Assessing protective factors to prevent post-discharge violent behaviour: towards an assets-based approach for clinical risk management

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Background.
Medium secure forensic psychiatric units (MSUs) in the UK aim to be recovery-oriented to enable discharge to community-based services. Risk assessments are key to discharge planning, but clinical practice tends to focus on risk factors for violence rather than protective factors associated with a decrease in risk. The aims of this study were to investigate the reliability and validity of the Structured Assessment of Protective Factors (SAPROF) as a useful measure to support an assets-based approach when planning discharge from MSUs.

Method
A prospective cohort follow-up design was chosen for this study using a confidential inquiry design to ensure a total sample of all discharges. All forensic patients discharged from 32 NHS MSUs over a 12-month period were assessed at discharge and followed-up at six and 12 months post discharge. The occurrence and frequency of post-discharge violence were compared with discharge SAPROF scores.

Findings
The inter-rater reliability between SAPROF raters was very high and the SAPROF significantly predicted community violence and scores were strongly correlated with violence frequency. The higher the SAPROF score the higher the protection against violence and risk significantly diminished.

Interpretation
Assessing protective factors is essential to identify assets and prevent violence with a

focus on what makes somebody safe. This study supports the use of the SAPROF to inform discharge planning. Cultivating protective factors is likely to be motivating for patients and the SAPROF can provide an objective, reliable measure of internal, motivational and external assets that reduce risk and support defensible decision making at discharge.

INTRODUCTION

Medium-secure forensic psychiatric units (MSUs) in the UK aim to rehabilitate mentally disordered offenders to enable discharge to community-based services. High quality MSUs are patient-centred and recovery-oriented[1]. In contemporary medium secure services, risk assessments are key to case formulation, planning, and decision-making[2]. The recommended approach to risks assessment in the UK is that of Structured Professional Judgement (SPJ), which combines the use of empirically validated guidelines, with professional knowledge and discretion[3,4]. The most widely used SPJ guideline for violence risk assessment is the *Historical Clinical and Risk Management-20 items* (HCR-20)[5], which has demonstrated strong reliability and validity in a UK MSU population[2]. However, the focus of the HCR-20 and much of the clinical practice of risk assessment is solely on factors associated with an increase in violence risk rather than protective factors associated with a decrease in risk.

Research on protective factors has a long history in the criminal justice system and several protective factors that lead to desistance from crime have been identified, including internal and external protective factors such as stable relationship, work, social network, training and maturation[6]. This is supported by a recent study of released prisoners in the UK highlighting the effects of protective factors on preventing post-release violence[7]. Risk-only assessments are flawed[8] and the importance of protective factors has been highlighted when transferring mentally disorder to prison from MSUs[,9]. Identifying protective factors supports an *assets-based approach* where personal and external protective factors are cultivated collaboratively between service users and staff to mitigate risk[10]. A positive, strengths-based rehabilitation programme focussing on personal strengths and protective factors has been found to prevent future violence from forensic service users[11] and best practice dictates that forensic mental health services focus on nurturing protective factors to promote recovery[12]. Although it is recognised that protective factors should be considered in discharge planning, no specific tool has yet been recommended for use in the UK to measure protective factors[4].

A tool designed to structure clinical judgements by focussing solely on protective factors for violence is the *Structured Assessment of Protective Factors for violence risk* (SAPROF)[13]. This was developed to redress the balance between risk and protective factors and foster a more positive assets-based approach. The SAPROF contains 17 protective factors, organized in three scales: Internal factors, Motivational factors, and External factors (see Table 1). The first two items are historical in nature and static, while the remaining 15 are dynamic and sensitive to change. Since the development of the SAPROF in 2009, an increasing number of validation studies have started to appear. In a recent review of the research evidence[14], 19 studies were cited. In summary, the average inter-rater reliability for the SAPROF total score was .82, which is considered excellent. The SAPROF also demonstrated moderate to good

predictive validity for a wide range of outcomes including violence, sexual violence, and criminal convictions, and predicted violence in different populations including forensic and mental health patients. In Ireland, the SAPROF was found to be predictive of inpatient self-harm and violence and suitability for conditional discharge[15], supporting its value as a clinical decision support tool. However, this study did not investigate post-discharge outcomes and previous SAPROF studies are limited in a UK context while many studies are retrospective and often focused on inpatients. Although a recent research study could not establish a 'causal' link between risk or protective factors and violence, the need for a measure of protective factors to support an assets-based approach in forensic services remains essential for discharge planning and to prevent future violence[8,16].

