Research Paper

Qualitative analytics from stakeholder perspective describes the biopsychosocial model for patient-centred approach to managing psychiatric ailments

Abhishek Cukkemane [a,b,c,*] , Rene Hurlemann [d,e], Veralia Gabriela Sanchez [f]

[a] Institute of Biological Information Processing, Structural Biochemistry (IBI 7), Forschungszentrum Jülich, Jülich, Germany
[b] Heinrich Heine University Düsseldorf, Institut für Physikalische Biologie, Düsseldorf, Germany
[c] Hanse-Wissenschaftskolleg Institute for Advanced Study, Delmenhorst, Germany
[d] Department of Psychiatry, School of Medicine and Health Sciences, University of Oldenburg, Oldenburg, Germany
[e] Karl-Jaspers-Klinik, Bad Zwischenahn, Germany
[f] Faculty of Technology, Natural Sciences and Maritime Sciences, University of South-Eastern Norway, Vestfold, Norway

ARTICLE INFO

ABSTRACT

Chronic mental illnesses (CMIs) such as schizophrenia, schizoaffective disorder, bipolar disorder, major depressive disorders, to name a few are psychiatric disorders poses significant burden to both patients and healthcare systems. The public policy and management of such complex set of spectral disorders often includes procedures and regulations, pharmacological treatments, psychotherapy, and social support. However, these approaches frequently fail to fully address patient requirements, leading to inadequate care and poor outcomes. Therefore, by conducting interviews and synthesizing insights from various stakeholders, including clinicians, researchers, and healthcare professionals, the study investigates the multi-dimensional challenges in CMI management. This report of qualitative analysis explores a patient-centric approach towards three main themes in managing CMIs such as, tasks related to diagnosis, challenges with current procedures, and expectations from newer diagnostic methodologies. Key themes emerged revolving around requirements for emotional care, trust, complexity, and the integration of technology in treatment. Our findings highlight the need for personalized care strategies that encompass biological, psychological, and social dimensions with emphasis on effective communication and resource management. The study underscores the potential of a holistic, patient-centred framework, which serendipitously parallels George Engel's biopsychosocial model to improve outcomes and address the multifaceted nature of spectral psychiatric disorders. In the light of newer emerging technologies and the demands for psychometric intervention, perhaps, we suggest revisiting the model for a comprehensive approach in policy-making, health care management and patient-centric support to address these challenges effectively

1. Introduction

Chronic mental illness (CMI) such as schizophrenia has a complex multi-factorial aetiology that affects approximately 20 million individuals worldwide, with a lifetime prevalence of around 1 %. Along with other related CMIs, such as bipolar disorders (BD), and major depressive disorders (MDD), the number balloons to 3–5 % of the afflicted in the global population (van Os and Kapur, 2009). The management of these are complex, requiring a multifaceted approach involving policy makers, reimbursement policies, health care management and support, and societal integration of the afflicted. Albeit of several professions participating in the preventive and curative measures for CMIs, current healthcare systems often fall short in providing holistic and personalized care for individuals, leading to suboptimal outcomes and a significant burden on patients, their families, and society.

One of the major associated problems begins at the onset of the entire process, i.e., w.r.t to diagnosis. CMIs are extremely challenging to diagnose albeit of DSM/ICD (Association, 2013; Organization, 2022) guidelines for over 60 years- This is because of overlapping symptomatology between disorders, it is not uncommon to misdiagnose (Smith and Craddock, 2011) bipolar disorder for major depression, and

depression between uni- and bi- polar disorders. In a similar vein, from 1990 to 2020, in 30 years the diagnosis for CMIs improved significantly by 18 % to 34 % for schizophrenia and from 27 % to 46 % for MDD (Paul and Potter, 2024) in Germany yet considerably falls short of effective medical care. The occurrence of misdiagnosis at such high rates is not unsurprising given the similarities in symptomatology of CMIs such as schizophrenia, schizoaffective disorder and BD (van Os and Kapur, 2009) but they can have dire consequences in reducing cases involving young adults with depression who are at high risk of developing BD and influence the choice of treatment approach. For instance, one may employ a more cautious and judicious use of medications, and place a greater emphasis on psychological and non-medical interventions for treatment and recovery.

This has posed a significant challenge on the health care system and the society (Canada, 2012; OECD/EU, 2018). A recent finding of public health insurance and psychiatry hospitals in Germany for patient care with depression have identified deviations and not rigorous implementation of the statutory guidelines resulting in a whopping 21 % cases of remission (Wiegand et al., 2020), indicating the urgent requirement of a newer and less cumbersome outlook to patient care and welfare. Therefore, to understand these limitation, using a combination of semi-structured interview (Kallio et al., 2016) and qualitative research methodology (Malterud, 2001), we probed the requirements of tasks related to diagnosis, challenges with current procedures, and expectations from newer diagnostic methods for a patient-centric approach in mental health care management. The reason we opted for qualitative content analysis (QCA) is because it is proven as a powerful tool to deepen our understanding in medicine for diverse subjects such as nursing (Graneheim and Lundman, 2004; McCormack and McCance, 2006), mental health in veterans (Zinn, 2010), mental health among old people (Anker-Hansen et al., 2019, 2020), attitude towards welfare system and smart houses (Sanchez et al., 2019) to reflect on few. Moreover, qualitative methodology provides deeper complementary insights at microscopic levels that quantitative data alone cannot capture.

Is the approach fruitful in itself? It certainly is worth trying; for instance, in a joint effort by several different stakeholders in clinical, research, and societal backgrounds, experts together proposed a panel of biomarkers from their respective fields for positive patient outcome (Frisoni et al., 2024). A similar collective agreement will prove highly beneficial for management of psychiatric disorder. A recent survey conducted by the Patient-Centered Outcomes Research (PCOR) Institute (Kim et al., 2018) on several stake holders for mental disorders that included patients, caretakers, next-of-kin, advocacy organizations, policy makers to name a few, identified three main aspects: (a) logistics, implementation strategy and the choice of outcome; (b) permitting flexibility in approaches to cater the requirements of health care and subjects; (c) identifying reimbursement protocols and adopting timelines for long-term planning recovery. In a similar vein, we are keen to comprehend the outlook of different stakeholders such as clinicians, researchers, social workers in NGOs, nurses, social scientists, entrepreneurs, pharmaceutical heads to name few who are associated with related CMIs that encompass schizophrenia, schizoaffective, BD, MDD etc. We are keen to understand the view, and identify the prospects for application of new approaches for diagnosis, the unmet needs in patient health care, and the possibilities of risk- management strategies.

The findings of this study highlight the importance of adopting a comprehensive, patient-centric approach to management of schizophrenia and related CMIs that parallels with Engel's biopsychosocial model (Engel, 1978, 1979). Although the model proposed 45 years ago, it represents an important theoretical model that is a part of the curriculum of medical graduates (Roberts, 2023), there has been no experimental evidence suggesting its utility. By interviewing stake holders, we for the first-time address experimentally that factors of biological/medical, psychosocial/ psychological, and societal/ social factors influence the lives and experiences of individuals involved with schizophrenia and depression welfare.

