

Evaluation of the validity and reliability of the Structured Assessment of PROtective Factors for violence risk (SAPROF) in an Italian sample of forensic and non-forensic psychiatric patients: validation study and clinical implications

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Abstract

Introduction: We report the first validation of the Italian translation of SAPROF (Structured Assessment of Protective Factors for violence risk). Law 81/2014 marked a turning point in the treatment of psychiatric offenders in Italy, promoting rehabilitation and recovery-oriented models in REMS and local services. In this scenario, the evaluation of protective factors, alongside that of risk factors, has become central for the planning of personalized interventions and the monitoring of therapeutic pathways. However, there was a lack of validated tools for the Italian population that would integrate the structured assessment of protective factors according to the structured professional judgment (SPJ) model.

Objectives: This study, the first in Italy, validated the SAPROF in a sample of forensic and non-forensic psychiatric patients, evaluating their reliability, predictive validity, sensitivity to change and discriminating ability between different clinical contexts.

Methods: 126 patients were recruited (59 in dedicated REMS/CRAP, 67 in non-forensic facilities), evaluated longitudinally up to three times over 18 months. In addition to SAPROF, BPRS-24, PCL-R, HCR-20 and GAF were administered. Inter-rater reliability was estimated on 40 cases via ICC, Spearman's rho and Cohen's kappa. Internal consistency was assessed with Cronbach's alpha. The predictive analysis was based on GEE models for violence risk reduction (measured via the MOAS scale), controlling for established clinical and forensic variables. Sensitivity to change was measured by Reliable Change Index (RCI).

Results: The SAPROF showed excellent inter-rater reliability (ICC = 0.973; rho = 0.953) and good internal consistency for the total scale ($\alpha = 0.798$), with lower values for some subscales (e.g. external $\alpha = 0.471$). The motivational (RCI = 1.03) and external (RCI = 1.39) subscale were particularly sensitive to therapeutic changes. The GEE analysis showed that the SAPROF total score is an independent and significant predictor of the reduction in the risk of violence ($p < 0.001$), even after controlling for psychopathological severity (BPRS-24) and psychopathic traits (PCL-R), while the HCR-20 did not show autonomous predictive power. The SAPROF also effectively discriminated between forensic and non-forensic patients, with significantly lower protection scores and greater clinical severity in patients in dedicated REMS-CRAP.

Conclusions: The SAPROF confirms itself as a reliable, valid and change-sensitive tool for the evaluation of protective factors in the Italian psychiatric population, forensic and non-forensic and has filled a gap in national clinical and forensic practice. Its integration into forensic care pathways can facilitate the planning of personalized rehabilitation interventions, the monitoring of therapeutic progress and a more balanced and respectful management of patients' rights, in line with the principles of Law 81/2014 and the recommendations of the Constitutional Court (Judgment 22/2022). Strengths of this study include inclusion of both forensic and non-forensic samples and the use of the Italian translation. Limitations of the study include the need for further validation on larger and more diverse samples and the optimization of subscales with less internal consistency. The SAPROF is proposed as a "work in progress" tool, susceptible to further improvement, and represents an innovative contribution to Italian clinical practice.

Keywords: SAPROF; protective factors; risk of violence; structured professional judgment; forensic psychiatry; individualized treatment.

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Evaluation of the validity and reliability of the Structured Assessment of PROtective Factors for violence risk (SAPROF) in an Italian sample of forensic and non-forensic psychiatric patients: validation study and clinical implications

Introduction

Law 81/2014 marked a historic turning point in the management system of psychiatric offenders in Italy (Carabellese & Felthous, 2016), decreeing the overcoming of the Judicial Psychiatric Hospitals (OPG) and introducing a therapeutic-rehabilitation model focused on Residences for the Execution of Security Measures (REMS) and on territorial treatment and recovery pathways (Carabellese & Carabellese, 2021).

Law 81/2014, inspired by the founding principles of Law 833/78, transferred the responsibility for the care of forensic patients from the Ministry of Justice, with its health emanations, as it was until 31 March 2015, to the National Health Service (Castelletti et al., 2018), changing the objectives of care from the asylum, custodial model to psychosocial rehabilitation, recovery and reintegration into the community (Parente et al., 2024), in line with international recommendations (Davidson et al., 2005; Andrews & Bonta, 2010).

Despite significant progress, the implementation of the new treatment model has aroused some criticism, as well as some proposals for improvement. Among others, the need to systematically use evaluation tools and more transparent and verifiable judgments has emerged (Carabellese, 2018; Kennedy, Carabellese, Carabellese, 2021), in line with what has been happening for some time in other countries (Kennedy, 2002).

Precisely for the recovery objectives of the Italian model and in order to plan effective rehabilitation interventions, after validating and proposing some effective tools in this regard (Caretto et al., 2019; Carabellese et al., 2022; Parente et al., 2024), it seemed particularly appropriate to proceed with the validation for the Italian population of a tool for assessing protective factors already in use in Italy, the Structured Assessment of PROtective Factors for violence risk (SAPROF), developed by de Vogel and colleagues in 2007 and translated into Italian by Margherita Spissu in 2010, but never validated for the Italian population.

The new forensic treatment system requires reliable and culturally sensitive tools to assess not only the risk of recidivism, but also the dynamic protective factors that can mitigate this risk and promote the recovery of the forensic patient.

