

Physical comorbidities in patients with severe mental disorders: a brief narrative review on current challenges and practical implications for professionals

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Summary. A paradox of the modern world is represented by the increasing rate of comorbidities, although the life expectancy is increasing worldwide, the number of disease-free years is not improving consequently. Physical comorbidities are often overlooked in people with severe mental disorders, although this problem needs to be adequately managed since it is associated with a worse quality of life and a poorer personal and social functioning. In this paper, we aim to: 1) carry out a narrative review of the recent literature in order to provide an update on the prevalence and incidence of the most frequent comorbid physical disorders in people with severe mental disorders; 2) highlight the most important difficulties in managing comorbidities in people with severe mental disorders in ordinary clinical care; 3) discuss possible solutions to overcome those difficulties, particularly through the role of education and scientific associations.

Key words. Comorbidity, lifestyle, mortality gap, physical illness, severe mental disorders.

La gestione delle comorbidità fisiche nei pazienti con disturbi mentali gravi: una revisione narrativa delle sfide e delle implicazioni pratiche per gli operatori della salute mentale.

Riassunto. L'aspettativa di vita media sta aumentando in maniera significativa nella società moderna, sebbene vi sia un aumento anche della prevalenza delle malattie fisiche in comorbidità. Pertanto, tale situazione determina una condizione paradossale per cui il numero complessivo di anni vissuti senza malattie (*disease-free years*) si mantiene stabile. Questo fenomeno è ulteriormente accentuato nei pazienti con disturbi mentali gravi, la cui salute fisica è spesso trascurata, sebbene un maggior numero di comorbidità fisiche si associ a una peggiore qualità di vita e a un peggior funzionamento sociale. Il presente lavoro è una revisione narrativa della letteratura che ha l'obiettivo di: 1) fornire dati aggiornati di prevalenza e incidenza delle principali comorbidità fisiche nei pazienti con disturbi mentali gravi; 2) evidenziare le principali difficoltà legate alla gestione delle comorbidità fisiche nella pratica clinica ordinaria; 3) discutere le possibili soluzioni per superare queste difficoltà, soprattutto attraverso il coinvolgimento delle società scientifiche internazionali.

Parole chiave. Comorbidità, disturbi mentali gravi, malattie fisiche, mortalità, stili di vita.

Background

Comorbidity, i.e. the simultaneous presence of two or more disorders in a given person, represents a paradox of the modern world. In fact, while life expectancy is increasing worldwide, the number of disease-free years is not improving consequently. Therefore, people live longer but suffering from a variety of physical conditions. This increase of physical comorbidities needs to be adequately managed since it is associated with a worse quality of life and a poorer personal and social functioning^{1,2}.

Comorbidity is rapidly increasing also in young people, when the negative consequences of comorbid conditions are as numerous and as troublesome as those occurring later in life. The rate of people affected by comorbidities is expected to increase in the next years due to several conditions, including

the success of medicine in prolonging life without curing disease, the phenomenon of population aging, the tendency to adopt unhealthy life behaviours, the climate changes and environmental pollution³.

Comorbidity does not mean the simple addition of two diseases that independently follow their usual trajectories. The simultaneous presence of two or more diseases will worsen the prognosis of all the diseases that are present, lead to an increasing number (and severity) of complications and make the treatment of all of them more difficult and, possibly, less efficacious.

What is worse is that one of the comorbid diseases is often overlooked. This is particularly true for mental disorders which are frequently comorbid with physical illnesses. In fact, the comorbidity of two or more somatic illnesses – for example cardiovascular disease and diabetes – is generally recog-

nized as being frequent and requiring simultaneous attention to both diseases. The situation is different when it comes to the comorbidity between physical and mental disorders. People with severe mental disorders, including schizophrenia spectrum disorders and affective disorders, have more physical health comorbidities⁴ and poorer prognoses from those comorbidities⁵ compared to the general population. The presence of physical comorbidities can lead to reduced quality of life, worsening mental health, and excess mortality in people with severe mental disorders (SMD)⁶⁻¹⁴.