The aims of this study were to investigate the inter-rater reliability and predictive validity of the SAPROF with a sample of all discharges from medium secure services in England and Wales. The hypotheses tested were that SAPROF total score and sub-scales scores could be coded accurately across different raters and that those patients with higher scores on the SAPROF would be significantly less likely to be violent at six and 12 months post-discharge.

TABLE 1 ABOUT HERE

METHOD

A prospective cohort follow-up design was chosen for this study. All forensic patients discharged from 32 NHS medium secure units across England and Wales over a 12-month period were assessed at discharge and those discharged to community placements were followed-up at six and 12 months post discharge. Patients were excluded if they had a primary diagnosis of learning disability or were outside of the age range 18 to 65 years old.

Procedure

The North West England Multi Site Research Ethics Committee approved the study. A confidential inquiry approach was used to ensure a total sample of discharges were included. Permission was sought and granted by the National Information Governance Board (NIGB) to conduct the study under section 251 of the NHS Act 2006. A link person was identified at each of the hospital sites and a notification system was set up so that the researchers were automatically informed when a patient was discharged. Baseline assessments were completed by interviewing a member of staff who knew the patient well and a review of records.

Baseline Assessment Measures

Demographic and diagnostic information were recorded at baseline for each patient and the SAPROF was completed. The SAPROF contains 17 protective factors organized into three scales (Table 1); internal, motivational, and external. The 17 items were rated on a three-point scale (0,1,2) up to a maximum score of 34.

The SAPROF was completed based on review of case records and interview with a member of staff from the respective MSU who knew the patient well (e.g. psychiatrist, nurse, psychologist). An interview schedule was devised, which included

each item of the SAPROF. Participating staff provided information and a rating on each of the items based on their knowledge of the service user in the six months prior to discharge. This information was collated with case records and final ratings were made based on all information.

Sample

Participants were identified as those having been discharged from the MSU to the community. There were 788 eligible service users discharged during the study period, of which 409 (52%) were discharged to the community.

Community Follow-Up Measures

Violence was defined in this study as sexual assaults; assaultive acts that involved the use of a weapon; or threats made with a weapon in hand, as well as all acts of battery, regardless of whether or not they resulted in injury. Verbal threats alone or verbal abuse were not included. The prevalence and frequency of violence recorded was based on review of clinical and police records and interviews with staff who knew the participant well during follow-up periods.

The MacArthur Community Violence Instrument (MCVI)[17] was used to detect violence and comprises 18 questions focusing on violent incidents. Research staff completed the MCVI based on the follow-up interview with care co-ordinators and this was used to detect any violent incidents. Details of any violent incidents found during the review of clinical records and police national computer records were also noted and cross-matched with information obtained at interview. Criminal convictions in the 12 months post-discharge were gathered using data from the Police National Computer. Information from all sources (interview, notes and PNC) were combined to ascertain whether participants had been involved in any violent incidents during follow-up.

Data Analysis

Data were analysed using SPSS for Windows version 26. Descriptive statistics at baseline for age, gender, diagnosis, and ethnicity are reported. Fisher's exact test was used with the chi-square statistic to compare differences in characteristics between violent and non-violent groups. To enable sensitivity analysis, the SAPROF total and subscales were split at the median score and 75th percentile for total score. Independent samples t-tests were conducted to identify any significant differences in mean scores on the SAPROF between violent and non-violent groups. Receiver Operating Characteristic (ROC) analysis was used to evaluate the validity of the SAPROF to predict post-discharge violence.

Researchers were trained in the use of the SAPROF and collaboratively rated cases based on interview notes and case records until consensus ratings were reached. Intraclass correlation coefficients (ICCs) were calculated between four raters who independently rated 20 randomly selected cases to evaluate interrater reliability. The ICCs for the total and sub-scales were found to be very good. For the SAPROF total score the ICC = .98; Internal scale, ICC = .96; Motivational Scale, ICC = .98; and the External Scale, ICC = .90.