This assessment is crucial to support clinical decisions with evident informed judicial implications and to personalize rehabilitation interventions according to the specific care and safety needs of individual offenders, with psychiatric danger profiles that can be defined differently

from patient to patient. For example, a patient with a history of substance abuse and a limited social network might benefit from specific interventions to address these areas of vulnerability and strengthen his or her protective factors to support those interventions.

In the authors' opinion, it is essential to find a balance between social safety and therapeutic needs, in order to ensure full respect for the fundamental rights of patients as well as those of the reference context.

It becomes necessary, therefore, to develop an integrated and multidisciplinary treatment approach, bio-psycho-social, as well as forensic obviously, which takes into account the guiding principles of recovery and the patient's responsibility with respect to the risk of new anti-social actions related to the pathology from which he is suffering.

This dual mandate requires close collaboration between the social-health system and the judicial system, with the common goal of facilitating a path of treatment, rehabilitation and social inclusion that is effective in treating pathologies in the best possible way, respectful of the dignity of the person and at the same time effective in reducing/preventing the risk of new violent acts. This integrated approach must also consider the crucial role of the family and the community in supporting the patient's recovery path, offering a supportive and inclusive environment (Stuart, 2006), able to guarantee continuity of care even after the stabilization obtained in forensic care facilities, the latter being a crucial and particularly delicate moment, especially after 81/2014 when it was established that it is the Mental Health Departments (DSM) that coordinate and guarantee the care and safety needs of forensic and non-forensic patients in the area.

The assessment and management of the risk of recidivism of violence represent, therefore, a central aspect in psychiatric-forensic practice, which is extremely complex, and this assessment poses a demanding challenge for mental health professionals and the judicial system involved in forensic treatment pathways. The approach to risk assessment has evolved over time, moving from unstructured clinical models to structured professional judgment (SPJ) tools, which integrate static, dynamic, and clinical risk factors into a more systematic and standardized framework (Webster et al., 1997). However, many traditional risk assessment tools, such as HCR-20, now in its third adaptation (Caretto et al., 2019), while including dynamic factors, tend to focus predominantly on vulnerability factors, neglecting the crucial role of protective and resilience factors in mitigating the risk of recurrence, promoting recovery and monitoring therapeutic progress. Even more

so in the Italian forensic model, where the primary objective is precisely the recovery and social reintegration of patients, it therefore becomes essential to integrate the assessment of risk factors with the identification and systematic evaluation of protective factors in terms of treatment, in particular those that are dynamic and modifiable through targeted rehabilitation interventions.

The standardised and structured tool SAPROF has been developed specifically to identify and assess dynamic protective factors that can help reduce the risk of future violent behaviour. The SAPROF was designed as a complement to existing risk assessment tools, such as the HCR-20, with the aim of providing a more balanced and comprehensive assessment of the risk of future violent behavior, aiding in the definition of personalized treatment goals, treatment planning, and monitoring of progress in the patient's recovery pathway.

The original version of the SAPROF was published in 2009, marking an important step in the development of more comprehensive and balanced risk assessment tools; in 2010, thanks to the collaboration with Van der Hoeven Kliniek in the Netherlands, Margherita Spissu oversaw the translation and cultural adaptation of the instrument into Italian, making it accessible and potentially usable in the Italian clinical and forensic context, but to date no validation of the instrument had been carried out for the Italian population: this is the main objective of the present investigation, subject to agreement with the authors of the instrument.

The SAPROF, in line with the structured professional judgement (SPJ) approach, uses a detailed checklist of well-defined items to assess a series of specific protective factors that can mitigate the risk of violence and future problematic behaviours, reducing the subjectivity of judgement and increasing reliability in the patient's assessment.

The tool considers 17 protective factors, each operationally defined to facilitate identification and assessment, divided into three main categories: internal characteristics, motivational support, and external factors.

Internal factors (5 items) include aspects such as intelligence, secure attachment during childhood, empathy, coping and self-control. These factors represent personal resources of the individual useful for managing situations of stress or conflict. For example, self-control refers to the ability to regulate one's behavior, while coping is about the ability to effectively deal with challenges and stressful events.

The category of motivational factors (7 items) focuses on items such as work activity, leisure activities, financial management, motivation for treatment, attitudes towards authority, life goals, and drug therapy. These factors reflect the desire to improve one's condition and adherence to the treatment plan. For example, the presence of positive life goals refers to projects and aspirations for the future, while motivation for treatment indicates the willingness to actively participate in one's therapeutic path.

External factors (5 items) concern the social and envi-

ronmental context and include the social network, romantic relationships, professional care, living environment and external control. These factors consider the importance of social support and a stable and safe environment, which have long been known as protective or resilience factors (Catanesi, Carabellese, Guarino, 2007; Carabellese et al, 2010). For example, social networking refers to the presence of meaningful and supportive relationships, while living environment refers to the stability and security of the housing and residential setting.

The evaluation of specific and measurable elements allows a risk stratification oriented towards recovery and the promotion of patient well-being.

Each factor is evaluated on a 3-point scale (0-1-2) (Dawes, 1979) that takes into account its presence and relevance in the specific case, allowing a dynamic and individualized evaluation. A score of "0" indicates the absence or low relevance of the protective factor, a score of "1" indicates a partial or moderate presence, while a score of "2" indicates a strong and significant presence of the factor considered. This approach allows not only to estimate the overall level of protection offered by the various factors, but also to identify specific areas on which to intervene to further reduce future risk.

