Social determinants of mental disorders and the Sustainable Development Goals: a systematic review of reviews

Crick Lund, Carrie Brooke-Sumner, Florence Baingana, Emily Claire Baron, Erica Breuer, Prabha Chandra, Johannes Haushofer, Helen Herrman, Mark Jordans, Christian Kieling, Maria Elena Medina-Mora, Ellen Morgan, Olayinka Omigbodun, Wietse Tol, Vikram Patel, Shekhar Saxena

Mental health has been included in the UN Sustainable Development Goals. However, uncertainty exists about the extent to which the major social determinants of mental disorders are addressed by these goals. The aim of this study was to develop a conceptual framework for the social determinants of mental disorders that is aligned with the Sustainable Development Goals, to use this framework to systematically review evidence regarding these social determinants, and to identify potential mechanisms and targets for interventions. We did a systematic review of reviews using a conceptual framework comprising demographic, economic, neighbourhood, environmental events, and social and culture domains. We included 289 articles in the final Review. This study sheds new light on how the Sustainable Development Goals are relevant for addressing the social determinants of mental disorders, and how these goals could be optimised to prevent mental disorders.

Lancet Psychiatry 2018; 5: 357–69

Alan J Flisher Centre for Public Mental Health, Department of Psychiatry and Mental Health, University of Cape Town, Cape Town, South Africa (Prof C Lund PhD, C Brooke-Sumner PhD, E C Baron MSc, E Breuer MPH); **Centre for Global Mental Health, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK** (Prof C Lund, M Jordans PhD); **Alcohol, Tobacco and Other Drug Research Unit, Medical Research Council of South Africa, Cape Town, South Africa** (C Brooke-Sumner); **World Health Organization Sierra Leone Country Office, Freetown, Sierra Leone** (F Baingana MSc); **Department of Psychiatry, National Institute of Mental Health and Neurosciences, Bangalore, India** (Prof P Chandra MD); **Princeton University, Princeton, NJ, USA** (J Haushofer, PhD); **Busara Center for Behavioral Economics, Nairobi, Kenya** (J Haushofer); **Orygen, The National Centre of Excellence in Youth Mental Health, and Centre for Youth Mental Health, The University of Melbourne, Melbourne, Australia** (H Herrman, PhD); **Research and Development Department, War Child, Amsterdam, Netherlands** (M Jordans); **Department of Psychiatry, School of Medicine, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil** (C Kieling MD); **Child & Adolescent Psychiatry Division, Hospital de Clínicas de Porto Alegre, Porto Alegre, Brazil** (C Kieling); **Ramón de la Fuente Muñiz National Institute of Psychiatry, Mexico, Mexico** (M E Medina-Mora PhD); **Grand Challenges Canada, Toronto, ON, Canada** (E Morgan MPhil); **Centre for Child and Adolescent Mental Health and Department of Psychiatry, College of Medicine, University of Ibadan, Ibadan, Nigeria** (Prof O Omigbodun FMCPsych);

Introduction

The Sustainable Development Goals (SDGs), endorsed by all United Nations member states in 2015, represent an ambitious plan for sustainable human development by the year 2030.[1] In a departure from the Millennium Development Goals, mental health and wellbeing are specifically addressed under SDG 3, which emphasises the inclusion of mental health care in universal health coverage. The acknowledgment of mental health in the SDGs is important, since the global human suffering and financial costs associated with mental disorders are substantial and growing.[2,3] Investments in mental health care have the potential to increase the capabilities and productivity of affected individuals and families, as shown in a recent return on investment analysis.[4]

However, there is growing global evidence that mental disorders in populations are strongly socially determined.[5,6] The social determinants of mental disorders are the social and economic conditions that have a direct influence on the prevalence and severity of mental disorders in men and women across the life course. For example, adverse social and economic circumstances, including poverty, income inequality, interpersonal and collective violence, and forced migration, are key determinants of mental disorders.[5]

Because mental disorders are so strongly socially determined, the global burden of these disorders is unlikely to be relieved by improved access to mental health treatments alone.[5,6] In the words of the final report of the WHO Commission on the social determinants of health in 2008: "Why treat people only to send them back to the conditions that made them sick in the first place?"[7] In this context, the SDGs have the potential to reduce the burden of mental disorders at the population level by addressing their upstream social determinants. For this reduction to occur, greater clarity is needed on which social determinants to target and how they are aligned with the SDGs.

To date, there is very little consolidated evidence, particularly from low-income and middle-income countries, regarding the socioeconomic and violence-related factors that should be targeted for the prevention of mental disorders.[8] Although the SDGs set out to address several pressing global challenges—such as violence, climate change, displacement, and income inequality—little is known about the extent to which addressing these challenges might prevent or reduce the burden of specific mental disorders.

This study had two purposes: first, to develop a preliminary conceptual framework for the social determinants of mental disorders that is aligned with the SDGs; and second, to use this framework to systematically review evidence regarding the social determinants of mental disorders, with a view to identifying potential mechanisms and targets for interventions that address these determinants. This task requires the collection of available research literature on social determinants of mental illness across the life course from low-income, middle-income, and high-income countries. Such an approach has the potential to increase alignment between the SDGs and reductions in the burden of mental disorders, and suggest possibilities for action across a range of sectors. It might also reveal potential mechanisms of interaction between socioeconomic factors and mental disorders. This, in turn, could provide an opportunity to shape the existing strategies for poverty alleviation and violence reduction set out in the SDGs to prevent the development of mental disorders in populations.

Conceptual framework

We developed a novel conceptual framework that summarised the major social determinants of mental health disorders and linked them with the SDGs. First, we identified the key domains of the social determinants of mental disorders, on the basis of available epidemiological data, namely: demographic, economic, neighbourhood, environmental events, and social and culture domains. The definitions of these domains are stated in the panel. These domains were based on previous conceptual work that we had done on the social

Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA (W Tol PhD); Peter C Alderman Foundation, Bedford, NY, USA (W Tol); Department of Global Health and Social Medicine, Harvard Medical School, Cambridge, MA, USA (Prof V Patel PhD); London School of Hygiene & Tropical Medicine, London, UK (Prof V Patel);

determinants of mental health.[9] The domains were chosen on the basis of their conceptual coherence and distinctness and the extent to which they could include both distal and proximal levels of effect on an individual's mental health outcomes. Second, we then examined these domains in relation to the WHO Commission on the Social Determinants of Health frameworks, to ensure that all key constructs were covered (for example, the use of a multilevel approach and the inclusion of a life-course dimension).[6] Finally, we matched the SDGs with the specific domains for which they appeared to be most relevant. When an SDG appeared to be relevant for more than one domain, we selected the domain for which it seemed most relevant, by consensus among the group of authors.

The domains were organised into the conceptual framework. Both distal and proximal determinants in each domain act on mental disorders, mediated by family-level and biological variables. Following Bronfenbrenner's ecological approach,[10] proximal factors refer to people, objects, or events in the immediate external environment with which the individual interacts that increase or reduce risk of mental disorders. Distal factors refer to the broader structural arrangements or trends in society which exert their influence on mental disorders in populations, frequently mediated by proximal factors. This framework seeks to capture the importance of an ecological approach[10] and the complex multidimensional way in which social determinants interact with key genetic determinants to affect mental disorders. The domains also incorporate each of the SDGs, illustrated by mapping each SDG onto the domains of the social determinants framework in figure 1.

Panel: Definition of the five domains of the social determinants of mental disorders, and the Sustainable Development Goals* that are most relevant to each domain[1]

Demographic domain: the specific demographic characteristics of populations that convey risk for, or protection from, mental illness

- SDG 5: achieve gender equality and empower all women and girls

Economic domain: factors relating to the production, consumption, and transfer of wealth that convey risk for, or protection from, mental illness

- SDG 1: end poverty in all its forms, everywhere
- SDG 2: end hunger, achieve food security and improved nutrition, and promote sustainable agriculture
- SDG 8: promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all
- SDG 9: build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation
- SDG 10: reduce inequality within and among countries

Neighbourhood domain: characteristics of an area or community that convey risk for, or protection from, mental illness, over and above what is attributable to the individual characteristics of community members

- SDG 6: ensure availability and sustainable management of water and sanitation for all
- SDG 7: ensure access to affordable, reliable, sustainable, and modern energy for all
- SDG 11: make cities and human settlements inclusive, safe, resilient, and sustainable
- SDG 12: ensure sustainable consumption and production patterns

Environmental events domain: serious disruptions of the functioning of a community that exceed its ability to cope by use of its own resources and convey risk for mental illness

- SDG 13: take urgent action to combat climate change and its impacts
- SDG 16: promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels

Social and cultural domain†: ways in which the organisation of society, social interactions, and relationships affect risk of, and protection from, mental illness

- SDG 4: ensure inclusive and equitable quality education, and promote lifelong learning opportunities for all

*Sustainable Development Goals (SDGs) identified in this panel are those for which substantial evidence exists on their contribution to risk for mental illness. SDG 14 and SDG 15 were omitted because the evidence for their direct effect on mental disorders is not yet available. †We faced a terminology difficulty when approaching the social determinants of mental health because, according to the WHO Commission on the social determinants of health and other research in this field, social determinants include a broad range of social, economic, structural, and environmental factors that affect population health. However, social determinants, as defined in relation to the social and cultural domain in this panel, can also refer to a more specific domain of human interactions (and do not necessarily include these broader structural determinants). To make this distinction more explicit, we have referred here and throughout the Review to social determinants as comprising a broad range of social, economic, structural, and environmental factors that affect population health, and the social and cultural domain as the organisation of society, social interactions, and relationships that convey risk for, and protection from, mental illness.