Sample Description

Of the 409 community discharges, 22 (5.4%) were lost to follow-up. Therefore, 387 were followed up at six and 12 months respectively. At discharge, the majority were male (n = 365, 89.2%) and the median age in years was 38 for males and 39 for females. The majority were white British (n = 244, 59.7%) and over a quarter (n =144, 25.4%) were recorded as black. There were no differences between the violent and non-violent groups in terms of gender or ethnicity. The mean length of stay was 879.11 days (SD = 974.5) and the median 391 days, ranging from 7 to 7299 days. Nearly half 178 (43.5%) were conditionally discharged subject to Section 41 of the mental health act (also known as a restriction order imposed by the crown court to ensure decisions on transfer and discharge are overseen by the Ministry of Justice)*, two (0.4%) were absolutely discharged, 118 (28.9%) were subject to a Community Treatment Order (CTO: conditions applied by the responsible clinical team prior to discharge, to those patients detained on a treatment order while inpatient) and six (1.4%) remained on a Section 3 (Hospital Treatment Order) of the Mental Health Act, 1983.

In terms of psychiatric diagnosis, over three-quarters (n = 319, 78%) had a diagnosis of schizophrenia or schizoaffective disorder, 29 (7.1%) had a primary diagnosis of mania/bipolar disorder. Less than one in ten (n = 26, 7.1%) had a primary diagnosis of personality disorder, although a fifth (n = 83, 20.4%) had a comorbid personality disorder diagnosis. Very few had a primary diagnosis of substance use disorder (n = 4, 1.1%), whereas over two-thirds (n = 267, 65.3%) had a definite and serious history of comorbid substance misuse.

RESULTS

Prevalence and Frequency of Violence

Information from all sources was combined to detect violent incidents. At six months post-discharge, 54 (14%) of the 387 who were successfully followed-up had committed at least one violent incident. According to the PNC alone, only six (1.6%) people were violent and, in all cases, where violence was detected by the PNC, it was also detected by either interview with collateral informant or case record review.

Non-violent individuals tended to be older (Mean = 38.42 years, SD = 9.73) than violent individuals (Mean = 34.28, SD =8.69). This difference was significant, t (385) = 2.95, p =.003. The prevalence of violence based on length of stay was also significant, t (385) = 2.38, p =.018. Those who were not violent during follow-up had been resident in medium secure care for longer before discharge (Mean = 957.59, SD = 1018.74) than those who were violent (Mean = 615.44, SD = 701.63).

A greater proportion of males (14.8%, N = 51) were violent compared to females (7.0%, N = 3) but this result was not significant, chi-square = 1.96, p = .161. There was, however, a significant difference in prevalence of violence based on legal status. A smaller proportion (9.7%, N = 17) of those discharged conditionally on a section 37/41 Mental Health Act, 1983 (Crown Court imposed Hospital Treatment Order with Restriction Order, which imposes supervision and treatment conditions on those offender patients who might be an ongoing high risk to others on discharge from hospital) were violent compared to those who were informal (not subject to any legal

order or restrictions) or discharged on other sections (17.5%, N =37), chi-square = 4.96, p =.026 (Table 2).

At the 12-month follow-up, 87 (22.5%) of the sample had been violent. Again, the PNC level of detection was significantly lower with only 11 (2.8%) cases having recorded violent convictions or cautions. The differences between violent and non-violent groups based on age and length of stay remained significant at 12 months post- discharge. The non-violent group were again older on average (Mean =39.08, SD =9.50) than the violent group (Mean =33.56, SD =9.13), t (385) =4.81, p < .001. Similarly, those who were not violent had remained as inpatients for longer before discharge (Mean =1003.99, SD =1051.10) than those who were violent (Mean =585.25, SD =628.13), t (385) =3.54, p < .001.

A smaller proportion of those conditionally discharged under section 37/41 (Mental Health Act, 1983;15.3%, N =27) were violent compared to those on other sections (28.4%, N =60, p =0.002).

TABLE 2 ABOUT HERE

Frequency of violence

The 54 people who were violent in the first six months following discharge committed a total of 99 violent acts. Thirty-three people committed a single act of violence, and the highest number of violent acts committed by a single person was eight. By 12-month follow-up, the 87 people who had been violent had committed a total of 176 violent acts. Fifty-one people had committed a single act of violence, with the highest number of acts committed by a single person rising to 12. The SAPROF total and all subscales were strongly correlated with frequency of violence at six- and twelve-months post-discharge (Table 3). The SAPROF total score was most closely correlated with the frequency of violence at six months and twelve months.