2. Experimental procedure

2.1. Aim and research question

Patients and caregivers face increasing challenges due to the complexity of medical support in the management of mental disorders (Anker-Hansen et al., 2019, 2020; Kim et al., 2018). Compounding the challenges include spiralling costs (6, 7), lengthy procedural frameworks, and shortage of medical support and psychotherapists (Hanf et al., 2021) that exacerbates the problem. At the recently concluded 36th European College of Neuropsychopharmacology, Barcelona (Neuropsychopharmacology), a session devoted to patient opinion and welfare, entitled "Patient session – It takes two to tango: pharmacogenetics in psychiatry " highlighted the travails patients face during questionnaire-based diagnosis and their opinion is suggestive of feeling of negative emotions, like stress, self-pity, sadness, anger to name a few. While the angst reflected by the patients is comprehensible, a silver lining in the cloud was highlighted in the form of a collaborative effort by the European Psychiatry Association (EPA); Global Alliance of Mental Illness Advocacy Network (GAMIAN-Europe) and European Federation of Associations of Families of People with Mental Illness (EUFAMI) with PSY-PGx (2024), Amsterdam (PSY-PGx) on pharmacogenetics and biomarkers in diagnosis of psychiatric disorders. The patients, the family members and related emotional stakeholders greatly appreciated the value information pertaining their health and recovery. This narrative reinforced our thinking to understand the benefits, challenges and the possibility to adopt newer technology and approaches for the benefit of the patients using QCA.

2.2. Ethical considerations

An informed consent as prescribed in Article 5(1)(d) accuracy and 5 (1)(f) integrity and confidentiality, as well as Article 32 security was obtained from all participants following the approval from the data protection services of Sikt – Norwegian Agency for Shared Services in Education and Research (reference number - 648482) on a legal framework of General Data Protection Regulation art. 6 nr. 1a.

2.3. Participant recruitment

We recruited individuals involved in health management, support and care of schizophrenia and the related CMIs, which includes their caregivers, and healthcare professionals, including psychiatrists, researchers, social workers, and nurses. Participants were recruited through strategies, that included recruit from the author's network (convenience sampling). At the same time, we requested participation of experts based on their scientific publications using email communications. However, the responses using both the approaches were poor, therefore, snowball sampling was then implemented, which involved word-of-mouth publicity asking knowledgeable people about whom could participate. Altogether, we contacted 57 participants (23 females and 34 males) from countries having social welfare policies that included nations within the EU, Norway, the USA and Canada. From which, a total of 7 participants (Table 1) based in Germany, UK, Norway and Denmark cooperated in the study. Hence, our findings herein will be representative for European countries only. The eligibility criteria included the involvement in the care of individuals with CMIs (for professional caregiver participants), and experience in the management of CMIs (for healthcare professional participants) that includes disorders like schizophrenia and major depression. Also, it is noteworthy that due to the high prevalence of CMIs, which stands at 3-5 % of the global population (van Os and Kapur, 2009), few participants were also caregivers to their family members who were suffering from schizophrenia or depression

Table 1

Participant demographics.

Participant	Sex	Education	Specialization	Current profession	Previous profession	Experience
1	male	MD, PhD	Psychiatry	Scientist	Clinician	>20
2	male	MD, PhD	Neurosciences	Scientist	Clinician*	>15
3	male	PhD, MBA	Biochemistry (Neurosciences)	Entrepreneur (CEO)	Scientist*	>15
4	male	PhD	Medicinal Chemistry	Entrepreneur (COO)	Scientist	>10
5	male	PhD	Psychiatry	BDM Pharmaceutical	Scientist	>20
6	female	MS	Informatics	Social worker (CEO)	IT*	>3
7	male	BSN	Nursing	Nurse	–	>1

* Participants with friends and family members afflicted with CMIs; The abbreviations stands for, CEO, chief executive officer; COO, chief operating officer; BDM, business Development manager; and IT, information technology.

2.4. Data collection and analysis

Out of the 7 interviews in English, six were held online and one was held in-person, which lasted 35-50 min. The design of the qualitative study (Malterud, 2001) was prepared with semi-structured interviews (see **Table S1** for the questionnaire (Kallio et al., 2016)) with three related frameworks that included tasks related to diagnosis, challenges with current procedures, and expectations from newer diagnostic methods. The interviews were audio-recorded and the transcripts were analysed thematically (Braun and Clarke, 2006). The data was coded using deductive inferences and emerging subcategories, subthemes', and theme were discussed and refined through an iterative process. (Elo and Kyngas, 2008; Graneheim and Lundman, 2004; Krippendorff, 1989) and categorized to multiple sub-themes and a unique theme. The unique theme that aligned with the tasks related to diagnosis, difficulties with current procedures and expectations of newer technologies that would provide vital clues in the pros and cons of the current medical setup for the welfare of patients suffering from CMIs.

The content of the interviews was analysed (Graneheim and Lundman, 2004; Krippendorff, 1989) by individually identifying 'meaning units' that were concise description of the message conveyed in the response. In the subsequent step, the meaning unit was further condensed, coded and categorized into codes and subcategories (see Table 2 for an example analysis methodology). The steps were iteratively analysed 4–6 times for the response of each interviewee until a consensus on the codes was reached. The datasets of the participants and the annotations have been provided in supplementary section as separate Excel sheet. A total of 27 codes (Fig. 1) were identified that were refined into subcategories categories that shared similar sub-themes

(Fig. 2).

3. Results

For the presentation of the analysis, based on the interviews (**Table S1**), the study investigates the multi-dimensional challenges in management of CMIs and synthesizing insights from various stakeholders. This approach permits for a comprehensive investigation of aspects related in diagnosing, treating, patient-care and managing CMIs as a whole. Our purpose was integrating these diverse viewpoints, one may identify not only the clinical and operational hurdles but also the emotional, social, and economic challenges faced by patients and their families. Additionally, understanding these multi-faceted challenges may enable the formulation of policy recommendations that address the needs of all stakeholders, fostering a more collaborative, and an integrated approach to mental health care.

3.1. Tasks related to diagnosis

Firstly, the narrations on "tasks related to diagnosis", encompasses the process of diagnosing mental conditions involving several critical steps such as diagnosis, prognosis and the various situations present unique challenges, such as differing symptom manifestations in depression, requiring tailored responses and therapeutic goals. The process begins from the moment a mental health professional receives a patient or sample, the structured work-flow and the flexibility in addressing the diverse needs of patients effectively.

