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The role of personal recovery and internalised stigma on the expression of symptomatology in severe mental disorders: Mediating and moderating effects

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ABSTRACT

Objective: Given the relevance of internalised stigma in people suffering from a mental disorder, in the present study, the possible mediating and moderating role of self-stigma in the relationship between personal recovery and symptomatology has been studied.
Method: 265 participants with severe mental disorder completed the following instruments: ISMI (self-stigma), REE (personal recovery) and HoNOS, CGI, GAF and EuroQol (symptomatology).
Results: both the mediation and moderation analyses show significant results, which would indicate that internalised stigma has an effect on the relationship between personal recovery and symptomatology. Also, people with lower level of personal recovery and greater self-stigma have greater symptomatology than those who are in more advanced personal recovery processes and have a lower perception of internalised stigma.
Discussion: the findings of this study suggest that self-stigma has an effect, and the improvement at personal recovery and symptomatology is accentuated when people with a severe mental disorder have a better management of internalised stigma. Therefore, it may be interesting to include this variable in recovery interventions.

1. Introduction

People with Severe Mental Disorders (SMD) need to face different barriers in their recovery process, such as: stigma and internalised stigma (Capar and Kavak, 2018; Livingston and Boyd, 2010). There are many different prejudices and negative attitudes towards people with mental disorders, which are known as social stigma (Corrigan et al., 2005). However, despite the fact that these people do not consider that these beliefs attributed to them by the society are true, the continued exposure to social perceptions provoke that these people suffering a mental illness internalise and experience them as real (Corrigan et al., 2011; Livingston and Boyd, 2010). This fact could produce internalised stigma or self-stigma. Yanos and his team (2010) explained that internalised stigma arises when the person with a mental disorder acquires the identity of the illness, and consequently assumes that the more objective aspects of the illness will condition their experience.

Research on stigma has increased considerably in recent years due to the association between these experiences and the personal recovery paradigm (Muñoz et al., 2011; Jahn et al., 2020). When higher self-stigma is related to a poorer recovery process (Muñoz et al., 2011), it may contribute to people with higher self-stigma not seeking help or not taking the active role necessary to carry out the recovery process (Leith and Stein, 2020). As indicated in various systematic reviews (Dubreucq et al., 2021; Gerlinger et al., 2013) and meta-analyses (Del Rosal et al., 2020; Livingstone and Boyd, 2010), self-stigma is related to other variables such as quality of life, functionality, empowerment, self-esteem, personal recovery or psychiatric symptomatology, among others. Furthermore, some of these associations such as personal recovery, global functioning or life satisfaction remain stable in longitudinal studies (Dubreucq et al., 2021). In other words, it has been found that internalised stigma is associated both with aspects related to the personal recovery process (Ipci et al., 2020; Kuramoto et al., 2024) and to

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the clinical symptomatology of the disease (Dubreucq et al., 2021; Ma et al., 2024; Penas et al., 2021). However, other authors suggest that the relationship between self-stigma and symptomatological aspects is unclear (Szcesniak et al., 2018). In this regard, Park and his team (2013) found in their study with people suffering from schizophrenia that negative symptoms of the illness were not associated with internalised stigma. As in other studies by Lysaker et al. (2006) or O'Connor et al. (2018) who found an association between self-stigma with positive symptoms of the illness and not with negative symptoms.

Taking into account the growing interest of personal recovery paradigm when guiding and carrying out interventions for the care of severe mental illness (Leonhardt et al., 2017), where the aim is for these people to acquire an autonomous and satisfactory life for themselves (Anthony, 1993), it seems relevant to consider variables associated with this process that may have a noticeable effect on the recovery process. Thus, studying the association between self-stigma, personal recovery and symptomatology can contribute to the development and improvement of interventions aimed at reducing internalised stigma (Park et al., 2013). Research conducted by Janh and his team (2020) suggests that interventions that do not include internalised stigma as an explicit goal, but address it through other related variables, may not be as effective in achieving recovery-oriented outcomes. Therefore has shown that stigma should not only be addressed from a community perspective, but that it is important to address it from the individual perspective and the experience of the people who suffer from the disease (Vass et al., 2015). Furthermore, it could be interesting to include the management of self-stigma as another aspect to work on within the recovery interventions, since these interventions aimed at managing self-stigma show medium-low effects on people with a serious mental disorder (Tsang et al., 2016). PAREI intervention has shown evidence that not only internalised stigma can be reduced but also improve recovery (Diaz-Mandado and Periáñez, 2021). A recent meta-analysis has explored effectiveness of different interventions to reduce internalised stigma (Chuang et al., 2024).