It has been estimated a reduction of life expectancy in people with severe mental disorders of at least 10-25 years compared to the general population, thus requiring urgent actions from healthcare professionals and governments worldwide. This increased mortality rate is primarily due to the high rates of cardiovascular, metabolic and infectious diseases in such patient population^{15,16}.

The most frequently identified non-communicable physical illnesses in people with severe mental disorders in high income countries include obesity, diabetes, cardiovascular disease, chronic respiratory diseases and metabolic syndrome^{17,18}.

In this paper, we aim to: 1) carry out a narrative review of the recent literature in order to provide an update on the prevalence and incidence of the most frequent comorbid disorders in people with severe mental disorders; 2) highlight the most important difficulties in managing comorbidities in people with severe mental disorders in ordinary clinical care; 3) discuss possible solutions to overcome those difficulties, particularly through the role of education and scientific associations.

Methods

This narrative review was performed according to the following procedure: definition of the problem, literature search, data evaluation and presentation of findings.

The search terms “comorbidity”, “severe mental disorders”, “depression”, “bipolar disorder”, “schizophrenia”, “cardiovascular diseases”, “metabolic syndrome”, “obesity”, “infectious diseases”, “tuberculosis”, “HIV”, “psychiatry” were entered in ERIC, MEDLINE, PsycARTICLES, PsycINFO, Scopus and PubMed. Terms and databases were combined using the Boolean search technique, which consists of a logical information retrieval system (two or more terms combined to make search more restrictive or detailed).

The search was limited to studies published in English. Only studies focused on adult population (aged 18 or more) have been included. Only studies on patients with severe mental disorders,

including schizophrenia spectrum disorders and affective disorders were considered. Studies on adolescent population were excluded since available prevalence data of physical comorbidities in such population is extreme heterogeneous and requires a different management plan compared to adult population.

Results

Included studies have been grouped in three categories: studies on cardiovascular diseases in people with severe mental disorders, studies on metabolic syndrome and obesity in people with severe mental disorders and studies on infectious diseases in people with severe mental disorders. Main findings of the included studies have been summarized in table 1.

Cardiovascular diseases in people with severe mental disorders

Cardiovascular diseases (CVD) represent a major cause of premature death in people with severe mental disorders, contributing by 17.4% and 22.0% to the reduction in overall life expectancy in men and women, respectively. Risk factors for cardiovascular diseases, such as smoking, unhealthy diet and lack of physical exercise, are common in these patients, and lifestyle interventions have been shown to produce small benefits.

A recent study by Tan et al.¹⁶ on a sample of 5,000 patients with schizophrenia, major depression disorder or bipolar disorder found that aberrant tests of high-density dyslipidaemia (HDL) and diastolic blood pressure during hospitalization period were associated with a higher risk of a psychiatric readmission compared to patients with optimal monitoring of blood lipids and blood pressure.

Pharmacological interventions to reduce risk factors for cardiovascular diseases have been proven to be effective. Treatment with antipsychotic drugs is associated with reduced mortality, but also with an increased risk of weight gain, dyslipidaemia and diabetes mellitus. These patients have a higher risk of both myocardial infarction and stroke but a lower risk of undergoing interventional procedures compared with the general population. Data indicate a negative attitude from clinicians not working in mental health towards patients with severe mental illness. Education might be a possible method to decrease the negative attitudes towards these patients, thereby improving diagnosis and treatment rates¹³.

If ageing is the primary driver for the higher mortality, patients with SMD might need earlier and more intensive treatment for cardiovascular risk factors than individuals without those disorders¹⁹.

Table 1. Main findings of the narrative review on prevalence of physical comorbidities in patients with severe mental disorders.