The data show a broad variety of replies across the different tasks both professionally as well as in ancillary roles. As an example, P2 said,

Table 2

An example analysis of the data grouped into sub-categories, sub-themes, and the main theme.

| Participant (specialization)	Condensed meaning unit	Code	Sub-category	Sub-theme	Theme
01. Psychiatry Researcher	Freedom of participation is important, if unwilling then the participant is free to leave	guidelines	guidelines represent the scope of activity	Biological / Medical	Biopsycho–social model
05. Psychiatry Pharmaceuticals	The resistance to medication stems from the fact that the patient is unclear on the purpose and the outcome of the medication	complexity in treatment	patients resist treatment to medication and recovery program		
03. Neurosciences Entreprenuer	Yes, patients do quite often resist treatment provided they are not mobile		patients resist treatment		
02. Neurosciences Researcher	There is unspoken friction in the very first interaction between patient and doctor. The doctor needs to cautiously win over the patient's trust.	lack of trust	loss in trust due to unclear info results in resistance to medical support	Psychological / Psychoscial	
06. Social worker - IT	Patient journey is very complex and challenging due to mistrust, and uncertainties to every aspect of life	patient journey	patient journey is arduous and filled with several challenges like history, trust, resources. Understanding these are critical for successful intervention		
04. Medicinal chemistry entrepreneur	Challenges comes in several different flavours, in doctors, patients, resources, regulations and insurances	legality and bureaucracy	medical care is severely time restrained and highly over regulated by legislative protocols	Social / Societal	
07. Nurse	Legal issues are very restrictive in medical support and the medical staff can't enforce support unless life-threatening				
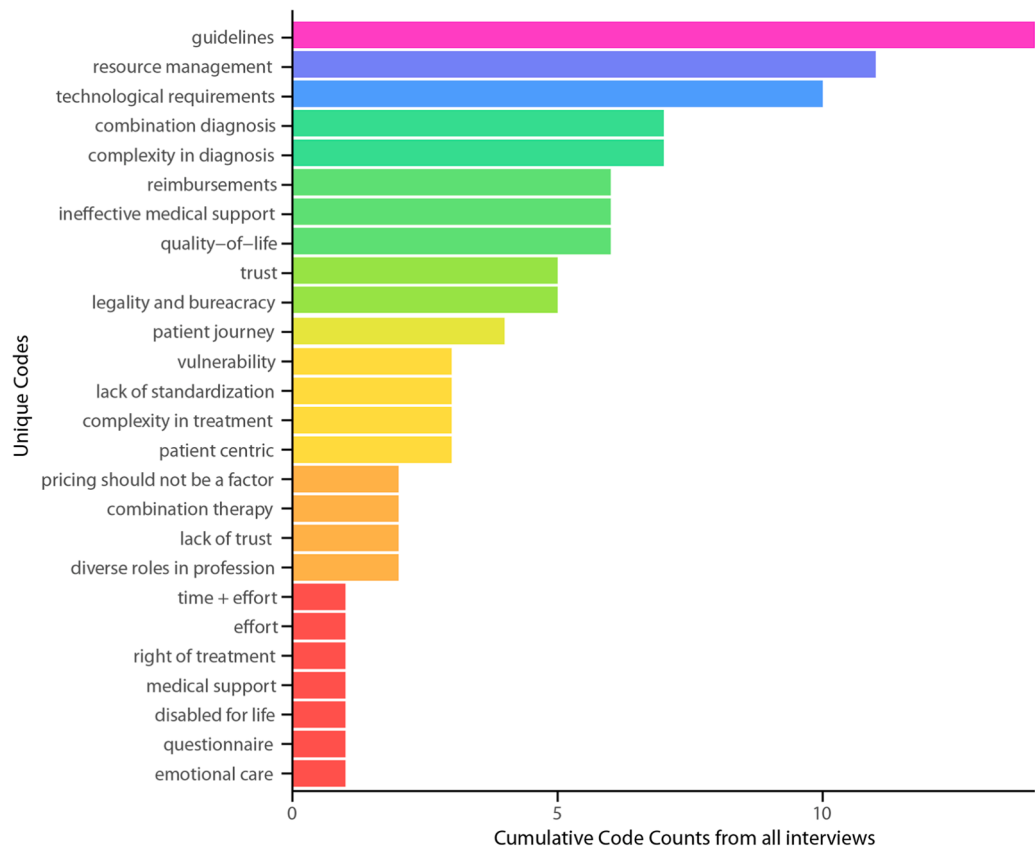
Fig. 1. Illustration of the occurrence (in ascending order) of various codes that were annotated from the interview.
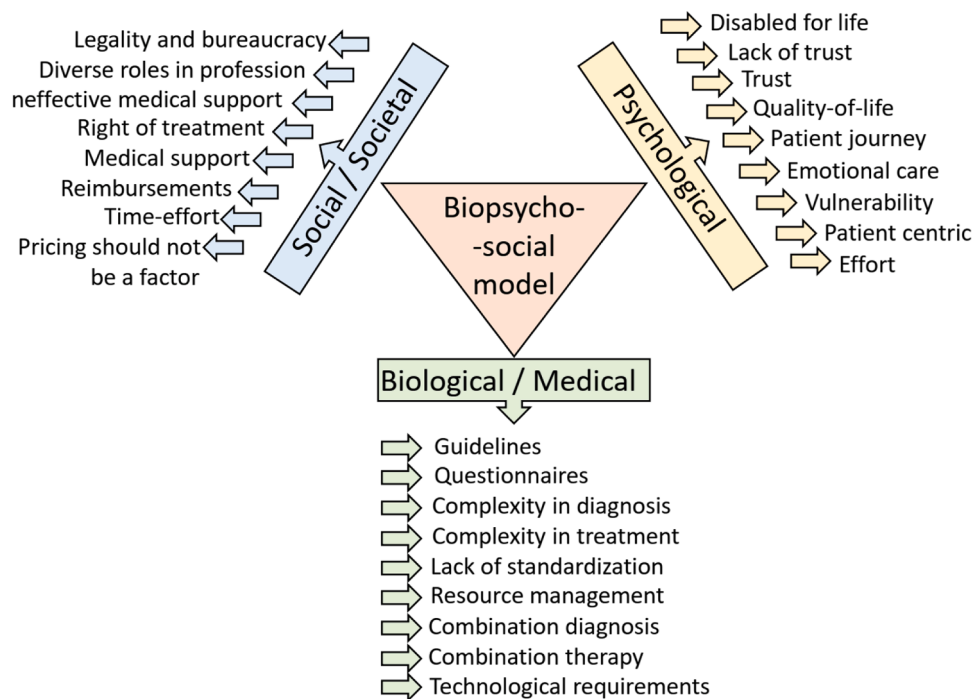

Fig. 2. Schematic representation of the identified codes and its association with the sub-themes, Biological/ Medical, Social/ Societal and Psychological/ Psycho-social factors in the theme biopsychosocial model.

"*Neural disorder is quite different from degeneracy because by inspecting the brain you can see some pathology or some theoretical changes in the brain, and you can act accordingly and treated accordingly. Yeah, so by surgery, our medicines are schematic treatment. But I think in neural disorder disease, I think as a physician in disorder management, we should pay more attention to the emotional support*" (P2)

On the other hand, P4's response is

"*For us in the new field, it's a multi-step process involving all the stakeholders. So of course, it's getting an idea and evaluating market needs in terms of the laboratory offering, our tests, the physicians who do diagnosis, who decide which therapy to go, who accompanied the therapy along the patient journey and of course the patient. And that's quite complex for us and a component to complete development process then. So, it's not just we're asking some questions, have understood it fully since asking three physicians, getting four answers is more normal than.*" (P4)

Taken together, the process is challenging not only for diagnosis but also management of the individual and the system. On a related note, P7 relished the ancillary role of the job as worthwhile, something he is proud of,

"*I had a patient who was sort of put into my care. Just as she was being discharged, she gave me chocolate and said I saved her life and that was like very meaningful from for like negative, what keeps me awake at night?*" (P7).

