIATRIC INPATIENT UNIT: AN EXPLORATION OF OUTCOME MEASURES

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SUMMARY

Routine Outcome Measures (ROM) are important tools, increasingly used to assess both patient progress and service-provider efficacy. The Health of the Nation Outcome Scales for Children and Adolescents (HoNOSCA) is a clinician- and patient-rated ROM which summarises a patient's global functioning within behaviour, impairment, symptoms and social domains. Recent literature suggests that consistent disparity exists between the patients' self-ratings and the clinicians' ratings on HoNOSCA. We analysed HoNOSCA data for our own adolescent inpatient unit and report similar findings. Studies have also shown significant differences in both physical and mental health outcomes based on the patient-clinician dynamic and effective communication. We thus investigated the predictive utility of the two HoNOSCA scores, and the disparity between them, with respect to other outcomes measures (CGAS, length of stay and improvement on HoNOSCA). HoNOSCA disparity scores were significantly associated with both patient- and clinician-rated HoNOSCA improvement scores. Moreover, higher admission HoNOSCA scores were associated with greater HoNOSCA improvement scores, for both patient and clinician ratings. We report admission and discharge HoNOSCA scores comparable to other child and adolescent psychiatric inpatient facilities.

Key words: *HoNOSCA – ROM – CAMHS – outcomes – adolescent – inpatients - mental health*

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INTRODUCTION

Routine Outcome Measures (ROM) are increasingly important tools within the health care domain, used by various healthcare stakeholders for different purposes (Hall 2013) - not least as the high cost of service provision in a resource-limited healthcare system requires continued evidence-based justification (Green 2007). At the clinician level, ROMs are used to measure each individual patient's change and assess their progress over the course of treatment. Analysing outcome measures for a cohort of patients provides a reflection of the efficacy of the service provider as a whole, and highlights areas for change and improvement.

Various ROMs are available for use in the adolescent psychiatry setting. The Health of the Nation Outcome Scales for Children and Adolescents (HoNOSCA) and the Child Global Assessment Scale (CGAS) are two well validated ROMs with acceptable reliability and applicability. They are both widely used (Johnston 2005) and recommended for routine use by the QNIC Routine Outcome Measurement service and CAMHS Outcomes Research Consortium (Ford 2006).

The HoNOSCA is a 15 item scale which summarises a patient's social, behavioural and physical functioning, as well as their psychiatric symptoms and impairments, in the 2 weeks prior to assessment (Gowers 1999). Initially a clinician-rated scale, a self-rated patient version has since been introduced (Gowers 2002).

The CGAS is a single-score clinician rating, from 1-100, which measures 'overall severity of disturbance' (Shaffer 1983), and similarly reflects the child's level of functioning.

However, as several studies have shown, there is consistent disparity between the HoNOSCA scores rated by clinicians and those rated by patients, especially within an inpatient setting (Gowers 2002, Yates 2006). Although disparities have been described, there is a paucity of research into their cause and/or subsequent utility. Successful treatment is often the result of positive, collaborative patient-clinician partnerships (Ha 2010, Stewart 1995). Recent research has shown significant differences in both physical and mental health outcomes based on the patient-clinician dynamic and effective communication (Bull 2002, Gensichen 2009, Staiger 2005). It would therefore be expected that greater agreement between patient and clinician at admission, by way of concordant HoNOSCA scores, would facilitate better outcomes. This present study aims to contribute further to this endeavour by examining the nature of this disparity, and investigating whether the two HoNOSCA scores, and the disparity between them, are predictive of other outcome measures (CGAS, length of stay and improvement on HoNOSCA).

Recent literature has variously compared child and adolescent psychiatric units across the globe (Brann 2001, Garralda 2008 2000, Gowers 2002, Green 2007, Hanssen-Bauer 2011, Harnett 2005, Yates 2006). It is through ROMs, which describe the service-user population and their health outcomes, that differences in performance between services can be compared. In this pilot study, ROMs data collected from an NHS-funded adolescent psychiatric inpatient unit in the UK will be analysed to investigate the clinical outcomes of this unit within the wider context of other comparable inpatient units.

METHODS

Setting

This study was conducted in an NHS Tier 4 adolescent inpatient unit for young people aged 12-17 years. This unit accepts referrals from senior clinicians in community CAMHS (Child and Adolescent Mental Health Services), and serves a wide catchment area in the Eastern England region. It assesses and treats young people with a range of emotional and behavioural disorders, including self-harm and suicide risk.