Cardiovascular diseases in people with severe mental disorders	Metabolic syndrome and obesity in people with severe mental disorders	Infectious diseases in people with severe mental disorders
It contributes to 17.4% and 22.0% to the reduction in overall life expectancy in men and women.	Pooled prevalence of obesity in people with severe mental disorders is 25.9% (95% CI= 23.3-29.1), increasing up to 60.1% (95% CI= 55.8-63.1) when considering the combination of overweight and obesity.	Patients with depression are exposed to a doubled risk to have tuberculosis compared to the general population and the same applies to people with schizophrenia.
Genome-wide association studies have identified several genetic variants associated with severe mental disorders and with CVD risk factors.	Glycaemic alterations are untreated in 63.9% of patients with severe mental disorders and lipid alterations remain untreated in 81.7% of people with severe mental disorders.	The frequency of HIV infection in patients with pre-existing severe mental disorders ranges between 5 and 7%.
High levels of diastolic blood pressure during hospitalization period are associated with a higher risk of a psychiatric readmission compared to patients with optimal monitoring of blood pressure.	The prevalence of metabolic syndrome ranges from 29.4% to 67.9%, with a prevalence risk of 1.58 higher among people with severe mental disorders compared to the general population.	New-onset psychosis in patients with HIV-spectrum illness range between 0.2 and 15% and may increase as the stage of HIV illness progresses.

The level of CVD mortality and morbidity has sustained high in people with SMDs during the past decades, but the causal mechanism must be further elucidated. Psychosocial and socioeconomic challenges are frequent in SMDs as well as in CVD. Further, recent studies have revealed genetic variants jointly associated with SMDs, CVD risk and social factors. Recent genome-wide association studies (GWASs) have identified several genetic variants associated with mental disorders and with CVD risk factors, including body mass index, type 2 diabetes mellitus, total cholesterol (TC), high-density lipoprotein (HDL) cholesterol, systolic blood pressure (SBP), diastolic blood pressure (DBP), along with coronary artery disease. Among social factors, loneliness has a central role in limiting the physical health of people with severe mental disorders. Rødevand et al.²⁰ have investigated the polygenic overlap between loneliness, severe mental disorders, and cardiovascular disease risk factors suggesting the presence of shared molecular mechanisms. These findings further confirm the complex interplay between gene, environment and mental disorders, which hamper the optimal management of physical comorbidities in people with severe mental disorders.

Metabolic syndrome and obesity in people with severe mental disorders

People with severe mental disorders are 3.04 more likely (95% CI=2.42-3.82) to have obesity than the general population, but there is no difference in the prevalence of overweight. Women with schizophrenia are 1.44 (95% CI=1.25-1.67) times more likely than men with schizophrenia to be obese; no gender differences were found among people with

bipolar disorder. In a recent study carried out in six Italian university psychiatric units, 35.4% of patients were overweight and 34.9% were obese, with a mean BMI of 32.2 (± 5.5); and 53.4% of recruited patients suffered from metabolic syndrome^{13,14}.

Afzal et al.²¹ estimated that the pooled prevalence of obesity in people with SMD is 25.9% (95% CI=23.3-29.1), increasing up to 60.1% (95% CI=55.8-63.1) when considering the combination of overweight and obesity. The highest prevalence of obesity is found in North Africa and in the Middle East.

Furthermore, the prevalence of metabolic syndrome, defined as the presence of metabolic changes related to insulin resistance, prothrombotic and inflammatory status, ranges from 29.4 to 67.9%, with a prevalence risk of 1.58 higher among people with mental disorders compared to the general population²².

Glycaemic alterations are untreated in 63.9% of patients and lipid alterations remain untreated in 81.7% of people with severe mental disorders referred to mental health centres^{22,23}, which clearly shows that physical health is often overlooked in this group of patients.

In conclusion, people with SMD have a markedly higher prevalence of obesity and metabolic syndrome compared to the general population. People with SMD around the world would likely benefit from interventions to reduce and prevent obesity.

Infectious diseases in people with severe mental disorders

Research has shown that people with mental disorders are more susceptible to infectious diseases such as tuberculosis (TB), HIV or hepatitis C²⁴. Several studies have documented that patients with de-

pression are exposed to a doubled risk to have TB compared to the general population²⁵ and the same applies to people with schizophrenia²⁶.

One of the greatest challenges is the complexity of the comorbidity between tuberculosis and severe mental illness; in fact, several vulnerability factors to severe mental illness, such as homelessness, HIV, diabetes, poverty, and alcohol/substance abuse, strongly predispose patients with SMD to tuberculosis. Furthermore, people hospitalized in long-term care facilities have a higher risk of developing some infectious diseases, particularly tuberculosis, due to the lack of routine infection control or to the fact that are densely populated.