3.2. Challenges with current procedures

Secondly, the questions on the "challenges with current procedures", that include complexity in diagnosing mental health conditions and potential errors. Furthermore, we discussed on challenges that may arise when patients resist the diagnostic process, how success and failure are gauge for performances, and the budgetary. In this context, we were also keen to comprehend patients and their families seek savings in terms of time, money, and effort for more streamlined and accessible mental health services.

Among several factors, money is a very important criteria for patient welfare, science and development of new technology. One of the participants (P4) who is involved in all three aspects said,

"*Most of the expenses are taken by the society since it's not so in terms of indirect effect. Patient journey's inefficiency of the system sector of course, if you are in concrete steps within the system. It's why other insurance companies quite good covered as far as we have experienced and have learned, but to get things new things improvements are need in this system again. It's a very long and much too long journey and we experience every day at the moment that the healthcare system is much too slow and inefficient, which means reimbursement issues take too long time.*" (P4).

The view point of a care-giver (P6) relates to the above yet markedly differs,

"*Fair share of mental health, because listening to the stories day-in and day-out causes us problems as well. So those are the hidden costs that we can't see and there are costs as providers that we have to incur. In fact, and I think that's a higher price that we have to pay in terms of being in that position or being in that service*" (P6).

3.3. Expectations from newer diagnostic methods

And lastly, on subject related to "expectations from newer diagnostic methods", we were keen to identify current value propositions in mental health care and their limitations. Also, it was important to understand performance issues related to diagnostic accuracy and treatment efficacy that can directly impact their work, causing frustration and impacting patient outcomes. While existing quality standards are in place, we sought to gather information on a hypothetical "silver bullet" that could simplify and enhance the diagnostic process, aspects of current procedures that professionals appreciate, such as specific features that streamline assessments or improve patient interactions. Lastly, in order to adopt a new value proposition, such as a blood-based biomarker assay, what factors would professionals prioritize better quality, lower

risk, low investments, and reduced costs.

Coming from a person scientifically skilled in the subject but also is a caregiver to family member, P3 says it is alarming to note the opinion of the current diagnostic that,

"*So, the diagnostic guidelines, they are just not visible to the patient or the family, it's a black box. When it comes to cancer, or so, at least he has something to kind of hold on to. Here there are just probably no set guidelines that are available to the family members or the caregivers or the kids and kids of the patients, right? I mean that is the most frustrating.*

So again, if we can get something to stage, OK, there is a major moment or there is a major, which is quantitative, that's going to drive the decisions both on the diagnostic side and on the treatment side that will be helpful."

On the other end of the spectrum P5 says,

"*In the clinical development, I think there's no issue, okay, because it's quite straightforward approach, okay, and because we are always talking about a smaller group. Let's say in the development of a drug, you might need, let's say in 3000 patients. That's a relatively small group. And you have you use clear diagnosis criteria you have this exclusion inclusion criteria. And so, it's for the bigger indication it's not a problem*" (P5).

These messages strongly point out the pole-apart differences in opinion between different stake holders and little congruence on the subject related to rating the value of the current diagnosis. However, regardless of whom we interviewed, most of the participants were suggestive of the need for better quality and lower risk technology as the priority for health care and management of the afflicted individual.

4. Discussion

During the course of the interview, we set out with frameworks related to tasks related to diagnosis, challenges with current procedures, and expectations from newer diagnostic methods in healthcare of CMIs. Also, in recent years, there has been an increase in use of biomarker-based analysis for various disease across a spectrum of medical disciplines in addition to increased usage of data-analytics, machine learning and artificial intelligence approaches for personalized medicine. Identifying biomarkers in a qualitative and quantitative fashion can offer strong basis for diagnostic and treatment follow-on for psychiatric disorders. Therefore, we were keen on understanding the viewpoint and gather as much as information of the different stakeholders in CMIs, which revealed several key factors that seem to origin from aspects associated with biological/medical, social/societal and psychological/psychosocial to align with George Engel's biopsychosocial model ((Engel, 1979), Figs. 2 and 3).

Participants highlighted the importance of understanding the technology, access to more information, better resource management, limited availability of newer technologies and the impact on their quality-of-life (Fig. 3). The study highlights the need for a shift in the management of CMIs, moving away from a narrow, biomedical model towards a more integrated approach that is more illustrative of the biopsychosocial model for patient-centred outcome. This involves not only optimizing pharmacological interventions but also incorporating psychological and social support strategies to address the multifaceted needs of individuals with schizophrenia.

Another set of important findings were combination-diagnostics and combination-treatment were vouched by most of the participants. They strongly were suggestive that while the current set of guidelines and therapy is constructive and have benefitted in patient care, it however lacks transparency and clearly is in sufficient. In addition, it is necessary to astutely listen to the patients, and where possible, personalized medicine needs to take into account the personal history and cultural settings of the patient (Gomez-Carrillo and Kirmayer, 2023; Gomez--Carrillo et al., 2023). In a similar vein, the response to the treatment needs sincere communications between the clinics and hospital for the

Biological / medical factors

1. Guidelines
   ➤ guidelines represent the scope of activity
   ➤ current guidelines are good but at times can be challenging with complexity of disorder

2. Questionnaires
   ➤ questionnaire for mental disorder defines the strength and specificity of clinical and research practises

3. Complexity in diagnosis
   ➤ mistakes are possible during diagnosis
   ➤ due to complexity of the diseases, the diagnosis is often difficult

4. Complexity in treatment
   ➤ patients resist treatment to medication and recovery program
   ➤ further diagnostic classification of spectral disorders is required for better drug development

5. Lack of standardization
   ➤ the procedure for diagnosis and prognosis is subjective, unclear, and has insufficient criteria for validation

6. Resource management
   ➤ multi-layered challenges are required for clinical diagnostics in the current scenario,
   ➤ medical outcome requires interaction between physician, society, patient and pharma

7. Combination diagnosis
   ➤ multiple methodologies using clinical and newer technologies can improve patient outcome

8. Combination therapy
   ➤ medication, non-medical treatment and patient communication is required quality standards for successful outcome

9. Technological requirements
   ➤ unmet needs for psychiatric disorders require newer ideas and input from medical society
   ➤ diagnostic conditions for complex psychiatric disorders with broad symptom requires more than one biomarker
   ➤ newer technology should be encouraged and modern state-of-art technologies required
   ➤ drug development requires proper molecule profiling with respect to efficiency, safety and expected follow-ups using a biomarker assay

Social / societal factors

1. Legality and bureaucracy
   ➤ medical care is severely time restrained and highly over regulated by legislative protocols

2. Diverse roles in profession
   ➤ one has to assume several roles to gather maximal information for successful outcome

3. Pricing should not be a factor
   ➤ best possible patient care and quality trumps cost factor

4. Ineffective medical support
   ➤ clinical setup is outdated, while new technologies are available, they remain unused poor diagnostic solution are not providing adequate support
   ➤ many difficulties arise due to exhaustive patient journey due to mismanagement and inefficiency