The SAPROF can therefore prove to be a valuable tool for the Italian forensic treatment model for several reasons. International scientific evidence supports the effectiveness of SAPROF as a predictive tool in patients with mental disorders who are offenders, highlighting several significant strengths. Meta-analysis studies have demonstrated good inter-rater reliability, with intraclass correlation coefficients (CCIs) ranging from moderate to good (greater than 0.80) for total score, subscales, and Final Judgment of Protection (de Vries & de Vogel, 2012).

SAPROF has also demonstrated incremental predictive validity compared to traditional risk assessment tools that focus solely on risk factors (Burghart et al., 2022). In particular, the combination of SAPROF with HCR-20 has shown a superior predictive ability of the risk of violent action compared to the use of HCR-20 alone, especially in short-term follow-up (de Vries & de Vogel & de Spa, 2011).

In addition, the tool has been shown to be sensitive to changes in the course of treatment, with a significant improvement in dynamic protective factors in patients considered discharged from community forensic facilities, thus supporting its clinical utility in the management and prevention of the risk of violence (de Vries & de Vogel & de Spa, 2011).

Other studies have shown a strong correlation between the SAPROF score and the Global Assessment of Functioning (GAF), with a value of $r = 0.745$, suggesting that the SAPROF is able to predict the absence of violent behavior is reflective of general ability to function adaptively. It has also been shown that SAPROF predicts absence of violent behaviour even when the HCR-20 score is taken into account (Abidin et al, 2013).

Research results have also demonstrated a significant

interactive effect between SAPROF and the dynamic score of HCR-20, suggesting a real protective effect of SAPROF in reducing the risk of violence even in the presence of risk factors (Abidin et al, 2013).

SAPROF has been found to be particularly useful in treatment planning and risk management, demonstrating efficacy in predicting non-recurrence of violence after clinical treatment (de Vries & de Vogel & de Spa, 2011), with an Area Under the Curve (AUC) ranging from 0.73 to 0.85 in different follow-up periods (de Vries, 2012). A study conducted in Canada on a sample of young offenders showed that SAPROF was able to predict violent non-recidivism with an accuracy of 75% (Viljoen et al., 2010).

Moreover, the focus of the SAPROF on protective factors is perfectly aligned with the rehabilitation and recovery-oriented approach of the Italian forensic treatment model, whose primary objective is to provide adequate care and promote the social reintegration of patients with socially dangerous mental disorders, balancing the former with the necessary social security measures. This approach is in line with international recommendations that underline the importance of promoting the mental health and well-being of forensic patients (WHO, 2002).

In addition, the new forensic psychiatric patient management system in Italy requires reliable tools to assess not only the risk of recidivism, but also the protective factors from this risk, in order to support clinical and judicial decisions specifically concerning forensic patients and monitor progress in the recovery pathway. For example, a significant improvement in SAPROF scores could indicate not only the effectiveness of the treatment followed so far but also that the patient could be ready for a less restrictive safety regimen or for gradual reintegration into the community with or without conditionality.

Last but not least, the ability to guide treatment planning and monitoring of the treatment progress of the forensic patient can effectively support healthcare professionals in defining personalized therapeutic pathways, based on the patient's strengths and resources, as is in the objectives of Law 81/2014. For example, if the SAPROF highlights a lack of social support, the treatment plan could include interventions to strengthen the patient's social network, such as self-help groups or volunteer programs.

Moreover, the treatment-oriented structure of the SAPROF can facilitate communication and collaboration between the different professionals involved in the forensic patient care pathway, an essential element in the new Italian forensic treatment system, which promotes an integrated approach between the health and judicial worlds. Furthermore, this integrated approach could improve the continuity of care and ensure that the patient receives adequate support at all stages of his recovery pathway, even after the psychiatric safety measure is lifted.

It should be emphasized, in fact, that the SAPROF can be used not only for forensic patients but also for those psychiatric patients who do not commit crimes, making it useful to the DSM that coordinates the treat-

ment paths of patients, whether or not they are perpetrators of crimes.

In light of these considerations, the validation of SAPROF in the Italian context becomes crucial to meet the need to equip clinicians with an evidence-based, standardized, reliable and culturally appropriate tool for the evaluation of protective factors in psychiatric patients. This makes it possible to support clinical decisions with more informed judicial implications and to plan personalized rehabilitation treatment pathways, truly oriented towards recovery, social security, social reintegration and the reduction of social dangerousness.

This study is part of a national project (ITAL-EE-REMS; Unique Protocol ID: NCT06018298) characterized by the need to standardize evaluation practices, promote an integrated approach between health and judicial services, and optimize the allocation of resources in forensic structures, in particular in REMS. The validation of the SAPROF responds to these needs.

Methodology

The research involved a total of 126 patients: 59 patients from dedicated REMS and Psychiatric Rehabilitation Assistance Communities (CRAP) (Group S) and 67 from non-forensic facilities (Group C). The sample included both forensic patients, included in REMS (medium secure residences) or CRAP (low secure residences) dedicated to forensic patients (offenders), and also non-forensic patients, from therapeutic-rehabilitation communities and territorial psychiatric services in different Italian regions.

The inclusion criteria for participation in the study were as follows: (1) minimum age of 18 years; (2) adequate command of the Italian language, both spoken and written, to ensure understanding of the evaluation procedures; (3) a score on the Mini Mental State Examination (MMSE) of not less than 19, indicative of a sufficient level of cognitive functioning to be able to provide valid informed consent; and (4) the signing of a written informed consent, subject to accurate information on the purposes of participation in the study (Carabellese et al., 2017; Carabellese et al., 2018).