The frequency of HIV infection in patients with pre-existing mental disorder ranges between 5 and 7%. Although being sexually active tends to be less common among patients with schizophrenia compared to nonpsychotic individuals, patients with schizophrenia are more likely to engage in high-risk sexual behavior. Moreover, many patients with schizophrenia have inadequate knowledge about the risks and consequences of HIV. Comorbidity of schizophrenia and life-threatening viral illnesses is associated with a worse prognosis for both conditions.

Estimates of new-onset psychosis in patients with HIV-spectrum illness range between 0.2 and 15% and may increase as the stage of HIV illness progresses. Regardless of which illness comes first, their occurrence together is associated with more morbidity and mortality than would be expected with either illness alone. Moreover, HIV has direct effects on the central nervous system, which may lead to cognitive and behavioral changes, and some antiretroviral therapies have psychiatric side effects.

The prevalence of major depressive disorder ranges from 16.2 to 36% among HIV patients in the USA. Another study in Kenya and in Democratic Republic of Congo found that depression is more frequent in HIV patients than in HIV negative individuals²⁷.

Discussion

The present narrative review highlights that people suffering from severe mental disorders, namely schizophrenia and affective disorders, present a higher rate of physical comorbidities compared to the general population. Several underlying factors have been identified including those related to the patients, to psychiatrists, to other non-psychiatrist medical doctors and to the healthcare system²⁸.

The factors related to patients include cognitive impairment, psychotic symptoms^{29,30} and patient's reluctance to attend check-up visits^{18,31}. Moreover, carers of persons with severe mental disorders often overlook physical health needs and tend to treat and manage only psychiatric symptoms.

Some antipsychotic and antidepressant medications have metabolic side effects and could further improve the risk of developing physical comorbidities³²⁻³⁸.

A relevant role is played by the healthcare system, which suffers from the long-standing separation between physical and mental disorders, with psychiatrists focusing only on mental conditions and other physicians rarely undertaking physical examinations in patients with severe mental disorders. Moreover, the collaboration and communication between primary care physicians and mental health professionals is often poor, due also to the physical distance of many mental health centres from other medical wards or hospitals^{39,40}. Conversely, non-psychiatric clinicians frequently have a negative attitude towards people with mental disorders, underestimating the seriousness of patients' complaints of physical signs and symptoms^{41,42}. The over-specialization of medical disciplines and the excessive fragmentation of medical knowledge^{43,44} have further contributed to the lack of collaboration among the different branches of medicine.

Another healthcare-related factor hampering the physical care of patients with severe mental disorders is related to the lack of clarity about the person or the team who is responsible for detecting and managing physical problems in patients with severe mental disorders^{45,46}. In this regard, a care manager with adequate knowledge and skills about mental, psychological and physical health may help to overcome at least this obstacle⁴⁷.

Finally, it has been recently highlighted that the neglect of physical comorbidity in patients with severe mental illnesses is also due to the lack of a dedicated training on physical and mental comorbidities in medical schools and in specialty training courses^{48,49}.

The present review has some limitations due to the narrative approach used, which is useful in order to provide a global overview on a debated topic, but it does not include methodological rigour in terms of inclusion and exclusion criteria. Moreover, it would have been beyond the scope of the present narrative review to assess and evaluate the prevalence and incidence rates of all physical conditions in patients with severe mental disorder. Therefore, the present review has been limited to the most frequent and disabling physical conditions in people with severe mental disorders.

Conclusions and way forward

Patients suffering from severe mental disorders have a higher rate of mortality and morbidity compared to the general population, which is not directly related to the presence of a given mental disorder, but rather to the consequence of the simultaneous

presence of comorbid physical health problems, such as cardiovascular, metabolic, and infectious diseases^{19,50-54}.

For several decades the physical health of people with severe mental disorders has been overlooked, contributing to the unacceptable “scandal” of premature mortality in such group of persons. Several scientific associations are promoting innovative strategies to improve the levels of knowledge, confidence and expertise of medical professionals in managing physical comorbidities in people with severe mental disorders^{20,55,56}.