Consequently, considering the relationships between the variables mentioned above it would be interesting to study the direction and the effect of the relationship between personal recovery, symptomatology index and internalised stigma with the aim of finding out the role of self-stigmatisation in the recovery process. Adding more information about this relationship could provide useful information to design effective interventions in personal recovery and in the development of autonomy for these individuals.

To our knowledge, there is no research that has investigated the role of internalised stigma in the relationship between the personal recovery and symptomatological process of people with a severe mental disorder. Consequently, the objectives of the present research are: 1) study the relationships between the different components of self-stigma (alienation, stereotypes, isolation, discrimination and resistance) and the recovery process carried out by people with severe mental illness. 2) To assess the role of self-stigma in the recovery of severe mental disorder, since it could be playing a mediating role, but also moderating one where the existence of internalised stigma could be affecting the intensity or the association between personal recovery and symptomatology. 3) And finally, people will be classified into four groups (high recovery high stigma, high recovery low stigma, low recovery high stigma and low recovery high stigma) in order to analyze group differences as a function of recovery and self-stigma.

2. Method

2.1. Participants

The data of this study draws from a research about recovery processes whose sample selection is described in Uriarte et al. (2020). In order to meet the objectives of the present study, a valid sample of 265 subjects out of the initial 312 were considered, which represents a loss of 15,1%. The inclusion criteria were: being over 18 years old and being a user of Severe Mental Disorder Program, whereas the exclusion criteria were: failure to obtain the informed consent, having communication difficulties and having a clinical status that does not allow the patient collaboration.

63% (n = 167) were males and 37% (n = 98) were females, aged 22 to 80 (M = 48.54, SD = 11.17). All the participants were recruited from a Severe Mental Disorder Program, were users need to meet the criteria to be considered a SMD: diagnosis, two or more years of duration of the disorder and presence of disability. The most frequent diagnosis was schizophrenia spectrum disorders (58,9%); followed by the disorders related to affective psychosis (23,8%), where 12,1% was the bipolar disorder, 9,4% was the schizoaffective disorder and 2,3% were depressive patients with psychotic symptoms; and finally, other psychotic disorders such as: delusional disorder, obsessive compulsive disorders. They were on treatment an average of 17.11 years (SD = 8.51). 58.5% were attended in Outpatient Mental Health Services, 27.9% in Day Hospitals, 7.9% in Assertive Community Treatment, and 5.7% were hospitalized in Psychiatric Service Units. Regarding marital status, most of them were single (67.5%), 16.2% were separated, divorced or widowed, and 13.6% were married. Among them, 66.8% live with their families, 20.8% live alone and 7.2% live in a supervised apartment. In terms of educational level, the majority have school education (67%), 21.6% have completed vocational training and only 11.4% have attended to university. Finally, it should be noted that only 15.8% were in active employment, the rest have a recognized disability (18.9%), are unemployed (43.4%) or under other circumstances (21.9%) such as studying or household chores.

2.2. Instruments

Self-stigma – The Internalised Stigma of Mental Illness (ISMI: Ritsher et al., 2003) scale was used in its Spanish version (Bengoeche-Seco et al., 2016). It is a self-report 29-items instrument, which measures the degree of subjective stigma experience. Five dimensions using 4-point Likert scale composed the measure: alienation, stereotype endorsement, discrimination experience, social withdrawal and stigma resistance. Higher scores indicate higher internalised stigma. The Spanish version of the instrument presented good psychometric properties (Bengoeche-Seco et al., 2016). In the present study the internal consistency was 0.93.

