

Risk Assessment for Future Violence in Individuals from an Ethnic Minority Group

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Across several countries (including the UK and U.S.) people of black (African-Caribbean) origin are overrepresented in secure psychiatric services. Risk assessment instruments for predicting violence are often used, but their accuracy is not known for ethnic minority patients. We therefore aimed: 1) to test the accuracy of two leading instruments (Violence Risk Appraisal Guide (VRAG) and HCR20 Risk Management Scheme) in patients from a black ethnic minority, and (2) to compare the levels of risk as defined by these instruments. Risk assessments were completed using only file information available at the time of discharge. Offending behavior postdischarge was obtained from official records with each patient being followed for at least 2 years. Both VRAG and HCR-20 were significant predictors of future violence for black patients, and had similar accuracy as when used on white patients. Risk assessment scores were slightly lower for black patients, but there were no significant differences in reconviction rates for either violent or general offences post discharge. The results provide an evidence base for the use of HCR-20 and VRAG as an accurate risk assessment instruments for black ethnic minority patients in the UK.

Keywords: Violence risk assessment, VRAG, HCR-20, ethnic minorities

INTRODUCTION

Racial Differences in Secure Service Admissions

The assessment of an individual's future risk of violence is an important part of a patient's care plan and for the protection of the public. In the UK those from a black ethnic origin are massively overrepresented in secure forensic psychiatric services, with approximately 5 times the rate of admission than those from a white population (Coid, Kahtan, Gault, & Jarmen, 2000). These findings are also mirrored by rates of admission to prisons in the UK (Coid et al., 2002b;

Ministry of Justice, 2008) and are reflected at each stage of the criminal justice pathway (Ministry of Justice, 2008). The situation does not seem any better in the United States where imprisonment rates are around 6 times greater for those from a black origin compared to a white one (Donzinger, 1996). For instance, in 2008 the rates of imprisonment were 487 per 100,000 for white males and 3,161 per 100,000 for black males (Sabol, West, & Cooper, 2009). Given the importance of risk assessment to patient care it is surprising that there have been no studies to date of the efficacy of risk assessment instruments for UK ethnic minorities. Indeed, there is a paucity of such studies right across the world.

The reason for these remarkable discrepancies in rates of admissions to secure services is still not fully established. Two general theories could be put forward. The first is that there are risk factors that are different between the ethnic groups. For instance, it has been suggested that personality factors may be less powerful determinates of future antisocial

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behaviour in black ethnic minorities due to the stronger influence of social and economic problems (Kosson, Smith, & Newman, 1990). If this is the case, then risk assessment instruments that combine risk factors (see below) would not be equally effective in the different ethnic groups, and separate schemes of assessment might be required. Second, the risk factors may be similar in both groups, but more prevalent in the black group (Moffitt, 1994). In support of the latter position Fite, Wynn, and Pardini (2009) examined arrest rates in male juveniles aged 10–17. Race was indeed associated with an increased arrest rate for violent offenses (black = 38%, white = 25%). However, most of these differences could be accounted for by the raised levels of risk factors during their childhood. These included factors related to the individual such as increased conduct problems, low academic achievement, and poor communication, as well as those relating to their environment such as neighborhood disadvantage and problems. Thus, these authors suggest that most racial discrepancies in juvenile male arrest rates can be accounted for by increased childhood risk factors. This later findings therefore suggests that risk factors are similar in nature in both ethnic groups and therefore imply that instruments that combine risk factors to produce a risk assessment should work in both groups.

Risk Assessment Instruments

Perhaps the most established and well-researched instruments designed to predict future violence are the Violence Risk Appraisal Guide (VRAG - Quinsey, Harris, Rice, & Cormier, 2006) and the HCR-20 Risk Management Guide (Webster, Douglas, Eaves, & Hart, 1997). The VRAG is an example of an actuarial approach to risk assessment. Risk factors that were most predictive of future violence in a construction sample are combined via a mathematical formula to provide a score for an individual. In turn these scores can be used to make a prediction about the likelihood of violence (as defined by the VRAG) over a period of years. Much research across the world has supported the conclusion that the VRAG scores are correlated with rates of violence (Doyle & Dolan, 2006; Harris, Rice, & Camilleri, 2004; Snowden, Gray, Taylor, & MacCulloch, 2007; Urbanik, Noll, Grunewald, Steinbach, & Endrass, 2006. For meta-analysis see Campbell, French, & Gendreau, 2009, and Harris, Rice, & Quinsey, 2010).