International scientific associations including the World Psychiatric Association (WPA), the European Psychiatric Association (EPA), the UK Royal College of Psychiatrists and the UK Royal College of General Practitioners are now committed to improve the quality of training and knowledge of healthcare professionals on the management of physical comorbidities in people with severe mental disorders^{57,58}. In particular, a revision of training curricula has been proposed in order to improve the educational requirements on detection and management of physical comorbidities. Among the educational initiatives promoted by the WPA – the world’s largest professional association of psychiatrists and mental health professionals⁵⁹⁻⁶² – a specific Working Group on Physical Comorbidities, held by Prof. N. Sartorius has been established in 2021⁶³⁻⁶⁴. The WPA Working Group has promoted several educational and research activities on the management of physical comorbidities⁶⁵⁻⁷⁰.

The European Psychiatric Association is also committed to improve the quality of education on physical comorbidities and healthy lifestyle behaviours. In fact, the EPA is involved in the European Alliance for Sport and Mental Health (EASMH) project, funded by the European Commission under the Erasmus+ actions, aiming to identify the best practices available in Europe in the field of sport and mental health, and to improve the levels of knowledge and expertise of healthcare professionals in disseminating sport-based interventions in routine clinical care⁷¹.

All these initiatives are highly needed, since it could be associated with a significant improvement in the levels of knowledge, confidence and expertise of medical professionals in managing physical comorbidities in people with severe mental disorders.

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References

1. Cascino TM, Kittleson MM, Lala A, et al.; REVIVAL Investigators. Comorbid Conditions and Health-Related Quality of Life in Ambulatory Heart Failure Patients: RE-
2. VIVAL (Registry Evaluation of Vital Information for VADs in Ambulatory Life REVIVAL). *Circ Heart Fail* 2020; 13: e006858.
3. Adriaanse MC, Drewes HW, van der Heide I, Struijs JN, Baan CA. The impact of comorbid chronic conditions on quality of life in type 2 diabetes patients. *Qual Life Res* 2016; 25: 175-82.
4. Sartorius N. Comorbidity of mental and physical diseases: a main challenge for medicine of the 21st century. *Shanghai Arch Psychiatry* 2013; 25: 68-9.
5. Teh WL, Cetty L, Jeyagurunathan A, et al. Comorbid physical illnesses in adult outpatients with psychotic disorders: risk factors, psychological functioning, and quality of life outcomes. *Soc Psychiatry Psychiatr Epidemiol* 2021; 56: 1633-43.
6. Momen NC, Plana-Ripoll O, Agerbo E, et al. Mortality associated with mental disorders and comorbid general medical conditions. *JAMA Psychiatry* 2022; 79: 444-53.
7. Plana-Ripoll O, Musliner KL, Dalsgaard S, et al. Nature and prevalence of combinations of mental disorders and their association with excess mortality in a population-based cohort study. *World Psychiatry* 2020; 19: 339-49.
8. De Rosa C, Sampogna G, Luciano M, et al. Improving physical health of patients with severe mental disorders: a critical review of lifestyle psychosocial interventions. *Expert Rev Neurother* 2017; 17: 667-81.
9. Luciano M, Sampogna G, Amore M, et al.; LIFESTYLE Working Group, Fiorillo A. Improving physical activity and diet in patients with severe mental disorders: results from the LIFESTYLE multicentric, real-world randomized controlled trial. *Psychiatry Res* 2022; 317: 114818.
10. Sampogna G, Luciano M, Del Vecchio V, et al. Stili di vita nei pazienti con disturbi mentali gravi: quali opportunità per il trattamento? *Riv Psichiatr* 2021; 56: 261-71.
11. Sampogna G, Luciano M, Di Vincenzo M, et al.; Working Group LIFESTYLE. The complex interplay between physical activity and recovery styles in patients with severe mental disorders in a real-world multicentric study. *Front Psychiatry* 2022; 13: 945650.
12. Sampogna G, Fiorillo A, Luciano M, et al. A randomized controlled trial on the efficacy of a psychosocial behavioural intervention to improve the lifestyle of patients with severe mental disorders: study protocol. *Front Psychiatry* 2018; 9: 235.
13. Fiorillo A, Luciano M, Pompili M, Sartorius N. Editorial: reducing the mortality gap in people with severe mental disorders: the role of lifestyle psychosocial interventions. *Front Psychiatry* 2019; 10: 434.
14. Fiorillo A, Sartorius N. Mortality gap and physical comorbidity of people with severe mental disorders: the public health scandal. *Ann Gen Psychiatry* 2021; 20: 52.
15. Thornicroft G. Physical health disparities and mental illness: the scandal of premature mortality. *Br J Psychiatry* 2011; 199: 441-2.
16. Tan XW, Chan CYW, Lum AWM, et al. Association of cardiovascular metabolic risk factor measurements with psychiatric readmission among in-hospital patients with severe mental illness: a retrospective study. *BMC Psychiatry* 2022; 22: 43.
17. Tan XW, Lee ES, Toh MPHS, et al. Comparison of mental-physical comorbidity, risk of death and mortality among patients with mental disorders - A retrospective cohort study. *J Psychiatr Res* 2021; 142: 48-53.
18. Soundy A, Wampers M, Probst M, et al. Physical activity and sedentary behaviour in outpatients with schizophrenia: a systematic review and meta-analysis. *Int J Ther Rehabil* 2013; 20: 588-96.
19. Kisely S, Crowe E, Lawrence D. Cancer-related mortality in people with mental illness. *JAMA Psychiatry* 2013; 70: 209-17.

