Nonmedical Interventions for Schizophrenia: A Review of Diet, Exercise and Social Roles

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Abstract

Schizophrenia is a major mental illness with a disease course that is influenced by lifestyle. The risk-benefit ratio for alternative interventions is more favorable than for antipsychotics in long-term treatment. Dietary interventions may target autoimmune features, vitamin or mineral deficiencies, abnormal lipid metabolism, gluten sensitivity or others. Examples of interventions involving diet, physical activity or physical processes, or social interventions including talk therapy exist in the literature. Notwithstanding, the general utility of these types of interventions remains inconclusive, awaiting long-term randomized trials. A perspective that separates the cause of the disease from its symptoms may be helpful in treatment planning and is warranted to distinguish between short-term and long-term recovery goals.

Keywords: schizophrenia; compliance; alternative mental health; psychiatry; long-term recovery.

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Introduction

The symptoms of mental illness are socially mediated, i.e. they co-exist with social and cultural constructions, and this makes them difficult to study. Some symptoms of mental illness may be communicable (Cochrane, 1983; Garety et al., 2001) in the same way that alcoholism (e.g. Fischer & Smith, 2008) is communicable via social learning. This social mediation of mental illness symptoms suggests a holistic framework for exploring treatment wherein an evidence basis is difficult to establish yet that evidence basis ought to form a guide nonetheless to treatment planning.

There are several competing models for the cause of the disease that also suggest competing frameworks for understanding the disease progression and treatment. One category of these models imagines the sufferer as akin to a machine that has some flaw—for the organism this may be in its neurology, metabolism, genetics, nurturance, exposure to infection, microbiome, immune condition, exposure to emotional stress or trauma, or others—and the task of the practitioner is to patch the machine by understanding the flaw and creating a fix for it. Reliance on long-term psychiatric medication is one example of this type of fix.

Yet a mechanical fix may be problematic. Psychiatric medications include major health risks from effects that appear during long-term adherence. Some medications cause weight gain and thus increase the risk of morbidity and mortality. Others produce a variety of long-term effects and histological changes, such that it is clear that the use of psychiatric medications for long-term treatment comes with health trade-offs that are marked and include decreased lifespan and quality of life.

The risk-benefit ratio for lifestyle interventions and alternative and complementary treatments thus may be much better than for psychiatric medication in the longterm, supposing that alternative treatments can be found and applied in a remarkably effective manner. This is an elusive goal. Obviously, the short-term crisis states ought to be managed in the safest manner possible. Yet long-term outcomes could improve from a deeper exploration of treatment options that include alternative treatment planning.

One type of linkage between the causal aspects of the disease and its treatment is to cast the symptoms as an internally-arising intoxicated state. This separates the cause from its effect in the mind of the practitioner, and allows for more flexibility in designing a path to successful recovery. This approach also supports the conception of schizophrenia as a group of illnesses with separate causes that each may produce the symptoms recognized in the disease. To provide an illustrative example: it is not yet clear whether a cure in one case arising from bone marrow transplant for a patient who at the same time had suffered from acute myeloid leukemia (Miyaoka et al., 2017) was due to a bone marrow transplant improving the immune response to cure the schizophrenia by coincidence along with the cancer, or whether the symptoms had been caused initially by a paraneoplastic syndrome (McKeon & Pittock, 2011) wherein the immune system attacked the client's neurology in addition to the cancer, and thus the attack resolved once the cancer had cleared. Thinking of cause and effect as separate mechanisms helps the practitioner to treat each patient uniquely, and this is an important approach until more is known about the disease, which itself is defined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) by symptoms rather than by causes.

Another type of causal model for schizophrenia places the impetus for disease completely within the social sphere and suggests that it is society that is pathological, and that the symptoms of the disease are a healthy reaction to a pathological context (Ferguson, 2018). The 1950s-1970s era Soviet diagnosis of schizophrenia was often a political excuse to remove supposed undesirables from society, people who perhaps did not meet the diagnostic criteria for the disease currently used (Lavretsky, 1998). Notwithstanding, this causal model also legitimately calls for improvement of social conditions

and a rethinking of the social and ecological impacts that an economy produces. The desire to have community-based treatment available for the person with schizophrenia historically arose from this category of model, and has had positive benefits in its realization (e.g. Balestrieri et al., 2016).

Ironically, if the main component of the disease is found to be autoimmune, the distinction between social and somatic causes will be moot, as the immune system responds to both types of input. A holistic approach to schizophrenia recognizes these complications. Notwithstanding, progress is difficult.

Practitioner definitions for recovery for schizophrenia have undergone a socially mediated change recently. The mechanical conception within health science is that *recovery* ought to be defined as managing mental-health symptoms and living a meaningful life while being medication compliant. In the social-sphere model, it may be necessary to coin a term for clarity, *medication-free recovery*, to capture an ideal recovery (and what some have achieved, e.g. Helman, 2018), as distinct from this mechanical medical model. It is the cessation of symptoms and the presence of a meaningful life once medication treatment has been withdrawn for a period of several years. Respect is given to the body as a whole. Within this context, it makes sense to explore long-term alternative and complementary non-medical treatments for the symptoms of schizophrenia.

