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# Functioning in schizophrenia: Recommendations of an expert panel

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ABSTRACT

Functioning is a fundamental dimension across all aspects of life, frequently compromised or reduced in individuals with schizophrenia. However, the lack of a commonly agreed definition of functioning in schizophrenia makes it difficult to apply this concept in clinical practice. In this document, we make a detailed analysis of the literature to identify and define functioning and describe how it can be used in clinical practice today. We performed a preliminary literature search in the MEDLINE database (via PubMed) for articles discussing functioning in schizophrenia. The articles retrieved were then read and discussed by a panel of psychiatrists specialising in schizophrenia. The conclusions reached in this meeting formed the basis for a new exhaustive literature search for the purpose of synthesising the evidence published in the past 5 years. In this article, we show the importance a comprehensive, modern, homogeneous definition of functioning in schizophrenia, propose a definition of functioning, and put forward a series of recommendations for assessing functioning in clinical practice. We also review current unmet needs and highlight the need for a standardised tool for evaluating functioning.

## 1. Introduction

The treatment of patients with schizophrenia is associated with the concept of remission, which can be either symptomatic or functional (Andreasen et al., 2005). Management of schizophrenia has traditionally been focussed on achieving symptomatic improvement and remission, and clinicians have shown a growing interest in patients' functioning in recent years. Management of the disease has evolved over the years, and clinicians now have access to a wide array of pharmacological and psychosocial treatments that can be combined on a patient-by-patient basis to increase the likelihood of achieving a positive therapeutic outcome (Peña et al., 2016). However, functioning is a complex concept that is difficult to analyse and quantify, and despite attempts by several authors, no common agreed definition has yet been reached (Lahera et al., 2018). Functioning as a parameter for evaluating remission encompasses multiple aspects of the patient's daily life, making it difficult to establish a commonly agreed definition with standardised evaluation criteria (Gorwood et al., 2019; Mallet et al., 2018; Peuskens and Gorwood, 2012). This has led to the development of different scales to measure different aspects of functioning, such as the *Functional Remission of General Schizophrenia* (FROGS) scale (Llorca et al., 2009), the *Global Assessment of Functioning* (GAF) scale (Aas, 2011), the *Personal and Social Performance* (PSP) scale (Morosini et al., 2000), and the *Psychosocial Remission in Schizophrenia* (PSRS) scale (Barak and Swartz, 2012), among others.

There is no unified criterion for applying these tools in clinical practice (AlAqeel and Margolese, 2012), and because of this, functioning as an evaluation criterion or therapeutic objective is either absent from leading clinical guidelines, or given secondary importance (Lahera et al., 2018; Lahera et al., 2016). The growing interest among clinicians to

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include functioning in their therapeutic decisions contrasts with the lack of a standardised definition of the term, and shows the need to find an operational definition that gives a clearer understanding of functioning as both a theoretical concept and a component of patient management.

Given the aforementioned difficulties, an expert panel was convened with the aim of achieving a consensus definition of functioning, as well as establishing a set of recommendations regarding its assessment in terms of timing and instrumentation.