Personal recovery - Recovery Markers subscale of the Recovery Enhancing Environment measure was used to assess the subjective personal recovery (Ridgway and Press, 2004) in its Spanish version (Uriarte et al., 2020). It is composed by 24-items rated with a Likert scale from 0 (strongly disagree) to 4 (strongly agree), were higher scores indicate higher levels of recovery. These items assess different aspects of personal recovery "*I4– I am involved in meaningful productive activities*" or "*I17 – I control the important decisions in my life*". The internal consistency has resulted adequate in the present study (0.94).

Clinical symptomatology index – This index has been created with the weighted score of the following four instruments: 1) Health of the Nation Outcome Scale (HoNOS; Wing et al., 1998; Uriarte et al., 1999) it is a 12-items instrument used to assess severity with an internal consistency of 0.70. 2) Clinical Global Impression Scale (CGI; Guy, 1976, 2004) was completed by the clinician to evaluate severity and the clinical evolution of the patient. 3) Global Assessment of Functioning scale (GAF; Endicott et al., 1976; Bobes et al., 2002) was used to collect information about the global functioning of the individual. And 4) health related quality of life was evaluated through the Visual Analogue Scale (VAS), implemented using the EuroQol-5D instrument completed by the participant (EuroQol Group, 1990; Roset et al., 1999).

2.3. Procedure

All the participants were informed by their reference clinician about

the research, and after accepting participation, an informed consent was signed by the participant or, if necessary, by his/her legal guardian. Once participation was secured, the cross-sectional study started. The full interview of the REE instrument was conducted under the guidance of an interviewer with personal experience on recovery process. The subjects also completed the ISMI and EuroQol-5D scales. At the same time, their reference clinicians completed the HoNOS, GAF and CGI questionnaires.

This research has received the approval of the Clinical Research Ethics Committee of the Health Services of Basque Country.

2.4. Statistical analyses

Firstly, the symptomatology index was generated through a process of factorial analysis using standardized scores, so the specific contribution of each instrument defines the latent construct of symptomatology. A higher value indicates a higher severity in symptomatology. Exploratory factor analysis was used with the unweighted least squares method and the parallel analysis to determine the number of factors to be retained. Subsequently it was corroborated through confirmatory factor analysis. The normality and homecedasticity test were conducted.

Then, a Pearson correlation analysis was conducted between different variables of interest, between different dimension of internalised stigma with personal and clinical symptomatology index and treatment years. Then, the mediation and moderation analyses were carried out using the PROCESS macro for SPSS (Hayes, 2013), where Personal Recovery was considered as the predictor variable, clinical symptomatology index as an outcome variable, and internalised stigma was entered as mediator and moderator variable depending on the analysis performed. The analyses were estimated using a 10.000 bootstraps, and also a 95% confidence interval has been considered. To illustrate the moderator effect the excel generated by Dawson and Ritchter (2006) was used.

Finally, personal recovery and internalised stigma scores were combined creating four groups: 1) high recovery and low self-stigma, 2) high recovery and high self-stigma, 3) low recovery and low self-stigma and 4) low recovery and high self-stigma. The cut-off points used to generate the groups were the cut-off point of one standard deviation in the recovery markers (PC = 3.34), since it is a sample composed by patients in a program for people with severe mental disorder of prolonged evolution and the standard criterion proposed by Jacobson and Truax is restrictive and only 5% of the users achieve that cut-off (Uriarte et al., 2022). In the internalised stigma instrument the cut-off point was stablished in 2.00, as Lysaker et al., 2006 make the following interpretation: 1.00–2.00 (minimal to no internalised stigma), 2.01–2.50 (mild internalised stigma), 2.51–3.00 (moderate internalised stigma) and 3.01–4.00 (severe internalised stigma). Finally, an ANOVA analysis was conducted to assess possible groups' differences considering symptomatology (clinical recovery), the Scheffe test was calculated to know between which groups were those differences, and the effect size was explored obtaining Cohen *d*.