5. Right of treatment
   ➤ many stake holders need to support the afflicted, which should be their fundamental rights

6. Medical support
   ➤ prognosis is challenging in neurological field and is critical in-patient recovery

7. Reimbursements
   ➤ insurance coverage decides on diagnostic frame work
   ➤ budgetary is critical for research, health insurance and family spending with insurance being a very critical deciding factor
   ➤ hidden costs go unnoticed and is a heavy societal burden

8. Time-effort
   ➤ money is not an important factor but time and effort are required for patient care

Psychological / psychosocial factors

1. Disabled for life
   ➤ due to difficulty in diagnosing, the afflicted individual is affected for life

2. lack of trust
   ➤ loss in trust due to unclear information results in resistance to medical support

3. trust
   ➤ trust building is vital for proper diagnosis

4. quality-of-life
   ➤ outcomes should be pursued towards improving patients' quality-of-life
   ➤ reasonable diagnostics are available for medical care but not sufficient for stigmatization

5. patient journey
   ➤ patient journey is arduous and filled with several challenges like history, trust, resources. Understanding these are critical for successful intervention

6. Emotional care
   ➤ it is important to recognize and tend to the personal space of the patient

7. Vulnerability
   ➤ physician needs to build trust and address patients' concerns and apprehension

8. Patient centric
   ➤ success must be defined on a patient-centric manner

9. Effort
   ➤ care taking is effort intensive

Fig. 3. The subcategories within sub-themes exemplifying the variety of aspects experienced by professionals in CMI health management.

greater benefit of the patient (Paul and Potter, 2024).

Listening to the patient, gaining their trust, addressing their vulnerability and emotional care emerges as one of the fundamental findings from our investigations from the interviews with clinician, nurse, social worker and pharma. In fact, such an approach has been suggested and laid in the concept of narrative medicine (Gomez-Carrillo and Kirmayer, 2023; Kirmayer et al., 2023). To this extent, George Engel's biopsychosocial approach (Engel, 1978) recognizes the significance of this two-way interaction.

Furthermore, participants shared their experiences of navigating the healthcare system, role of financial support, the ancillary help by care givers and the role of legislative and bureaucracy in the patient recovery (Fig. 3). They expressed frustration with the fragmented and often complex nature of the healthcare system, which posed significant barriers to accessing comprehensive and coordinated care.

This study highlights the need for a new and revamped outlook in management of schizophrenia and related psychotic disorders like bi-polar disorder and, major depression towards a more patient-centric. Currently, the most prevalent methodology in patient care involves descriptive psychopathology pioneered by the Karl Jaspers (Hafner, 2015), which takes into account "objective description of abnormal states of the mind" or a phenomenological and later a physiological stance to psychotherapy. However, considering the challenges and limitations that the health care and the society is facing, one needs to evolve with the provisions of medical support in a time relevant manner.

On those lines, George Engel's biopsychosocial model (Engel, 1978, 1979), which is 45 years old is younger than the other models and serves a valuable framework, for instance in oncology for patient-centred (Lauriola and Tomai, 2019) and clinical trials (Chartogne et al., 2021), in cardiovascular diseases (CVD) like myocardial infarction (Tomas et al., 2023), rehabilitation of CVD (Anttila et al., 2021) to name few. It is also a vital component of medical education (Jaini and Lee, 2015; Roberts, 2023) for CMIs and continues to be a vital part of psychiatric and psychotherapy training worldwide. However, the subject matter has received a fair share of criticism in the world of psychiatry (Ghaemi, 2009; Roberts, 2023), which in itself is not totally unfounded.

This is because the utility of a model is best described by the unmet needs and success, but there is no experimental evidence (Williamson, 2022) supporting its requirements in psychiatry, thereby rightfully questioning an otherwise popular model, which is the prerequisite of a critical scientific process.

Interestingly, our findings (Figs. 2 and 3) for the requirements of the challenges and the unmet needs in the world of psychiatry is strongly indicative of applying the model for greater success similar to CVD and oncology treatments mentioned above. A schematic representation (Fig. 2) of our findings shows segregation of the different codes into 3 different themes, namely biological/ medical, societal and psychosocial/ psychological categories. Deeper insights into these codes reveals several different subcategories (Fig. 3) within. For instance, among the biological code, "technological requirement" reveals 5 subcategories that can be summarized as, "*the unmet needs in psychiatric disorders necessitate innovative approaches and input from the medical community. Diagnosing complex psychiatric conditions with diverse symptoms demands multiple biomarkers. Advancing state-of-the-art technologies is essential, and drug development should prioritize thorough molecule profiling for efficacy, safety, and biomarker-based monitoring.*". This aspect is complemented by social/ societal factors (Fig. 3) such as "ineffective medical support" and "right of treatment". These codes jointly are suggestive of "*outdated clinical practises and underutilized new technologies lead to inadequate diagnostic solutions and ineffective medical support resulting in hampering patient journey. It is crucial that all of us, stakeholders ensure the fundamental right to proper treatment for those affected.*". Clearly a direct link to the codes from the above two factors points to psychological/ psychosocial factors in "quality-of-life" and "patient journey", where "*efforts should focus on enhancing patients' quality-of-life. Although reasonable diagnostic procedures are in place, they don't adequately address stigmatization. Altogether, the patient journey is challenging, involving complexities like medical history, trust, and resource limitations, which are crucial to understand for effective intervention.*"

Based on these subcategories within the codes, enables us to build a framework that utilizes cross- and trans- disciplinary approaches for psychiatric disorder management. To this extent, several models in

patient welfare have already been mentioned and also applied, some of which are from a social and cultural perspective (Gomez-Carrillo and Kirmayer, 2023; Kirmayer et al., 2023), others are psychological and psychosocial interventions like cognitive behaviour therapy (CBT (Salahuddin et al., 2024)), yet others that are medical in origin (Association, 2013; Organization, 2022), and few others encompass integration of medical and research (Clark et al., 2017), or medical, societal and psychological (Engel, 1978; Gomez-Carrillo et al., 2023; Organization, 2023). In one such major effort of "reinventing schizophrenia" and "updating the construct", several leading experts provided a diversely differing opinion on schizophrenia health care in an editorial report (Tandon et al., 2023), which matches aptly with our identified codes of "lack of standardization" and "complexity in diagnosis". Taking into account the stake holder views from our experimental findings in psychiatric health care management unequivocally identify combination approaches to diagnosis and treatment as the best plausible route. Although, combination of medical and research have steadily gained grounds in clinical applications (Clark et al., 2017), clearly the medical fraternity in clinicians seems divided on the best possible strategy (Tandon et al., 2023) due to various valid yet conflicting views. Nevertheless, assuming all these models, thoughts and connotations are true then it clearly reflects a lack in communication between experts of various disciplines tending to the healthcare and welfare of psychiatric ailments like schizophrenia and related CMIs (Moren, 2024). Not surprisingly, the outcomes are indeed reflected in the response to the interview questions, so much so that the interviewees themselves have acknowledged the need of cross- and/or trans- disciplinary approaches.