Methods

We searched three databases (PubMed, PsycINFO, and Scopus) for studies. The Scopus database enabled searching Embase for articles not indexed on PubMed or MEDLINE. Individual search strategies were developed for each domain, and searches were run in November, 2016, for each database (see appendix for full search terms). The search strategies were intentionally broad to capture the diversity of potential determinants of mental disorders, and were aligned with the conceptual framework for each of the social determinant domains. We used database-specific strategies according to the search terms in each domain. To manage the scope of this Review, we focused on relationships with mental disorders, for which there is a more robust evidence base than for positive aspects of mental health and wellbeing.

After removing any duplicates, we identified 13706 abstracts for initial review (figure 2). One author (CB-S) reviewed titles and abstracts for these articles using bibliographic software. The overlap and interrelatedness of the concepts in the five domains was evidenced by articles being retrieved in more than one domain search, and articles from one domain search (eg, demographic) being more relevant for another domain (eg, environmental events). Abstracts retrieved in one domain that were more relevant to another domain were transferred to the more relevant domain in a further sorting stage. Subsequently, 699 full articles for the final list of included abstracts were accessed and reviewed by two to three authors for each domain. Articles not meeting the inclusion criteria at this stage were excluded.

Data analysis

Data from included studies were extracted into a standardised table independently by two to three authors

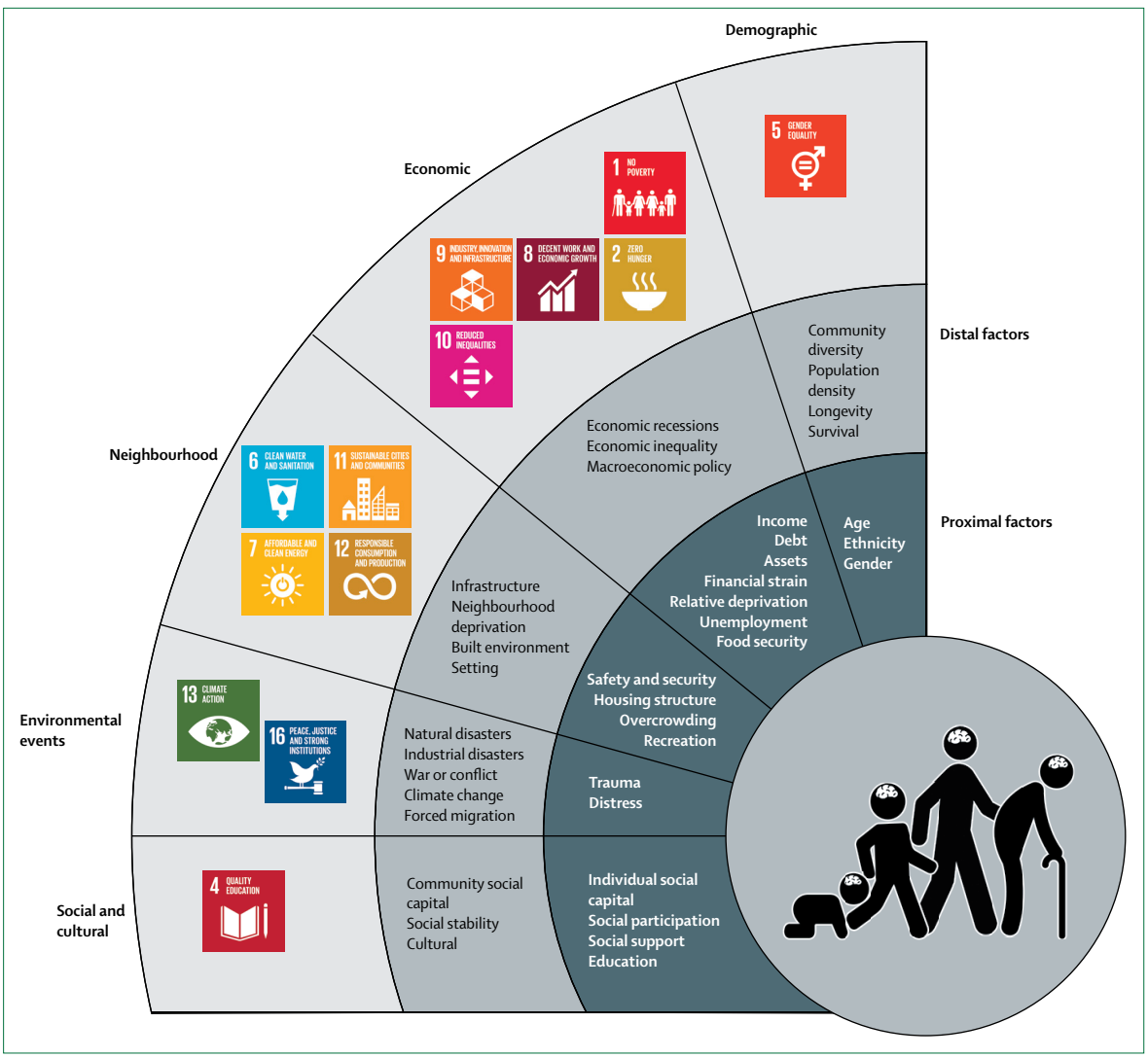

Figure 1: **Social and cultural determinants of mental disorders and the Sustainable Development Goals: a conceptual framework**

per domain (appendix). Data extracted were the risk and protective factors (separated into proximal and distal factors), the hypothesised pathways for mediation of this risk or protection (as proposed by authors of the included studies), and the mental disorder outcomes, by age and gender. The strength-of-evidence scores were assigned to each factor on a scale of 0 to 10 according to each author's judgment, based on their review of the evidence in their assigned domain. We took care not to assign all studies with similar designs equal levels of evidence, and critically examined their designs and methods, to draw our own conclusions regarding the strength of the evidence in each case. Systematic reviews with meta-analyses were judged as providing stronger evidence than narrative, critical, and integrative reviews. Additionally, we rated the quality of each included study using the AMSTAR tool.[11] Data extraction tables were shared between authors, and key concepts were agreed for each domain. Once the data extraction tables were completed, authors worked in pairs to draft summaries that synthesised the main findings for each domain. This approach was taken because of the large number and heterogeneity of reviews, to try and provide an integrative and consolidated review of the evidence base.

Results

In total, 289 full-text articles were included in the final Review: 135 for the demographic domain, 63 for the economic domain, 31 for the neighbourhood domain, 26 for the environmental events domain, and 34 for the social and cultural domain (appendix).

Demographic domain

Demographic factors included gender, age, ethnicity, life expectancy, and longevity, making them particularly relevant for SDG 5 (achieving gender equality).[1]

Sangath, Porvorim, Goa, India (Prof V Patel)**; Centre for Chronic Conditions and Injuries, Public Health Foundation of India, Delhi, India** (Prof V Patel)**; and Department of Mental Health and Substance Abuse, World Health Organization, Geneva, Switzerland** (S Saxena MD)

Correspondence to:
Prof Crick Lund, Alan J Flisher Centre for Public Mental Health, Department of Psychiatry and Mental Health, University of Cape Town, Cape Town 7700, South Africa
crick.lund@uct.ac.za

See Online for appendix

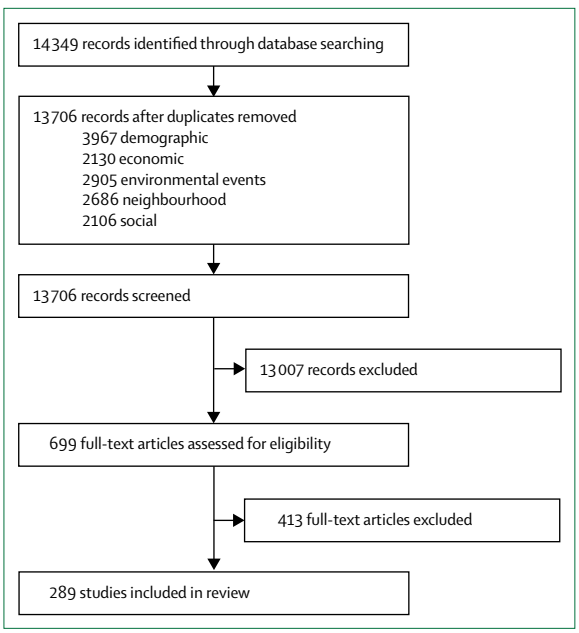

Figure 2: **PRISMA flow diagram**
Exclusion of studies was on the basis of not meeting the inclusion criteria for the Review. See search strategy and selection criteria for the inclusion and exclusion criteria.