The HCR-20 is an example of the structured professional judgment approach to risk assessment. In this approach a range of risk factors, selected from research and clinical opinion, are systematically considered and a risk judgment is then made in a clinical manner. Again much research from around the world supports the notion that HCR-20 assessment is related to future violence¹ (Dernevik, Grann, &

Johansson, 2002; Douglas, Ogloff, Nicholls, & Grant, 1999; Doyle, Dolan, & McGovern, 2002; Gray, Taylor, & Snowden, 2008; McNiel, Gregory, Lam, Binder, & Sullivan, 2003. For meta-analysis see Campbell et al., 2009).

Despite this large body of support for the efficacy of these instruments across many countries nearly all these studies are from countries where the majority of the patients were Caucasian and differences in ethnic groups within the sample have been ignored. An exception to this is the study of Fujii, Tokioka, Lichten, and Hishinuma (2005) which compared the accuracy of the HCR-20 for Asian-Americans, Euro-Americans and Native-Hawaiians. The authors did not find any statistically significant differences between these groups. However, this lack of significance may have been due to small sample sizes as the mean area under the curve (AUC) for the groups varied between a small effect (AUC = 0.58, Asian Americans) to a large effect (AUC = 0.73, Native Hawaiians) according to conventional criteria (Rice & Harris, 2005). Hence the primary aim of the present research was to explore the efficacy of these two instruments in an ethnic minority group in the UK in comparison to a Caucasian group.

METHOD

The study was a pseudo-prospective case note analysis of mentally disordered offenders discharged from independent sector, medium-secure psychiatric facilities in the UK.

Participants

The total sample consisted of 1,182 patients that were discharged from four independent sector medium-secure units run by Partnerships in Care PLC between December 1992 and September 2001. Data relating to some of these patients has appeared in a previous publication (Gray et al., 2008).

Ethnicity was determined via self-report into 1 of 9 possible groups (Government Statistical Service, 1996). Data relating to ethnicity was not available for 55 patients and these patients were removed from the database. In order to make groups large enough for statistical analysis these 9 groupings were reduced to three groups consisting of 'white' patients ($n = 834$, 74%), 'black' patients ($n = 249$, 22%) and 'others' ($n = 44$, 4%) of which the vast majority were of Asian origin. In this paper we will only present statistical comparisons between the white and black groups due to the small sample size and heterogeneous nature of the 'other' sample.

It was not possible to gather exactly the same data on all the participants. Thus, many of the analyses below are on subsamples of this overall population. Of the remaining 1,127 patients we were not able to score the HCR20 for 111 patients (due to lacking information) leaving a final sample size of $N = 1016$. We did not commence scoring VRAGs at the start of this project and so the total sample for these comparisons is $N = 579$. For each subsample used (e.g., those with a valid

¹Though the vast majority of this research merely used the number of risk factors present to make the risk prediction rather than a true clinical judgment.

HCR-20 score) we compared the patient characteristics (e.g., age, diagnosis etc.) to the sample as a whole. No significant differences were found for any of these comparisons.

Measures

HCR-20: The HCR-20 consists of 20 items, 10 items related to Historical factors (e.g., Employment Problems, History of Mental Illness), 5 items related to current clinical presentation (e.g., Lack of Insight, Current Symptoms of Major Mental Illness) and 5 items related to future risk factors (e.g., Lack of Personal Support, Non-compliance with Remediation Attempts). Each item was scored as 0 (not present), 1 (partially or possibly present) or 2 (present), leading to a maximum Total score of 40, and maximum subscale scores of 20 for the History Scale, and 10 for the Clinical and the Risk scales.

Violence Risk Appraisal Guide: The VRAG (Quinsey, Harris, Rice, & Cormier, 1998) comprises 12 items. They include such items as elementary school adjustment, offender's age at time of index offense, etc. If we could not score a particular item then that item was rated as a '0'. We did not include the VRAG if more than 4 items could not be scored.

Procedure

Ethical approval was obtained from the Ethical Committee of the School of Psychology, Cardiff University. Four psychologists completed all assessments by access to file-based information. Each assessor was trained on the two risk assessment instruments. On a test sample of 19 cases the raters had a collective ICC (one-way model, single measure) = 0.80 (95% CI = 0.54-0.91) for the HCR20, and ICC = 0.95 (95% CI = 0.86-0.98) for the VRAG. All background psychiatric and mental health reports on the patients were obtained, as were full criminal record history, admission and discharge psychiatric and psychological reports, social work and probation information, and nursing records. Risk assessments were completed blind to outcome following discharge.