## 2. Methods

A panel of six experts in schizophrenia was assembled. Experts were selected based on having more than 20 years of clinical experience and bringing their expertise from both in-patient and out-patient settings, being aware of the issue of functioning in schizophrenia, and working in multidisciplinary teams. The review flow chart is shown in Fig. 1. We first searched the MEDLINE database (via PubMed) for articles discussing functioning in schizophrenia using simple and cross-referenced MeSH (*Medical Subject Headings*) terms related to functioning (Table 1). The studies retrieved were then filtered to obtain those containing the terms *schizophrenia* and *function* (and derivative terms, e.g., *functioning*) in the abstract, and these were reviewed to select the final articles to be used as starting material in the task force meeting. Thus, these final articles were selected based on their abstracts aligning with the meeting's objectives: to discuss the concept of functioning in patients with schizophrenia, covering established definitions and the applicability of the concept throughout the course of the illness. Prior to the expert panel meeting, each member of the panel was asked to complete a 58-item questionnaire on functioning in patients with schizophrenia and their management (Fig. 1). The questionnaire covered various areas related to functioning, such as the items and dimensions that should be included in its definition, the timing of functioning assessment throughout the course of the disease, or the evaluation of different measurement instruments of functioning, among others. It consisted of both closed-ended questions with multiple-choice responses and open-ended questions. The complete questionnaire is available in the Supplementary Material. During the meeting, the panel analysed the data obtained from the selected studies and pooled their perspectives on clinical practice in psychiatry with regard to functioning in patients with schizophrenia, using their answers to the questionnaire as a basis. Based on this evidence, the experts discussed proposals and recommendations to standardise the evaluation of functioning, and used their conclusions to outline a new, exhaustive, search of recent literature in MEDLINE using new MeSH terms that encompass the different aspects of functioning and various factors that impact functioning (Table 1). The obtained references were subsequently screened by reading title and abstract. Therefore, studies published in the past 5 years that contained the terms *schizophrenia*, *function* (and derivative terms, e.g., *functioning*) and *performance* (due to the experts' opinion of the importance of this term in functioning) in the abstract were selected. The final records obtained from both searches were used to compile a synthesis of the evidence which was further supplemented with the consensus opinion of the panel of experts. As it was a small group of experts, consensus was sought as a group on all relevant issues for providing recommendations in this document. During the meeting, the panel also compared some of the scales most used to evaluate functioning according to the literature search. Although there may be other instruments developed for and used in assessing functioning within the general population and/or among other patient cohorts, the search was intentionally narrowed to focus on tools that are currently in use for patients with schizophrenia in clinical practice due to the distinct and profound impact of this severe mental disorder on patient lives.

## 3. Results and discussion

### 3.1. Results of the literature searches

Seven studies were selected from the preliminary literature search for critical reading during the task force meeting (Table 2). These studies were selected after reading the abstracts to ensure they included the topics to be discussed in the meeting. The second, exhaustive literature review using the new search terms agreed by the panel of experts yielded 1623 records related to functioning ($n = 25$), personal aspects ($n = 707$), professional aspects ($n = 46$), educational aspects ($n = 185$), independence aspects ($n = 83$), and social aspects ($n = 577$). Of these 1623 records, 92 studies published in the past 5 years that contained the terms *schizophrenia*, *function* (and its derivative terms, e.g., *functioning*) and *performance* were included in the synthesis of the evidence (Fig. 1).

### 3.2. Definition of functioning in schizophrenia

There is as yet no commonly agreed definition of the concept of functioning, and various terms have been used interchangeably in this context (Harvey and Bellack, 2009). Nevertheless, the importance of functioning as a treatment goal is now widely accepted, although opinions vary with regard to the specific functioning to be targeted by a particular intervention (Harvey et al., 2019a). The considerable ambiguity around the concept of functioning and how it should be applied in clinical practice became evident in our exhaustive literature search, since few studies address the concept of functioning in schizophrenia, and none put forward an agreed definition of the different aspects of functioning (Lahera et al., 2018).

For this reason, the panel of experts agreed to unify the different criteria and arrive at a definition of the concept of functioning. Based on the experience and expertise of its members, the panel put forward a definition that combines their criterion and the conclusions reached during the meeting with all the aspects of functioning described in the studies reviewed. Thus, the working group defined functioning as *the ability of a person with schizophrenia to achieve a similar degree of adaptation and performance in different domains* (*social, self-care, occupational, and family*) *that would be achieved by a person with similar sociodemographic characteristics without said diagnosis*. The domains included in the definition of functioning are:

1) Social: relationship (sexual or otherwise) with friends, acquaintances, and people in their wider social circle
2) Self-care: maintenance of physical health, nutrition, capacity to manage their own affairs and get around