Treatment is provided by a diverse multidisciplinary team who interact closely with the patient and their family. This includes doctors, nursing staff, social workers, clinical psychologists and family, occupational and art therapists, as well as teachers at the attached hospital school. Patients stay at the unit throughout the whole week, although increasing periods of leave are encouraged throughout the course of admission.

Measures

HoNOSCA

The HoNOSCA consists 15 scales, each focusing on clinically significant problems and symptoms. A score is given for each scale, ranging from 0 (no problem) to 4 (severe to very severe problem). Higher scores therefore represent greater severity of dysfunction. The HoNOSCA total score is calculated as the sum of the first 13 scales and functions as a metric of mental health problem severity (Brann 2001). HoNOSCAs were measured at two time points for each patient: at admission and again at discharge. Patient-rated admission HoNOSCAs were conducted on admission under supervision of a nurse. Clinician-rated admission HoNOSCAs were conducted by a Doctor after the first multi-disciplinary team (MDT) case discussion meeting post-admission, where the patient's background history and recent progress are discussed. Discharge HoNOSCAs were completed by patient and clinician, respectively, at time of discharge.

HoNOSCA score disparity

Given as the clinician-rated less the patient-rated HoNOSCA total score. Statistical analyses were performed both on the raw score disparity, where the sign of the score disparity was considered in analysis, as well as the absolute score disparity, where only the magnitude of the disparity was considered.

HoNOSCA Improvement Score

Calculated as the admission less the discharge HoNOSCA total score. It reflects the change in HoNOSCA score over the course of admission. Positive improvement scores represent decreases in HoNOSCA scores from admission to discharge, which reflect overall improvement.

CGAS

Measured weekly at the ward round, with input from the patient and MDT, as well as at admission and discharge.

CGAS improvement score

Calculated as the discharge less the admission CGAS score. Positive improvement scores reflect overall improvement.

Length of Stay (LoS): the number of days between admission and discharge.

Procedure

This retrospective study used a pre-post observational design. Anonymised data was obtained from the unit database, sampling from 136 admissions to the unit over the period January 2012- March 2015. Current patients were excluded from the study. Unfortunately, not all patients had had outcome measures recorded, either at admission or at discharge. Subjects without admission HoNOSCA data were excluded from further analysis D.

Statistical Analyses

All statistical analyses were performed using IBM SPSS Statistics 21 software. All significance tests were two-tailed at the 0.05 significance level. Paired samples t-tests were used to compare clinician and patient-rated HoNOSCA scores, and assess the mean change from admission to discharge. Pearson product-moment correlation coefficients were calculated to investigate associations between HoNOSCA score disparity/admission HoNOSCA score and the various outcome measures.

RESULTS

Demographic data

The majority of admissions were female (97/136; 71%) with the median age 16 years (range 12-17). Mean length of stay was 89 days (12.8 weeks). Patients may be admitted to the unit on an informal basis, or detained as a formal patient under the Mental Health Act (1983) for assessment and/or treatment: Table 1 details the admission types for the unit.

HoNOSCA data completeness

This retrospective study relied upon pre-collected data. Unfortunately, there were many instances of incomplete data collection, where HoNOSCAs were omitted. Consequently, the statistical analyses performed in this study are drawn from various sub-groups of this overall cohort. Table 2 details completeness of HoNOSCA data.

Admission HoNOSCA scores

Patients rated themselves as functionally worse compared to the judgement of clinicians, at admission. Mean HoNOSCA total score as rated bypatients was 24.0 (SD 8.6), and by clinicians was 18.2 (SD 6.6), giving a significant difference of 5.8 (SD 10.8), t_{72}=4.6, p<0.001.There was no correlation between clinician and patient-rated HoNOSCA scores (r=0.016, p=0.895).

Table 1. Breakdown of admission types to the unit

Admission Type	Frequency (n=136)	%
Informal (no section used)	107	78.7
Section 2 of MHA: admission for assessment	20	14.7
Section 3 of MHA: admission for treatment	7	5.1
Other	2	1.5

Table 2. HoNOSCA data completeness

	Frequency (n=136)	%
With Clinician-rated Admission HoNOSCA	100	73.5
With Patient-rated Admission HoNOSCA	87	64.0
With Clinician & Patient-rated Admission HoNOSCAs	73	53.7
With Clinician-rated Discharge HoNOSCA	73	53.7
With patient-rated Discharge HoNOSCA	53	39.0
With Clinician & patient-rated Discharge HoNOSCAs	41	30.1
With Clinician & patient-rated HoNOSCAs at Admission & Discharge	32	23.5