3. Results

The solution of the exploratory factor analysis indicated the extraction of one factor solution that explained the 59.60% of the variance, the fit model is statistically significant and its adjustment indexes are appropriate. Confirmatory factor analyses confirmed those previous results [$\chi^2 = 0.705$, $p = 0.703$, GFI = 0.999, AGFI = 0.993, SRMR = 0.009, RMSEA = 0.000, (0.000–0.089)], and its factor loadings range from 0.866 to 0.428. Finally, the symptomatology index has obtained an Omega of 0.78, indicating an adequate reliability.

In Table 1, the central tendency data, communality, factor loadings and correlation matrix of the measures that composed the symptomatology index are presented. Through an exploratory factor analysis, the scores of the HoNOS, GAF, CGI and EuroQoL-VAS where standardized, generating the dependent variable which is an expression of symptomatology.

In Table 2, the correlational analysis is presented. Personal recovery is negatively and highly correlated with internalised stigma ($r = -0.50$, $p < 0.001$) and its subdimensions, which means that a higher perception of self-stigma is associated with lower personal recovery. Also, a significant and positive relationship between symptomatology and internalised stigma has been found ($r = 0.34$, $p < 0.001$). Finally, the variable of years in treatment is only significantly related with stereotype endorsement ($r = 0.20$, $p < 0.001$).

In Fig. 1 the mediation graph is presented, where it can be observed that the effect between recovery and symptomatology was statistically significant and was reduced from −0.417 (−0.550 to-0.284) (total effect) to −0.333 (−0.485 to −0.181) (direct effect) when the self-stigma variable has been included as a mediator. In addition, the Sobel test was calculated (Sobel test = −2.54, $p = 0.01$), which indicated that there was a significant partial mediation effect in the model.

As it can be appreciated in Table 3, both recovery ($\beta = -0.380$, $p < 0.001$) and self-stigma ($\beta = 0.185$, $p = 0.004$) had a statistically significant direct effect on the symptomatological index. Furthermore, the introduction of the interaction variable in the model showed a significant effect ($\beta = 0.141$, $p = 0.021$), indicating that self-stigma has a moderating effect on the relationship between personal recovery and level of symptomatology. Nevertheless, it should be highlighted that this interaction explained a little proportion of the model (1,6%).

Fig. 2 shows that higher levels of recovery lead to lower levels of symptomatology for mental health users who perceive bot high and low levels of internalised stigma. However, despite both regression slopes being statistically significant, those with lower self-stigma have a steeper slope (−0.712, $p < 0.001$) towards recovery than those with higher perceived internalised stigma (−0.368, $p < 0.001$).

In order to assess how grouping levels of personal recovery and self-stigma might describe differences in symptomatological severity, the differences between groups are presented in Table 4. Statistical significant differences were found between the group 2 (high perception of personal recovery and low self-stigma) and the group 3 (low recovery and high self-stigma), where the first group scored lower in symptomatology than the third one, having a notorious effect size ($d = 1.26$). Likewise, the group 2 has shown a significantly less symptomatology than the group 4 (low recovery and low self-stigma) with an effect size of 1.06.

Table 1
Data from the symptomatology index.

		Range	M	SD	h^2	λ	1	2	3	4
1	HONoS	0–48	11.26	5.94	0.669	0.818				
2	GAF	0–100	58.45	13.10	0.750	0.866	0.59			
3	CGI	0–7	4.06	0.94	0.751	0.866	0.58	0.69		
4	EuroQoL-VAS	0–100	33.05	17.87	0.183	0.428	0.22	0.22	0.25	
5	VD-Symptomatology	-∞ to +∞	0.00	1.00			0.82	0.87	0.87	0.43

Note. M = mean; SD = Standard Desviation; h^2 = communality; λ = factor loadings.

Table 2
Descriptive Statistics and correlations between variables.