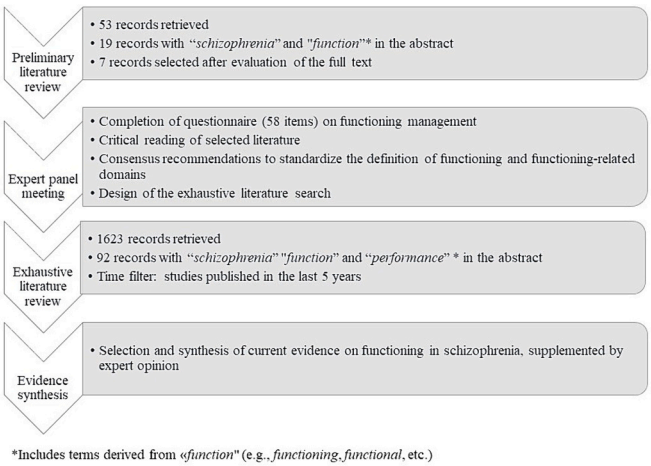


**Fig. 1.** Flow diagram of the literature review and expert opinion on the concept of functioning in schizophrenia.

**Table 1**
Literature search for aspects of functioning in schizophrenia and influencing factors, and MeSH terms used.

| | Preliminary literature review | Exhaustive literature review |
|---|---|---|
| Area | MeSH Terms | |
| Functioning | *Functional status*; *Recovery of function* | *Functional Status*; *Recovery of Function*; *Acclimatization* |
| Personal aspects | N/A | *Sedentary behaviour*; *Sexual Dysfunctions*; *Psychological Health*; *Nutritional Status*; *Mobility Limitation*; *Family* |
| Professional aspects | N/A | *Professional Autonomy*; *Rehabilitation*; *Vocational*; *Return to Work*; *Work Engagement*; *Work Performance* |
| Educational aspects | N/A | *Education*; *Academic Performance* |
| Independence aspects | N/A | *Independent Living*; *Self Care*; *Personal Autonomy* |
| Social aspects | N/A | *Psychosocial Functioning*; *Social Interaction*; *Interpersonal Relations*; *Social Isolation*; *Social Stigma*; *Friends*; *Social Mobility*; *Hobbies* |

N/A, not applicable; MeSH (*Medical Subject Headings*).

3) Occupational: studies, work, leisure activities (hobbies), protected activities, assigned domestic activities
4) Family: members of their own and extended family

It is important not to confuse this interpretation of functioning with "functional recovery" or "remission"; functional recovery includes clinical remission but not vice versa, so functional recovery is therefore broader in scope. It is equally important to assess functioning in patients who, due to early onset, have been prevented from achieving the level of functioning expected in a healthy subject. Clinical remission in schizophrenia, according to the criteria published by Andreasen et al. (Andreasen et al., 2005), usually refers to the acute stage of the disease, and involves maintaining improvement in certain positive and negative symptoms for more than 6 months. Now, however, we know that negative symptoms together with cognition have a greater impact on loss of functioning in chronic phases than positive symptoms. (Nemoto et al., 2019). In any event, it is always advisable to refer to functioning in schizophrenia as a therapeutic objective and, therefore, to evaluate it in a healthcare setting.

Functioning can be indirectly affected to the extent where the treatment administered controls a patient's symptoms, reduces adverse events, and promotes therapeutic adherence (Akiyama et al., 2016; Dewa et al., 2021; Granholm et al., 2018; Kossmann et al., 2021; Lim et al., 2021; Zhu et al., 2020). However, functioning depends directly on the subject's capacity to adapt to the demands of their environment (e.g., urban vs. rural). Another important factor is the bias that can be attached to sociodemographic characteristics (sex, race, age, cultural habits, etc.). According to the panel of experts, the combined concepts of adaptation and sociodemographic characteristics encompass the social, self-care, occupational, and family dimensions described in the literature (Cámara et al., 2021; Dubreucq et al., 2020; Harvey et al., 2019a; Harvey and Isner, 2020; Joseph et al., 2017; Kim et al., 2019; Kossmann et al., 2021; Stefańska et al., 2019; Tan et al., 2020) and included in the proposed definition. In their definition of functioning, the panel considered factors that go beyond those identified in the studies analysed, namely: capacity to live a dignified social life, to perform adequately in different domains of life, to maintain adequate hygiene and biological rhythms, to maintain contact with their primary care physician and other specialists involved in their physical health problems, to manage the skills needed to live as independently as possible, and to manage their own affairs and get around.