Interestingly, summarizing the coded factors from the interviews fell into 3 major categories that encompass elements from the perspectives of scientific fields such as biological/medical (e.g., medication, research and management), psychological/psychosocial (e.g., emotions, coping strategies, stigma), and societal/social (e.g., patient, healthcare system navigation) factors (Fig. 3). The strength of this study lies in its qualitative, patient-centric approach, which provides in-depth insights into the experiences and perspectives of professionals associated with support to CMIs like schizophrenia, and depression from scientific, medical, and care-giving. The study's finding corroborates with Engel's biopsychosocial model (Engel, 1979) as a guiding framework ensures a comprehensive reductionist yet holistic exploration of the factors influencing management of psychiatric disorders.

Like any other form of qualitative research (Malterud, 2001), the study is limited by small sample size and the potential for selection bias, however, as participants who engaged were from Europe, the findings presented herein is more specific for the geographic region. If any bias, then we are more of the opinion that may arise due to absence of professionals in CMIs who did not engage in the interviews such as practising physicians, social scientists in mental health and nursing, actuarial mathematicians specializing in health insurance policies, and policy makers themselves. In addition, we have many more male participants during the course of the event. It is not uncommon to observe that in many such studies it is challenging to interview female participants (Gubrium and Holstein, 2001). Qualitative research indeed can be challenging (Dickson-Swift et al., 2007) to conduct for both the interviewer and the interviewee due to the sensitive nature of the research. Drawing strength from our work, however we hope that in a similar attempt, "missing" experts would be willing to share their experience. Lastly, few of the experts whom we had contacted declined to participate because of the sheer stress that they had to endure previously caretaking their loved ones afflicted with CMIs. Lastly, it is important to note that qualitative research sampling does not have a set number of participants but is dependent on the richness of the information (Fossey et al., 2002; Marshall, 1996; Sandelowski, 1995) that illustrates the microdetails of the subject under study. Equally important the data obtained using the qualitative study herein will serve as a springboard for further qualitative and quantitative studies for health management for CMIs.

By addressing the multifaceted needs of individuals with schizophrenia and CMIs, policy makers and healthcare providers can develop general as well as personalized regimes that improve clinical outcomes, reduce the burden on patients and their families, and contribute to the overall well-being of this population. The findings of this study have important implications for the development of more comprehensive and effective management strategies of CMIs. While all of these criteria exist in terms of insurance, health care management, diagnostic criteria, etc., a major aspect goes neglected and is rather confined to literature is the patient perspective that has remained unchanged. In an anonymously drafted report in 1988 ("Where next with psychiatric illness?," 1988) titled, "Where next with psychiatric illnesses?", the writer describes schizophrenia as the worst disease and the person disabled for life. We found similar codes, "disabled for life", "patient journey" and "quality-of-life" from our study. Unfortunately, very little has changed and communication between different stake holders remains awfully poor (Moren, 2024) dramatically affecting medical services and positive patient outcome.

Therefore, it is necessary that the future research focus on implementing and evaluating the impact of a more encompassing model such as biopsychosocial interventions on the clinical, functional, and quality-of-life outcomes of individuals with schizophrenia, depression and related CMIs. A perfect example for such an initiative can be drawn from the European intersocietal recommendations for the biomarker-based diagnosis of neurocognitive disorders (Frisoni et al., 2024). As an example, we have recently observed an interesting shift in DSM IV to DSM 5(Bredstrom, 2019; Substance Abuse and Mental Health Services Administration, 2016), although inadequate it represents an important shift by incorporating the views of social sciences researchers.

While this manuscript was under revision, a narrative review (Leucht et al., 2024) was published, which emphasizes on the importance of focusing on patient's experiences in psychiatric diagnosis and treatment. Furthermore, it criticizes modern approaches that abstract patient experiences into higher-order constructs as described in the manuals DSM and ICD, which are necessary for reimbursement for medical claims but have the potential of obscuring actual symptoms and the sufferings the patients experience. This perspective aligns with the findings from our interviews, which highlight the necessity of understanding patients' personal histories and cultural contexts to provide effective, personalized care. Both sources advocate for a shift from a narrow biomedical model to a more integrated approach, addressing the complex interplay of biological, psychological, and social factors in mental health care.

A silver lining, however in the current psychiatric cloud is the report commissioned by NHS England South, where the psychometric scale such as PANSS (Kay et al., 1987) was recommended by the Trust of NHS-UK (Ltd, 2021) to improve patient outcome at all stages of medical support. On a macroscale, PANSS draws its strengths from its objective assessment for clinical practises, and drug-development by incorporating 30 different scaled-biomarkers in symptoms, social and psychopathological factors. In an essence, PANSS is a conceptual derivative of the biopsychosocial model, and has potentials in providing personalized care for patient outcome, hence is strongly advocated in several clinical practises in a near-ubiquitous manner.

In our opinion, based on the findings, and the recent reports on the patient-centred outcome research (Kim et al., 2018; Largent et al., 2018; Moreno-Poyato et al., 2021) and strategies that involve cross- and transdisciplinary approaches such as collaborating with genomics groups like Schizophrenia Spectrum Biomarkers Consortium (SSBC ((SSBC), 2024)), biomarker identification (Korth and Fangerau, 2020), antibody-antigen assays (Pils et al., 2023) and phenomics studies using proteomics (Sialana et al., 2018) and metabolomics (Jansen et al., 2023), in a combined fashion holds the key areas of engagement. Therefore, additional efforts are required to integrate several different ideas for a patient-centric approach into the broader healthcare system, ensuring that individuals with schizophrenia have access to the support and resources they need to manage their condition effectively.

Funding

CRediT authorship contribution statement

Abhishek Cukkemane: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Rene Hurlemann:** Writing – review & editing, Supervision, Conceptualization. **Veralia Gabriela Sanchez:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

All authors declare no conflict of interest

Acknowledgements

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jadr.2025.100893.

References

Anker-Hansen, C., Skovdahl, K., McCormack, B., Tonnessen, S., 2019. Invisible cornerstones. A hermeneutic study of the experience of care partners of older people with mental health problems in home care services. Int. J. Older. People Nurs. 14 (1), e12214. https://doi.org/10.1111/opn.12214.

Anker-Hansen, C., Skovdahl, K., McCormack, B., Tonnessen, S., 2020. Collaboration between home care staff, leaders and care partners of older people with mental health problems: a focus on personhood. Scand. J. Caring Sci. 34 (1), 128–138. https://doi.org/10.1111/scs.12714.

Anttila, M.R., Soderlund, A., Paajanen, T., Kivisto, H., Kokko, K., Sjogren, T., 2021. Biopsychosocial profiles of patients with cardiac disease in remote rehabilitation processes: mixed methods grounded theory approach. JMIR Rehabil. Assist. Technol. 8 (4), e16864. https://doi.org/10.2196/16864.

Association, A.P., 2013. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. American Psychiatric Association, Arlington VA.

Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qual. Res. Psychol. 3 (2), 77–101. https://doi.org/10.1191/1478088706qp063oa.

Bredstrom, 2019. Culture and context in Mental health diagnosing: scrutinizing the DSM-5 revision. J. Med. Humanit. 40 (3), 347–363. https://doi.org/10.1007/s10912-017-9501-1.