		M	SD	α	1	2	3	4	5	6	7	8
1	VD- sintomatology	0.00	1.00	–								
2	Recovery	2.65	0.69	0.94	−0.42[a]							
3	Self-stigma	2.01	0.48	0.94	0.34[a]	−0.50[a]						
4	Alienation	2.10	0.63	0.79	0.28[a]	−0.52[a]	0.88[a]					
5	Stereotype endorsement	1.80	0.51	0.77	0.28[a]	−0.33[a]	0.83[a]	0.62[a]				
6	Discrimination experience	2.05	0.64	0.81	0.33[a]	−0.37[a]	0.83[a]	0.71[a]	0.58[a]			
7	Social wirhdrawal	2.01	0.66	0.86	0.27[a]	−0.40[a]	0.89[a]	0.71[a]	0.68[a]	0.70[a]		
8	Stigma resistance	2.19	0.46	0.47	0.20[a]	−0.41[a]	0.60[a]	0.46[a]	0.40[a]	0.31[a]	0.46[a]	
9	Treatment years	17.11	8.51	–	0.09	−0.04	0.11	0.06	0.20[a]	0.09	0.11	−0.04

Note. α = Alpha de Cronbach.
[a] p is significant at .001 level.

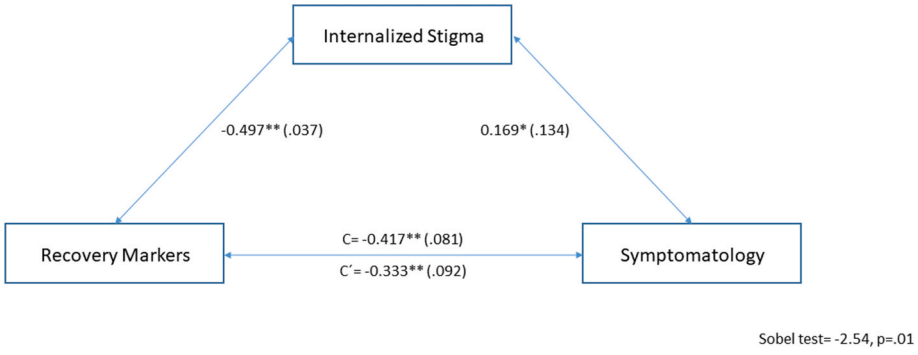

Fig. 1. Mediation model of self-stigma in the relation between personal recovery and symptomatology.

Table 3
Regression model.

	Step 1				Step 2				Step 3			
	β	r_p	t	p	β	r_p	T	p	β	r_p	t	p
Recovery	−0.415	−0.415	−7.40	0.001	−0.331	−0.287	−5.18	0.001	−0.380	−0.313	−5.69	0.001
Self-stigma					0.169	0.146	2.64	0.009	0.185	0.160	2.90	0.004
Interaction									0.141	0.128	2.33	0.021
R^2		0.173				0.194				0.210		
ΔR^2						0.021				0.016		
F (p)	54.82(<0.001)				6.97(p = 0.009)				5.42(p = 0.031)			

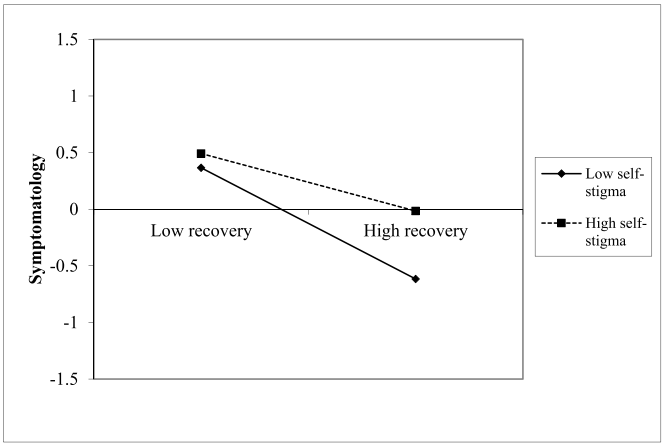

Fig. 2. Moderator graph.

