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Review of Major Social Determinants of Health in Schizophrenia-Spectrum Psychotic Disorders: I. Clinical Outcomes

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Background: Social determinants of health (SDoHs) are receiving growing attention and are particularly relevant to persons with schizophrenia-spectrum psychotic disorders (SSPDs), considering their heightened risk of comorbidities, cognitive and functional decline, and early mortality. Yet, we did not find any comprehensive review of multiple SDoHs in SSPD. **Study Design:** We conducted a scoping review of meta-analyses and systematic reviews of nine major SDoHs in SSPD. **Study Results:** Childhood abuse, parental psychopathology, parental communication problems, bullying, and urban settings with lower socioeconomic status were major risk factors for the greater incidence of SSPD and/or worse health. Social network size was inversely associated with overall psychopathology and negative symptoms. Experiences of racial/ethnic discrimination correlated with the prevalence of psychotic symptoms and experiences. Compared to native populations, the risk of psychosis was higher in immigrants, refugees, and asylees. Social fragmentation was associated with an increased prevalence of schizophrenia. Homeless populations had a 30-fold higher prevalence of schizophrenia than the general population. Seriously mentally ill people were 2.7 times more likely to report food insecurity than controls. The prevalence of non-affective psychosis in prisoners was 2.0%–6.5%, compared to 0.3% in the general population. Certain potentially positive factors like family and

community resilience remain poorly studied. **Conclusions:** SDoHs are associated with higher rates of and worse outcomes in SSPD. Well-designed longitudinal studies are needed to understand SDoHs' contribution to health in persons with SSPD, to develop interventions, and to implement changes in clinical care and public health policies that would reduce adverse health impacts of SDoHs. Positive SDoHs deserve greater attention.

Key words: childhood trauma/social connections/racism/migration/poverty/homelessness

Introduction

Environmental, social, and structural factors that affect incidence, prevalence, and prognosis of diseases as well as health inequities are labeled social determinants of health (SDoHs). According to the World Health Organization (WHO), SDoHs are the conditions in which people are born, grow, work, live, and age, as well as the wider set of forces and systems that shape the conditions of everyday life.¹ SDoHs reportedly account for 30%–55% of health outcomes, exceeding the contribution from medical factors.^{2,3} SDoHs also have an important influence on potentially avoidable health disparities within and between countries. Commonly listed SDoHs

include early-life adversities, social connections, poverty, structural racism, migration, and food insecurity. Social determinants can influence the onset age for psychosis in those at risk and worsen chronic morbidities associated with schizophrenia-spectrum psychotic disorders (SSPDs).

In recent years, there has been growing interest in social determinants of *mental health* that are relevant to serious mental illnesses (SMIs) such as SSPD.⁴⁻⁶ Schizophrenia is a brain disease with many genetic and biological underpinnings. Yet, a number of social factors impact the development and course of the illness. For example, childhood traumas, socioeconomic barriers, and social exclusion increase the risk of SSPD, whereas social support, being married, and having early access to treatment improve the chances of remission.^{7,8} Numerous papers have been written on the association of schizophrenia with different social factors mentioned above, although the broad perspectives of SDoHs have been rarely employed. We did not find any scholarly review of SDoHs related to SSPD. Therefore, we sought to conduct a scoping review of the impact of SDoHs on SSPD, their incidence/prevalence, and related clinical outcomes.

Methods

Literature Search, Inclusion Criteria, and Data Extraction

We opted to perform a scoping review of the literature and prepared a list of commonly included SDoHs relevant to schizophrenia.^{2-5,9-11} The list of proposed SDoHs has grown considerably.¹² An organized framework for considering various SDoHs is clearly warranted. See [figure 1](#) for the search terms and databases used. Our list was developed via consensus among the co-authors and was made to highlight potentially malleable major factors that could be addressed in a clinical setting. We selected the most recently published meta-analyses for the selected nine SDoHs: early-life adversities, social disconnection, racism (racial/ethnic discrimination), disadvantaged neighborhoods (urbanicity and lower socioeconomic status), migration (immigrants, refugees, asylees), social fragmentation, homelessness, food insecurity, and incarceration.

A total of 1363 articles were found. After the removal of 477 duplicates and 785 articles after title/abstract screening, 101 full texts were examined. Of the 101 articles, 13 met the inclusion criteria ([figure 1](#)). These criteria were: (1) the article had to be an umbrella review or meta-analysis (when the topic was not sufficiently covered, a systematic review was chosen), (2) if multiple meta-analyses were found, the most recently published article was chosen, (3) at least one of the nine SDoHs was examined, and (4) included people with SSPD—ie, with schizophrenia spectrum disorders except for schizotypal personality disorder.¹³ Umbrella reviews were chosen

over meta-analyses when available. See Supplementary material 1 for a list of articles that were not included in our review, but could be considered relevant SDoHs.

The data extracted included: (1) author/year and study type, (2) number of studies included in the meta-analysis, (3) sample size, (4) which SDoH(s) was/were measured, (5) study outcomes, (6) whether between-study variance, publication bias, quality of the included studies, or subanalyses/sensitivity analyses were conducted, and (7) results of the meta-analysis with estimates and effect sizes when available (estimates = odds ratios [OR], incidence rate ratios [IRR]; effect sizes = Hedge's *g*, Cohen's *d*, Pearson's *r*, standardized mean difference, relative risk or risk ratio [RR]). When possible, 95% confidence intervals were provided in brackets.

Results

Below we summarize the results of meta-analyses and systematic reviews of the above-mentioned SDoHs ([table 1](#)).