The study has obtained the approval of the Ethics Committee of the Bari Polyclinic (prot. no. 0999 of 24.07.2020). This survey is part of a larger research project.

The evaluations were conducted by a team of professionals composed of psychiatrists, psychologists and social-health professionals with experience in psychiatric care settings, all with specific and certified training on the use of the SAPROF and the other assessment tools included in the research protocol. In order to ensure the standardization of the evaluation procedures and minimize inter-rater variability, all the evaluators participated in a training conducted by one of the authors (Prof. Carabellese), who in turn was trained in the use of the tool by one of the authors of the SAPROF and authorized to proceed with the

validation of the tool for the Italian population. During the training, the theoretical and practical characteristics of SAPROF were illustrated in detail, with particular attention to the operational definition of the individual items, the correct attribution of scores and the use of concrete clinical examples.

The inter-rater reliability of the SAPROF was evaluated on a subsample of 40 patients (20 from Group S and 20 from Group C), each patient evaluated by two clinicians with independent, simultaneous observations. The agreement between evaluators was quantified by the intraclass correlation coefficient (ICC), the Spearman rho coefficient and the Cohen kappa for the individual items, following the guidelines for instrumental reliability studies (McHugh, 2012). The collected data was anonymized and entered into secure databases, then analyzed using SPSS-29. To correct for autocorrelation due to repeated measurements on the same subjects, Generalized Estimating Equations (GEE) were used. The internal consistency of the subscales and the total SAPROF scale was assessed via Cronbach's alpha. The Reliable Change Index (RCI) was also calculated according to Evans' formula.

To ensure the representativeness of the sample with respect to the population studied, patients with different psychiatric diagnoses and with heterogeneous clinical and forensic profiles were included.

Participants

The study sample consisted of 126 patients, divided into two main groups:

- Forensic Group “S” (Forensic Psychiatric): composed of 59 forensic psychiatric patients from dedicated REMS and CRAP;
- Comparison Group “C” (Non-Forensic Psychiatry): composed of 67 non-forensic psychiatric patients, coming from therapeutic-rehabilitative communities and/or followed by local psychiatric services.

The selection of participants took place consecutively among patients admitted or in charge at the facilities participating in the study, who provided informed consent after being adequately informed about the aims of the research.

The mean age of the participants was 41.7 years (standard deviation = 10.4; range 19-64 years), with a prevalence of male subjects (78.6%), while women represented 21.4% of the sample.

The level of education was mainly medium-low: 63.7% of patients had a lower secondary school diploma, 23% had a high school diploma, 9.5% had an elementary school diploma and only 1.6% had a university degree. Most of the patients were unemployed (87.7%) and unmarried (84%).

Variable	Category	N	% (valid)
Gender	Males	99	78,6
	Females	27	21,4
Marital status	Unmarried	105	84,0
	Conjugated	20	16,0
Educational qualification	Middle school diploma	79	63,7
	Diploma	29	23,4
	Elementary school certificate	12	9,7
	Degree	2	1,6
Occupation	No title	2	1,6
	Unemployed	57	87,7*
	Busy	8	12,3*

*Data on 65 subjects.

Table 1b. Descriptive features

As for the main psychiatric diagnoses, formulated according to DSM-5 criteria (Diagnostic and Statistical Manual of Mental Disorders, 5th edition, American Psychiatric Association, 2013, Italian version edited by Nicolò & Pompili, 2023), the distribution was as follows: 36.5% had a diagnosis of schizophrenia, 19.8% of schizoaffective disorder, 19.0% of personality disorder, 13.5% bipolar disorder, 7.1% delusional disorder, and 4.0% unipolar depression. 13.5% of the sample had a diagnosis of neurocognitive disorder. 44.4% had used substances in the past 12 months, 21.6% had a history of self-injurious behaviors, and 39.5% had previous heteroinjurious behaviors.

Variable	Category	N	% (valid)
Main diagnosis	Schizophrenia	46	36,5
	Schizoaffective dist.	25	19,8
	Personality dist.	24	19,0
	Dist. bipolar	17	13,5
	Delusional dist.	9	7,1
	Depressed. unipolar	5	4,0
Personality diagnosis	No disturbances	81	64,3
	Borderline	19	15,1
	Antisocial	6	4,8
	Mixed NAS	12	9,5

Variable	Category	N	% (valid)
	Paranoid	4	3,2
	Schizotypal	2	1,6
	Borderline + antisocial	2	1,6
Diagnosis of substance use	No disturbances	101	80,2
	Cannabis use dist.	1	0,8
	Multiple Use Dist.	16	12,7
	Alcohol use dist.	8	6,3
Diagnosis dist. neurocognitive	Present	17	13,5
	Absent	109	86,5

Table 1c. Psychiatric diagnoses and comorbidities (N=126)

Variable	Category	N	% (valid)
Substance use last 12 months	Yes	55	44,4
	No	69	55,6
Self-injurious behaviors	Yes	27	21,6
	No	98	78,4
Heteroharmful behaviors	Yes	49	39,5
	No	75	60,5
SPDC precedents	Nobody	38	30,9
	1-2	40	32,5
	3	45	36,6
Previous TSOs	Nobody	43	37,1
	1-2	45	38,8
	3	28	24,1
Previous criminal convictions	None	79	65,8
	1-2	20	16,7
	3	21	17,5
Previous prison	Yes	40	33,3
	No	80	66,7
Previous REMS	Yes	17	14,3
	No	102	85,7