TABLE 3 ABOUT HERE

Comparison of Mean Scores

The sample mean score of the SAPROF total was 23.37 (SD 5.25), Internal scale 6.52 (SD 2.10), Motivational scale 9.73 (SD 3.06) and External scale 7.12 (SD 1.44). When comparing the mean scores of the SAPROF in the violent and non-violent groups, those in the violent group scored significantly lower on the SAPROF total score and across all the subscales at six and twelve months post discharge (Table 4). The difference in scale scores between the violent and non-violent was highest for the SAPROF total score. Overwhelmingly, the higher the SAPROF score the lower the risk.

Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value

The median split on the SAPROF total and all the subscales was used as the cut-off and the outcome used here was non-violence. At the median split, the SAPROF and all subscales showed that those scoring lower than the median were between three and five times more likely to be violent at six and 12 months post-discharge (Table 5). At six months the highest risk ratio was for the SAPROF Motivational scale score at 5.3,

with a sensitivity of 63.4%, specificity of 77.8%, PPV of 94.6% and NPV of 25.6%. At 12 months follow-up, the highest risk ratio was for the Internal scale at 2.6 with a sensitivity of 47.7%, specificity of 77%, PPV of 88.2% and NPV 30.7%. The PPVs of the SAPROF total of 94.6% at six months and 88.2% at 12 months for non-violence, means that those with protective factor score at the median score of 25 and below are nearly five times more likely to be violent than those who score above the median at six months (25% v 5.8%) and nearly 2.5 times more likely at 12 months (34% v 13.9%). Sensitivity statistics change depending on cut-off score. If the 75th percentile set as the cut off on the SAPROF total (28 and over) the PPV would increase to 98.3% at six months, meaning only two cases (1.7%) who scored above the 28 were violent with a risk ratio of 11.3, and 88.1% at 12 months. High scores on the SAPROF result in high protection against post-discharge violence.

TABLE 5 ABOUT HERE

Predictive Validity

Based on ROC analysis, the SAPROF and all sub-scales significantly predicted violence at six- and 12-months post-discharge where the higher the score the less likely violence would occur. At six months, the best predictor was the SAPROF total score with an Area under the Curve (AUC) of .76, (Table 6). At 12 months, the SAPROF total score remained the best predictor with an AUC of .69, closely followed by the Motivational sub-scale score with an AUC of .67. All AUCs remained highly significant where $p < .001$.

As the majority of participants had a history of major mental illness we also investigated if adherence to medication item was predictive of future violence at six and 12 months. The AUC for total sample at six (.59, $p < 0.07$) and 12 months (.56, $p < 0.12$) were non-significant, although when we only looked at those with a history of major mental illness, the AUC at six months remained at .59 but was significant where $p < 0.04$, but remained non-significant at 12 months (.57, $p < 0.08$).

TABLE 6 ABOUT HERE

DISCUSSION

This is the first prospective cohort study evaluating protective factors and community violence based on a whole cohort of discharges from NHS Medium Secure Services in England and Wales. In this study, the SAPROF significantly predicted community violence at six- and 12-months post-discharge with AUCs similar to those found in previous studies[14]. The SAPROF and sub-scale mean scores significantly discriminated between the violent and non-violent groups and high scores were strongly correlated with frequency of violence. The findings support the hypothesis that the SAPROF can be reliably coded by different raters as the reliability achieved here is superior to previous studies[14].

The prevalence of violence at both six- and 12-months post-discharge, was considerably higher than that found in similar studies that relied on official records only[18,19]. Police National Computer (PNC) records detected only a 2.8% base rate of

violence in this study and this adds further support to the suggestion that rates of violence may be significantly underestimated if official records alone are relied upon. Outcome information should be sought from multiple sources where possible especially as there was evidence of violent behaviour of a serious nature that did not result in conviction[2].