The main dependent variable was the occurrence of an offence after discharge from secure psychiatric services and was obtained from the UK Ministry of Justice Offenders Index. Offences were grouped as to whether they were violent (included all offenses classified as violence against the person by the Home Office and kidnap, criminal damage endangering life, robbery, rape, and indecent assault) or any offense (which also included violent offenses). Time to offense was calculated as the difference between the discharge date and the time of reconviction. Patients that committed a nonviolent offense were removed from the analysis of violent offenses from the time of the non-violent offense as they may no longer have been at liberty to commit further offenses. Each patient was followed for at least 2 years (though many were followed for longer). However, data that relates to the accuracy of the risk assessment instruments were analyzed for

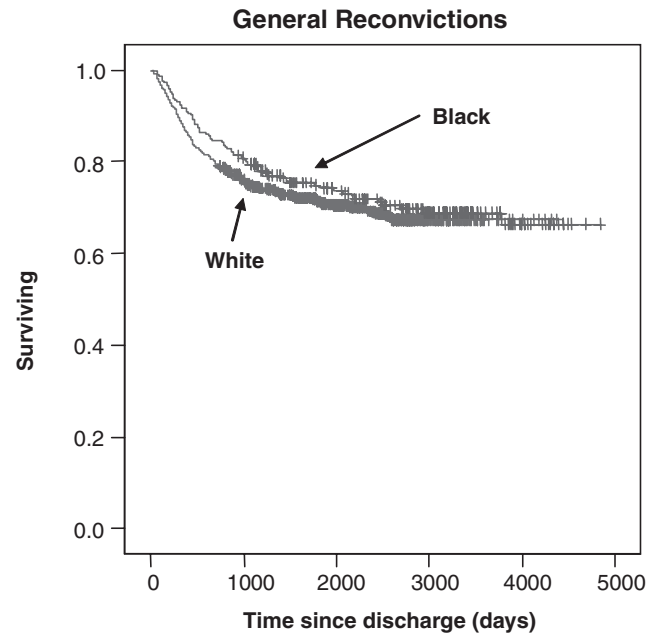


FIGURE 1 Survival rate (having no conviction after discharge) as a function of time since discharge for the black and white patients.

just a fixed 2-year follow-up, though the analysis of offense rates (survival analysis) uses all the data.

RESULTS

Demographics

The black and white groups were well matched in terms of male to females (males: white = 83%, black = 86%) and average age (white = 32.0, black = 31.2 years). These small differences were not statistically significant.

Information on psychiatric diagnoses was extracted from the patients' medical records. Diagnoses were made by their consultant psychiatrist (according to ICD-10 criteria), and many individuals had more than one diagnoses (i.e., comorbid diagnoses). The prevalence of mental illness was smaller in white than in black patients (65.7% vs. 87.6%, $p < .001$), whilst there was a greater prevalence of personality disorder (27.2% vs. 9.2%, $p < .001$), and of intellectual disability (14.1% vs. 5.6%, $p < .01$) in the white participants.

Risk Assessment Scores

Data relating to the risk assessment instruments are displayed in Table 1. For both the risk assessment instruments the black participants had lower risk scores than the white participants and these differences were statistically significant (all $ps < .01$). The difference in scores produced a 'medium' effect size (Cohen, 1988).

TABLE 1
Risk assessment instrument scores relating to the sample.

		All	White	Black	Difference between groups <i>p</i> value	Effect Size (Hedges' \hat{g})
VRAG	Score (<i>SD</i>)	4.73 (10.25)	5.55 (10.51)	2.44 (7.98)	<.01	0.31
	AUC (<i>SE</i>)	0.76 (0.03)**	0.79 (0.03)**	0.74 (0.06)**	<i>ns</i>	—
HCR20 Total	Score (<i>SD</i>)	18.5 (6.5)	19.0 (6.9)	16.9 (6.0)	<.001	0.33
	AUC (<i>SE</i>)	0.71 (.03)**	0.72 (.03)**	0.66 (.06)**	<i>ns</i>	—
History	Score (<i>SD</i>)	11.3 (3.7)	11.5 (3.8)	10.7 (3.5)	<.01	0.28
	AUC (<i>SE</i>)	0.70 (.03)**	0.71 (.03)**	0.68 (.07)**	<i>ns</i>	—
Clinical	Score (<i>SD</i>)	3.3 (2.5)	3.5 (2.5)	3.0 (2.5)	<.05	0.20
	AUC (<i>SE</i>)	0.54 (.03)	0.54 (.03)	0.53 (.07)	<i>ns</i>	—
Risk	Score (<i>SD</i>)	3.8 (2.6)	4.0 (2.6)	3.0 (2.2)	<.001	0.38
	AUC (<i>SE</i>)	0.69 (.03)**	0.69 (.03)**	0.62 (.06)	<i>ns</i>	—