Table 3. Clinician- and patient-rated admission, discharge and improvement scores on HoNOSCA

	Admission HoNOSCA score (SD)	Discharge HoNOSCA score (SD)	HoNOSCA improvement score (SD)	t_{31}	P
Clinician	18.0 (7.2)	9.7 (2.9)	8.3 (6.6)	7.1	<0.001
Patient	25.2 (8.4)	14.9 (8.5)	10.3 (12.4)	4.7	<0.001

Discharge HoNOSCA scores

Patients still rated themselves as functionally worse on discharge, compared to the clinicians' ratings. Mean patient-rated HoNOSCA total score was 16.0 (SD 8.6), and clinician-rated was 9.8 (SD 3.2), giving a significant difference of 6.1 (SD 8.3), t_{40}=4.7, p<0.001. There was no correlation between clinician and patient-rated HoNOSCA scores (r=0.277, p=0.08)

HoNOSCA improvement scores

Both clinician and patient-rated HoNOSCA scores fell significantly from admission to discharge. Data from the 32 patients for whom clinician and patient HoNOSCAs were completed at both time points are presented in Table 3 and Figure 1.

Trends in admission HoNOSCA score disparity

Raw HoNOSCA score disparity was strongly and significantly correlated with both clinician and patient-rated admission HoNOSCA scores. Weaker, though still significant, correlations were found with absolute disparity scores, as indicated in Table 4.

Admission HoNOSCA score disparity as a predictor of outcomes

Raw HoNOSCA score disparity showed significant positive correlations with both clinician and patient-rated HoNOSCA improvement scores. Absolute HoNOSCA score disparity was significantly positively correlated with clinician but not patient-rated HoNOSCA improvement scores. Results are summarised in Table 5 and Figures 2-4.
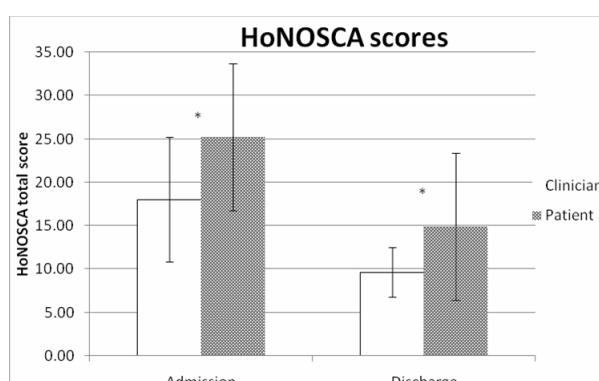

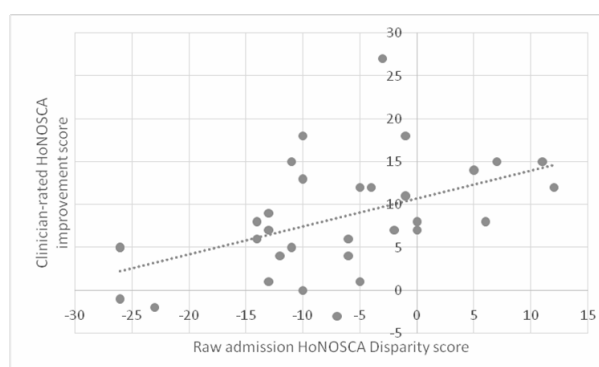**Figure 1.** Clinician- and patient- rated HoNOSCA scores at admission and discharge

Figure 2. Correlation between raw admission HoNOSCA disparity scores and clinician-rated HoNOSCA improvement scores

There was no significant correlation between admission HoNOSCA score disparity and CGAS or LoS, when either the raw or absolute disparity scores were used.