The predictive validity findings for the SAPROF reported here are similar to those reported in previous studies[14]. The AUCs are useful for validating the SAPROF but the PPV may appeal more in clinical practice as the PPV provides the probability that a patient scoring above the cut-off is not going to be violent. The high PPVs of the SAPROF of 94.2% at six months and 86.1% at 12 months for non-violence, provides an evidence-base for clinicians when factoring in strengths and assets into risk formulations and violence prevention plans. Attainment of protective factors over a sustained period up to an optimal cut-off could justifiably be used as a decision rule prior to discharge whereby any stepping down of restrictions will be dependent on need to build assets as reflected by improved scores on the SAPROF.

It is likely that individual or specific groups of protective factors will have different impacts on those with a mental illness compared to those without[14], and further analysis of medication adherence on those with a history of mental illness suggested this might be the case here. However, further research is required to compare level of protection afforded by medication, and long-acting neuroleptics post-discharge on those with past and current major mental illness, and such studies are currently underway.

It is of note that the performance of the SAPROF diminished over time between six and 12 months. This highlights the dynamic nature of the protection afforded by the SAPROF items and brings into question the value of the two static items: *Intelligence* and *Secure attachment in childhood*. This is reflected in the recent development of the SAPROF-Youth Version, where all the 16 items included are dynamic[20]. Future versions of the SAPROF adult version may focus on dynamic items only.

There are several limitations of the study that need to be considered. The use of section 251 NHS Act (2006) allowed for a whole and therefore a truly representative sample of discharges, thus avoiding the limitations of non-consenters experienced in other studies. There are many potential confounders that could impact on the study findings, and information relating to key factors such as diagnoses, symptoms, substance use and experiences of support was reliant upon the knowledge of third parties and records. Therefore, staff informants were only recruited if they had worked closely with the service users and were confident that they knew the patients well. During the follow-up, a small minority of patients were lost from the study and this could impact on the findings. The focus on protective factors only could lead to important risk factors being missed. To control for this the authors of the SAPROF recommend that it should only be used following a structured assessment of risk factors, such as the HCR-20[13]. An assessment of protective factors to inform risk judgements must only occur once risk factors have been assessed.

There is a growing consensus that protective factors should be an essential part of an assets-based approach to prevent violence where the question is focused on what makes somebody safe rather than what makes them a threat. Prior to this study, there

was limited research to support use of a valid and reliable tool to measure protective factors in discharge planning. Testing reliability and validity remains an important part of any guideline validation process if users are to be assured that guidelines are evidence-based and credible[21]. However, the application of the SAPROF in clinical practice will reflect the clinical task of violence prevention rather than prediction[16], and in practice the SAPROF may be most useful as an evidence-based decision support tool that focusses on internal, motivational and external 'assets' and balances these with risk factors to enhance patient involvement, structure clinical judgements and prevent violence. Personalised formulations based on assets and risks and co-produced with service users are consistent with contemporary best practice in risk management in mental health services[22,5], and supports contemporary approaches to personal and clinical recovery in forensic mental health services[23, 8].

The study findings support the use of the SAPROF as a measure of progress for individuals recovering from mental disorders associated with the risk of violence. Developing protective factors is likely to be motivating for both the patient and staff as balancing risk with assets is more just and equitable, while the mutual target is asset-building rather than solely mitigating risk factors[24, 25]. The SAPROF can provide an objective, reliable measure of internal, motivational and external assets that reduce risk and thereby support defensible decision making. Where SAPROF items are not present, these can be positive goals for service users to attain as part of their care plans and recovery[26]. Used this way, the evidence from this study suggests that using the SAPROF to inform care plans collaboratively developed between staff and patient would prevent violence.

In the future, care pathways from medium security to the community should continue to be a focus for research and the dynamic nature of the SAPROF items over time needs further investigation. Future research will need to consider how the SAPROF is applied in practice to ensure this aligns with assessment of risk factors, formulations of risk, the clinical pathway and care planning.