Early-Life Adversities

Varchmin et al.'s¹⁴ umbrella review included 11 meta-analyses and focused on childhood adversities, the experience of racial/ethnic discrimination, and migration. (The latter two topics are discussed elsewhere in this article.) The authors found that experiencing childhood adversities was associated with developing non-affective psychosis later in adulthood (OR = 2.81 [2.03, 3.83]), with a medium effect size ($d = 0.57$ [0.39, 0.74]). Of the specific types of childhood trauma, emotional abuse displayed the strongest association with psychosis ($d = 0.77$ [0.53, 1.01]), followed by physical abuse ($d = 0.63$ [0.51, 0.74]), sexual abuse ($d = 0.50$ [0.39, 0.62]), and neglect ($d = 0.47$ [0.34, 0.60]). Other predictors were variations in parental communication ($d = 0.97$ [0.76, 1.18]), bullying in childhood ($d = 0.49$ [0.37, 0.62]), and parental death ($d = 0.12$ [0.04, 0.21]). Davies et al.'s¹⁵ systematic review and meta-analysis examined the association of 98 prenatal or perinatal risk and protective factors with psychosis spectrum disorders in 152 studies. Major risk factors included maternal (OR = 4.60 [2.74, 7.73]) or paternal (OR = 2.73 [2.33, 3.19]) psychopathology, especially maternal psychosis (OR = 7.61 [6.29, 9.21]); of course, these are also genetic/biological factors.

Social Disconnection

Social disconnection reflects poor social network, which is defined as “the specific set of linkages among a defined set of persons or, alternatively, the set of relationships of a particular individual.”¹⁶ A small or absent social network reflecting social isolation is a known risk factor for worse health and premature all-cause mortality.¹⁷ Degnan et al.¹⁸ conducted a systematic review