### 3.3. Timing of functioning assessments in patients with schizophrenia

The recent literature on functioning in schizophrenia mainly includes studies that analyse the impact of different treatments or interventions on functioning and the factors that predict good or bad functioning, and validate or examine tools for measuring functioning (Giraud-Baro et al., 2016; Gorwood et al., 2019; Harvey et al., 2019b; Kern et al., 2009; Kossmann et al., 2021; Zhao et al., 2019). None of the studies reviewed establishes the timing of functioning assessments over the course of the disease. However, certain interventions have been shown to have an effect on clinical and functional remission (Gorwood et al., 2019; Mike et al., 2019).

The panel believes that in order to assess functioning in clinical practice it is important to establish the timing of each evaluation. This, naturally, will depend on the clinical scenario and the vital context and care setting of the patient. However, given the importance of functioning as a therapeutic goal, the experts consider that patients must be closely monitored and their functioning evaluated during diagnosis and in the initial phases of treatment in order to define their individual treatment goals (Fig. 2). This baseline and evolutionary evaluation of functioning must include retrospective information on the patient's environment. Some clinicians believe that functioning should be evaluated during clinical remission, and not during the acute phases of the disease (Giraud-Baro et al., 2016). Nevertheless, the latest studies indicate that functioning should be measured during each exacerbation and after each new remission, since the greater the frequency of relapses, the greater the difficulty in returning to premorbid levels of functioning. None of the schizophrenia management guidelines establish the ideal interval between remission and functioning assessment;

**Table 2**
Studies selected for critical reading and discussion during the expert panel meeting on functioning in schizophrenia.

| Author | Year | Journal | Type of study/article | Focus |
|---|---|---|---|---|
| Giraud-Baro et al. (Giraud-Baro et al., 2016) | 2016 | BMC Psychiatry | Observational, multicentre, cohort, prospective | • Primary outcome measure: evaluation of overall functioning using the GAF scale after 1 year of treatment.<br>• Secondary measure: measurement of social functioning |
| Gorwood et al. (Gorwood et al., 2019) | 2019 | Psychiatry Research | Observational, prospective | • Measurement of functional remission with FROGS and evaluation of predictive factors of functional remission |
| Harvey et al. (Harvey and Bellack, 2009) | 2009 | Schizophrenia Bulletin | Opinion article | • Proposed model for defining functional remission and evaluating factors underlying suboptimal general functioning |
| Kern et al. (Kern et al., 2009) | 2009 | Schizophrenia Bulletin | Review article | • Review and discussion of psychosocial interventions aimed at functional recovery |
| Lahera et al. (Lahera et al., 2018) | 2018 | BMC Psychiatry | Position statement | • Questionnaire and Delphi method to assess the definition of functional recovery and associated factors |
| Lahera et al. (Lahera et al., 2016) | 2016 | Actas Españolas de Psiquiatría | Observational, cross-sectional | • Analysis of the relationship between functioning and symptomatology according to experts in psychiatry |
| Sabbag et al. (Sabbag et al., 2011) | 2011 | Schizophrenia Research | Observational, prospective | • Analysis of the correlation between informant reports on the general functioning of patients with schizophrenia |

GAF, *Global Assessment of Functioning*; FROGS, *Functional Remission of General Schizophrenia Scale.*