19. Nielsen RE, Banner J, Jensen SE. Cardiovascular disease in patients with severe mental illness. *Nat Rev Cardiol* 2021; 18: 136-45.
20. Rødevand L, Bahrami S, Frei O, et al. Polygenic overlap and shared genetic loci between loneliness, severe mental disorders, and cardiovascular disease risk factors suggest shared molecular mechanisms. *Transl Psychiatry* 2021; 11: 3.
21. Afzal M, Siddiqi N, Ahmad B, et al. Prevalence of overweight and obesity in people with severe mental illness: systematic review and meta-analysis. *Front Endocrinol (Lausanne)* 2021; 12: 769309.
22. Reis da Silva DA, de Almeida LS, Correa LL, et al. Prevalence and factors associated with metabolic syndrome in patients at a psychosocial care center: a cross-sectional study. *Int J Environ Res Public Health* 2022; 19: 10203.
23. Tirupati S, Chua L-E. Obesity and metabolic syndrome in a psychiatric rehabilitation service. *Aust N Z J Psychiatry* 2007; 41: 606-10.
24. Hughes E, Bassi S, Gilbody S, Bland M, Martin F. Prevalence of HIV, hepatitis B, and hepatitis C in people with severe mental illness: a systematic review and meta-analysis. *Lancet Psychiatry* 2016; 3: 40-8. Erratum in: *Lancet Psychiatry* 2016; 3: 17.
25. Hosseini Divkolaye NS, Burkle FM Jr. The enduring health challenges of Afghan immigrants and refugees in Iran: a systematic review. *PLoS Curr* 2017; 9: ecurrents.di.s.449b4c549951e359363a90a7f4cf8fc4.
26. Kuo SC, Chen YT, Li SY, et al. Incidence and outcome of newly-diagnosed tuberculosis in schizophrenics: a 12-year, nationwide, retrospective longitudinal study. *BMC Infect Dis* 2013; 13: 351.
27. Lofgren SM, Bond DJ, Nakasujja N, Boulware DR. Burden of depression in outpatient HIV-infected adults in Sub-Saharan Africa; systematic review and meta-analysis. *AIDS Behav* 2020; 24: 1752-64.
28. Leucht S, Burkard T, Henderson J, Maj M, Sartorius N. Physical illness and schizophrenia: a review of the literature. *Acta Psychiatr Scand* 2007; 116: 317-33.
29. Menon V. Brain networks and cognitive impairment in psychiatric disorders. *World Psychiatry* 2020; 19: 309-10.
30. Moritz S, Silverstein SM, Dietrichkeit M, Gallinat J. Neurocognitive deficits in schizophrenia are likely to be less severe and less related to the disorder than previously thought. *World Psychiatry* 2020; 19: 254-5.
31. De Leon J, Sanz EJ, Norén GN, De Las Cuevas C. Pneumonia may be more frequent and have more fatal outcomes with clozapine than with other second-generation antipsychotics. *World Psychiatry* 2020; 19: 120-1.
32. Stubbs B, Koyanagi A, Veronese N, et al. Physical multimorbidity and psychosis: comprehensive cross-sectional analysis including 242,952 people across 48 low- and middle-income countries. *BMC Med* 2016; 14: 189.
33. Taipale H, Tanskanen A, Mehtälä J, Vattulainen P, Correll CU, Tiihonen J. 20-year follow-up study of physical morbidity and mortality in relationship to antipsychotic treatment in a nationwide cohort of 62,250 patients with schizophrenia (FIN20). *World Psychiatry* 2020; 19: 61-8.
34. Mirza L, Das-Munshi J, Chaturvedi J, et al. Investigating the association between physical health comorbidities and disability in individuals with severe mental illness. *Eur Psychiatry* 2021; 64: e77.
35. Correll CU, Sikich L, Reeves G, et al. Metformin add-on vs. antipsychotic switch vs. continued antipsychotic treatment plus healthy lifestyle education in overweight or obese youth with severe mental illness: results from the IMPACT trial. *World Psychiatry* 2020; 19: 69-80.
36. Firth J, Solmi M, Wootton RE, et al. A meta-review of "lifestyle psychiatry": the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. *World Psychiatry* 2020; 19: 360-80.