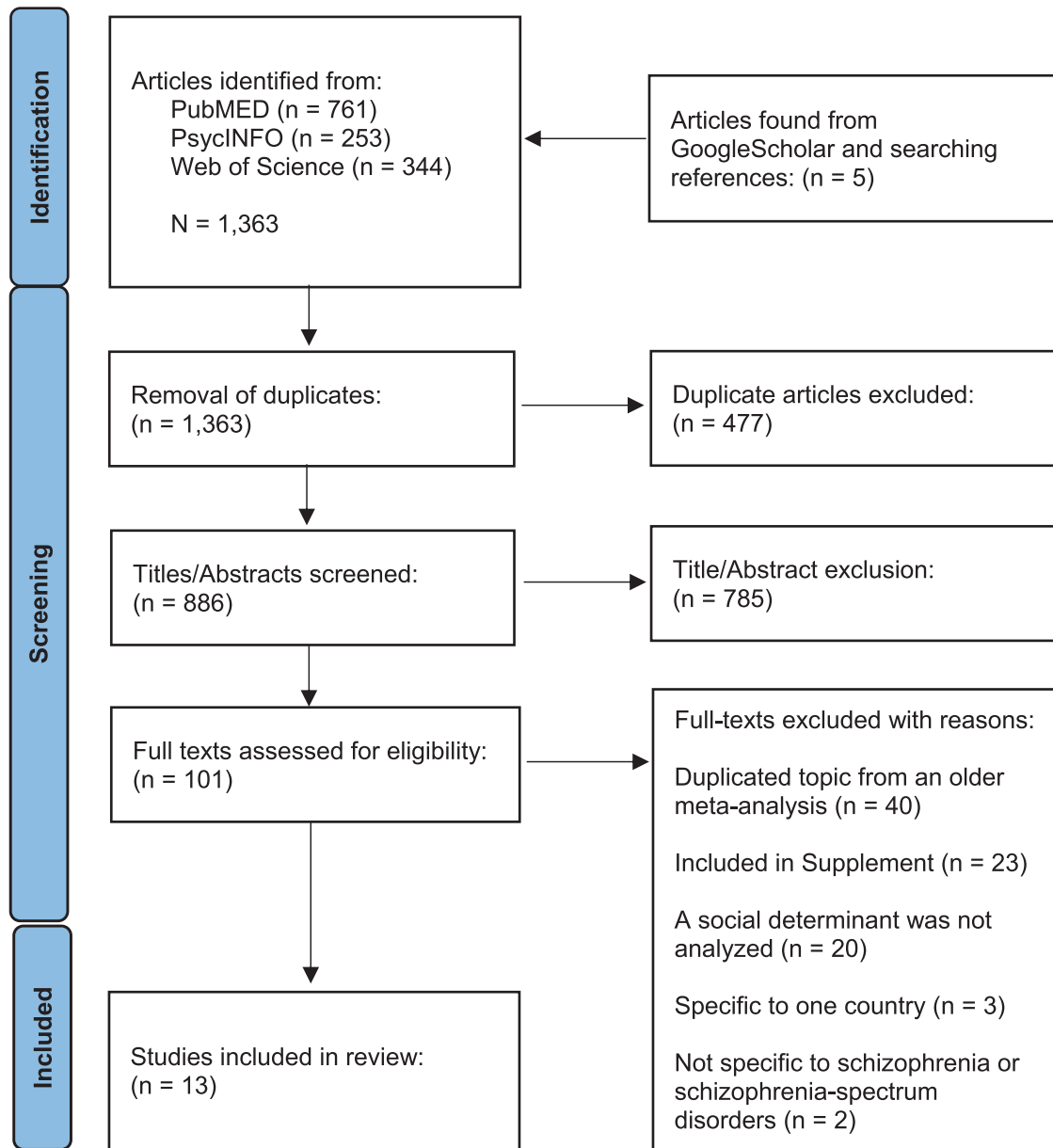


Fig. 1. Prisma flow chart. Note: Originally, we sought to conduct a systematic review of SDoHs in schizophrenia using three electronic databases—PsycINFO, PubMed, and Web of Science, in July 2022. Key terms included “schizophrenia” OR “schizoaffective” AND “social determinant”. A total of 328 articles were found, and 259 were screened for selection following a deletion of duplicates. After reviewing abstracts and full texts, we found that no article measuring specific SdoHs, that included the search term “social determinant” in their abstracts or texts, despite measuring individual domains within the construct. Therefore, we completed the following search below in PubMed, PsycINFO, and Web of Science and transitioned to a scoping review framework. Search Terms: ((schizophrenia OR “schizophrenia-spectrum disorder”) AND (meta-analysis) AND (“social network” OR “social isolation” OR “social support” OR “emotional support” OR “instrumental support” OR “relationship quality” OR “marital” OR “social fragmentation” OR “abuse” OR “neglect” OR “adversity” OR “discrimination” OR “racism” OR “prison*” OR “imprison*” OR “incarcerat*” OR “prenatal” OR “perinatal” OR “immigration” OR “migration” OR “refugee” OR “displace*” OR “rural*” OR “urban*” OR “educational quality” OR “educational access” OR “employ*” OR “occupational environment” OR “vocational environment” OR “work environment” OR “food insecurity” OR “food desert” OR “homeless*” OR “houseless*” OR “unhoused” OR “healthcare” OR “insurance” OR “socioeconomically deprived” OR “poverty” OR “impoverish*” OR “socioeconomic” OR “stigma*” OR “victim*” OR “neighborhood” OR “environment” OR “community” OR “religio*” OR “spirit*))

and meta-analysis of studies that had at least one quantitative measure of social network size and severity of overall psychiatric symptoms, positive symptoms,

negative symptoms, and social functioning. Sixteen eligible articles had a total sample size of 1929. Social network size was significantly and inversely associated with

Table 1. Summary of Meta-analyses, Umbrella Reviews, and Systematic Reviews for Selected Social Determinants of Health in Schizophrenia

Author (Year) *Study type	# Studies included	Sample size	Social determinants of health	Outcome(s)	Methods	Findings
Social connection/isolation Degnan et al. (2018)	16	1,929	Social network size	Overall psychiatric symptoms	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes	Social network size was inversely associated with overall psychiatric symptoms (Hedge's $g = -0.53$ [$-0.88, -0.18$]) and severity of negative symptoms ($g = -0.75$ [$-1.00, -0.51$]), but not with positive symptoms ($g = -0.19$ [$-0.49, 0.11$]) or social functioning ($g = 0.36$ [$-0.08, 0.80$]).
Meta-analysis				Positive symptoms Negative symptoms		
Ku et al. (2021) Systematic review	19	N/A	Social fragmentation	Incidence of first episode psychosis Schizophrenia prevalence	Measured: Between-study variance? N/A Publication bias? N/A Quality assessment? Yes Sensitivity analyses? N/A	There were 4- and 12-times higher rates of schizophrenia prevalence and first admission for psychosis, respectively, in areas with the highest compared to the lowest measures of social fragmentation.
Life experiences/events Fazel and Seewald (2012) Meta-analysis	25	33,588	Incarceration	Prevalence of psychosis	Measured: Between-study variance? Yes Publication bias? No Quality assessment? No Sensitivity analyses? Yes	The pooled prevalence of all forms of psychosis was 3.6% [3.1%, 4.2%] in male-identifying incarcerated individuals and 3.9% [2.7%, 5.0%] in female-identifying incarcerated individuals.
Prins (2014) Systematic review	28	>200,000	Incarceration	Prevalence of schizophrenia	Measured: Between-study variance? N/A Publication bias? N/A Quality assessment? No Sensitivity analyses? N/A	The prevalence of schizophrenia ranged from 2.0% to 6.5% in incarcerated individuals.
Radua et al. (2018) Umbrella review	First-generation immigrant = 42 Second-generation immigrant = 26	First-generation immigrant = 25,063 Second-generation immigrant = 28,753	Immigration	Incidence of psychosis	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes	Second generation immigrants and racial/ethnic minorities living in low ethnic density areas were considered to be two of the six "highly suggestive" risk factors, while first generation immigrants and racial/ethnic minorities living in high ethnic density areas were two of the nine "suggestive" risk factors.
Bardol et al. (2020) Meta-analysis	17	33,211	Racial/Ethnic discrimination	Psychotic experiences Psychotic symptoms	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes	Perceived racial/ethnic discrimination was associated with psychotic symptoms (OR = 1.82 [1.41, 2.36]) and psychotic experiences (OR = 1.94 [1.42, 2.67]).
Davies et al. (2020) Meta-analysis	Maternal psychopathology = 9 Maternal psychosis = 6 Paternal psychopathology = 5	N/A	Maternal psychopathology Maternal psychosis Paternal psychopathology	Psychotic disorder diagnosis of offspring	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes	Maternal (OR = 4.60 [2.74, 7.73]) or paternal (OR = 2.73 [2.33, 3.19]) psychopathology, especially maternal psychosis (OR = 7.61 [6.29, 9.21]) was associated with offspring developing a psychotic disorder.