4. Discussion

The results of the present study reflect the interaction between the variables of personal recovery, symptomatology and internalised stigma, indicating that self-stigma plays a relevant role in the recovery process of people suffering from mental illness. This supports the idea that internalised stigma should be incorporated to interventions for promoting recovery of people with severe mental illness.

Firstly, the correlations show that the greater the personal recovery, the lower the internalised stigma, and the lower the symptomatology, the lower the self-stigma. These results are consistent with those found by Leith and Stein (2020), who studied how the stages of the recovery process are related to self-stigma as well as to symptomatology. In this correlational analysis, it has also been observed that the variable of years in treatment only correlates with approval of stereotypes, which could indicate that the evolution of the illness may have an effect on the internalisation of behaviours and stereotypes associated with severe mental illness. In contrast, Leith and Stein (2020) found that the early stages of the recovery process are associated with a greater strength of self-stigma. There is not much research about the course of illness and the process of acquiring stigma. However, Firmin and his team (2019) concluded that people with a long-standing severe mental illness

Table 4
Symptomatology index regarding scores in groups considering recovery and self-stigma.

	1 - High recovery – High self-stigma (n = 12)	2 - High recovery – Low self-stigma (n = 27)	3 - Low recovery – High self-stigma (n = 140)	4 - Low recovery – Low self-stigma (n = 82)	F	Effect size between groups comparisons[a]	
	M (SD)	M (SD)	M (SD)	M (SD)		2–3	2–4
Sint-Tot	−0.09 (0.78)	−1.00 (1.06)	0.23 (0.97)	−0.03 (0.87)	13.10[b]	1.26	1.06
HONoS	11.17 (4.86)	6.85 (4.50)	12.48 (6.34)	10.66 (5.02)	7.76[b]	0.93	0.78
CGI	4.00 (0.85)	3.26 (1.06)	4.22 (0.89)	4.06 (0.89)	8.49[b]	1.05	0.86
GAF	59.08 (11.10)	68.85 (15.77)	56.36 (12.45)	58.34 (12.33)	7.27[b]	0.96	0.80
EuroQoL-VAS	71.67 (18.75)	80.85 (12.62)	63.42 (17.91)	66.88 (16.86)	8.17[b]	1.02	0.88

Note.
[a] Only the significant differences between groups have been indicated with the Cohen d's value.
[b] p is significant at <.001 level.

experience greater internalised stigma than people with a recent diagnosis, suggesting that this may be because at the onset of the illness people have not yet internalised the identity and negative stereotypes associated with the diagnosis of the severe mental disorder. Szczesniak et al. (2018) relate that people with an older age have developed a greater acceptance of social stereotypes of the illness, suggesting that this could be a consequence of a greater tolerance of mental illness of younger generations.

Both internalised stigma and the different dimensions of alienation, experience of discrimination, social distancing, stereotype approval and stigma resistance are more strongly associated with personal recovery than the symptomatology index. This indicates that this variable has more to do with the concept of recovery and less with symptoms or more objective recovery rates. The relationship between self-stigma and personal recovery has been reported by other researchers (Chan et al., 2022). Among the variables associated with lower self-stigma we find loss of quality of life, self-esteem, empowerment or hope (Del Rosal et al., 2020), some of them main variables of the CHIME concept of personal recovery (Leamy et al., 2011). Also, in interventions aimed at managing internalised stigma, we find strategies related to the development of self-determination or self-management, the acquisition of social skills and collaborative work (Díaz-Mandado and Periáñez, 2021), aspects related to personal recovery.

After studying the relationships between variables, it was tested whether internalised stigma could have a mediating effect on the relationship between personal recovery and symptomatology, and this turned out to have a partially mediation effect. The association between personal recovery and symptomatology index is significantly reduced when self-stigma is introduced into the model, the explained variance is reduced in 6.3% (from 17.38% to 11.08%). This means that people who have not internalised the stigma of the disease or have had a better management of it could have a different process of recovery experience. However, as this is a partial mediation, we cannot forget the existence of other possible interacting factors. In the literature, other variables that have a strong correlation with self-stigma, such as self-esteem and self-efficacy have been studied (Jahn et al., 2020).