Table 1d. Clinical and behavioural history (N variable)

Clinically, the mean score on the Mini Mental State Examination (MMSE) was 26.7 (SD = 3.1; range 19-33), while the mean score on the Global Assessment of Functioning (GAF) was 53.8 (SD = 13.8). The severity of psychopathological symptoms, assessed by the Brief Psychiatric Rating Scale (BPRS-24), had a mean value of 48.8 (SD = 16.0). The average total score at the Psychopathy Checklist-Revised (PCL-R) was 14.8 (SD = 8.2), with 13.5% of patients reaching a score equal to or greater than 25, a figure that signals one of the most reported critical issues regarding the Italian model, namely the presence in forensic structures of subjects with a strong profile oriented towards the psychopathic dimension of antisociality, further confirmation, if you will, of the need for an accurate evaluation, oriented to the PSJ and not to subjective judgments of patients to be included in forensic facilities, to be carried out, obviously, before the placement of the patient in question in the facility.

Variable	N	Minimum	Maximum	Media	Std. deviation
Age	126	19	64	41,7	10,4
Age of onset of disorder	126	12	60	22,2	8,8
MMSE	126	19	33	26,7	3,1
VGF	126	21	80	53,8	13,8
Total BPRS T0	125	25	110	48,7	16,1
PCL-R T0 F1 (interpersonal-affective)	126	0	14	5,9	3,8
PCL-R T0 F2 (antisocial style)	124	0	18	7,9	4,6
Total PCL-R T0	126	1	36	14,8	8,2
HCR T0 1 (priority future violence)	126	1	3	1,6	0,8
HCR T0 2 (physical injury severity)	126	1	3	1,3	0,6
HCR T0 3 (imminent violence)	126	1	3	1,2	0,4
SAPROF T0 protection	126	1	3	1,8	0,7
SAPROF T0 risk	126	1	3	1,7	0,7

Table 1a. Descriptive characteristics of continuous variables (whole sample, N=126)

The mean length of stay at the facility at the time of the first assessment was approximately 484 days (SD = 607.2), with a median of 291 days.

Procedures

The research protocol included longitudinal assessments conducted at regular intervals of six months, with a maximum follow-up of 18 months:

- **T0 (Baseline Assessment):** Performed at the time of initial participant recruitment (July 2020).
- **T1 (6-month follow-up):** carried out 6 months after the baseline assessment.
- **T2 (12-month follow-up):** carried out 12 months after the baseline assessment.
- **T3 (18-month follow-up):** carried out 18 months after the baseline assessment, at the end of the follow-up period.

Patient monitoring was maintained even in the event of discharge from the health facility or a change in the safety regime; In these circumstances, the assessments were carried out through telephone contacts, home visits or visits to the local mental health services of reference, in order to ensure the continuity and completeness of the data collected and minimize the risk of loss of relevant information.

Instruments

During the assessments conducted at T0, T1 and T2, the following standardized instruments were administered:

- **Brief Psychiatric Rating Scale** 24-item Italian version (BPRS-24; Morosini et al., 1995) for the evaluation of the severity of psychopathological symptoms;
- **Hare Psychopathy Checklist-Revised**, Second Edition (PCL-R; Hare, 2003; Italian version Caretti et al., 2011) for the evaluation of psychopathic personality traits;
- **Historical-Clinical-Risk Management-20 version 3** (HCR-20 v3.0; Caretti et al., 2019) for the assessment of the risk of future violent behavior, considering historical, clinical and management factors;
- **Structured Assessment of Protective Factors for violence risk** (SAPROF; Spissu, 2010) for the evaluation of dynamic protective factors;

- **Modified Overt Aggression Scale** (MOAS; Margari et al., 2005) for the evaluation of aggressive and/or violent behaviors objectified by institutional sources in the 14 days prior to each evaluation.

At the end of the follow-up (T3), patients were re-evaluated using an additional form to detect critical events in the last six months, including hospitalizations in a psychiatric environment (distinguishing between voluntary and compulsory treatment), commission of violent crimes (threats, sexual violence, persecutory acts, damage/fire, mistreatment in the family) and non-violent crimes (theft, robbery, possession / dealing of drugs, crimes against the Public Administration) and other criminally relevant events. The form also required the precise indication of the source of the information (patient, nursing staff, lawyer, family member, health documentation, telephone contact), in order to ensure the transparency and verifiability of the data collected. The primary objective of this phase was to monitor any antisocial recidivism and the onset of aggressive or violent behavior, crucial elements for the evaluation of the risk and effectiveness of treatments. As far as the purposes of this survey are concerned, only the results and analyses relating to SAPROF are reported here, the other data constituting material for subsequent publication.

Results

Psychometric properties

The SAPROF showed excellent inter-rater reliability in the Italian context, with an intraclass correlation coefficient (ICC) of 0.973 for the total scale (95% CI: 0.948-0.986) and a Spearman rho of 0.953 (95% CI: 0.911-0.975).

The subscales also showed high CCI values: 0.957 for internal items (95% CI: 0.919-0.977), 0.957 for motivational items (95% CI: 0.918-0.977) and 0.965 for external items (95% CI: 0.933-0.981).