Canada, M.H.C.o. (2012). *Making the case for investing in mental health in Canada.* https://www.mentalhealthcommission.ca/wp-content/uploads/drupal/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf (last visited 24 Oct 2024).

Chartogne, M., Leclercq, A., Beaune, B., Boyas, S., Forestier, C., Martin, T., Thomas-Ollivier, V., Landry, S., Bourgeois, H., Cojocarasu, O., Pialoux, V., Zanna, O., Messonnier, L.A., Rahmani, A., Morel, S., 2021. Building a biopsychosocial model of cancer-related fatigue: the BIOCARE FActory cohort study protocol. BMC Cancer 21 (1), 1140. https://doi.org/10.1186/s12885-021-08831-3.

Clark, L.A., Cuthbert, B., Lewis-Fernandez, R., Narrow, W.E., Reed, G.M., 2017. Three approaches to understanding and classifying Mental disorder: ICD-11, DSM-5, and the National Institute of Mental Health's Research Domain Criteria (RDoC). Psychol. Sci. Public Interest 18 (2), 72–145. https://doi.org/10.1177/1529100617727266.

Dickson-Swift, V., James, E.L., Kippen, S., Liamputtong, P., 2007. Doing sensitive research: what challenges do qualitative researchers face? Qual. Res. 7 (3), 327–353. https://doi.org/10.1177/1468794107078515.

Elo, S., Kyngas, H., 2008. The qualitative content analysis process. J. Adv. Nurs. 62 (1), 107–115. https://doi.org/10.1111/j.1365-2648.2007.04569.x.

Engel, G.L., 1978. The biopsychosocial model and the education of health professionals. Ann. N. Y. Acad. Sci. 310, 169–187. https://doi.org/10.1111/j.1749-6632.1978.tb22070.x.

Engel, G.L., 1979. The biopsychosocial model and the education of health professionals. Gen. Hosp. Psychiatry 1 (2), 156–165. https://doi.org/10.1016/0163-8343(79)90062-8.

Fossey, E., Harvey, C., McDermott, F., Davidson, L., 2002. Understanding and evaluating qualitative research. Aust. N. Z. J. Psychiatry 36 (6), 717–732. https://doi.org/10.1046/j.1440-1614.2002.01100.x.

Frisoni, G.B., Festari, C., Massa, F., Cotta Ramusino, M., Orini, S., Aarsland, D., Agosta, F., Babiloni, C., Borroni, B., Cappa, S.F., Frederiksen, K.S., Froelich, L., Garibotto, V., Haliassos, A., Jessen, F., Kamondi, A., Kessels, R.P., Morbelli, S.D., O'Brien, J.T, Nobili, F., 2024. European intersocietal recommendations for the biomarker-based diagnosis of neurocognitive disorders. Lancet Neurol. 23 (3), 302–312. https://doi.org/10.1016/S1474-4422(23)00447-7.

Global Alliance of Mental Illness Advocacy Network (GAMIAN-Europe). https://www.gamian.eu (last visited 24 Oct 2024).

Ghaemi, S.N., 2009. The rise and fall of the biopsychosocial model. Br. J. Psychiatry 195 (1), 3–4. https://doi.org/10.1192/bjp.bp.109.063859.

Gomez-Carrillo, A., Kirmayer, L.J., 2023. A cultural-ecosocial systems view for psychiatry. Front. Psychiatry 14, 1031390. https://doi.org/10.3389/fpsyt.2023.1031390.

Gomez-Carrillo, A., Paquin, V., Dumas, G., Kirmayer, L.J., 2023. Restoring the missing person to personalized medicine and precision psychiatry. Front. Neurosci. 17, 1041433. https://doi.org/10.3389/fnins.2023.1041433.

Graneheim, U.H., Lundman, B., 2004. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse Educ. Today 24 (2), 105–112. https://doi.org/10.1016/j.nedt.2003.10.001.

Gubrium, J., Holstein, J., 2001. Handbook of Interview Research. https://doi.org/10.4135/9781412973588.

Hafner, H., 2015. Descriptive psychopathology, phenomenology, and the legacy of Karl Jaspers. Dialog. Clin. Neurosci. 17 (1), 19–29. https://doi.org/10.31887/DCNS.2015.17.1/hhaefner.

Hanf, M., Hirt, J., van den Akker, M., 2021. Primary care professionals' attitudes towards digital health interventions for common mental disorders: study protocol for a mixed methods systematic review. BMJ Open 11 (6), e045657. https://doi.org/10.1136/bmjopen-2020-045657.

European Federation of Associations of Families of People with Mental Illness (EUFAMI). https://eufami.org/en. (last visited 24 Oct 2024).

Jaini, P.A., Lee, J.S., 2015. A review of 21st century utility of a biopsychosocial model in United States Medical School education. J. Lifestyle Med. 5 (2), 49–59. https://doi.org/10.15280/jlm.2015.5.2.49.

Jansen, R., Milaneschi, Y., Schranner, D., Kastenmuller, G., Arnold, M., Han, X., Dunlop, B.W., , Mood Disorder Precision Medicine, C., Rush, A.J., Kaddurah-Daouk, R., Penninx, B.W., 2023. The metabolome-wide signature of major depressive disorder. Res Sq https://doi.org/10.21203/rs.3.rs-3127544/v1.

Kallio, H., Pietila, A.M., Johnson, M., Kangasniemi, M., 2016. Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. J. Adv. Nurs. 72 (12), 2954–2965. https://doi.org/10.1111/jan.13031.

Kay, S.R., Fiszbein, A., Opler, L.A., 1987. The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr. Bull. 13 (2), 261–276. https://doi.org/10.1093/schbul/13.2.261.

Kim, K.K., Khodyakov, D., Marie, K., Taras, H., Meeker, D., Campos, H.O., Ohno-Machado, L., 2018. A novel stakeholder engagement approach for patient-centered outcomes research. Med. Care 56 (10 Suppl 1), S41–S47. https://doi.org/10.1097/MLR.0000000000000790. Suppl 10 Suppl 1.

Kirmayer, L.J., Gómez-Carrillo, A., Sukhanova, E., Garrido, E., 2023. Narrative medicine. In: Mezzich, J.E., Appleyard, W.J., Glare, P., Snaedal, J., Wilson, C.R. (Eds.), Person Centered Medicine. Springer International Publishing, pp. 235–255. https://doi.org/10.1007/978-3-031-17650-0_14.

Korth, C., Fangerau, H., 2020. Blood tests to diagnose schizophrenia: self-imposed limits in psychiatry. Lancet Psychiatry 7 (10), 911–914. https://doi.org/10.1016/S2215-0366(20)30058-4.

Krippendorff, K., 1989. Content Analysis. Oxford University Press, New York, NY. Vol. 1. http://repository.upenn.edu/asc_papers/226.

Largent, E.A., Weissman, J.S., Gupta, A., Abraham, M., Rozenblum, R., Lynch, H.F., Cohen, I.G., 2018. Patient-centered outcomes research: stakeholder perspectives and ethical and regulatory oversight issues. IRB 40 (1), 7–17. https://www.ncbi.nlm.nih.gov/pubmed/30631218.