37. Solmi M, Fornaro M, Ostinelli EG, et al. Safety of 80 antidepressants, antipsychotics, anti-attention-deficit/hyperactivity medications and mood stabilizers in children and adolescents with psychiatric disorders: a large scale systematic meta-review of adverse effects. *Psychiatry* 2020; 19: 214-32.
38. Crump C, Sundquist K, Winkleby MA, Sundquist J. Comorbidities and mortality in bipolar disorder: a Swedish national cohort study. *JAMA Psychiatry* 2013; 70: 931-9.
39. Goodrich DE, Kilbourne AM, Nord KM, Bauer MS. Mental health collaborative care and its role in primary care settings. *Curr Psychiatry Rep* 2013; 15: 383.
40. McBain H, Lamontagne-Godwin F, Haddad M, et al. Management of type 2 diabetes mellitus in people with severe mental illness: an online cross-sectional survey of healthcare professionals. *BMJ Open* 2018; 8: e019400.
41. Callard F, Fitzgerald D, Woods A. Interdisciplinary collaboration in action: tracking the signal, tracing the noise. *Palgrave Commun* 2015; 1: 15019.
42. Sherwood G. Patient safety: sharing new evidence to confront a global crisis. *J Res Nurs* 2021; 26: 3-5.
43. Cainelli E, Vedovelli L. Over-specialization versus synergy in neuroscience: professionals' integration is more than the sum of its parts. *Neural Regen Res* 2021; 16: 2232-3.
44. Lloyd HM, Pearson M, Sheaff R, et al. Collaborative action for person-centred coordinated care (P3C): an approach to support the development of a comprehensive system-wide solution to fragmented care. *Health Res Policy Syst* 2017; 15: 98.
45. Björk Brämberg E, Torgerson J, Norman Kjellström A, Welin P, Rusner M. Access to primary and specialized somatic health care for persons with severe mental illness: a qualitative study of perceived barriers and facilitators in Swedish health care. *BMC Fam Pract* 2018; 19: 12.
46. Lawrence D, Kisely S. Inequalities in healthcare provision for people with severe mental illness. *J Psychopharmacol* 2010; 24 (4 Suppl): 61-8.
47. Pingani L, Fiorillo A, Luciano M, et al. Who cares for it? How to provide psychosocial interventions in the community. *Int J Soc Psychiatry* 2013; 59: 701-5.
48. Glew S, Chapman B. Closing the gap between physical and mental health training. *Br J Gen Pract* 2016; 66: 506-7.
49. Breslau J, Leckman-Westin E, Han B, et al. Providing health physicals and/or health monitoring services in mental health clinics: impact on laboratory screening and monitoring for high risk populations. *Adm Policy Ment Health* 2021; 48: 279-89.
50. Wang L, Wang QQ, Davis PB, Volkow ND, Xu R. Increased risk for COVID-19 breakthrough infection in fully vaccinated patients with substance use disorders in the United States between December 2020 and August 2021. *World Psychiatry* 2021; 21: 124-32.
51. Galderisi S, De Hert M, Del Prato S, et al. Identification and management of cardiometabolic risk in subjects with schizophrenia spectrum disorders: a Delphi expert consensus study. *Eur Psychiatry* 2021; 64: e7.
52. Gao YN, Olfson M. National trends in metabolic risk of psychiatric inpatients in the United States during the atypical antipsychotic era. *Schizophr Res* 2022; 248: 320-8.
53. Wysokinski A, Strzelecki D, Kloszewska I. Levels of triglycerides, cholesterol, LDL, HDL and glucose in patients with schizophrenia, unipolar depression and bipolar disorder. *Diabetes Metab Syndr* 2015; 9: 168-76.
54. McCracken LM. Cognitive behavioral therapy, process-based approaches, and evolution in the context of physical health. *World Psychiatry* 2021; 20: 383-5.