The female gender is associated with increased risk of major depressive disorder at different life stages, beginning in adolescence,[12–15] in many diverse settings.[16–18] The same female preponderance is also observed in relation to anxiety[19] and eating disorders.[20] Conversely, the male gender is associated with increased risk of substance use disorders.[21] Boys also have increased risk of childhood behavioural and developmental disorders, such as behavioural disorder, autism spectrum disorder, attention deficit hyperactivity disorder, Tourette syndrome, and early-onset schizophrenia.[22,23] Additionally, some responses to fetal stress appear to be sex-specific, for example the risk of developing schizophrenia.[22] Although there is a higher prevalence of self-harm among adolescent girls than in adolescent boys,[24] being male is associated with an increased probability of dying by suicide in a wide range of populations.[25–27]

A developmental perspective is essential to understanding the causes of mental disorders across the life course.[28] Mounting evidence indicates that most mental disorders start early in life, and a comprehensive meta-analysis[29] identified a pooled prevalence of mental disorders among children and adolescents of 13·4% (95% CI 11·3–15·9). Most preventive strategies will have an increased probability of success if they are focused in the first years or decades of life.[28] This is a vulnerable period, during which adverse social experiences can negatively affect cognitive, emotional, and behavioural development.[30] At the other extreme of the life course, increased age is associated with a specific pattern of mental disorders, including a higher prevalence of dementia[31] and depression,[15] and lower prevalence of anxiety disorders compared with young adults.[19]

Ethnicity and ethnic heterogeneity have also been recognised as a source of variability in the occurrence of mental disorders. Numerous studies have reported increased prevalence of mental disorders in minority groups.[32–40] These increases can be a consequence of experiences of discrimination and exclusion, genetic background, differential cultural interpretation of symptoms, or a combination of these factors. Consistent evidence has showed an increased risk of psychopathology (particularly psychosis,[41–43] child and adolescent anxiety and depression, and post-partum depression[12,44–46]) among migrants, although risk can vary substantially in relation to the context of migrancy—including factors such as country of origin and destination, reasons for migration, and age—and outcomes vary for different disorders.[47] Minority ethnicity status and associated discrimination can also be risk factors for depression in children and adolescents.[48,49] Experiencing racial discrimination has been strongly linked to depression among children and adolescents.[50]

Economic domain

The economic domain includes income, expenditure, debt, assets, food security, employment status, housing, income inequality, macroeconomic trends such as recessions, and subjective financial strain. Several SDGs are relevant for the economic domain, namely SDG 1 (ending poverty), SDG 2 (ending hunger), SDG 8 (decent work and economic growth), SDG 9 (industry, innovation, and infrastructure), and SDG 10 (reducing inequalities).[1]

Poverty is consistently associated with increased prevalence of adult common mental disorders, such as depression and anxiety disorders, in low-income, middle-income, and high-income countries, although the effects of specific aspects of poverty vary.[51–53] The effects of poverty on mental illness are more pronounced among women[51] (particularly during the perinatal period[54]), adolescents,[55] and people with chronic diseases, such as diabetes.[56] A lower economic status, diminished wealth, and unemployment are associated with suicidal ideation and suicidal behaviour in low-income and middle-income countries,[57] and poverty is associated with increased prevalence of dementia in India and China.[58] The association between poverty and mental disorders does not imply that people in poorer countries are at increased risk of mental disorders compared with people in wealthier countries.

The association between poverty and mental disorders is complex and bidirectional, characterised by both social causation and social drift.[59] These bidirectional influences act across the life course, from childhood to old age,[60–62] and interact with environmental events.[63]

Homelessness is associated with increased risk of depression, anxiety, and suicidal ideation in

school-aged children and adolescents.[64,65] Inadequate housing, including structural housing quality and overcrowding, is associated with increased risk of common mental disorders in adults.[51,66] Providing permanent housing in the community for people with severe mental illness can reduce hospital admissions.[67,68]

Employment is an important protective factor against mental disorders, and is associated with better social functioning, less severe symptoms, higher quality of life, and improved self-esteem in people living with schizophrenia[69] and bipolar disorder.[70] Employment is also robustly associated with reduced symptoms of depression and anxiety and decreased suicide prevalences, especially among men.[57,71,72]

Food insecurity has been consistently associated with increased risk of adult common mental disorders in low-income and middle-income countries,[51] and inadequate nutrition has been consistently associated with poor cognitive, motor, and social-emotional development in children.[73,74] Indebted individuals have higher rates of depression and more suicidal ideation than those without debt.[75]

At a national level, macroeconomic decline has been associated with increased risk of depression, anxiety, suicide, and alcohol abuse, mainly through effects on employment, income, insecurity, and loss of social networks.[76] In relation to income inequality at a national level, countries that are more unequal have been reported to have increased schizophrenia incidence in adults.[77] Increased prevalence of depression, anxiety, substance abuse, decreased general happiness, and decreased child wellbeing indices have also been reported in countries with more income inequality. However, these associations seem to be more prominent in high-income countries than in low-income countries.[78–80]

In addition to this correlational evidence, several studies have tested the causal effect of economic interventions on mental illness with, for example, randomised experiments of cash transfer programmes, which have been shown to decrease stress and depression.[8,81] Numerous employment intervention studies have shown improvement in mental health and functioning among people living with disorders such as schizophrenia and depression,[82–84] although the quality of the evidence is mixed,[85] and not all outcomes were positive.[86]

Finally, housing and gardening interventions have shown mixed effects on mental disorder outcomes.[84,87] However, individual programmes, such as the Moving to Opportunity programme in the USA, led to increases in psychological wellbeing.[88]

Neighbourhood domain

Neighbourhoods constitute constellations of environmental risk factors (eg, safety, deprivation at neighbourhood level, access to recreational facilities, and availability of services). Neighbourhood level effects are those that remain even after controlling for individual or family level socioeconomic deprivation and other exposures. Frequently, these neighbourhood risk factors interact with coexisting individual factors.[89] SDG 6 (clean water and sanitation), SDG 7 (affordable and clean energy), SDG 11 (sustainable cities and communities), and SDG 12 (sustainable consumption and production) are particularly relevant goals for the neighbourhood domain, although they are also relevant for broader societal characteristics.

Neighbourhood level socioeconomic deprivation is strongly associated with increased prevalence of psychotic disorders,[90] depression,[91–93] common mental disorders in young people (aged 10–20 years),[94] and reduced cognitive function in older adults.[95] Individuals in neighbourhoods with low socioeconomic status can have more life stressors (eg, exposure to violence, unemployment, under-resourced facilities) and fewer sources of support and resources to deal with them, thus increasing vulnerability. Social drift might also explain the movement of people living with mental illness into more deprived neighbourhoods.[93,96]

Living in an urban environment has been reported to increase risk of developing schizophrenia[97–100] and mood and anxiety disorders.[101] Structural features of the neighbourhood (eg, built environment) also affect mental disorders. Neighbourhoods that are more walkable and provide leisure opportunities are associated with a reduced prevalence of depression and alcohol abuse.[102] Other structural features, including racial segregation and community instability, are associated with depression[103,104] and psychotic disorders.[105] A high density of a particular ethnic group might have benefits for individuals of that ethnicity (eg, reduced risk of psychoses, depression, and anxiety disorders).[106] This might be mediated by the increase of social support, stronger sense of identity, and positive self-evaluation.[49]

Accumulating evidence indicates that neighbourhood crime-related safety and the fear of crime can have a substantial effect on mental illness,[107,108] sometimes combining with other negative factors in the environment. Exposure to community level violence (such as prevalence of criminal violence per neighbourhood) has been linked to post-traumatic stress disorder in low-income and middle-income countries,[109] and high-income countries.[110,111] In children and adolescents, community violence, including gang violence, has been linked to substance abuse, externalising behaviours, and bullying perpetration,[94,112–115] symptoms of depression, anxiety, and post-traumatic stress disorder,[48,94,114,115] as well as compromised developmental outcomes.[112] Community violence itself is linked to more upstream or distal determinants, including population density, family composition, deficits in supportive social institutions and networks, and housing conditions.[112] These neighbourhood factors frequently interact with demographic factors, such as

gender.[109] Community-based mental health interventions (including strengthening social networks, prosocial behaviour, and community mobilisation) are associated with reductions in prevalence of substance use.[116]

Environmental events domain

Environmental events are defined as serious disruptions of community functioning that exceed the ability of the community to cope by use of its own resources.[117] These events include disasters triggered by natural hazards (eg, earthquakes), industrial events (eg, chemical spills), armed conflict and displacement (eg, war, political violence), and ecosystem hazards due to climate change or increased population (eg, droughts or flooding). SDG 13 (climate change action) and SDG 16 (peace, justice, and strong institutions) are particularly relevant for the environmental events domain.

The most frequently measured outcomes that are associated with these disasters and hazards are symptoms of post-traumatic stress disorder, anxiety, and depression, which are estimated to be three to four times higher among survivors than in the general population.[118–126] Behavioural and emotional symptoms, sleep problems, disturbed play, and psychosomatic symptoms are common among children exposed to war, conflict, terrorism, and displacement.[127] Meta-analyses of studies in children affected by armed conflict have shown an overall pooled prevalence estimate of post-traumatic stress disorder of 47%.[128] Disaster survivors also reported high prevalences of generalised anxiety.[118] Ecosystem hazards have been associated with depression, anxiety, and suicide.[125] Specific environmental toxins also have negative mental health consequences—for example, lead exposure has been associated with emotional and behavioural problems in 3–5-year-old children in China.[129] Some reviews show the increased risk of substance abuse[118,130] and problematic substance use among individuals with pre-existing problems who experienced an environmental event.[118] Complex emergencies (such as war, armed conflicts, and mass displacement) and human trafficking are associated with an increased prevalence of mental disorders,[131,132] which tends to remain high for years after displacement as a result of war.[132] Torture has been robustly associated with risk of post-traumatic stress disorder and has also been linked to depression.[123] Estimating the prevalence of mental disorders in the context of environmental events is challenged by difficulties in separating expected psychological distress from a disorder and by insufficient socio-culturally validated measures.[133]

Risk factors for the development of mental disorders in the context of environmental events include: higher level of exposure to the event, previous mental disorder, female gender, being unmarried, younger and older age, low socioeconomic status, lower educational attainment, minority group status, unemployment, and insecurity.[118,125,126,130,134–137] Violence before, during, and after forced migration is also a risk factor, together with harsh living conditions, uncertainty, loss of social status, and difficulties with the language and culture of the new setting.[138] Older people who had a higher socioeconomic status and educational attainment before being displaced, but a reduced socioeconomic status in their new settings, have an increased risk for the development of mental disorders.[139] Social support is a protective factor in the context of environmental events.[118,140]

We identified a large body of literature on intervention responses to the human suffering caused by environmental events. Although the focus of this Review does not allow for a detailed presentation of these responses, it is important to note the growing evidence base for interventions that are primarily used in the context of reducing environmental stressors. These include psychological first aid,[1,137,141] narrative exposure therapy,[142,143] and the common elements treatment approach.[144] Overall, there is a need to bridge the large gap that exists between population approaches (more commonly focused on addressing risks and strengths in the social environment) and the focus of researchers on evaluating specialised and largely individual psychotherapeutic approaches.[145]

Social and cultural domain

The social and cultural domain encompasses education, family and peer relationships, social capital, social networks, culture, and group membership. SDG 4 (quality education) is relevant for this domain.