**Fig. 2.** Recommended timing of functioning evaluations in schizophrenic patients.

however, based on their clinical experience, the panel suggests an interval of 3 months. Evaluating functioning once the patient has been stabilised, even if he or she remains hospitalised, will yield more objective criteria to guide specific interventions to target the domains in which functioning is impaired. It is also important to establish a definition of the patient with chronic schizophrenia, since they may initially present a rapid decline in functioning followed by various functional states, depending on decompensation, life changes, etc. Since the type of onset (rapid or slow) may make it difficult to determine the duration of the initial phases of the disease, the literature establishes a period of 5 years (Lieberman et al., 2001; van Berckel et al., 2008). It is also advisable to re-evaluate functioning every 12 months in chronic patients in order to plan and select rehabilitation interventions. Finally, given the impact of life changes (change of job, loss of a family member or caregiver, etc.), it is important to evaluate functioning after these events in order to implement palliative or corrective measures.

Fig. 2 shows the functioning evaluation timeline.

### *3.4. Tools to assess functioning in patients with schizophrenia: unmet needs*

The absence of a unified, standardised, user-friendly functioning assessment tool for patients with schizophrenia in clinical practice has led to clinicians using a variety of strategies. Various scales have been developed to assess the different dimensions of functioning, and certain scales are sometimes used in combination. These tools have limited application in clinical practice and are predominantly used for research. In a study by Lahera et al., only 14 % of psychiatrists polled stated that they regularly use functioning evaluation scales (Lahera et al., 2016). As mentioned above, the absence of a definition of functioning has prevented the development of valid, specific, assessment tools for daily clinical practice. This is further confounded by the difficulties involved in patient self-assessment, which is subjective and often differs from the results obtained by the attending clinician and/or family member (Lahera et al., 2018).

During the meeting, the panel compared some of the scales most commonly used to evaluate functioning, rated their usefulness, and identified potential missing items (Alonso et al., 2008; Barak et al., 2010; Chiu et al., 2018; Garcia-Portilla et al., 2011; Mallet et al., 2018; Rabinowitz et al., 2021; Rouillon et al., 2013; Vázquez Morejón and Jiménez Ga-Bóveda, 2000) (Table 3). In general, none of these scales is a practical, useful, updated tool that both provides an accurate picture of overall functioning and is easy and quick to apply in clinical practice.

The scales that received the highest rating in terms of coverage of the dimensions of functioning were the *Social Functional Scale* (SFS) and the *Functional Remission of General Schizophrenia Scale* (FROGS). These scales, however, are over-long, include items that are not relevant to certain patients, are outdated, and are hardly ever used in clinical practice (Table 3). The panel considers the short versions of the FROGS (mini-FROGS) and the *Social Functioning Scale* (mini-SFS) to be more applicable in routine clinical practice because they can be completed in less time, even though they do not include all the key items required to correctly assess and map different aspects of functioning. It is important to bear in mind that psychiatrists are not usually inclined to use lengthy questionnaires in clinical practice, particularly if they need to be administered frequently over the course of the disease. Because of this, it is important to consider the potential advantage of using new technologies to deliver ecological momentary assessments to measure the patient's level of functioning. Furthermore, given their importance in assessing care needs, the opinion of other healthcare and social workers should be taken into account when evaluating functioning.

There is evidence that improved quality of life is directly correlated with improved functioning (Ertekin Pinar and Sabanciogullari, 2020; Lee et al., 2021). Quality of life, however, is a highly ambiguous, subjective concept that is dependent on factors such as age, gender, or place of residence, and as such should be measured independently and not as an item in functioning assessment tools. Nevertheless, functioning assessment tools could include items that measure patient-perceived satisfaction with their performance, or the level of adaptation achieved as a result of an improvement in functioning. This would complement the patient's self-assessment by prompting them to rate their functioning and their degree of satisfaction with their performance. On the other hand, if the clinician or informant completes a questionnaire at the same time as the patient, then the results can be pooled and used to take decisions on aspects that are important to the patient.