TABLES

Table 1
SAPROF items and sub-scales

Internal	Motivational	External
Intelligence	Work	Social network
Secure attachment in childhood	Leisure activities	Intimate relationships
Empathy	Financial management	Professional care
Coping	Motivation for treatment	Living circumstances
Self-control	Attitudes towards authority	External control
	Life Goals	
	Medication	

Table 2
Comparison of Violent and Non-Violent Groups at 6 and 12 Months Post-Discharge

	6 months			12 months		
Variable	**Violent N (%)**	**Non-Violent N (%)**	**X^2**	**Violent N (%)**	**Non-Violent N (%)**	**X^2**
Gender						
Male	51 (14.8)	293 (85.2)	1.96	81 (23.5)	263 (76.5)	2.02
Female	3 (7.0)	40 (93.0)		6 (14.0)	37 (86.0)	
Diagnosis						
Major mental illness	49 (13.7)	309 (86.3)	0.28	81 (22.6)	277 (77.4)	0.06
No major mental illness	5 (17.2)	24 (82.8)		6 (20.7)	23 (79.3)	
Ethnicity						
White British/Irish/Any other white background	28 (12.0)	205 (88.0)	1.83	47 (20.2)	186 (79.8)	1.79
Other ethnic groups	26 (16.9)	128 (83.1)		40 (26.0)	114 (74.0)	
Personality disorder						
History of Personality Disorder	12 (15.4)	66 (84.6)	0.167	17 (21.8)	61 (78.2)	0.03
No history of Personality Disorder	42 (13.6)	267 (86.4)		70 (22.7)	239 (77.3)	
Legal status at discharge						
Section 37/41	17 (9.7)	159 (90.3)	4.958*	27 (15.3)	149 (84.7)	9.44**
Other	37 (17.5)	174 (82.5)		60 (28.4)	151 (71.6)	
Substance Use						
History of Serious Substance Use	38 (14.8)	219 (85.2)	0.442	62 (24.1)	195 (75.9)	1.19
No History of Serious Substance Use	16 (12.3)	114 (87.7)		25 (19.2)	105 (80.8)	

** $p < .01$; * $p < .05$

Table 3
Correlations Between SAPROF scores and Frequency of Violence at 6 and 12 Months Post-Discharge.

SAPROF	Violence at 6 months *r*	Violence at 12 months *r*
Total	-.32**	-.31**
Internal	-.26**	-.27**
Motivational	-.28**	-.27**
External	-.21**	-.19**

***p<0.01

Table 4
Comparison of Violent and Non-Violent Groups by SAPROF Mean Scores at 6 and 12 Months Post-Discharge

SAPROF	6 months			12 months		
	Violent Mean (sd)	Non-violent Mean (sd)	t	Violent Mean (sd)	Non-violent Mean (sd)	t
Total	21.00 (4.50)	25.24 (4.69)	6.19***	22.11 (5.20)	25.38 (4.54)	5.71***
Internal	5.89 (1.96)	7.18 (1.77)	4.89***	6.24 (1.93)	7.22 (1.77)	4.43***
Motivational	8.61 (2.78)	10.85 (2.67)	5.69***	9.25 (2.99)	10.91 (2.63)	5.03***
External	6.50 (1.19)	7.21 (1.43)	3.45**	6.62 (1.45)	7.25 (1.38)	3.71***

**p<0.01 ***p<0.001

Table 5
Sensitivity, Specificity, Positive* Predictive Values and Negative Predictive Values at 6 and 12 Months Post-Discharge**

	Median +1	Sensitivity %		Specificity %		PPV %		NPV %		Risk Ratio	
Follow-up Month		6	12	6	12	6	12	6	12	6	12
SAPROF Total	25+	63.7	64.7	74.1	63.2	93.8	85.8	24.8	34.2	4.0	2.4
Internal	8+	47.7	49.7	81.5	77	94.1	88.2	20.2	30.7	3.4	2.6
Motivational	11+	63.4	63	77.8	60.9	94.6	84.8	25.6	32.3	4.8	2.1
External	8+	49.2	49.3	77.8	67.8	93.2	84.1	19.9	28	2.9	1.8

* Positive = no violence; ** Negative = violence
PPV = Positive Predictive Value; NPV = Negative Predictive Value

Table 6
Predictive Validity of SAPROF

	6 months			12 months		
		95% CIs			95% CIs	
SAPROF	AUC	Lower	Upper	AUC	Lower	Upper
Total	.76***	.70	.82	.69***	.63	.75
Internal	.69***	.61	.77	.65***	.58	.71
Motivational	.74***	.67	.80	.67***	.61	.73
External	.66***	.59	.74	.63***	.56	.69

*** *p < .001*

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