55. McEwen BS. The untapped power of allostasis promoted by healthy lifestyles. *World Psychiatry* 2020; 19: 57-8.
56. Slade M, Sweeney A. Rethinking the concept of insight. *World Psychiatry* 2020; 19: 389-90.
57. Catalá-López F, Alonso-Arroyo A, Page MJ, Hutton B, Tabarés-Seisdedos R, Aleixandre-Benavent R. Mapping of global scientific research in comorbidity and multimorbidity: a cross-sectional analysis. *PLoS One* 2018; 13: e0189091.
58. Foguet-Boreu Q, Fernández San Martín MI, Flores Mateo G, et al. Cardiovascular risk assessment in patients with a severe mental illness: a systematic review and meta-analysis. *BMC Psychiatry*
59. Schulze TG. The WPA Education, Science, Publication, and Research Initiative (ESPRI): jumpstarting scientific projects in low- and middle-income countries. *World Psychiatry* 2020; 19: 123-4.
60. Schulze TG. WPA Scientific Sections: a strengthened backbone for the 2020-2023 triennium. *World Psychiatry* 2020; 19: 408-10.
61. Herrman H. Report on the WPA Action Plan at the end of the triennium 2017-2020. *World Psychiatry* 2020; 19: 404-6.
62. Herrman H. The practice of psychiatry in health care and sustainable development: progress on the WPA Action Plan 2017-2020. *World Psychiatry* 2020; 19: 256-7.
63. Fiorillo A, Bhui KS, Stein DJ, et al. The 2021-2024 Work Plan of WPA Collaborating Centres. *World Psychiatry* 2021; 20: 457.
64. Heinze G, Sartorius N, Guizar Sanchez DP, et al. Integration of mental health comorbidity in medical specialty programs in 20 countries. *Int J Psychiatry Med* 2021; 56: 278-93.
65. Ng RMK. WPA educational initiatives: where are we after three years? *World Psychiatry* 2020; 19: 257-8.
66. Kallivayalil RA. Strengthening the functioning of WPA through its Secretariat. *World Psychiatry* 2020; 19: 407-8.
67. Kallivayalil RA. The WPA website: newer user-friendly functions. *World Psychiatry* 2020; 19: 124.
68. Baron D, Noordsy D. The Lifestyle Psychiatry project of the WPA Section on Medicine, Psychiatry and Primary Care. *World Psychiatry* 2021; 20: 454-5.
69. Grassi L, Riba M. Psychiatric care in oncology and palliative medicine: new challenges and future perspectives. *World Psychiatry* 2021; 20: 452-3.
70. Giuliani L. ICD-11-related educational activities. *World Psychiatry* 2021; 20: 457-8.
71. Sampogna G, Borgi M, Collacchi B, et al. Using sport-based interventions for people with severe mental disorders: results from the European EASMH study. *Int Rev Psychiatry* 2022; 1-11.

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