Considering the limitations of existing functioning scales, the proposed definition of functioning in patients with schizophrenia could form the basis for an evaluation tool that would meet existing needs in clinical practice. Such a tool would need to address all the key aspects of functioning, be quick and easy to administer, and require minimal training. It would need to be validated in each setting, with should be tested for reliability, validity, and sensitivity to changes.

## 4. Conclusions

- In this review of the literature and discussion of functioning in schizophrenia, the panel of experts has highlighted the lack of a common agreed definition of this concept, and the importance of functioning as a therapeutic goal in clinical practice.
- The experts put forward a definition of functioning based on an exhaustive analysis of all functional domains, and on this basis establish the timing of functioning evaluations over the course of the disease.
- The experts discuss the existing limitations of existing measurement scales, and call for the development and validation of a single tool capable of evaluating all the key aspects of functioning and standardising clinical practice.

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**Table 3**
Comparison of scales commonly used in clinical trials to assess dimensions of functioning in schizophrenia.

| Scale | Completion time | Overall rating[a] | Use in clinical practice[b] (%) | Main advantages | Main drawbacks |
|---|---|---|---|---|---|
| GAF | Short | 4.33 | 67 | Short questionnaire, easy to use in clinical practice | Very generic evaluation, does not evaluate different key domains of functioning |
| PSP | Long | 6.33 | 50 | Correct mapping of different domains of functioning | Extensive questionnaire, does not record the opinion of the patient or caregiver |
| FROGS | Long | 7.67 | 33 | Good functioning mapping, stable over time | Long questionnaire |
| Mini-FROGS | Short | 5.67 | 83 | Short questionnaire, easy to use in clinical practice | Partially valid, does not cover all important domains of functioning |
| PSRS | Short | 4 | 17 | Short questionnaire, easy to use | Questionable validity to measure functioning, mixes symptoms with concepts of functioning and quality of life |
| SFS | Long | 7.5 | 67 | Very comprehensive, included detailed assessment of aspects of social functioning not included in other scales, provides global score and by domains | Long questionnaire, some items not applicable to all patients, complex scoring system, assesses a single dimension of functioning |
| Mini-SFS | Short | 5.83 | 83 | Short questionnaire, easy to use | Assesses a single dimension of functioning, offers little information |

FROGS, *Functional Remission of General Schizophrenia Scale*; GAF, *Global Assessment of Functioning*; PSP, *Personal and Social Performance*; PSRS, *Psychosocial Remission in Schizophrenia*; SFS, *Social Functioning Scale*.
[a] Average score out of 10 awarded by the experts to each scale.
[b] Percentage of the group of experts who use or would use the scale in clinical practice, based on their experience.

S.A. and Lundbeck Spain.

## CRediT authorship contribution statement

**Iluminada Corripio:** Writing – review & editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization. **David Fraguas:** Writing – review & editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization. **María Paz García-Portilla:** Writing – review & editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization. **José Manuel Olivares:** Writing – review & editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization. **Pilar Sierra:** Writing – review & editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization. **Pedro Sánchez:** Writing – review & editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization.

## Declaration of competing interest

IC has received in the last five years fees and honoraria in terms of registrations for congresses, participation in conferences and working groups from Otsuka-Lunbeck, Janssen, Angelini, Casen Recordati and Okedi.

DF has been a consultant and/or has received fees from Angelini, Casen-Recordati, Janssen, Lundbeck, and Otsuka, and has received grant support from *Instituto de Salud Carlos III* (Spanish Ministry of Science and Innovation), *Fundación Alicia Koplowitz*, and *Fundación La Caixa*.

MPGP has been a consultant to and/or has received honoraria/grants from Alter, Angelini, Cassen-Recordati, Janssen-Cilag, Idorsia, Lundbeck, Otsuka, and SAGE Therapeutics.

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