Lauriola, M., Tomai, M., 2019. Biopsychosocial correlates of adjustment to cancer during chemotherapy: the key role of health-related quality of life. ScientificWorldJournal. 2019, 9750940. https://doi.org/10.1155/2019/9750940.

Leucht, S., van Os, J., Jager, M., Davis, J.M., 2024. Prioritization of psychopathological symptoms and clinical characterization in psychiatric diagnoses: a narrative review. JAMA Psychiatry 81 (11), 1149–1158. https://doi.org/10.1001/jamapsychiatry.2024.2652.

N. H. S. C. C. Ltd, 2021. An Independent Investigation into the Care and Treatment of a Mental Health Service User Mr J in Kent. https://www.england.nhs.uk/south-east/wp-content/uploads/sites/45/2022/06/Final-report-2018-23654-v3.4.pdf.

Malterud, K., 2001. Qualitative research: standards, challenges, and guidelines. Lancet 358 (9280), 483–488. https://doi.org/10.1016/S0140-6736(01)05627-6.

Marshall, M.N., 1996. Sampling for qualitative research. Fam. Pract. 13 (6), 522–525. https://doi.org/10.1093/fampra/13.6.522.

McCormack, B., McCance, T.V., 2006. Development of a framework for person-centred nursing. J. Adv. Nurs. 56 (5), 472–479. https://doi.org/10.1111/j.1365-2648.2006.04042.x.

Moren, C., 2024. Put people at the heart of schizophrenia research. Nature 630, 531.

Moreno-Poyato, A.R., El Abidi, K., Rodriguez-Nogueira, O., Lluch-Canut, T., Puig-Llobet, M., 2021. A qualitative study exploring the patients' perspective from the 'Reserved Therapeutic Space' nursing intervention in acute mental health units. Int. J. Ment. Health Nurs. 30 (3), 783–797. https://doi.org/10.1111/inm.12848.

European College of Neuropsychopharmacology (ECNP). https://www.ecnp.eu/Congress2023/ECNPcongress (last visited 24 Oct 2024).

OECD/EU, 2018. Health at a Glance: Europe 2018: State of Health in the EU Cycle. OECD Publishing, Paris. https://doi.org/10.1787/health_glance_eur-2018-en last visited 24 Oct 2024.

World Health Organization, 2022. ICD-11: International Classification of Diseases (11th revision). https://icd.who.int/. last visited 24 Oct 2024.

World Health Organization, 2023. Mental Health Gap Action Programme (mhGAP) Guideline For mental, Neurological and Substance Use Disorders. World Health Organization, Geneva. https://www.who.int/publications/book-orders. last visited 24 Oct 2024.

Paul, S.M., Potter, W.Z., 2024. Finding new and better treatments for psychiatric disorders. Neuropsychopharmacology 49 (1), 3–9. https://doi.org/10.1038/s41386-023-01690-5.

Pils, M., Rutsch, J., Eren, F., Engberg, G., Piehl, F., Cervenka, S., Sellgren, C., Trossbach, S., Willbold, D., Erhardt, S., Bannach, O., Korth, C., 2023. Disrupted-in-schizophrenia 1 protein aggregates in cerebrospinal fluid are elevated in patients with first-episode psychosis. Psychiatry Clin. Neurosci. 77 (12), 665–671. https://doi.org/10.1111/pcn.13594.

Pharmacogenetics in Psychiatry(PSY-PGx) - A New Intervention for Implementation of Pharmacogenetics in Psychiatry . www.psy-pgx.org (last visited 24 Oct 2024).

Substance Abuse and Mental Health Services Administration. (2016). *Impact of the DSM-IV to DSM-5 Changes on the National Survey on Drug Use and Health*. Substance Abuse and Mental Health Services Administration (US).

Roberts, A., 2023. The biopsychosocial model: its use and abuse. Med. Health Care Philos. 26 (3), 367–384. https://doi.org/10.1007/s11019-023-10150-2.

Salahuddin, N.H., Schutz, A., Pitschel-Walz, G., Mayer, S.F., Chaimani, A., Siafis, S., Priller, J., Leucht, S., Bighelli, I., 2024. Psychological and psychosocial interventions for treatment-resistant schizophrenia: a systematic review and network meta-analysis. Lancet Psychiatry 11 (7), 545–553. https://doi.org/10.1016/S2215-0366(24)00136-6.

Sanchez, V.G., Anker-Hansen, C., Taylor, I., Eilertsen, G., 2019. Older people's attitudes and perspectives of welfare technology In Norway. J. Multidiscip. Healthc. 12, 841–853. https://doi.org/10.2147/JMDH.S219458.

Sandelowski, M., 1995. Sample size in qualitative research. Res. Nurs. Health 18 (2), 179–183. https://doi.org/10.1002/nur.4770180211.

Sialana, F.J., Wang, A.L., Fazari, B., Kristofova, M., Smidak, R., Trossbach, S.V., Korth, C., Huston, J.P., de Souza Silva, M.A., Lubec, G., 2018. Quantitative proteomics of synaptosomal fractions in a rat overexpressing Human DISC1 gene indicates profound synaptic dysregulation in the dorsal striatum. Front. Mol. Neurosci. 11, 26. https://doi.org/10.3389/fnmol.2018.00026.

Smith, D.J., Craddock, N., 2011. Unipolar and bipolar depression: different of the same? Br. J. Psychiatry 199 (4), 272–274. https://doi.org/10.1192/bjp.bp.111.092726.

Schizophrenia Spectrum Biomarkers Consortium 2024 (SSBC) https://ssbcbio.org (last visited 24 Oct 2024).

Tandon, R., Keshavan, M., Nasrallah, H., 2023. "Reinventing schizophrenia: updating the construct". Project update and next steps. Schizophr. Res. 252, 345–347. https://doi.org/10.1016/j.schres.2023.01.025.

Tomas, J.M., Oliver, A., Torres, Z., Parker, J., Marques-Sule, E., Sentandreu-Mano, T., 2023. A biopsychosocial model predicting myocardial infarction. J. Clin. Med. 12 (17). https://doi.org/10.3390/jcm12175715.

van Os, J., Kapur, S., 2009. Schizophrenia. Lancet 374 (9690), 635–645. https://doi.org/10.1016/S0140-6736(09)60995-8.

Where next with psychiatric illness?, 1988. Nature 336 (6195), 95–96. https://doi.org/10.1038/336095a0.

Wiegand, H.F., Saam, J., Marschall, U., Chmitorz, A., Kriston, L., Berger, M., Lieb, K., Holzel, L.P., 2020. Challenges in the transition from In-patient to out-patient treatment in depression. Dtsch. Arztebl. Int. 117 (27–28), 472–479. https://doi.org/10.3238/arztebl.2020.0472.

Williamson, S., 2022. The biopsychosocial model: not dead, but in need of revival. BJPsych. Bull. 46 (4), 1–3. https://doi.org/10.1192/bjb.2022.29.

Zinn, J.O., 2010. The biographical management of risk and uncertainty—british veterans. Qual Soc Res 11 (1). https://doi.org/10.17169/fqs-11.1.1457.