Table 1. Continued

Author (Year) *Study type	# Studies included	Sample size	Social determinants of health	Outcome(s)	Methods	Findings
Henssler et al. (2020) Meta-analysis	First-generation immigrant = 20 Second-generation immigrant = 13 Both generations combined = 2	N/A	Immigration	Incidence of schizophrenia or non-affective psychosis	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes	Restricting analyses to low risk-of-bias studies, the RR of incident non-affective psychosis was 1.81 [1.62, 2.02] in immigrants compared to non-immigrants. Among first-generation immigrants specifically, RR was 1.81 [1.59, 2.07] compared to the native population, and 1.82 [1.66, 1.99] among second-generation immigrants. Experiencing childhood adversities was associated with developing non-affective psychosis later in adulthood (OR = 2.81 [2.03, 3.83]), with a medium effect size ($d = 0.57$ [0.39, 0.74]). Emotional abuse displayed the strongest association with psychosis ($d = 0.77$ [0.53, 1.01]), followed by physical abuse ($d = 0.63$ [0.51, 0.74]), sexual abuse ($d = 0.50$ [0.39, 0.62]), and neglect ($d = 0.47$ [0.34, 0.60]). Other predictors were variations in parental communication ($d = 0.97$ [0.76, 1.18]), bullying in childhood ($d = 0.49$ [0.37, 0.62]), and parental death ($d = 0.12$ [0.04, 0.21]).
Varchmin et al. (2021) Umbrella review	11 meta-analyses	N/A	Emotional abuse Physical abuse Sexual abuse Neglect Bullying in childhood Parental death Variations in parental communication	Incidence of psychosis	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes	
Access Castillejos et al. (2018) Meta-analysis	Urbanicity = 8 Socioeconomic area = 4	N/A	Living in an urban versus rural area Living in a socioeconomically deprived area	Incidence of psychotic disorders	Measured: Between-study variance? Yes Publication bias? No Quality assessment? Yes Sensitivity analyses? No	For overall psychosis, the incidence rates for urban and rural settings were 30.46 [17.20, 43.72] and 17.80 [14.95, 20.65] per 100,000, respectively. The IRR for living in an urban setting was 1.64 (1.38, 1.95). The incidence rates for living in a lower or higher socioeconomic area were 34.40 [20.89, 47.90] and 24.74 [10.03, 39.46] per 100,000, respectively; the IRR for living in a lower socioeconomic area was 1.78 [1.43, 2.22].

Table 1. Continued

Author (Year) *Study type	# Studies included	Sample size	Social determinants of health	Outcome(s)	Methods	Findings
Ayano et al. (2019) Meta-analysis	31	51,925	Homelessness	Prevalence of schizophrenia and other psychotic disorders	Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes Measured: Between-study variance? Yes	Among adults experiencing homelessness, prevalence rates were: overall psychosis (21.2% [13.7%, 31.3%]), schizophrenia (10.3% [6.4%, 16.0%]), schizophreniform disorder (2.5% [6.2%, 28.1%]), schizoaffective disorder (3.5% [1.3%, 9.1%]), and psychotic disorders not otherwise specified (9% [6.9%, 11.6%]). The pooled prevalence of a current mental disorder was 76.2% [64.0%, 86.6%].
Gutwinski et al. (2021) Meta-analysis	Schizophrenia = 35	N/A	Homelessness in high-income countries as classified by the World Bank	Prevalence of psychiatric disorders	Publication bias? No Quality assessment? Yes	Schizophrenia spectrum disorders was found in 12.4% [9.5%, 15.7%] of homeless persons.
Teasdale et al. (2021) Meta-analysis	31	N/A	Food insecurity	Food insecurity was measured in persons with schizophrenia and related psychoses	Sensitivity analyses? Yes Measured: Between-study variance? Yes Publication bias? Yes Quality assessment? Yes Sensitivity analyses? Yes	The prevalence of food insecurity in schizophrenia and related psychoses ranged from 25.3% to 71.4% (median 45%). Adults living with serious mental illness were 2.71 [2.27, 3.24] times more likely to report food insecurity than non-psychiatric controls/general populations.

Note. Umbrella reviews (ie, meta-analysis of meta-analyses) were preferred. When an umbrella review or meta-analysis was not found, the most recent systematic review was chosen.

Abbreviations: OR = odds ratio; RR = relative risk or risk ratio

overall psychiatric symptoms ($g = -0.53 [-0.88, -0.18]$) and severity of negative symptoms ($g = -0.75 [-1.00, -0.51]$), but not with positive symptoms ($g = -0.19 [-0.49, 0.11]$) or social functioning ($g = 0.36 [-0.08, 0.80]$).

Racism (Racial/Ethnic Discrimination)

Racism can occur at multiple levels; structural racism refers specifically to how society and its systems cause avoidable and unfair inequities in access to power, resources, capacities, and opportunities for marginalized groups.¹⁹ Racial/ethnic discrimination is a major contributor to adverse physical and mental health outcomes in marginalized groups. Bardol et al.'s²⁰ systematic review and meta-analysis reported a significant association between perceived racial/ethnic discrimination and psychotic symptoms (OR = 1.82 [1.41, 2.36]) and psychotic experiences (OR = 1.94 [1.42, 2.67]).

Disadvantaged Neighborhoods (Urbanicity and Lower Socioeconomic Status)

Castillejos et al.²¹ conducted a systematic review and meta-analysis of 33 articles from 13 countries, pertaining to several SDoHs related to the incidence of psychosis. Two SDoHs examined that are not covered elsewhere in the present article, were urbanicity and socioeconomic status. For overall psychosis, the incidence rates for urban and rural settings were 30.46 [17.20, 43.72] and 17.80 [14.95, 20.65] per 100 000, respectively. The IRR for living in an urban setting was 1.64 (1.38, 1.95). The incidence rates for living in a lower or higher socioeconomic area were 34.40 [20.89, 47.90] and 24.74 [10.03, 39.46] per 100 000, respectively; the IRR for living in a lower socioeconomic area was 1.78 [1.43, 2.22].

Migration (Immigrants, Refugees, Asylees)

Radua et al.²² examined 55 meta-analyses and systematic reviews in their umbrella review, corresponding to 683 individual studies and 170 putative psychosocial and other risk or protective factors for psychotic disorders. Second-generation immigrants and racial/ethnic minorities living in low ethnic density areas (ie, low proportion of ethnic minority residents in a given area²³) were considered to be two of the six “highly suggestive” risk factors, while first-generation immigrants and racial/ethnic minorities living in high ethnic density areas were two of the nine “suggestive” risk factors.