Lower levels of education and literacy are strongly linked to development of dementia,[146–150] although higher levels of education can be associated with a faster disease progression.[148] Education is believed to affect the brain (for example, by increasing synapse numbers or vascularisation), creating cognitive reserve and resilience against dementia.[146] Low levels of education, potentially acting through reduced self-efficacy and cognitive function, have also been associated with late life depression[151] and depression in young people who have not completed school.[152] Suicide has also been linked to low education, with the association being stronger in men than in women. Being less educated has been linked to reduced social cohesion, poor social capital, and chronic stress.[153]

In terms of social relationships, intimate partner abuse during pregnancy is strongly linked to increased risk of depression, anxiety, and post-traumatic stress disorder for women in the postnatal period.[154–156] Low empathy and support from a partner,[157] low emotional and practical support from other sources, and being unmarried also increases the risk of common mental disorders[158] and suicidal thoughts and behaviours in women.[159] Conversely, perceived social support and marital satisfaction might be protective against antenatal depression and anxiety.[160] Befriending programmes and enhancing social support can decrease depression

	Relevant SDGs*	Key factors	Hypothesised pathways (risk and protective factors)	Mental disorder outcomes	Potential interventions†
Demographic domain	SDG 5: gender equality	Gender and sex, age, ethnicity	Differential exposure to adversity, social norms, discrimination, early life onset, and gene–environment interactions in sensitive developmental windows (pregnancy, early childhood, and adolescence)	Depression, anxiety, substance abuse, psychosis, child and adolescent behavioural and developmental disorders, and dementia	Reduction of gender-based violence (H), child maltreatment (H), and racial discrimination and xenophobia (H)
Economic domain	SDG 1: no poverty; SDG 2: zero hunger; SDG 8: decent work and economic growth; SDG 9: industry, innovation, and infrastructure; SDG 10: reduced inequalities	Income security, debt, assets, food security, employment, housing, income inequality, macroeconomic recessions, and subjective financial strain	Social causation: insecurity, stress, helplessness, external locus of control, low social status, worse physical health status, social comparison, undernutrition, antisocial coping behaviours, and entrapment linked to suicide; social drift: increased health-care expenditure, disability, and stigma	Depression, anxiety, substance abuse, psychosis, suicide, dementia, and childhood internalising and externalising disorders	Cash transfers or basic income grants (H), reductions in income inequality (M), and improved employment (H)
Neighbourhood domain	SDG 6: clean water and sanitation; SDG 7: affordable and clean energy; SDG 11: sustainable cities and communities; SDG 12: responsible consumption and production	Structural characteristics of neighbourhoods including infrastructure, safety, aggregate socioeconomic deprivation, built environment, leisure opportunities, urbanicity, crime, community violence, and social cohesion	Urban migration, dopamine dysregulation, insecurity, exposure to violence, and disempowerment	Depression, anxiety, substance abuse, psychosis, child and adolescent substance abuse, and externalising behaviours	Improved housing (M), safe neighbourhoods (H)
Environmental events domain	SDG 13: climate action; SDG 16: peace, justice, and strong institutions	Natural hazards, industrial disasters, armed conflict, displacement, and disasters triggered by ecosystem hazards due to climate change or increased population	Trauma (episodic and continuous), severe stress, adversity, insecurity, and loss of social support systems	PTSD, depression, anxiety, suicide, and childhood internalising and externalising disorders	Reductions in violence (H), early response to environmental events (H), and action on protecting vulnerable ecosystems (H)
Social and cultural domain	SDG 4: quality education	Education, social cohesion, social capital, culture, and social class	Cognitive reserve, self-efficacy, social skills, social support, trust, parenting, bullying, and discrimination	Depression, anxiety, dementia, psychosis, and child and adolescent internalising disorders	Improved education (H), strengthened social capital (M), and improving social support and networks for older adults (H)

SDG=sustainable development goal. PTSD=post-traumatic stress disorder. *SDG 3 is not listed in this table because the focus of this Review is on the SDGs that address the upstream social determinants of mental disorders. †The strength of the effect of potential interventions is rated as low (L), moderate (M), or high (H).

Table: **Social determinants of mental disorders, hypothesised pathways, related outcomes, and potential interventions**

among women.[161,162] The shared family environment has important effects on the development and clustering of mental disorders, including child behavioural problems, oppositional defiant disorder, anxiety, depression, and substance abuse.[163,164]

Identifying as part of a social group creates social connections and provides opportunities to give and receive support. Social capital is associated with a decreased prevalence of depression and is protective for mental health, particularly in older people.[165,166] Higher individual cognitive social capital (trusting in the community and actively participating) is also protective against common mental disorders.[167] Individuals who develop a psychotic disorder have reduced social networks before the disorder,[168] not just as a consequence of social exclusion due to the presence of the disorder. Shared meaning and identity associated with culture has been shown to be protective of mental health.[169] Loss of cultural identity—for example, in the context of forced migration—has been associated with negative mental health outcomes.[170] Particularly negative experiences in the social environment, such as discrimination[171] and bullying,[172] are associated with increased stress, depressive or childhood internalising symptoms linked to reduced self-esteem, and experience of social isolation. Reduced social participation and contact are associated with onset of dementia,[173] while social support through networks and regular involvement in social activities are protective against depression in older people.[13,174] Some evidence exists that social media and other online social interactions are linked to increased social capital and self-esteem, but they can also be associated with increased social isolation and depression,[175] particularly in the case of cyberbullying.[176]

Discussion

From evidence to action: recommendations for policy and future research

The findings of this Review summarise a broad body of evidence that outlines the social determinants of mental disorders, and their relevance for the SDGs. Several key factors, hypothesised pathways, specific mental disorder outcomes, and potential interventions can be identified and linked to the SDGs (table). Importantly, social determinants do not act uniformly for all mental disorders in all circumstances, and there is considerable heterogeneity according to gender, developmental stage, local context, and specific mental disorder outcomes. Nevertheless, the findings point to synergy between the SDGs and many of the key social determinants of

Search strategy and selection criteria

We searched three databases (PubMed, PsycINFO, and Scopus) for systematic reviews, narrative reviews, meta-analyses, and meta-synthesis articles published in peer-reviewed academic journals, covering studies on all age groups, from all countries. To be included, studies had to be review articles that reported data on mental disorders and risk or protective factors in one or more of the five domains defined in the conceptual framework, namely demographic, economic, neighbourhood, environmental events, and social and cultural. Publication dates for inclusion were set from Jan 1, 2000, to Dec 31, 2016. The search was developed using the MeSH terms described here in PubMed. Subsequently, the searches were adapted for PsychINFO and Scopus. A search string was developed for mental disorders and combined with OR to a search string for each domain as identified in the conceptual framework described in this paper. We searched for "mental disorders", "mental health", "depression", "depressive disorder", "depression", "postpartum", "bipolar disorder", "adjustment disorders", "mood disorders", "stress disorders", "attention deficit and disruptive behaviour disorders", "anxiety disorders", "schizophrenia", "psychological trauma", "psychotic disorders", "dementia", "epilepsy", "substance-related disorders", "alcoholism", "common mental disorder", and "severe mental disorder". Under the demographic domain, the search terms were: "age groups", "male", "female", "pregnant women", "minority groups", "marital status", "population groups", "population density", and "community diversity". Search terms for the economic domain were: "social class", "poverty", "vulnerable populations", "socioeconomic factors", "employment", "unemployment", "income", and "absenteeism". Search terms for the environmental events domain were: "disasters", "earthquakes", "floods", "tsunamis", "cyclonic storms", "landslides", "warfare", "riots", "armed conflicts", "climate change", "radiation exposure", "accidents", "droughts", "refugees", "transients", and "migrants". Search terms for the neighbourhood domain were: "residence characteristics", "poverty areas", "rural population", "urban population", "safety", "sanitation", "parks recreational", "fitness centers", "ambulatory care facilities", "health services accessibility", "crime", "violence", "exposure to violence", "housing", and "public housing". Search terms for the social and cultural domain were: "social psychosocial deprivation", "social capital", "social class", "social environment", "social distance", "sociological factors", "social justice", "social welfare", "education", and "educational status". For the full search strategy, see appendix. Results were restricted to reviews in all databases. Grey literature from non-peer-reviewed publications and non-English language publications was excluded. After removing duplicates, we identified 13 706 abstracts for initial review. One author (CB-S) reviewed titles and abstracts from these articles using bibliographic software. To be included, studies had to report on distal or proximal social risk or protective factors, or social interventions addressing the mental disorders described. Subsequently, 699 full texts were reviewed by two to three authors for each domain. 289 studies were identified for inclusion in the Review.

mental disorders, because many of the determinants documented in this Review are also targeted by the SDGs.

The data extraction table for this study (appendix) integrates findings from 289 reviews reporting on social determinants of mental disorders, with ratings for strength of evidence and study quality. We envisage this Review as a potential resource for researchers, policy makers, and organisations working in the field of mental health and sustainable development.

Several policy recommendations can be drawn from these findings. Although this Review has largely presented observational evidence, several potential universal, selective, and indicated prevention interventions can be recommended to address the social determinants of mental disorders (table). We acknowledge that some of these recommended actions have not yet been shown in trials to have a direct effect on mental disorders, and that many implementation challenges remain unresolved. Nevertheless, we believe that identifying these candidate interventions on social determinants is an important first step in setting a policy agenda to prevent mental disorders at a population level, in alignment with the SDGs.