		ICC 95% confidence interval		F	P	Spearman rho	95% confidence interval	
	ICC	lower	upper				lower	upper
SAPROF internal	0.957	0.919	0.977	23.3	<0.001	0.903	0.820	0.949
SAPROF motivational	0.957	0.918	0.977	23.1	<0.001	0.914	0.840	0.955
SAPROF external	0.965	0.933	0.981	28.3	<0.001	0.899	0.813	0.947
SAPROF total	0.973	0.948	0.986	36.6	<0.001	0.953	0.911	0.975

Notes		
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	Total	80	100.0
a. Listwise deletion based on all variables in the procedure.			

Intraclass Correlation Coefficient							
	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.918 ^a	.850	.956	23.367	39	39	<.001
Average Measures	.957 ^c	.919	.977	23.367	39	39	<.001
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. The estimator is the same, whether the interaction effect is present or not.							
b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.							
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.							

Notes		
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
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	Elapsed Time	00:00:00.00

Case Processing Summary			
		N	%
Cases	Valid	40	50.0
	Excluded ^a	40	50.0
	Total	80	100.0
a. Listwise deletion based on all variables in the procedure.			

Intraclass Correlation Coefficient							
	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.917 ^a	.849	.955	23.112	39	39	<.001
Average Measures	.957 ^c	.918	.977	23.112	39	39	<.001
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. The estimator is the same, whether the interaction effect is present or not.							
b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.							
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.							

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
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Case Processing Summary			
		N	%
Cases	Valid	40	50.0
	Excluded ^a	40	50.0
	Total	80	100.0
a. Listwise deletion based on all variables in the procedure.			

Intraclass Correlation Coefficient							
	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.932 ^a	.875	.963	28.317	39	39	<.001
Average Measures	.965 ^c	.933	.981	28.317	39	39	<.001
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. The estimator is the same, whether the interaction effect is present or not.							
b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.							
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.							

Notes		
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	N of Rows in Working Data File	80
	Matrix Input	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
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Resources	Processor Time	00:00:00.01
	Elapsed Time	00:00:00.00

Case Processing Summary			
		N	%
Cases	Valid	40	50.0
	Excluded ^a	40	50.0
	Total	80	100.0
a. Listwise deletion based on all variables in the procedure.			

Intraclass Correlation Coefficient							
	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.947 ^a	.902	.972	36.615	39	39	<.001
Average Measures	.973 ^c	.948	.986	36.615	39	39	<.001
Two-way mixed effects model where people effects are random and measures effects are fixed.							
a. The estimator is the same, whether the interaction effect is present or not.							
b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.							
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.							

Table 4. Table X. Inter-rater reliability for subscales and total score of the SAPROF (N=40)

Cohen's kappa analysis on individual items found excellent agreement ($\kappa = 0.81-1.00$) for 5 items, substantial ($\kappa = 0.61-0.80$) for 8 items, and moderate ($\kappa = 0.41-0.60$) for 4 items; No item showed levels of agreement lower than those considered acceptable.

The internal coherence of the instrument, assessed by Cronbach's alpha, was good for the total scale ($\alpha = 0.798$; 95% CI: 0.688-0.883). The subscales showed variable values: moderate for internal items ($\alpha = 0.616$; 95% CI: 0.374-0.783), good for motivational items ($\alpha = 0.728$; 95% CI: 0.577-0.840) and low for external items ($\alpha = 0.471$; 95% CI: 0.159-0.692), suggesting greater robustness of the total scale compared to individual subscales.

Criterion validity

Predictive analysis conducted using GEE models showed that the SAPROF total score represents an independent and significant predictor of the reduction in the risk of violence, measured by the MOAS scale ($\beta = -0.23$; $p < 0.001$), even after controlling for clinical (BPRS-24, GAF) and forensic (PCL-R) variables. In contrast, HCR-20 did not show autonomous predictive power in the combined models ($p = 0.325$).

As regards sensitivity to change, the Reliable Index of Variation (RCI) calculated for the total SAPROF scale was 0.68, for the internal subscale 0.57, while for the motivational and external subscales the values are 1.03 and 1.39 respectively.

These results indicate that the SAPROF is able to detect clinically significant changes in protective factors, especially for the motivational and external subscales, confirming its usefulness in monitoring rehabilitation pathways.

Sensitivity to sample differences

The analysis of comparisons between facilities showed that patients residing in dedicated REMS and CRAPs had significantly lower SAPROF Final Judgment of Protection scores than those from other non-forensic psychiatric facilities and a higher clinical severity. The average score of the SAPROF Final Judgment of Protection was 1.46 (SD

= 0.60) in the dedicated REMS/CRAP against 2.13 (SD = 0.60) in the other facilities ($p < 0.001$).

The greater clinical severity of forensic patients admitted to dedicated REMS and CRAPs compared to those housed in non-forensic facilities is evidenced by significantly higher scores on both the BPRS scale and the PCL-R: the total score on the BPRS scale is on average 55.37 (SD = 17.57) in patients of dedicated REMS-CRAP, compared to an average of 42.80 (SD = 11.88) in patients in non-forensic facilities ($p < 0.001$); similarly, the total score on the PCL-R scale is on average 17.71 (SD = 7.19) in patients of dedicated REMS-CRAP, compared to a mean of 12.18 (SD = 8.18) in patients of other facilities ($p < 0.001$).