As this work intended to explore the role of internalised stigma, this variable was also tested as a moderator. The results show that self-stigma significantly moderates the relationship between personal recovery and symptomatology. When people have a higher internalised stigma they suffer greater symptomatology and poorer recovery, while people with lower internalised stigma have lower symptomatology and greater recovery, with the slope of improvement being steeper in people with lower self-stigma. This could be indicating that the stigma that these people internalise about serious mental disorder influences the relationship between the two types of recovery, where the impact of self-stigma on recovery is greater when the person has more experience in the recovery process. These results would again support the importance of addressing internalised stigma in interventions for supporting the acquisition of skills and competencies that are necessary for their recovery experience. In this sense, Leith and Stein (2020) concluded that actively working on self-stigma in the care of people with mental health problems helps the acquisition of skills in the recovery process. It could be a more effective strategy in recovery than working on stigma at the social level (Jahn et al., 2020). There are several evidences that showed the effectiveness of internalised stigma interventions (Alonso et al., 2019; Chuang et al., 2024). In this sense, it would be interesting that mental health workers consider the importance of working in internalised stigma reduction (Liu et al., 2024). However, other researchers show how the application of a programme aimed at reducing internalised stigma has not led to an improvement in symptomatology, personal recovery, life satisfaction and social functioning (González-Domínguez et al., 2019).

Finally, to further study the role of internalised stigma and personal recovery on symptomatology, groups were generated by combining the scores of both variables (personal recovery and self-stigma). The group with poorer personal recovery and a high level of internalised stigma scored higher on symptomatology than the group with higher recovery and a low level of self-stigma, with the effect size of the difference being more noticeable between these two groups. This could be suggesting that the combination of both situations impoverishes the health of people with a severe mental disorder. These results are in line with previous studies, which corroborate the influence of the personal recovery process in the improvement of symptomatology, and although to a lesser extent, the role of internalised stigma.

This study has some limitations that must be considered when interpreting the results. On the one hand, we are dealing with a cross-sectional study that does not allow us to know the directionality of the relationships between variables; therefore, in the future it could be interesting to work longitudinally with these variables. On the other hand, not knowing what role internalised stigma might play in recovery has meant that this is a more exploratory study, and therefore it will be necessary to corroborate these results in subsequent research. The possible specific characteristics of the recruited sample and services should be considered in order to be able to generalize the results. Finally, it would be interesting to know what other aspects may be interfering in the recovery process along with self-stigma, since, being a complex process, it could be that other related variables have an important effect on the personal process carried out by these people. However, having more knowledge about the process of acquiring self-stigma could be useful to better understand its influence (Chan and Mak, 2017).

The findings found through this study suggest that the process of personal recovery carried out by people with a severe mental disorder is related to the perceived symptomatology, a process in which internalised stigma also acquires relevance. In fact, the effect of recovery is greater when the level of self-stigma perceived by these people is lower, in other words, the management of internalised stigma reinforces the improvement in recovery. Therefore, it could be interesting to include

aspects related to internalised stigma in recovery-oriented interventions, as they could improve the recovery process of these individuals.

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CRediT authorship contribution statement

Patricia Penas: Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Jose Juan Uriarte:** Writing – review & editing, Resources, Project administration, Funding acquisition. **Alexander Alvarez-Gonzalez:** Writing – review & editing, Supervision, Methodology. **María-Concepción Moreno-Calvete:** Writing – review & editing, Resources, Project administration, Funding acquisition. **Maria Asuncion Garay:** Writing – review & editing, Supervision, Resources, Conceptualization. **Ioseba Iraurgi:** Writing – original draft, Supervision, Methodology, Investigation, Formal analysis.

Declaration of competing interest

None.

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