Henssler et al.²⁴ meta-analyzed the incidence of non-affective psychotic disorders among first- and second-generation migrants in six European countries, Israel, and Canada. Restricting analyses to low risk-of-bias studies, the RR of incident non-affective psychosis was 1.81 [1.62, 2.02] in immigrants compared to non-immigrants. Among first-generation immigrants specifically, RR was

1.81 [1.59, 2.07] compared to the native population, and 1.82 [1.66, 1.99] among second-generation immigrants. Brandt et al.²⁵ conducted a meta-analysis focusing on the incidence of non-affective psychoses among refugees in studies from Scandinavian countries and Canada. Analyses of low risk-of-bias studies showed an RR of 1.39 [1.23, 1.58] for refugees compared with non-refugee migrants, 2.41 [1.51, 3.85] for refugees compared with the native population, and 1.92 [1.02, 3.62] for non-refugee migrants compared with the native population.

Social Fragmentation

Social fragmentation refers to a neighborhood level of instability in social relationships and is the opposite of social cohesion, social support, or social integration.²⁶ Ku et al.²⁷ systematically reviewed the relationship between social fragmentation and psychosis, specifically its prevalence, age of onset, symptom severity, and duration of untreated psychosis. The authors computed a Social Fragmentation Index—a combination of four area-level characteristics: percentage of single-person households, single persons (marital status), people who recently moved (residential instability), and percentage of renters. There were 4- and 12-times higher rates of schizophrenia prevalence and first admission for psychosis, respectively, in areas with the highest compared to the lowest measures of social fragmentation. Social fragmentation measures were, however, not associated with psychosis symptom severity or duration of untreated psychosis. The association between school-level social fragmentation and psychosis was greater than that between urbanicity and psychosis. Area-level residential instability predicted an earlier age at the onset of psychosis among individuals with first-episode psychosis.

Homelessness

Gutwinski et al.²⁸ identified 39 publications concerning homelessness and mental illnesses. The estimated mean random effects pooled prevalence of a current mental disorder was 76.2% [64.0%, 86.6%]. The most common mental illnesses among homeless individuals were alcohol use disorders at 36.7% [27.7%, 46.2%] and substance use disorders at 21.7% [13.1%, 31.7%], followed by SSPD (12.4% [9.5%, 15.7%]). Ayano et al.²⁹ conducted a meta-analysis of 31 studies of homelessness and psychotic disorders. Among adults experiencing homelessness, prevalence rates were: overall psychosis (21.2% [13.7%, 31.3%]), schizophrenia (10.3% [6.4%, 16.0%]), schizophreniform disorder (2.5% [6.2%, 28.1%]), schizoaffective disorder (3.5% [1.3%, 9.1%]), and psychotic disorders not otherwise specified (9% [6.9%, 11.6%]). Thus, the pooled prevalence of schizophrenia in samples of homeless persons exceeds that in the general population (0.3%) by at least 30-fold.

Food Insecurity

Food insecurity is defined as the economic and social condition of limited or uncertain access to adequate food.³⁰ It describes a lack of consistent and assured access to and availability of safe and sufficient food to support nutritional adequacy and healthy life. Teasdale et al.³¹ reviewed 29 studies and found that the prevalence of food insecurity in schizophrenia and related psychoses ranged from 25.3% to 71.4% (median 45%). Adults living with SMI were 2.71 [2.27, 3.24] times more likely to report food insecurity than non-psychiatric controls/general populations.

Incarceration

People with SMI are markedly overrepresented in prison populations. Fazel and Seewald³² conducted a systematic review and meta-analysis of studies from 24 countries. Overall, the pooled prevalence of all forms of psychosis was 3.6% [3.1%, 4.2%] in male-identifying incarcerated individuals and 3.9% [2.7%, 5.0%] in female-identifying incarcerated individuals. These estimates eclipse the general population prevalence of schizophrenia by 12- and 13-fold, respectively. Prins's³³ systematic review included 28 articles focused on 16 state prisons in the United States, and estimated that the current and lifetime prevalence of schizophrenia ranged from 2.0% to 6.5%.

Positive SDoHs

These include resilience, positive attitude, compassion, and others but we found no meta-analysis of family or community levels of positive SDoHs. One meta-analysis reported that the level of resilience in individuals with schizophrenia was positively related to their psychosocial functioning,³⁴ but we felt that this measure of resilience was at an individual level (ie, making it a psychosocial factor) and not at a social/community level (ie, making it an SDoH).

Discussion

This scoping review highlights the association between SDoHs and SSPD. Below we discuss possible mechanisms underlying the association between SDoHs and health in persons with SSPD, followed by specific needs for future research, and proposed interventions at individual and community levels to reduce the adverse impacts and promote positive effects of SDoHs.

Mechanisms and Pathways Underlying SDoH-SSPD Interactions

There has been considerable discussion of how SDoHs may contribute to the risk of schizophrenia. However,

more broadly, the basic conceptualization behind the SDoH terminology needs some rethinking. As explained by Lundberg,³⁵ it is important to avoid “determinism.” For example, coming from a lower socioeconomic class does not *determine* that the person will have worse health and specific illnesses. Thus, most SDoHs should not be considered as *causes* of SMI, but social situations that *contribute to or exacerbate* underlying pathology in a bidirectional relationship. Adverse SDoHs are considered risk factors for poor clinical outcomes, which include increased incidence of SSPD as well as worse mental and physical health in persons who already have SSPD. For example, early-life adversities contribute to an increased incidence of SSPD, whereas homelessness and incarceration worsen psychopathology in individuals who have SSPD.