Variable	Non-dedicated (N=67)	Dedicated REMS-CRAP (N=59)	p-value
MMSE	26.5 (SD 3.1)	26.9 (SD 3.1)	0.442
VGF	58.4 (SD 13.2)	48.6 (SD 12.7)	<0.001
Total BPRS T0	42.80 (SD 11.9)	55.4 (SD 17.6)	<0.001
PCL-R T0 F1 (interpersonal-affective)	4,8 (DS 3,6)	7,4 (DS 3,5)	<0.001
PCL-R T0 F2 (antisocial style)	6,9 (DS 4,8)	9,1 (DS 3,9)	0,005
Total PCL-R T0	12.2 (DS 8.2)	17.7 (SD 7.2)	<0.001
SAPROF T0 protection	2,1 (DS 0,6)	1,5 (DS 0,6)	<0.001
SAPROF T0 risk	1,4 (DS 0,6)	2,0 (DS 0,7)	<0.001

Notes: The p-value refers to the T-test for independent samples (assuming equal or less variances depending on the results of the Levene's test).

Table 2. Comparison of baseline clinical variables between dedicated (REMS-CRAP) and non-dedicated facilities

Predictive validity

Finally, there were no statistically significant differences in SAPROF scores between patients with and with-

out new offenses at two years of follow-up ($p = 0.730$ for “protection”; $p = 0.783$ for “risk”).

Variable	No new crimes (N=104) Media (SD)	New crimes (N=22) Media (SD)	p-value
SAPROF Protection	1,8 (0,7)	1,9 (0,7)	0,730
SAPROF Risk	1,7 (0,7)	1,6 (0,6)	0,783

Note: The p-value was calculated by t-testing for independent samples. No statistically significant differences emerged between the groups.

Table 3. Comparison of SAPROF scores between patients with and without new offenses at 2 years follow-up

Discussion

The results confirm that the SAPROF is a reliable and valid tool for the evaluation of protective factors in the Italian forensic context and effectively responds to the needs of the post-OPG system outlined by Law 81/2014.

The observed high inter-rater reliability ($ICC > 0.95$ for all subscales), combined with item consistency (Cohen's Kappa = 0.41 for all items), suggests that the SAPROF can be used consistently and standardized by different mental health professionals, reducing variability in assessments and the risk of subjective discrepancies typical of unstructured tools. This aspect is crucial in a multidisciplinary system such as that of Italian forensic structures, particularly in REMS, where collaboration between psychiatrists, psychologists and social-health professionals requires shared evaluation languages. However, the low internal coherence of external items ($\alpha = 0.471$) raises questions about the cultural sensitivity of indicators such as “social network” or “external control”, suggesting the need for contextual adaptations to reflect specific dynamics of the Italian system, such as the role of the family or access to territorial services.

Multivariate analysis reveals that SAPROF demonstrates a statistically significant independent predictive capacity ($p < 0.001$) in reducing the risk of in-patient violence (measured with MOAS), maintaining its efficacy even when controlled for established variables such as psychopathological severity (BPRS-24) and psychopathic traits (PCL-R). This data underlines how the protective factors of a dynamic nature (e.g. therapeutic adherence, coping skills) captured by the SAPROF provide unique information, not overlapping with traditional static/actuarial tools, focused on “fixed” risks and psychopathology. On the contrary, HCR-20 does not show an additional predictive contribution in these integrated models, suggesting a partial redundancy with existing clinical variables, as indicated by the literature on the subject (Castelletti et al., 2014).

The specificity of the SAPROF in evaluating modifiable elements is in line with the principles of Law

81/2014, which favor personalized rehabilitation interventions, enhancement of individual resources and overcoming purely containment approaches.

The SAPROF is distinguished by its ability to capture changes in dynamic protective factors during treatment, as evidenced by the Reliable Variation Index (RCI). In particular, the motivational ($RCI = 1.03$) and external ($RCI = 1.39$) subscales are more sensitive to changes than the total ($RCI = 0.68$) and internal ($RCI = 0.57$) scales, indicating that aspects such as motivation for treatment and social support are more influenced by therapeutic interventions and represent key areas on which to act from a rehabilitation perspective.

The ability to capture these variations allows clinicians to personalize the therapeutic pathway, focusing on the aspects that need more attention, such as strengthening the social network or developing adaptive coping strategies.

This approach is particularly relevant in the Italian context, where the management system of forensic patients is aimed at rehabilitation and social reintegration. For example, if a patient has a low score on the social network subscale, specific programs can be intervened to enhance interpersonal support, such as participation in self-help groups or community activities.

These results are consistent with what emerges from the international literature, which underlines the added value of tools oriented to the assessment of dynamic and protective factors in the context of forensic mental health (De Vogel et al., 2009; De Vries Robbé et al., 2011).

Discrimination between clinical contexts is another strength of the tool in question: patients in dedicated REMS-CRAP have lower SAPROF scores (1.46 vs 2.13; $p < 0.001$), greater symptom severity (BPRS: 55.37 vs 42.80) and more marked psychopathic traits (PCL-R: 17.71 vs 12.18) than those in non-forensic facilities. This disparity reflects the greater clinical severity and complexity of the needs of patients referred to REMS and, more generally, for forensic patients compared to patients who do not commit crimes; the former often have a history characterized by prolonged institutionalization, fragile socio-family networks, low adherence to treatment and less awareness of their clinical condition, as evidenced in Italian studies (Catanesi et al., 2019; Carabellese et al., 2022). Consequently, it is evident that forensic treatment programs must be built in such a way as to respond to the specific deficiencies in the protective factors that characterize these patients, to their peculiar complexities, paying particular attention to the strengthening of personal and social resources and to the development of more effective coping strategies.