It is crucial to create robust indicators to track both the social determinants of mental disorders and the mental health status of populations and subpopulations (eg, men and women, old and young, susceptible groups) in a manner that is relevant for the existing SDG indicators. The current global indicators are insufficient to track crucial pathways, interventions, and outcomes for the prevention of mental disorders. In our view, the key risk and protective factors and their pathways identified in the table represent an important starting point for expanding the SDG indicator set.

This Review has highlighted several potential areas for future research. During the past 10 years, millions of dollars in research funding have been committed to assessing the treatment of mental disorders in low-resource settings, but little research has been done on interventions that might address the social determinants of mental disorders, or examining the mechanisms by which social determinants affect mental disorders and mental health at a population level. A range of intervention study designs are required: robust, randomised controlled trials to answer specific effectiveness and efficacy questions, qualitative research to address questions around context and culture, and mixed-method implementation science approaches to assess the scaling up of evidence-based interventions. Given the substantial heterogeneity noted in this Review, intervention developers need to understand this complexity and develop local contextual solutions rather than imposing universal solutions. Regarding observational research, there is an urgent need for adequately powered longitudinal studies, especially in low-income and middle-income settings, that integrate social, economic, and biological (particularly genetic) data. These multicentre longitudinal studies are required to shed more light on the mechanisms by which social determinants act on population mental health across the life course. Research into specific gene–environment interactions for different mental disorders, to understand the interplay between social and biological factors, will be a key approach for future research.[177] Additionally, we detected a dearth of research in some crucial areas, such as resilience in the context of social determinants and quantifying the links between the SDGs and positive aspects of mental health and wellbeing.

Finally, there are several major future social and economic trends and risks that might affect mental

disorders at the population level. Chief among these threats is the reality of climate change. Apart from the long-term threat to the survival of many species, including human beings, the early stages of climate change bring together several simultaneously interacting risk factors for mental health. The evidence for the effects of these threats is already available in the research literature presented in this Review, including economic insecurity, environmental events such as extreme weather, diminished social cohesion, violence, and income inequality. From a mental health perspective, we join the global call for urgent action on climate change.

Limitations

The following limitations of our study need to be acknowledged. First, although we put considerable effort into ensuring that the domains of the conceptual framework were coherent and minimised overlap, some degree of overlap is still present. Second, the broad search strategy limited the degree to which comparison across studies was possible and to which specific research questions related to individual mental disorders could be examined. Third, restricting eligible papers to reviews might mean that some social determinants of mental health are not covered. Fourth, it was difficult to standardise the rating of the strength of evidence for each factor in each domain (from 0 to 10). Fifth, not all SDGs fit neatly into each domain, and many applied across multiple domains. Nevertheless, we believe that the SDGs in the conceptual framework are linked to the domain for which they are most relevant, on the basis of available evidence and the premise that the SDGs are intended to be mutually reinforcing.[178] Sixth, we need to acknowledge that the SDGs did not set out to improve mental health, and their ambition addresses a far wider range of social, environmental, and economic goals. Our intention in this Review was to draw the attention of the international development community to the potential alignment of the SDGs with the goals of reducing the global burden of mental disorders.

Conclusion

Addressing the SDGs that are relevant for the social determinants of mental disorders requires a coordinated, truly global effort by governments, civil societies, and the private sector. The interruption of negative cycles of poverty, violence, environmental degradation, and mental disorders is possible, as is establishing virtuous cycles of mental health, wellbeing, and sustainable development. Evidence presented in this study indicates opportunities for action in demographic, economic, neighbourhood, environmental events, and social and cultural domains. This study is an initial effort to develop a framework, which we hope will provide a platform for further research in this area, focusing on mechanisms and opportunities for intervention.

Contributors

CL led the design of the study and the drafting of the Introduction, Discussion, and Conclusion sections. CB-S drafted the Methods section, did the literature searches and initial title and abstract reviews, and edited the data extraction tables. EB, ECB, and CK extracted the data and drafted the text for the demographic domain. CL and JH extracted the data and drafted the text for the economic domain. CB-S and WT extracted the data and drafted the text for the neighbourhood domain. MJ and MEM-M extracted the data and drafted the text for the environmental events domain. CB-S and PC extracted the data and drafted the text for the social and cultural domain. FB, HH, EM, OO, VP, and SS provided crucial input on the design, analysis, and drafting of the manuscript. All authors gave crucial input on drafts of the manuscript and checked and approved the final version.

Declaration of interests

CK has received authorship royalties from Brazilian publishers Artmed and Manole. EM reports grants from Johnson & Johnson, outside the submitted work. JH reports non-financial support from Pharmacy Solutions (Ann Arbor, MI, USA), outside the submitted work. All other authors declare no competing interests.

Acknowledgments

CL, CB-S, EB, ECB, MJ, and VP are supported by the UK Department for International Development, as part of the Programme for improving mental health care (201446). CK has received support from the Brazilian governmental research funding agencies (Conselho Nacional de Desenvolvimento Científico e Tecnológico, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, and Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul). HH has received support from the National Health and Medical Research Council of Australia. The views expressed in this study do not necessarily represent those of the funders. The funders had no role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

References

1 UN General Assembly. Resolution A/RES/70/1—Transforming our world: the 2030 agenda for sustainable development. New York, NY: United Nations, 2015.

2 GBD 2015 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; **388:** 1603–58.

3 Bloom DE, Cafiero ET, Jané-Llopis E, et al. The global economic burden of noncommunicable diseases. Geneva: World Economic Forum, 2011.

4 Chisholm D, Sweeny K, Sheehan P, et al. Scaling up treatment of depression and anxiety: a global return on investment analysis. *Lancet Psychiatry* 2016; **3:** 415–24.

5 WHO, Calouste Gulbenkian Foundation. Social determinants of mental health. Geneva: World Health Organization, 2014.

6 Blas E, Kurup AS. Equity, social determinants and public health programmes. Geneva: World Health Organization, 2010.

7 WHO. WHO Commission on the social determinants of health. Final report. 2008. http://apps.who.int/iris/bitstream/10665/43943/1/9789241563703_eng.pdf (accessed Feb 7, 2018).

8 Lund C, De Silva M, Plagerson S, et al. Poverty and mental disorders: breaking the cycle in low and middle-income countries. *Lancet* 2011; **378:** 1502–14.

9 Lund C, Stansfeld S, De Silva MJ. Social determinants of mental health. In: Patel V, Minas H, Cohen A, Prince M, eds. Global mental health: principles and practice. Oxford: Oxford University Press, 2014: 116–36.

10 Bronfenbrenner U. The ecology of human development: experiments by nature and design. Cambridge, MA: Harvard University Press, 1979.

11 Shea BJ, Grimshaw JM, Wells GA, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Methodol* 2007; **7:** 10.

12 Kouider EB, Petermann F. Common risk factors of depressive and anxiety symptomatics in childhood and adolescence: a systematic review from transdiagnostic perspectives. *Fortschr Neurol Psychiatr* 2015; **83:** 321–33 (in German).

13 Chen Y, Hicks A, While AE. Depression and related factors in older people in China: a systematic review. *Rev Clin Gerontol* 2012; **22:** 52–67.

14 Dopp RR, Lipson SK, Eisenberg D. Mental health among late adolescents and young adults from a population-level and clinical perspective. *Adolesc Med State Art Rev* 2013; **24:** 573–96.

15 Luppa M, Sikorski C, Luck T, et al. Age- and gender-specific prevalence of depression in latest-life—systematic review and meta-analysis. *J Affect Disord* 2012; **136:** 212–21.

16 Musliner KL, Munk-Olsen T, Eaton WW, Zandi PP. Heterogeneity in long-term trajectories of depressive symptoms: patterns, predictors and outcomes. *J Affect Disord* 2016; **192:** 199–211.

17 Sadeghirad B, Haghdoost AA, Amin-Esmaeili M, et al. Epidemiology of major depressive disorder in Iran: a systematic review and meta-analysis. *Int J Prev Med* 2010; **1:** 81–91.

18 Shah A. Psychiatry of old age and ethnic minority older people in the United Kingdom. *Rev Clin Gerontol* 2009; **19:** 119–34.

19 Baxter AJ, Scott KM, Vos T, Whiteford HA. Global prevalence of anxiety disorders: a systematic review and meta-regression. *Psychol Med* 2013; **43:** 897–910.

20 Qian J, Hu Q, Wan Y, et al. Prevalence of eating disorders in the general population: a systematic review. *Shanghai Arch Psychiatry* 2013; **25:** 212–22.

21 Cheng HG, Deng F, Xiong W, Phillips MR. Prevalence of alcohol use disorders in mainland China: a systematic review. *Addiction* 2015; **110:** 761–74.

22 Bale TL, Epperson CN. Sex differences and stress across the lifespan. *Nat Neurosci* 2015; **18:** 1413–20.

23 Merikangas KR, Nakamura EF, Kessler RC. Epidemiology of mental disorders in children and adolescents. *Dialogues Clin Neurosci* 2009; **11:** 7–20.

24 Fliege H, Lee JR, Grimm A, Klapp BF. Risk factors and correlates of deliberate self-harm behavior: a systematic review. *J Psychosom Res* 2009; **66:** 477–93.

25 Fazel S, Cartwright J, Norman-Nott A, Hawton K. Suicide in prisoners: a systematic review of risk factors. *J Clin Psychiatry* 2008; **69:** 1721–31.

26 Hor K, Taylor M. Suicide and schizophrenia: a systematic review of rates and risk factors. *J Psychopharmacol* 2010; **24** (suppl 4)**:** 81–90.