Effect sizes are Hedges' \hat{g} (Hedges & Olkin, 1985) - which is very similar to Cohen's *d* but relates to samples of unequal size.

**Figure is statistically significantly different from chance levels (0.50) at *p* < .01.

Prevalence of Reoffending

Figure 1 shows survival curves that compare the rates of reconviction for any offense following discharge. A Kaplan-Meier Log Rank Test showed no difference in overall survival rates (white = 3278 days, black = 2932 days, Log rank (*df* = 1) = 0.2, *p* = 0.88). As our comparisons of risk assessment instruments aimed to use a single follow-up period (2 years) we also calculated conviction rates for any offense and for a violent offense. For any offenses 19% white offenders were reconvicted whereas 16% black offenders were reconvicted, but this difference was not significant. For violent offenses 12% white offenders were reconvicted whereas 11% black offenders were reconvicted. This difference was not significant.

Predictive Validity the Risk Assessment Instruments

The validity of the instruments to predict a reconviction for a violent offence within 2 years of discharge was calculated using signal detection theory. The area under the curves (AUCs) of the resulting receiver operating characteristics are given in Table 1. For the VRAG the resulting AUCs were 0.79 (white group) and 0.74 (black group), which represent very good prediction levels in both groups (effect sizes of 0.71 are regarded as 'large effect' sizes - Rice & Harris, 2005).² These AUCs did not differ significantly from one another (Hanley & McNeil, 1982). For the HCR-20 the resulting AUCs were

0.72 and 0.66 for the white and black groups. Once again the small difference between the groups was not statistically significant. Table 2 also presents the results from the subscales of the HCR-20. Whilst there are small differences (again prediction levels are slightly superior in the white group), none of these reached statistical significance.³

DISCUSSION

Evidence-base for These Risk Assessment Instruments

The primary goal of this research was to see if two well-established instruments for the prediction of future violence, the VRAG and the HCR-20, were applicable to a black population in the UK. Our results show that the accuracy of prediction of future violent reconvictions were good for both instruments and closely resembled the prediction efficacy for the white population. As such we believe that this study provides a sound evidence base for the use of both of these instruments within this particular ethnic minority group discharged from medium secure psychiatric services within the UK. Of course, this does not necessarily mean that these instruments will also be effective in other ethnic minority groups, or that other instruments will also be effective in this ethnic group. Clearly further research is needed to secure a sound evidence-base for these populations. However, the

²Whilst the white and black groups were reasonably matched for gender there is still the possibility that this might have influenced the results, particularly so given some evidence for rather poorer validity for such instruments in female samples (see Garcia-Mansilla, Rosenfeld and Nicholls, 2009). A supplementary analysis using only the male patients showed a similar pattern to that reported, namely HCR-20 AUC (*SE*) was 0.73 (0.03) for the white group and 0.68 (0.06) for the black group. For the VRAG the AUCs were 0.83 (0.03) for the white group and 0.75 (0.07) for the black group.

³Due to collection of VRAG data starting later, and the different rules that govern whether the assessment can be completed for each instrument, the AUCs for the VRAG and HCR20 are based on largely overlapping, but not identical samples. In a supplementary analysis we analysed only those patients where we had been able to complete both instruments. The results were nearly identical to those reported in the main text. For the white group (*N* = 380) the AUC (*SE*) for the HCR-20 = 0.73 (0.04) and VRAG = 0.78 (0.03). For the black group (*N* = 120) HCR-20 = 0.68 (0.07) and VRAG = 0.74 (0.07).

converging evidence, to which this study is supportive, appears to be that the combination of a few out of several possible risk factors can be used to produce an effective prediction instrument and that these factors appear to cross most racial and cultural boundaries. Hence, while this direct evidence is needed, it would seem likely that these instruments will be effective in other ethnic groups.