The low presence of dynamic protective factors, such as self-control and the ability to define life goals in patients included in dedicated REMS-CRAP, underlines the need for rehabilitation paths focused on strengthening these areas, especially in chronic cases, where institutional history and the fragility of social networks negatively affect adherence to care and response to treatment.

This evidence is in line with the international literature, which suggests that the integration of protective factor-oriented tools, such as SAPROF with traditional risk scales, improves the personalization of interventions and accuracy in global risk assessment (Burghart et al., 2022; Douglas et al., 1999).

Furthermore, the results confirm that in forensic contexts the presence of lower SAPROF scores is associated with greater difficulties in social adaptation and greater resistance to the therapeutic pathway, making it essential to provide specific training of the healthcare professionals involved and the adoption of a recovery-oriented approach, which goes beyond simple risk management and favors the real social reintegration of the patient (Viljoen et al., 2025). All this requires, in the authors' opinion, specific training courses for health professionals engaged in this field.

From this point of view, the University has specific educational responsibilities to be adequately fulfilled.

The lack of correlation between SAPROF scores and recidivism at 2 years ($p > 0.7$) does not diminish the value of the instrument, but reflects the modulatory nature of protective factors: they act by reducing the likelihood of violence in the presence of risk factors, rather than directly predicting non-recidivism. This implies that the clinical efficacy of SAPROF is maximum when integrated with multidimensional assessments, combining clinical assessments (e.g. BPRS), risk factors (e.g. HCR-20) and protective assessments in a dynamic model, to be subjected to periodic verifications, for a balanced risk estimate.

The SAPROF confirms itself as a methodological bridge between safety and recovery, capable of offering a shared language that translates patients' strengths into concrete and personalized therapeutic projects. In this context, it is essential to note that neither SAPROF nor HCR-20 are designed to predict the seriousness of recidivist violence. Seriousness of violence is often the most important factor to consider when advising or deciding on moves to less secure places or return to the community, along side probability of recidivism. For this, the DUN-DRUM Toolkit may be more relevant.

The adoption of SAPROF in forensic structures, such as dedicated REMS and CRAP, therefore represents an opportunity to accelerate the transition from a predominantly custodial model to one oriented towards rehabilitation, in line with the objectives of the Italian reform and with the recommendations of the Constitutional Court (Judgment no. 22/2022 of 27 January 2022), which highlighted the criticalities of the REMS system.

The results of this study reinforce the idea that SAPROF is a reliable, valid and change-sensitive tool, capable of effectively integrating traditional risk assessment with a specific focus on protective factors.

Precisely because of its dynamic nature and the possibility of adapting to different contexts, the SAPROF is configured as a "work in progress" tool, susceptible to further refinements and adaptations to meet the needs of Italian clinical practice and the peculiarities of the forensic

population. Its application makes it possible to support the planning of more targeted rehabilitation interventions, to monitor therapeutic progress in a structured way and to promote a more effective, more respectful and rights-oriented forensic treatment management of psychiatric patients.

The low internal coherence of some subscales and the need for validation on larger and more diverse samples represent limitations that will have to be addressed by future research.

Ultimately, these results are fully part of the current debate on the management of REMS and on the prospects for reform of the legal system, reiterating how the structured and transparent assessment of protective factors, together with that concerning risk factors, represents a concrete response to the indications of the Constitutional Court.

SAPROF, in this perspective, constitutes a step forward towards a more balanced and constitutionally oriented management of forensic patients, capable of combining the protection of collective security with the promotion of individual rights and recovery opportunities.

Conclusions

This research represents the first validation study of SAPROF in the Italian population, marking a fundamental step for clinical practice and forensic evaluation in our country. The introduction of a structured and culturally adapted tool for the assessment of protective factors makes it possible to overcome an exclusively risk-centred vision and to promote a more balanced and recovery-oriented approach, in line with the principles of Law 81/2014 and the most recent international recommendations.

The validation of SAPROF in Italy allows clinical and forensic health professionals to have reliable support for the planning of personalized rehabilitation interventions, favoring assistance to the forensic patient that enhances his individual resources and allows dynamic monitoring of the therapeutic progress made.

The experience gained during this study confirms that SAPROF, despite being a tool in continuous evolution and improvement, is already capable of responding to the needs of a modern clinical practice, which requires transparent, shared evaluations oriented towards the overall well-being of the patient.

The systematic application of this tool can help facilitate collaboration between multidisciplinary teams, support clinical decisions with more objective judicial implications and promote a culture of evaluation based on the balance between the protection of the community and the rights of the individual.

However, like any new tool introduced in a complex and rapidly changing context, the SAPROF also has some limitations.

The internal consistency of some subscales suggests

the need for further adaptations and insights, while validation on larger and more diverse samples, including female patients and adolescents, represents an important research perspective for the future.

In addition, it is desirable that the training of health professionals and the dissemination of an evaluation culture oriented towards protective factors become an integral part of professional training courses, especially in forensic contexts, in order to maximize the positive impact of the tool in daily practice. The University has specific responsibilities in this regard and it would be appropriate for it to equip itself in this regard.

In conclusion, the Italian validation of the SAPROF opens a new phase for the evaluation and management of psychiatric offenders, offering healthcare professionals engaged in forensic and non-forensic contexts a reliable and sensitive tool, capable of supporting the transition to truly personalized and recovery-oriented care models.

The SAPROF is thus confirmed as a “work in progress” of great value, destined to evolve together with the needs of the clinic and research, and to contribute substantially to the innovation of rehabilitation paths and the promotion of a more just, effective and respectful forensic mental health of the person.

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