Table 4. Correlations between HoNOSCA score disparity and admission HoNOSCA scores

	Correlation with clinician-rated admission HoNOSCA score (n=32)	P	Correlation with patient-rated admission HoNOSCA score (n=32)	P
Raw HoNOSCA score disparity	0.553	0.001	-0.705	<0.001
Absolute HoNOSCA score disparity	-0.431	0.014	0.527	0.002

Table 5. Correlations between HoNOSCA score disparity and various outcome measures

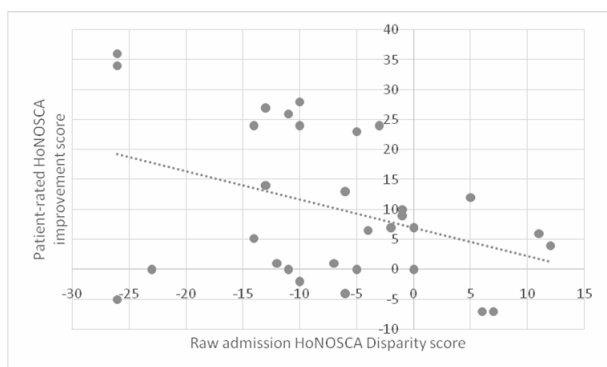|	Correlation with CGAS change score (n=71)	P	Correlation with LoS (n=71)	P	Correlation with clinician-rated HoNOSCA improvement score (n=32)	P	Correlation with patient-rated HoNOSCA improvement score (n=32)	P
Raw HoNOSCA score disparity	0.133	0.267	0.150	0.212	0.492	0.004	-0.381	0.031
Absolute HoNOSCA score disparity	0.007	0.954	-0.062	0.606	-0.414	0.019	0.274	0.129

Figure 3. Correlation between raw admission HoNOSCA disparity scores and patient-rated HoNOSCA improvement scores
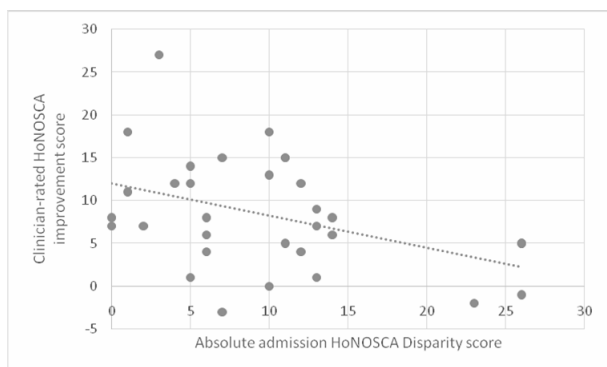

Figure 4. Correlation between absolute admission HoNOSCA disparity scores and clinician-rated HoNOSCA improvement scores

Admission HoNOSCA score as a predictor of outcomes

We investigated the predictive utility of clinician- and patient-rated admission HoNOSCA total scores separately to examine any differential effects.

Clinician-rated HoNOSCA scores

Clinician-rated admission HoNOSCA scores were significantly correlated with clinician-rated improvement scores (Figure 5, r=0.916, p<0.001), and showed a weak correlation with CGAS improvement (r=0.279, p=0.019). There were no significant correlations between clinician-rated admission HoNOSCA score and LoS.
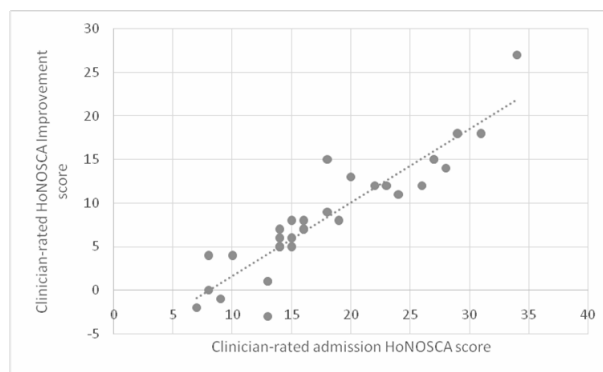

Figure 5. Correlation between clinician-rated admission HoNOSCA and HoNOSCA improvement scores

Patient-rated HoNOSCA scores

Patient-rated admission HoNOSCA scores were significantly correlated with patient-rated improvement scores (Figure 6, r=0.731, p<0.001). There were no significant correlations between patient-rated admission HoNOSCA score and either LoS or CGAS improvement score.
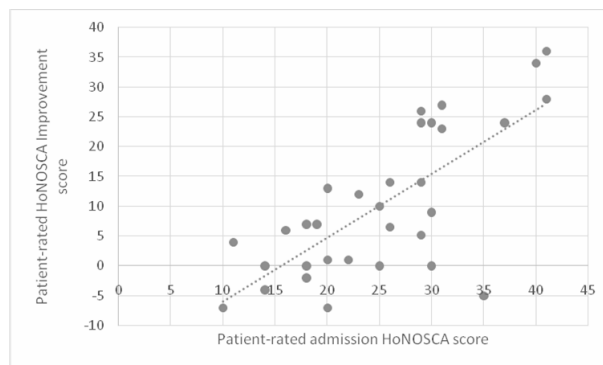