There is a concept of “social gradient”—ie, individuals from lower socioeconomic strata tend to be marginalized, leading to greater exposure to unhealthy social networks and environment, resulting in worse health that accumulates across the lifespan.⁴ On the other hand, “social drift” refers to situations in which people with schizophrenia end up with lower educational achievement, loss of jobs or underemployment, and homelessness, sometimes accompanied by damaging interactions with the inequitable U.S. criminal justice system.³⁶ Serious psychopathology worsens personal choices and affects living conditions that restrict opportunities. Below we discuss some putative psychosocial mechanisms underlying the effects of specific SDoHs on persons with schizophrenia.

Early-Life Adversities. Several authors have proposed a plausible path from previous traumas, migration, discrimination, and social exclusion to psychosis using a Bayesian framework, which has been linked to dopamine dysfunction in schizophrenia.^{14,24} Specifically, these adversities produce existential anxiety and feelings of being threatened, even in ambiguous social contexts, raising doubts about previously acquired knowledge and trust in social interactions. This results in a greater focus on environmental input, with more importance being attributed to otherwise irrelevant external stimuli, contributing to delusional thinking. This reduces information overflow and complexity for the individual, but at the cost of flexible belief adaptations, leading to positive and negative symptoms of schizophrenia.

Chronic or toxic social stress due to social fragmentation may contribute to the onset or worsening of psychosis.²⁷ Such stressors are repetitive, in terms of actual events and cognitive expectations and perceptions. Urbanicity is associated with social isolation and fragmentation, poor cohesion, and lack of perceived safety.²¹ Larger social network size could buffer against the stress of living with schizophrenia whereas severe psychopathology especially anhedonia, apathy, and other

negative symptoms, reduce social motivation and social skills, worsening interpersonal relationships.¹⁸ A recent scoping review of longitudinal studies identified social disconnection and loneliness as major determinants of adverse mental health outcomes in the general population.³⁷ Unfortunately, too few high-quality, longitudinal studies exist on this topic in SSPD and deserve greater investigation.

Racism. Many studies have reported higher rates of diagnosed SSPD in marginalized communities, especially Black patients compared to non-Hispanic White patients.^{38,39} Possible explanations include unconscious clinician bias.²⁰ There is also no clear evidence showing ancestry/race/ethnicity-related genetic or neurodevelopmental factors or greater cannabis use^{40,41} as contributing to higher prevalence. The increased risk likely stems from SDoHs related to living as a marginalized group, with resultant social isolation, social fragmentation, early-life adversities, and socioeconomic disadvantage.^{41–43} People at clinically high risk for psychosis report higher levels of perceived discrimination which is strongly associated with negative symptoms⁴⁴ and persecutory ideation.⁴⁵ Marginalized racial/ethnic groups experience greater mental illness stigma as well,⁴⁶ and such stigma may worsen the disease course by delaying treatment⁴⁷ and by increasing cyclical patterns of treatment discontinuation with consequent psychotic relapse.⁴⁸

Migration. The greater risk of schizophrenia among migrants cannot be explained by a higher incidence of the illness in countries of their origin. Similarity in the increased RR in first- and second-generation migrants points to stressful interactions with the host society rather than specific experiences associated with migration.²⁴ Also, the RR is increased only in the migrants with a visible minority status. Stress factors associated with social exclusion, discrimination, and “defeat” may contribute to delusional ideation. Low levels of protective ethnic density in the neighborhood, resulting in a lack of social support from individuals who experience similar forms of discrimination, may make psychosis more severe.²² Finally, immigration policy and support services that are available (or not available) during the immigration process, as well as the extent of social integration and acceptance may have a greater impact than immigration *per se*. Immigration policies and support services from pre- through post-immigration stages are needed to buffer the stress associated with the transition.⁴⁹

Homelessness. The strong association between homelessness and SMI as well as cannabis and other substance use disorders also reflects a bidirectional relationship.

Additionally, substance use may worsen psychosis in homeless people and contribute to increased medical comorbidity and premature mortality.

Food Insecurity. There is also a bidirectional relationship between food insecurity and mental and physical illnesses. In people with low income, the limitation of food access raises levels of stress, anxiety, and depression. Food purchasing is considered a discretionary expense relative to other living necessities, so cheaper (yet obesogenic) foods are selected though they increase the risk for metabolic and vascular disorders.³¹ Studies of the long-term effects of the Dutch Hunger Winter famine of 1944–1945 and the Chinese Great Leap Forward famine of 1959–1961 reported that schizophrenia was more common among adults born during these famines compared with controls not exposed to the famines.^{50,51} A systematic review and meta-analysis comparing nutrient levels in patients with first-episode psychosis to non-psychiatric controls found that deficits in vitamin D, folate, and possibly vitamin C appeared to exist from illness onset, and were associated with worse symptomology.⁵² Maternal malnutrition is reported to increase the risk of developing SSPD in later adulthood, polyunsaturated fatty acids are believed to play an important role in this.⁵³ At the same time, high levels of psychopathology impact education and occupation, reduce income, and affect housing, increasing food insecurity.

Incarceration : The number of Americans diagnosed with SSPD in correctional facilities is more than three times the number in hospitals.⁵⁴ Re-incarceration rates are 40% higher in offenders with psychotic disorders compared with non-SMI offenders.³² The underlying criminalization of mental illness reflects mental healthcare inequities, especially in people from racial/ethnic marginalized groups, and those who experience poverty, unemployment and underemployment, victimization, family breakdown, homelessness, and substance abuse.³³ In prisons, poor living conditions and abuse further worsen psychopathology.