27 Hawton K, Comabella CCI, Haw C, Saunders K. Risk factors for suicide in individuals with depression: a systematic review. *J Affect Disord* 2013; **147:** 17–28.

28 Kieling C, Baker-Henningham H, Belfer M, et al. Child and adolescent mental health worldwide: evidence for action. *Lancet* 2011; **378:** 1515–25.

29 Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual research review: a meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *J Child Psychol Psychiatry* 2015; **56:** 345–65.

30 Rocha TB, Hutz MH, Salatino-Oliveira A, et al. Gene-environment interaction in youth depression: replication of the 5-HTTLPR moderation in a diverse setting. *Am J Psychiatry* 2015; **172:** 978–85.

31 Fiest KM, Jetté N, Roberts JI, et al. The prevalence and incidence of dementia: a systematic review and meta-analysis. *Can J Neurol Sci* 2016; **43** (suppl 1)**:** S03–50.

32 Alcantara C, Casement MD, Lewis-Fernandez R. Conditional risk for PTSD among Latinos: a systematic review of racial/ethnic differences and sociocultural explanations. *Clin Psychol Rev* 2013; **33:** 107–19.

33 Anderson ER, Mayes LC. Race/ethnicity and internalizing disorders in youth: a review. *Clin Psychol Rev* 2010; **30:** 338–48.

34 Balaratnasingam S, Roy M. Intellectual disability in Indigenous Australians: issues and challenges. *Australas Psychiatry* 2015; **23:** 641–43.

35 Barnes LL, Bennett DA. Alzheimer's disease in African Americans: risk factors and challenges for the future. *Health Aff (Millwood)* 2014; **33:** 580–86.

36 Bassett D, Buchwald D, Manson S. Posttraumatic stress disorder and symptoms among American Indians and Alaska Natives: a review of the literature. *Soc Psychiatry Psychiatr Epidemiol* 2014; **49:** 417–33.

37 Black EB, Ranmuthugala G, Kondalsamy-Chennakesavan S, Toombs MR, Nicholson GC, Kisely S. A systematic review: identifying the prevalence rates of psychiatric disorder in Australia's Indigenous populations. *Aust NZ J Psychiatry* 2015; **49:** 412–29.

38 Murray J, Anselmi L, Gallo EAG, Fleitlich-Bilyk B, Bordin IA. Epidemiology of childhood conduct problems in Brazil: systematic review and meta-analysis. *Soc Psychiatry Psychiatr Epidemiol* 2013; **48:** 1527–38.

39 Kirkbride JB, Errazuriz A, Croudace TJ, et al. Incidence of schizophrenia and other psychoses in England, 1950–2009: a systematic review and meta-analyses. *PLoS One* 2012; **7:** e31660.

40 Linscott RJ, van Os J. An updated and conservative systematic review and meta-analysis of epidemiological evidence on psychotic experiences in children and adults: on the pathway from proneness to persistence to dimensional expression across mental disorders. *Psychol Med* 2013; **43:** 1133–49.

41 Selten JP, Cantor-Graae E, Kahn RS. Migration and schizophrenia. *Curr Opin Psychiatry* 2007; **20:** 111–15.

42 Veling W. Ethnic minority position and risk for psychotic disorders. *Curr Opin Psychiatry* 2013; **26:** 166–71.

43 Dealberto MJ. Prevalence of autism according to maternal immigrant status and ethnic origin. *Acta Psychiatr Scand* 2011; **123:** 339–48.

44 Sullivan MM, Rehm R. Mental health of undocumented Mexican immigrants: a review of the literature. *ANS Adv Nurs Sci* 2005; **28:** 240–51.

45 Falah-Hassani K, Shiri R, Vigod S, Dennis CL. Prevalence of postpartum depression among immigrant women: a systematic review and meta-analysis. *J Psychiatr Res* 2015; **70:** 67–82.

46 Gilliver SC, Sundquist J, Li X, Sundquist K. Recent research on the mental health of immigrants to Sweden: a literature review. *Eur J Public Health* 2014; **24** (suppl 1)**:** 72–79.

47 Bourque F, van der Ven E, Malla A. A meta-analysis of the risk for psychotic disorders among first- and second-generation immigrants. *Psychol Med* 2011; **41:** 897–910.

48 Stirling K, Toumbourou JW, Rowland B. Community factors influencing child and adolescent depression: a systematic review and meta-analysis. *Aust NZ J Psychiatry* 2015; **49:** 869–86.

49 Shaw RJ, Atkin K, Becares L, et al. Impact of ethnic density on adult mental disorders: narrative review. *Br J Psychiatry* 2012; **201:** 11–19.

50 Priest N, Paradies Y, Trenerry B, Truong M, Karlsen S, Kelly Y. A systematic review of studies examining the relationship between reported racism and health and wellbeing for children and young people. *Soc Sci Med* 2013; **95:** 115–27.

51 Lund C, Breen A, Flisher AJ, et al. Poverty and common mental disorders in low and middle income countries: a systematic review. *Soc Sci Med* 2010; **71:** 517–28.

52 Kuruvilla A, Jacob KS. Poverty, social stress & mental health. *Indian J Med Res* 2007; **126:** 273–78.

53 Ortiz-Hernandez L, Lopez-Moreno S, Borges G. Socioeconomic inequality and mental health: a Latin American literature review. *Cad Saude Publica* 2007; **23:** 1255–72 (in Spanish).

54 Gelaye B, Rondon MB, Araya R, Williams MA. Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. *Lancet Psychiatry* 2016; **3:** 973–82.

55 Quon EC, McGrath JJ. Subjective socioeconomic status and adolescent health: a meta-analysis. *Health Psychol* 2014; **33:** 433–47.

56 Leone T, Coast E, Narayanan S, de Graft Aikins A. Diabetes and depression comorbidity and socio-economic status in low and middle income countries (LMICs): a mapping of the evidence. *Global Health* 2012; **8:** 39.

57 Iemmi V, Bantjes J, Coast E, et al. Suicide and poverty in low-income and middle-income countries: a systematic review. *Lancet Psychiatry* 2016; **3:** 774–83.

58 Cheng HG, Shidhaye R, Charlson F, et al. Social correlates of mental, neurological, and substance use disorders in China and India: a review. *Lancet Psychiatry* 2016; **3:** 882–99.

59 Dohrenwend BP, Levav I, Shrout PE, et al. Socioeconomic status and psychiatric disorders: the causation-selection issue. *Science* 1992; **255:** 946–52.

60 Yoshikawa H, Aber JL, Beardslee WR. The effects of poverty on the mental, emotional, and behavioral health of children and youth: implications for prevention. *Am Psychol* 2012; **67:** 272–84.

61 Gilman SE. Childhood socioeconomic status, life course pathways and adult mental health. *Int J Epidemiol* 2002; **31:** 403–04.

62 Kwok W. Is there evidence that social class at birth increases risk of psychosis? A systematic review. *Int J Soc Psychiatry* 2014; **60:** 801–08.

63 Das-Munshi J, Leavey G, Stansfeld SA, Prince MJ. Migration, social mobility and common mental disorders: critical review of the literature and meta-analysis. *Ethn Health* 2012; **17:** 17–53.

64 Kulik DM, Gaetz S, Crowe C, Ford-Jones E. Homeless youth's overwhelming health burden: a review of the literature. *Paediatr Child Health* 2011; **16:** e43–47.

65 Vameghi M, Rafiey H, Sajjadi H, Rashidian A. Disadvantages of being a street child in Iran: a systematic review. *Int J Adolesc Youth* 2014; **19:** 521–35.

66 Liddell C, Guiney C. Living in a cold and damp home: frameworks for understanding impacts on mental well-being. *Public Health* 2015; **129:** 191–99.

67 Kyle T, Dunn JR. Effects of housing circumstances on health, quality of life and healthcare use for people with severe mental illness: a review. *Health Soc Care Community* 2008; **16:** 1–15.

68 Nelson G, Aubry T, Lafrance A. A review of the literature on the effectiveness of housing and support, assertive community treatment, and intensive case management interventions for persons with mental illness who have been homeless. *Am J Orthopsychiatry* 2007; **77:** 350–61.

69 Marwaha S, Johnson S. Schizophrenia and employment—a review. *Soc Psychiatry Psychiatr Epidemiol* 2004; **39:** 337–49.

70 Marwaha S, Durrani A, Singh S. Employment outcomes in people with bipolar disorder: a systematic review. *Acta Psychiatr Scand* 2013; **128:** 179–93.

71 Milner A, Page A, LaMontagne AD. Cause and effect in studies on unemployment, mental health and suicide: a meta-analytic and conceptual review. *Psychol Med* 2014; **44:** 909–17.

72 Mollison E, Chaplin E, Underwood L, McCarthy J. A review of risk factors associated with suicide in adults with intellectual disability. *Adv Ment Health Intellec Disabil* 2014; **8:** 302–08.

73 Grantham-McGregor SM, Cheung YN, Cueto S, Glewwe P, Richter L, Strupp B. Developmental potential in the first 5 years for children in developing countries. *Lancet* 2007; **369:** 60–70.

74 Walker SP, Wachs TD, Gardner JM, Lozoff B, Wasserman GA, Pollitt E. Child development: risk factors for adverse outcomes in developing countries. *Lancet* 2007; **369:** 145–57.

75 Turunen E, Hiilamo H. Health effects of indebtedness: a systematic review. *BMC Public Health* 2014; **14:** 489.

76 Catalano R, Goldman-Mellor S, Saxton K, et al. The health effects of economic decline. *Annu Rev Public Health* 2011; **32:** 431–50.