Figure 6. Correlation between patient-rated admission HoNOSCA and HoNOSCA improvement scores

DISCUSSION

Clinicians and patients differ in their HoNOSCA ratings for a variety of reasons. Patients may arguably have greatest insight into their selves, and their ratings could potentially represent the most accurate reflection of the two scores. Clinicians may initially only perceive the patient superficially, having not appreciated the full extent of their history and condition. Equally, and in contrast, patients may lack self-awareness and insight, and in these cases it is the clinician's account which best describes the patient. Indeed, the HoNOSCA has demonstrably good interrater reliability (Brann 2001, Gowers 1999, Hanssen-Bauer 2007), and previous studies have shown acceptable concordance when comparing clinicians' ratings at admission with referrers' and even parents' ratings (Garralda 2000, Yates 1999). Whilst this study does not aim to explain why they differ, the literature suggests that the clinicians' independent judgements of the patient are accurate.

HoNOSCA scores in context

Mean patient-rated HoNOSCA scores were higher than clinician ratings both at admission and discharge, in contrast to Gowers' (2002) initial findings in both inpatient and outpatient samples. Admission scores were comparable to other inpatient units, where values range 18.7 (Hanssen-Bauer 2011), 19.1 (Garralda 2008) and 19.6 (Gowers 2002); discharge scores were also similar.

Compared to outpatient studies, we report greater (clinician-rated) scores at admission. This gives higher improvement scores, comparable to the mean of 7.78 (SD 6.78) reported in another UK CAMHS inpatient unit (Garralda 2008). This is not surprising, as the inpatient unit in this study functions to treat patients too unwell to be managed by outpatient community care, and indeed Gowers' (2002) findings reflect this.

Previous studies have investigated how HoNOSCA scores relate to subjective perceptions of patient improvement. Gowers (1999) found that mean HoNOSCA improvement scores of 7.7 concurred with clinicians' perceptions of patient outcome as 'much better'. Similarly, patients that clinicians judged as 'much improved' had HoNOSCA improvement scores of 6.55 in Garralda's (2000) study. Although we did not collect data on perceived patient improvement from admission to discharge, discharge can be taken as a rough measure of positive progress (except in rare cases of unplanned discharges).It is therefore notable that both the patient (10.3) and clinician-rated (8.3) HoNOSCA improvement scores we report are also at similar levels, suggesting that improvement scores in this range represent desirable and achievable outcomes.

Trends in admission HoNOSCA score disparity

The correlations between raw score disparity and clinician-rated HoNOSCA score suggest that those who

clinicians judge to be more dysfunctional tend to believe they are less dysfunctional, whereas those who clinicians' judge to be less dysfunctional tend to believe that they are more dysfunctional than they actually are. This is also reflected in the strongly negative correlation between raw score disparity and patient-rated HoNOSCA score. This is suggestive of a lack of insight in both patient groups.

We also queried whether the magnitude of disparity was associated with level of patient dysfunction. Taking the clinician's rating as the most accurate metric of patient dysfunction, we found a surprising modest negative correlation with absolute score disparity. This suggests that patients who clinicians view as most ill make self-ratings which are most concordant with the clinicians' opinions. Patients who judged themselves to be most dysfunctional also tended to have greatest absolute disparity scores. This perhaps reflects a greater lack of insight at the upper end of patient-rated scores.

Admission HoNOSCA score disparity as a predictor of outcomes

We used correlations to investigate the disparities in judgements between clinician and patient, rather than the patient's absolute level of functioning.

There were significant correlations between raw admission HoNOSCA disparity scores and both patient and clinician-rated HoNOSCA improvement scores. However, where a positive correlation existed between clinician-rated HoNOSCA improvement and raw admission HoNOSCA disparity scores, there was a negative correlation for patient-rated HoNOSCA improvement scores.

This suggests that the higher the patient's ratings are above the clinician's at admission, independent of the actual HoNOSCA score, the greater the patient-rated HoNOSCA improvement, but the lower the clinician-rated HoNOSCA improvement. This is explained in the context that patients tend to self-rate higher HoNOSCA scores than clinicians, and indeed demonstrate higher HoNOSCA improvement scores at discharge.