Positive SDoHs. Far less attention has been paid to positive SDoHs than to adverse ones. In people with schizophrenia, well-being is significantly associated with higher scores on scales that assess resilience, optimism, wisdom, and social connections.⁵⁵ In one study, schizophrenia patients had more severe childhood trauma, lower resilience, worse mental and physical health, and worse levels of metabolic and inflammatory biomarkers than a non-psychiatric comparison group.^{56,57} Trauma severity was associated with worse self-reported well-being as well as higher levels of fasting glucose and insulin resistance, while the reverse was true for psychological resilience. Notably, resilience appeared to counteract the adverse effects of childhood trauma and mental illness on health. The schizophrenia subgroup with severe trauma and high

resilience reported well-being and levels of glycosylated hemoglobin and insulin resistance that were comparable to those in controls with severe trauma and low resilience. These results, although limited by their cross-sectional nature, suggest that increasing resilience in later life could reduce the damaging biological impact of early-life adversity.

This review has several limitations. Despite our best efforts, we might have missed a few relevant meta-analyses. Also, there are other structural SDoHs in schizophrenia that we did not include here (eg, climatological effects and global warming, healthcare and mental healthcare access, macroeconomic policies that affect access to housing, employment, income, etc.), but plan to study in the near future. Importantly, there are a number of noteworthy limitations of the individual studies that were included in the meta-analyses—eg, cross-sectional design, heterogeneity in measured constructs and in study samples of patients and comparison groups, varied outcomes, and risk for publication bias favoring reports with significant findings. Most studies focused on one or two selected SDoHs and did not control for relevant confounds including overlapping SDoHs. Race is usually considered a demographic characteristic, and racism is an SDoH because it reflects the social discrimination based on race when people belonging to a specific race are minoritized. However, race itself could be a proxy for racial discrimination, given how pervasive systemic and interpersonal racism is in the United States and several other parts of the world. Notwithstanding these limitations, the review indicates lines for future research in this arena.

Suggested Research Priorities

Future studies need to use clear definitions and valid measures of the SDoHs studied. Given that many of these factors are strongly interrelated, longitudinal investigations with large and diverse samples are critical to evaluate possible confounders, mediators, moderators, and underlying bidirectional relationships. In addition to measuring the incidence/prevalence of schizophrenia, the investigations should seek to understand how SDoH affects physical, mental, and cognitive health, and early mortality. People with SMI have a 15- to 20-year shorter lifespan than the general population and this longevity gap seems to have increased in recent decades due to social rather than biological factors.⁵⁷ It will be useful to determine which SDoHs are associated with specific health issues. Below, we consider examples of specific research issues for some SDoHs.

Social Disconnection

Important aspects other than counting the number of social ties include the quality of those relationships,

whether those ties are aversive (stress-inducing) or supportive/positive (stress-reducing), and the nature of those ties in terms of the level of emotional or instrumental social support provided.¹⁸

Racism and Experiences of Discrimination

Palmer et al.⁵⁸ recommend new analytic and methodological approaches like complex systems modeling, computing cumulative risk, study designs that better account for establishing causality, taking into account bias and confounding, use of validated scales of internalized racism,⁵⁹ and studies of neighborhoods including protective factors and resilience mechanisms.

Homelessness

There is a need for studying several subpopulations that have been underrepresented in published reports, such as migrants, refugees, asylees, and homeless women. Ayano et al.²⁹ also recommend using randomized sampling, standardized diagnostic instruments, and trained interviewers with clinical backgrounds such as nurses, psychologists, and physicians. Rigorous research is needed to understand how permanent supportive housing models are best adapted to support the long-term housing stability of individuals with SSPD.

Proposed Interventions

There is an urgent need for research on interventions to prevent and manage various health-related problems resulting from the SDoHs. Below are examples of such interventions; however, some of them have not been tried in people with SSPD, and therefore, their usefulness in schizophrenia patients remains unclear.

Early-Life Adversities

A randomized controlled trial (RCT) showed that decreases in maternal criticism predicted improvement in subthreshold psychotic symptoms in individuals at clinical high risk for psychosis.⁶⁰ Recent findings suggest that family-focused therapy is effective for these patients.⁶¹ However, these families may benefit from more intensive or focused communication training than is required by families of adolescents at clinically high risk for bipolar or other mood disorders.⁶² Trauma-focused cognitive behavioral therapy, prolonged exposure, and other psychosocial interventions have been recommended by several national and international guidelines.¹⁴ Adjunctive non-verbal approaches like occupational or art therapies could help all, especially, marginalized groups, though sufficient empirical evidence in this area is also lacking.

Racism and Experiences of Discrimination

Nearly all SDoHs—and the adverse effects of SDoHs—are impacted by racism and discrimination. Racism operates via systems of power and control. The most impactful effects of racism do not operate at the individual level and must be intervened on at a systems and policy level.^{63,64} Therefore, mental health professionals must help marginalized individuals to cope with racism in a meaningful way through psychotherapy, social prescribing, and other means, and also recognize their role in advocating for policies that will help dismantle structural racism, such as with criminal justice reform. Finally, while this review has highlighted racism and experiences of discrimination specifically, the systemic dismantling of other “-isms” and “-phobias” (ie, ableism, ageism, colorism, classism, sexism, homophobia, religious prejudices, transphobia, xenophobia) must be worked toward concurrently if positive change is to be seen at a population level.