77 Burns JK, Tomita A, Kapadia AS. Income inequality and schizophrenia: increased schizophrenia incidence in countries with high levels of income inequality. *Int J Soc Psychiatry* 2014; **60:** 185–96.

78 Bouffard L, Dube M. Mental income inequality: a "virus" which affects health and happiness. *Sante Ment Que* 2013; **38:** 215–33. (in French)

79 Pickett KE, James OW, Wilkinson RG. Income inequality and the prevalence of mental illness: a preliminary international analysis. *J Epidemiol Community Health* 2006; **60:** 646–47.

80 Rai D, Zitko P, Jones K, Lynch J, Araya R. Country- and individual-level socioeconomic determinants of depression: multilevel cross-national comparison. *Br J Psychiatry* 2013; **202:** 195–203.

81 Haushofer J, Shapiro J. The short-term impact of unconditional cash transfers to the poor: evidence from Kenya. *Q J Econ* 2016; **131:** 1973–2042.

82 Heffernan J, Pilkington P. Supported employment for persons with mental illness: systematic review of the effectiveness of individual placement and support in the UK. *J Ment Health* 2011; **20:** 368–80.

83 Charzyńska K, Kucharska K, Mortimer A. Does employment promote the process of recovery from schizophrenia? A review of the existing evidence. *Int J Occup Med Environ Health* 2015; **28:** 407–18.

84 Gottlieb L, Waitzkin H, Miranda J. Depressive symptoms and their social contexts: a qualitative systematic literature review of contextual interventions. *Int J Soc Psychiatry* 2011; **57:** 402–17.

85 Kinoshita Y, Furukawa TA, Kinoshita K, et al. Supported employment for adults with severe mental illness. *Cochrane Database Syst Rev* 2013; **9:** Cd008297.

86 Campbell M, Thomson H, Fenton C, Gibson M. Lone parents, health, wellbeing and welfare to work: a systematic review of qualitative studies. *BMC Public Health* 2016; **16:** 188.

87 Genter C, Roberts A, Richardson J, Sheaff M. The contribution of allotment gardening to health and wellbeing: a systematic review of the literature. *Br J Occup Ther* 2015; **78:** 593–605.

88 Ludwig J, Duncan GJ, Gennetian LA, et al. Neighborhood effects on the long-term well-being of low-income adults. *Science* 2012; **337:** 1505–10.

89 Truong KD, Ma S. A systematic review of relations between neighborhoods and mental health. *J Ment Health Policy Econ* 2006; **9:** 137–54.

90 O'Donoghue B, Roche E, Lane A. Neighbourhood level social deprivation and the risk of psychotic disorders: a systematic review. *Soc Psychiatry Psychiatr Epidemiol* 2016; **51:** 941–50.

91 Julien D, Richard L, Gauvin L, Kestens Y. Neighborhood characteristics and depressive mood among older adults: an integrative review. *Int Psychogeriatr* 2012; **24:** 1207–25.

92 Kim D. Blues from the neighborhood? Neighborhood characteristics and depression. *Epidemiol Rev* 2008; **30:** 101–17.

93 Richardson R, Westley T, Gariepy G, Austin N, Nandi A. Neighborhood socioeconomic conditions and depression: a systematic review and meta-analysis. *Soc Psychiatry Psychiatr Epidemiol* 2015; **50:** 1641–56.

94 Curtis S, Pain R, Fuller S, et al. Neighbourhood risk factors for common mental disorders among young people aged 10–20 years: a structured review of quantitative research. *Health Place* 2013; **20:** 81–90.

95 Wu YT, Prina AM, Brayne C. The association between community environment and cognitive function: a systematic review. *Soc Psychiatry Psychiatr Epidemiol* 2015; **50:** 351–62.

96 Perry DM, Tabb KM, Mendenhall R. Examining the effects of urban neighborhoods on the mental health of adolescent African American males: a qualitative systematic review. *J Negro Educ* 2015; **84:** 254–68.

97 Vassos E, Pedersen CB, Murray RM, Collier DA, Lewis CM. Meta-analysis of the association of urbanicity with schizophrenia. *Schizophr Bull* 2012; **38:** 1118–23.

98 Krabbendam L, van Os J. Schizophrenia and urbanicity: a major environmental influence—conditional on genetic risk. *Schizophr Bull* 2005; **31:** 795–99.

99 Padhy SK, Sarkar S, Davuluri T, Patra BN. Urban living and psychosis—an overview. *Asian J Psychiatr* 2014; **12:** 17–22.

100 Cantor-Graae E. The contribution of social factors to the development of schizophrenia: a review of recent findings. *Can J Psychiatry* 2007; **52:** 277–86.

101 Peen J, Schoevers RA, Beekman AT, Dekker J. The current status of urban-rural differences in psychiatric disorders. *Acta Psychiatr Scand* 2010; **121:** 84–93.

102 Renalds A, Smith TH, Hale PJ. A systematic review of built environment and health. *Fam Community Health* 2010; **33:** 68–78.

103 Mair C, Diez Roux AV, Galea S. Are neighbourhood characteristics associated with depressive symptoms? A review of evidence. *J Epidemiol Community Health* 2008; **62:** 940–46.

104 Paczkowski MM, Galea S. Sociodemographic characteristics of the neighborhood and depressive symptoms. *Curr Opin Psychiatry* 2010; **23:** 337–41.

105 Allardyce J, Boydell J. Review: the wider social environment and schizophrenia. *Schizophr Bull* 2006; **32:** 592–98.

106 Bosqui TJ, Hoy K, Shannon C. A systematic review and meta-analysis of the ethnic density effect in psychotic disorders. *Soc Psychiatry Psychiatr Epidemiol* 2014; **49:** 519–29.

107 Won J, Lee C, Forjuoh SN, Ory MG. Neighborhood safety factors associated with older adults' health-related outcomes: a systematic literature review. *Soc Sci Med* 2016; **165**: 177–86.

108 Lorenc T, Clayton S, Neary D, et al. Crime, fear of crime, environment, and mental health and wellbeing: mapping review of theories and causal pathways. *Health Place* 2012; **18:** 757–65.

109 Ribeiro WS, Andreoli SB, Ferri CP, Prince M, Mari JJ. Exposure to violence and mental health problems in low and middle-income countries: a literature review. *Rev Bras Psiquiatr* 2009; **31** (suppl 2)**:** S49–57 (in Portuguese).

110 McDonald CCM, Richmond TR. The relationship between community violence exposure and mental health symptoms in urban adolescents. *J Psychiatr Ment Health Nurs* 2008; **15:** 833–49.

111 Blizzard SJ, Kemppainen J, Taylor J. Posttraumatic stress disorder and community violence: an update for nurse practitioners. *J Am Acad Nurse Pract* 2009; **21:** 535–41.

112 Aisenberg E, Herrenkohl T. Community violence in context: risk and resilience in children and families. *J Interpers Violence* 2008; **23:** 296–315.

113 Albdour M, Krouse HJ. Bullying and victimization among African American adolescents: a literature review. *J Child Adolesc Psychiatr Nurs* 2014; **27:** 68–82.

114 Fowler PJ, Tompsett CJ, Braciszewski JM, Jacques-Tiura AJ, Baltes BB. Community violence: a meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. *Dev Psychopathol* 2009; **21:** 227–59.

115 Kelly S. The psychological consequences to adolescents of exposure to gang violence in the community: an integrated review of the literature. *J Child Adolesc Psychiatr Nurs* 2010; **23:** 61–73.

116 Biglan A, Hinds E. Evolving prosocial and sustainable neighborhoods and communities. *Ann Rev Clin Psychol* 2009; **5:** 169–96.

117 UN International Strategy for Disaster Reduction. 2009 UNISDR terminology on disaster risk reduction. New York, NY: United Nations, 2009.

118 Goldman E, Galea S. Mental health consequences of disasters. *Annu Rev Publlic Health* 2014; **35:** 169–83.

119 Salguero J, Fernández-Berrocal P, Iruarrizaga I. Major depressive disorder following terrorist attacks: a systematic review of prevalence, course and correlates. *BMC Psychiatry* 2011; **11:** 96–107.

120 Ba I, Bhopal RS. Physical, mental and social consequences in civilians who have experienced war-related sexual violence: a systematic review (1981–2014). *Public Health* 2017; **142:** 121–35.

121 Ottisova L, Hemmings S, Howard LM, Zimmerman C, Oram S. Prevalence and risk of violence and the mental, physical and sexual health problems associated with human trafficking: an updated systematic review. *Epidemiol Psychiatr Sci* 2016; **25:** 317–41.

122 Reed R, Fazel M, Jones L, Panter-Brick C, Stein A. Mental health of displaced and refugee children resettled in low-income and middle-income countries: risk and protective factors. *Lancet* 2012; **379:** 250–65.

123 Steel Z, Chey T, Silove D, Marnane C, Bryant R, van Ommeren M. Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflict and displacement. *JAMA* 2009; **302:** 537–49.

124 Bonde J, Utzon-Frank N, Bertelsen M, et al. Risk of depressive disorder following disasters and military deployment: systematic review with meta-analysis. *Br J Psychiatry* 2016; **208:** 330–36.

125 Crabtree A. Climate change and mental health following flood disasters in developing countries, a review of the epidemiological literature: what do we know, whats is being recommended? *Austral J Dis Trauma Stud* 2012; **1:** 21–29.

126 Dai W, Chen L, Lai Z, Li Y, Wang J, Liu A. The incidence of post-traumatic stress disorder among survivors after earthquakes: a systematic review and meta-analysis. *BMC Psychiatry* 2016; **16:** 188–99.

127 Slone M, Mann S. Effects of war, terrorism and armed conflict on young children: a systematic review. *Child Psychiatry Hum Dev* 2016; **47:** 950–65.