Using absolute disparity scores, we found that higher disparity at admission was associated with lower clinician-rated improvement scores. This initially suggests that reduced clinician-patient concordance at admission may impact upon patient improvement, which may well be true. However, given that those who have lower clinician-rated admission HoNOSCA scores have greater absolute disparity, and those who have lower scores require lower improvement scores to achieve discharge, this finding is less surprising.

This pilot study adds to the literature by suggesting that disparity scores may be a useful indicator of patient outcome. Given the value of such information, the need for greater completeness of data collection in this unit and others is made more pertinent.

Admission HoNOSCA score
as a predictor of outcomes

Interestingly, when absolute levels of functioning were analysed, greater improvement was correlated with greater admission HoNOSCA scores, considering ratings of both clinicians and patients. Taken with the higher mean HoNOSCA score achieved here compared with outpatient units, this suggests that even at the patient level, greater benefit is derived from those who have greater need, as they are more severely ill. This supports Garralda's findings, which showed that greater HoNOSCA scores were achieved with higher initial HoNOSCA scores in both outpatient(2000) and inpatient (2008) samples.

Length of stay was an outcome measure which was not correlated with any of the various HoNOSCA scores. Although initially hypothesised to depend on the severity of patient dysfunction, LoS is in reality affected by a multitude of contributing factors, of which patient dysfunction is just one. Successful planned discharge from the unit relies upon organisation of appropriate onward accommodation, social care and other community support, which are often unpredictable logistical challenges, and independent of the patient's clinical progress.

LIMITATIONS AND FURTHER WORK

Descriptive statistics were carried out on a large patient cohort, but correlations were only performed on a small subgroup, owing to the pervasiveness of missing data. This is partly due to the low turnover of patients, given the limited number of beds and the length of stay required to treat each patient. This has limited the power of the present study, and somewhat restricts interpretation of these results. Poor completion rates are disappointing but not unusual: Hall et al. (2013) report completed data sets for only 16% of cases in an audit of three CAMHS services.

As with most studies using this pre-post observational methodology, no control group was assigned due to its unethical nature. Thus, patients may simply have recovered spontaneously without the need for inpatient treatment- a limitation that Garralda (2008) has previously acknowledged. However, when Green et al. (2007) measured patients' dysfunction using CGAS pre-, intra- and post-inpatient admission, they found a mean increase of only 3.7 points pre-admission, but 12 points intra-admission, each after a similar period of 16 weeks. This suggests that such drastic improvements are unlikely to be achieved without inpatient treatment.

Patients are treated with active involvement of persons within their wider social context, including family and schools, and the difficulties experienced by patients often impact on others. As Jaffa (2000) argues, the HoNOSCA and CGAS are both subjective clinician measures, just at different levels. Greater utility would perhaps be found in investigating the predictive value of HoNOSCA scores with respect to ratings by other affected, but independent, stakeholders. As such, future studies should account for their judgement, investigating how admission HoNOSCA score disparities affect improvement in the eyes of family members, school teachers and others involved in the patients' care. These judgements can offer a more global sense of progress, not limited to symptoms, such asperceived integration within social or family groups.

In this study, we found that admission HoNOSCA score disparity was associated with HoNOSCA improvement scores, which is encouraging, although score disparity is itself associated with admission HoNOSCA scores, and this association is also present with clinician and patient-rated admission HoNOSCA scores. Consideration of further outcome variables is therefore needed in order to conclude whether the disparity scores provide any extra information that clinician-ratings do not, as well as concluding whether the clinician and patient ratings are predictive of different outcome measures. These would include post-discharge follow up, and the subjective perceptions of patient change as evaluated by clinicians, nursing staff, parents and teachers.

By the centre's very nature as a specialist referral unit, the inpatient population is enormously heterogeneous with regards primary diagnoses, comorbid conditions, and, subsequently, outcomes. Patients here represent extremes of the population of adolescents with mental health problems. Given this diversity, this study's inclusion of all patients may have obscured results relevant to each specific primary diagnosis. Indeed, Garralda (2008) reported lowest HoNOSCA improvement scores for patients with schizophrenia, but highest for mood and eating disorders, making analysis of patients by primary diagnosis subgroups pertinent. Furthermore, Gowers (2002) found differences between clinician and patient HoNOSCA ratings on specific scales of the HoNOSCA. Whilst we have reported overall differences, further analysis of scores for each of the 13 scales may prove instructive, as they may express changes that do not translate to overall changes on the HoNOSCA total score (Brann 2010). Both recommendations would also offer greater insight into the unit's strengths and weaknesses (Harnett 2005).

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