Homelessness

Several different initiatives to address homelessness have been researched over the last decade, including Housing First, Intensive Case Management, Assertive Community Treatment, and Critical Time Intervention. RCTs using these approaches have shown positive effects on housing stability, but only moderate or no effects on indicators of mental health and substance use, in comparison to usual care.²⁸ Therefore, further improvements in housing for people with SMI are needed and in research methods to test these models.⁶⁵

Social Fragmentation

Patients' cognitive biases and low self-esteem could mediate the impact of social fragmentation on the development of psychotic symptoms. Identifying such mediators would help target psychosocial interventions for people living in socially fragmented neighborhoods.²⁷ Identifying positive social buffers within fragmented neighborhoods (eg, cultural centers, community organizations, outdoor areas, religious organizations) is needed.

Food Insecurity

Teasdale et al.³¹ advocate for social supports and occupational therapists to be involved in community mental health services as they can contribute to the reduction of food insecurity through interventions that seek to improve work functioning and employment. Dietitians can address food access and food supply issues as a part of dietary interventions. Tifessa et al.⁶⁶ showed that access to mental healthcare over a 12-month period reduced symptom severity, work impairment, and perceived discrimination, and subsequently food insecurity. Unfortunately, few studies have sought to test the effectiveness and implementation of interventions targeting

food insecurity in patients with SMI. The Academy of Nutrition and Dietetics⁶⁷ has proposed proactive public health and healthcare policy actions to address nutrition security and malnutrition care, thereby helping to support improved access to quality and affordable health care for underserved Americans.

Incarceration

Several programs have been developed to divert people with SMI from unhelpful contact with justice systems to reduce risks of incarceration and recidivism, although they have not had a significant impact on the prevalence of SMI in prisons.³² A recently developed Jail Diversion program includes training law enforcement officers and offering linkages to treatment and support services to facilitate community re-entry.⁶⁸ In an RCT called PRIDE (Paliperidone Palmitate Research in Demonstrating Effectiveness) in 444 patients with schizophrenia with a history of incarceration, a depot antipsychotic (paliperidone) was associated with a significant delay in time to first arrest/incarceration and psychiatric hospitalization, compared to oral antipsychotics.⁶⁹ Today, formerly incarcerated individuals face problems with public housing, employment, education, and community integration in addition to geriatric health issues. Baranyi et al.⁷⁰ suggest that community interventions like enhancing health literacy and using digital technologies to improve mental health should also be used in prisons. Linkage with case management prior to release and sustained engagement can help with community re-entry.⁷¹ Additionally, there are interventions that seek to reduce the incarceration of individuals with mental illnesses.^{72–76} Greater attention should be paid by researchers, funding agencies, and legal professionals to develop, test, and implement such strategies.

Positive SDoHs

A family resilience model using family-centered nursing has been proposed.⁷⁷ It seeks to increase family capability for stress management by controlling the burden and stigma to improve the well-being of persons with schizophrenia. Exposure to trauma among people with psychotic illnesses commonly leads to post-traumatic stress disorder (PTSD). However, some patients experience post-traumatic growth (PTG), mediated by meaning-making and coping self-efficacy appraisal.⁷⁸ In a study of caregivers of persons with schizophrenia, Balaban et al.⁷⁹ found that optimistic and problem-focused coping and perceived social support were related to PTG. Just as supportive communities with social cohesion can help reduce the risk of PTSD in their residents following major disasters,⁸⁰ families and communities can promote PTG in individuals with SMI after personal crises. Finally, international community movements that are focused on promoting the health and well-being of specific segments of underserved populations (eg, age-friendly communities for older adults^{81,82} and

compassionate communities for people in palliative care⁸³) could be adapted for people with SMI. Longitudinal study designs with randomization are needed to better ascertain the impact of positive SDoH-based interventions such as housing or food security or protective classrooms on health outcomes in persons with SSPD.

The interventions may also be considered strategies for prevention at different levels. Thus, primordial prevention is illustrated by governmental efforts to eliminate risk factors like food insecurity through ensuring adequate food supplies to everyone. Primary prevention is exemplified by public health programs to improve maternal health to reduce early-life adversities and thereby lower the incidence of SSPD. Early diagnosis and initiation of treatment by clinicians would lead to secondary prevention by raising the likelihood of a better course and prognosis. Tertiary prevention may result from lowering risks of relapse through maintenance of optimal treatment through clinician and caregiver efforts.

Increasing the use of standard electronic health records (EHRs) from general medical clinics that do not include valid measures of SDoHs is a cause for concern. Integrating SDoHs into EHRs is necessary to inform and improve clinical care.^{84,85} There is also a critical need for focusing on public health aspects of SDoHs, and advocating for implementing major changes in policies and practices related to the economics of healthcare, housing, social networking, and criminal justice systems, among other initiatives that are most pertinent to people with SMI. Although research to date, and our focus here, has been on the impact of individual-level SDoHs on individuals with SSPD, SDoH is also a population-based, public health concept. As emphasized by Compton and Shim,^{86–88} all SDoHs, including those related to employment, income, housing, food, etc., emanate from an unfair and unjust distribution of opportunity, underpinned by two different, but interacting, societal structures: public policies and social norms. Therefore, interventions to address SDoHs at the individual level in the clinical setting are as important as altering the SDoHs at the community, population, and societal levels, requiring changes both in public policies (eg, legislation, regulations, organizational policies, court decisions) and in social norms (eg, biases of some groups toward other groups).⁸⁹

In conclusion, the literature suggests that SDoHs are significantly associated with higher rates of SSPD and with worse outcomes. Assessments of and providing interventions targeting potentially modifiable SDoHs such as early-life adversities, social disconnection and fragmentation, food insecurity, racism, and homelessness, both at the individual care level and public health policy level are necessary to improve the physical health and mental well-being of persons with SSPD. We support Lund et al.'s⁹⁰ perspective that the prevalent vicious circles of poverty, environmental degradation, and mental illnesses can—and must—be interrupted and replaced with virtuous circles of mental health, well-being, and sustainable development.

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