Comparison of White and Black Offenders

The secondary goal of this research was to consider possible reasons behind the large overrepresentation of people from black ethnic origin in secure forensic psychiatric services within the UK (and by implication other psychiatric and criminal justice services). In our sample 22% of the patients categorized themselves as black. In the UK census of 2001 the category of black accounted for only 2.8% of the general population (Ministry of Justice, 2008). Thus, the large overrepresentation of the black ethnic minority was present in our sample. The present population was drawn solely from independent sector psychiatric hospitals. However, the proportion of white and black patients appears to be nearly identical to those found by Coid et al. (2000) for admissions to maximum and medium secure forensic psychiatry services in England (white = 74%, black = 21%) and hence show the same overrepresentation of the black ethnic group compared to the general population.

One possibility for this overrepresentation is that there is some form of racial bias at play. Black patients might be regarded as more dangerous than their white counterparts and hence be placed into secure psychiatric services due to this perceived risk. In order to investigate this possibility we require a risk assessment instrument that is free from this possible bias. The VRAG is based on item scores that should be relatively free from any racial bias (e.g., 'marital status') and its final risk prediction is produced in a purely actuarial manner (adding up the item scores) that does not involve any clinical judgment. Hence we believe that this produces a bias-resistant measure of risk.⁴ Therefore, if there is any systematic bias we should expect that those from the black ethnic minority will show lower VRAG scores. Our analysis shows that this was the case, with the black group having an average VRAG score of around 3 points lower than the white group. However, it should be noted that a 3-point change in VRAG score is not very large. It is smaller than the standard error of measurement for this instrument (SEM = 4; Quinsey et al., 2006), and could only ever lead to a single category change in risk level. Likewise this 3-point difference on the VRAG is only equivalent to an effect size of 0.31 (Hedges' *g*; Hedges & Olkin, 1985) and is only 'medium' in magnitude. Such a difference does not seem capable of producing the

very large (5-fold) difference in admission rates to these secure psychiatric services.

One reason for the difference in these VRAG scores between the white and black groups may be the difference in psychiatric diagnoses that we noted between the samples. We found that the black group were more likely than the white group to have a diagnosis of mental illness (of which the majority are schizophrenia related disorders), while the white group were more likely to have a diagnosis related to personality disorder or learning disability. These findings are in agreement with other studies of psychiatric diagnosis and ethnicity (Coid et al., 2002a, 2002b; Harrison et al., 1997; Maden, Friendship, McClintock, & Rutter, 1999; Shubsachs, Huws, Close, Larkin, & Falvey, 1995). Within the VRAG a diagnosis of schizophrenia produces a reduction in risk score, while a diagnosis of personality disorder raises the risk score. Thus from these differences in diagnoses we should expect those from a black ethnic origin to have lower risk scores on the VRAG than the white group. Of course, this does not explain why there are differences in diagnoses between these groups, and this should be a continuing area of investigation and clinical relevance (Lyal, 2005).

A second test of the 'racial bias' hypothesis might be to examine reconvictions following discharge. If black patients are placed in secure psychiatric services because their dangerousness has been perceived to be exaggerated we should then expect them to commit fewer offences upon discharge. Examination of Figure 1 shows that while there may be a small effect such that the black group were reconvicted at a slightly lower rate than the white group for the first few years following discharge, overall there were no significant differences. This slight difference (evident at 2 years postdischarge) is in line with the risk prediction instruments showing a slightly lower score for the black patients. Likewise there were only slight (and statistically nonsignificant) differences in the rates for violent reconvictions. Therefore, there does not appear to be any strong evidence that the black patients were less risky or less dangerous than the white patients and hence this does not support the notion of a strong racial bias in perceived dangerousness. Hence, our data do not explain the massive overrepresentation of black ethnic minorities in psychiatric secure services.

CONCLUSIONS

Our data provides an evidence base for the use of the HCR-20 structured risk assessment scheme and the VRAG actuarial scheme for the prediction of violence in patients discharged from medium psychiatric secure units in the UK who are from a black ethnic minority. The data also suggest that while there is a difference in risk scores between these ethnic groups this is not reflected in any change in reconviction rates (for any offences or for violent offences) and probably reflects different rates of psychiatric diagnoses of mental illness and personality disorder between these groups.

⁴Of course a person with a strong racial bias might deliberately ignore or distort information, hence no assessment is truly bias free.

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