128 Attanayake V, McKay R, Joffres M, Singh S, Burkle F Jr, Mills E. Prevalence of mental disorders among children exposed to war: a systematic review of 7920 children. *Med Confl Surviv* 2009; **25:** 4–19.

129 Liu J, Liu X, Wang W, et al. Blood lead concentrations and children's behavioral and emotional problems: a cohort study. *JAMA Pediatr* 2014; **168:** 737–45.

130 Fernandez A, Black J, Jones M, et al. Flooding and mental health: a systematic mapping review. *PLoS One* 2015; **10:** e0119929.

131 Latif F, Yeatermeyer J, Horne Z, et al. Psychological impact of nuclear disasters in children and adolescents. *Child Adolesc Psychiatric Clin N Am* 2015; **24:** 811–22.

132 Bogic M, Njoku A, Priebe S. Long-term mental health of war-refugees: a systematic literature review. *BMC Int Health Hum Rights* 2015; **15:** 29.

133 Tol W. Mental health and psychosocial support in humanitarian settings: linking practice and research. *Lancet* 2011; **378:** 1–11.

134 Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: a systematic review. *Psychol Med* 2008; **38:** 467–80.

135 Xu J, Zhang Y, Liu B, Xue L. Risk perception in natural disaster management. 2014 Tech4Dev International Conference; Lausanne, Switzerland; June 4–6, 2014. TH2-SE02-01.

136 Roberts B, Browne J. A systematic review of factors influencing the psychological health of conflict-affected populations in low- and middle-income countries. *Glob Public Health* 2011; **6:** 814–29.

137 North C, Pfefferbaum B. Mental health response to community disasters: a systematic review. *JAMA* 2013; **310:** 507–18.

138 Kirmayer L, Narasiah L, Munoz M, et al. Common mental health problems in immigrants and refugees: general approach in primary care. *CMAJ* 2011; **183:** 959–67.

139 Porter M, Haslam N. Predisplacement and postdisplacement factors associated with mental health of refugees and internally displaced persons: a meta-analysis. *JAMA* 2005; **294:** 602–12.

140 Rodriguez-Llanes J, Vos F, Guha-Sapir D. Measuring psychological resilience to disasters: are evidence-based indicators and achievable goal? *Environ Health* 2013; **12:** 115–36.

141 Dieltjens T, Moonens I, Van Praet K. A systematic literature search on psychological first aid: lack of evidence to develop guidelines. *PLoS One* 2014; **9:** e114714.

142 Gwozdziewycz N, Mehl-Madrona L. Meta-analysis of the use of narrative exposure therapy for the effects of trauma among refugee populations. *Perm J* 2013; **17:** 70–76.

143 Mundt AP, Wünsche P, Heinz A, Pross C. Evaluating interventions for posttraumatic stress disorder in low and middle income countries: narrative exposure therapy. *Interv J* 2014; **12:** 250–66.

144 Weiss WM, Murray LK, Zangana GAS, et al. Community-based mental health treatments for survivors of torture and militant attacks in Southern Iraq: a randomized control trial. *BMC Psychiatry* 2015; **15:** 1–16.

145 Tol WA, van Ommeren M. Evidence mental health and psychosocial support im humanitarian settings: gaps and opportunities. *Evid Based Ment Health* 2012; **15:** 25–26.

146 Beydoun MA, Beydoun HA, Gamaldo AA, Teel A, Zonderman AB, Wang Y. Epidemiologic studies of modifiable factors associated with cognition and dementia: systematic review and meta-analysis. *BMC Public Health* 2014; **14:** 643.

147 Dong MJ, Peng B, Lin XT, Zhao J, Zhou YR, Wang RH. The prevalence of dementia in the People's Republic of China: a systematic analysis of 1980–2004 studies. *Age Ageing* 2007; **36:** 619–24.

148 Bennett DA, Arnold SE, Valenzuela MJ, Brayne C, Schneider JA. Cognitive and social lifestyle: links with neuropathology and cognition in late life. *Acta Neuropathol* 2014; **127:** 137–50.

149 Nitrini R, Bottino CMC, Albala C, et al. Prevalence of dementia in Latin America: a collaborative study of population-based cohorts. *Int Psychogeriatr* 2009; **21:** 622–30.

150 Paradise M, Cooper C, Livingston G. Systematic review of the effect of education on survival in Alzheimer's disease. *Int Psychogeriatr* 2009; **21:** 25–32.

151 Chang-Quan H, Zheng-Rong W, Yong-Hong L, Yi-Zhou X, Qing-Xiu L. Education and risk for late life depression: a meta-analysis of published literature. *Int J Psychiatry Med* 2010; **40:** 109–24.

152 Esch P, Bocquet V, Pull C, et al. The downward spiral of mental disorders and educational attainment: a systematic review on early school leaving. *BMC Psychiatry* 2014; **14:** 237.

153 Li Z, Page A, Martin G, Taylor R. Attributable risk of psychiatric and socio-economic factors for suicide from individual-level, population-based studies: a systematic review. *Soc Sci Med* 2011; **72:** 608–16.

154 Howard LM, Oram S, Galley H, Trevillion K, Feder G. Domestic violence and perinatal mental disorders: a systematic review and meta-analysis. *PLoS Med* 2013; **10:** e1001452.

155 Satyanarayana VA, Chandra PS, Vaddiparti K. Mental health consequences of violence against women and girls. *Curr Opin Psychiatry* 2015; **28:** 350–56.

156 Nilaweera I, Doran F, Fisher J. Prevalence, nature and determinants of postpartum mental health problems among women who have migrated from South Asian to high-income countries: a systematic review of the evidence. *J Affect Disord* 2014; **166:** 213–26.

157 Wittkowski A, Gardner PL, Bunton P, Edge D. Culturally determined risk factors for postnatal depression in Sub-Saharan Africa: a mixed method systematic review. *J Affect Disord* 2014; **163:** 115–24.

158 Fisher J, Cabral de Mello M, Patel V, et al. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review. *Bull World Health Organ* 2012; **90:** 139–49H.

159 Kazan D, Calear AL, Batterham PJ. The impact of intimate partner relationships on suicidal thoughts and behaviours: a systematic review. *J Affect Disord* 2016; **190:** 585–98.

160 Biaggi A, Conroy S, Pawlby S, Pariante CM. Identifying the women at risk of antenatal anxiety and depression: a systematic review. *J Affect Disord* 2016; **191:** 62–77.

161 van der Waerden JE, Hoefnagels C, Hosman CM. Psychosocial preventive interventions to reduce depressive symptoms in low-SES women at risk: a meta-analysis. *J Affect Disord* 2011; **128:** 10–23.

162 Mead N, Lester H, Chew-Graham C, Gask L, Bower P. Effects of befriending on depressive symptoms and distress: systematic review and meta-analysis. *Br J Psychiatry* 2010; **196:** 96–101.

163 Burt SA. Rethinking environmental contributions to child and adolescent psychopathology: a meta-analysis of shared environmental influences. *Psychol Bull* 2009; **135:** 608–37.

164 Cerdá M, Sagdeo A, Johnson J, Galea S. Genetic and environmental influences on psychiatric comorbidity: a systematic review. *J Affect Disord* 2010; **126:** 14–38.

165 Santini ZI, Koyanagi A, Tyrovolas S, Mason C, Haro JM. The association between social relationships and depression: a systematic review. *J Affect Disord* 2015; **175:** 53–65.

166 Nyqvist F, Forsman AK, Giuntoli G, Cattan M. Social capital as a resource for mental well-being in older people: a systematic review. *Aging Ment Health* 2013; **17:** 394–410.

167 Ehsan AM, De Silva MJ. Social capital and common mental disorder: a systematic review. *J Epidemiol Community Health* 2015; **69:** 1021–28.

168 Gayer-Anderson C, Morgan C. Social networks, support and early psychosis: a systematic review. *Epidemiol Psychiatr Sci* 2013; **22:** 131–46.

169 US Department of Health and Human Services. Mental health: culture, race and ethnicity—a supplement to Mental health: a report of the surgeon general. Rockville, MD: US Department of Health and Human Services, 2001.

170 Bhugra D, Becker MA. Migration, cultural bereavement and cultural identity. *World Psychiatry* 2005; **4:** 18–24.

171 Araújo BY, Borrell LN. Understanding the link between discrimination, mental health outcomes, and life chances among Latinos. *Hisp J Behav Sci* 2006; **28:** 245–66.

172 Klomek AB, Sourander A, Elonheimo H. Bullying by peers in childhood and effects on psychopathology, suicidality, and criminality in adulthood. *Lancet Psychiatry* 2015; **2:** 930–41.

173 Kuiper JS, Zuidersma M, Oude Voshaar RC, et al. Social relationships and risk of dementia: a systematic review and meta-analysis of longitudinal cohort studies. *Ageing Res Rev* 2015; **22:** 39–57.

174 Schwarzbach M, Luppa M, Forstmeier S, König HH, Riedel-Heller SG. Social relations and depression in late life—a systematic review. *Int J Geriatr Psychiatry* 2014; **29:** 1–21.

175 Best P, Manktelow R, Taylor B. Online communication, social media and adolescent wellbeing: a systematic narrative review. *Child Youth Serv Rev* 2014; **41:** 27–36.

176 Aboujaoude E, Savage MW, Starcevic V, Salame WO. Cyberbullying: review of an old problem gone viral. *J Adolesc Health* 2015; **57:** 10–18.

177 Hidaka BH. Depression as a disease of modernity: explanations for increasing prevalence. *J Affect Disord* 2012; **140:** 205–14.

178 Griggs DJ, Nilsson M, Stevance A, McCollum D, eds. A guide to SDG interactions: from science to implementation. Paris: International Council for Science, 2017.