Literature Review

The literature related to schizophrenia is vast. This project is limited to a few relevant themes: to what helps with non-medical recovery—hypothesized: food, exercise and society—and to questions of medication and creativity. The selection criteria were related to personal experience in recovery from the disease (Helman, 2014; 2018). These topics will be treated in order.

The review itself was undertaken in three stages. In the first stage, primary research studies on hand from previous projects were organized. These had originally been gathered via word of mouth and with keyword searches related to alternative and complementary treatments for schizophrenia in a snowball fashion, i.e. new treatment searches were implemented on the basis of previous mentions in search results and articles over the course of a few years. Many of these are older studies that have not been pursued more recently. They are included and are meant as a background to the subject where an initial understanding of what has been pursued already is important for generating future treatment ideas. These form the basis for the initial results in each section.

In the second stage—a general evidence-basis search—undertaken on 24 February 2018, the following search term was entered into the database Google Scholar, and the first 226 results were examined: Cochrane schizophrenia. Relevant articles were retained. The results of this stage are presented in Table 1.

Table 1

Search results of Google Scholar on 24 February 2018: Cochrane schizophrenia—with diet, exercise and society (and related) interventions in bold.

Topic	Number of Articles
psychiatric medication treatment outcomes	113
cognitive and psychological therapies treatment outcomes	13
quality of studies	9
social or lifeskills therapies outcomes	9 (not enough data: 7)(withdrawn: 2)
symptoms assessment	8
epidemiology and prevalence of schizophrenia and its treatment	8
professional clinical guidelines	6
history of the field and the Cochrane methodology	6
treatment of psychiatric medication side effects	6
unrelated or duplicate results	6
comorbidities	5
social compliance outcomes	5
health effects on and treatments for families and caregivers	5
medication compliance	4
professional research guidelines	4
treatment overviews	3
dietary intervention outcomes	3 (related to weight gain: 2)
physically coercive treatment (seclusion, restraint) outcomes	2
exercise outcomes	2 (not enough data: 1)
music therapy	2
herbal medication treatment outcomes	1
intermittent antipsychotic medication therapy	1
economic interventions	1
electroconvulsive therapy for schizophrenia	1
acupuncture treatment outcomes	1 (not enough data: 1)
drama therapy outcomes	1
public perception of schizophrenia	1
Total	226

Stage three searches were performed on 24 February 2018. In stage three—categorical evidence-basis searches—the following search terms were entered into the database Google Scholar: Cochrane schizophrenia diet; Cochrane schizophrenia exercise; Cochrane schizophrenia lifeskills. These are relevant for each of the categories studied. An estimate was made of the number of relevant articles in each of the last three stages, and representative articles were noted.

The results for each topic (diet, exercise, society) are treated initially with the results of the first-stage review. Next, the Cochrane sources are listed and discussed clearly below these in a new paragraph. These start with distinctive language to alert the reader that these are articles following a Cochrane protocol.

Food as Cause, Food as Treatment

Lakhan and Vieira (2008) look at the connection between nutritional disorders and mental illness generally. For schizophrenia specifically, there's some evidence that the gut in people with schizophrenia have excessive interleukin-2 levels and receptors (Smith, 1991), an indication of an autoimmune correlation between diet and the disease. Mineral or vitamin deficiencies may be present (Rahman, et al., 2009; Tuohimaa, et al., 2009). Abnormal lipid metabolism has been widely studied, and may be strongly correlated with schizophrenia (Adibhatla & Hatcher, 2008; Christensen & Christensen, 1988; du Bois, et al., 2006; Hillbrand, et al., 1997; Horrobin, 1999; Saugstad, 2006). Likewise, a strong correlation between celiac or gluten sensitivity and psychosis has been noted (De Santis, et al., 1997; Kalaydjian, et al., 2006). Amino acid supplementation has sometimes been tried as therapy, with significant results (Pollin, et al., 1961). Likewise, fasting has sometimes been met with functional success (Boehme, 1977).

The second (general) search stage produced the following results from the Cochrane literature. Two of the three Cochrane articles on diet and schizophrenia are related to weight gain management and attribute significant modest benefits from pharmacological and/or social/cognitive interventions in one but not the other (Faulkner et al., 2003; Faulkner et al., 2007). These are unrelated to diet as a treatment modality for the disease, but may be useful for practitioners in helping their patients manage weight gain and its associated morbidities. The remaining Cochrane article from the general evidence-basis search examines the effectiveness of polyunsaturated fatty acid supplementation in treating schizophrenia (Joy et al., 2003). Omega-3 improved mental state in several small studies, but medium-term effects were insignificant. Likewise, omega-3 supplementation improved psychotic symptoms whether used in conjunction with antipsychotic medication or not in one small study. The dose response to omega-3 fatty acids is not clear, nor is there a differential benefit known between different types of fatty acids studied. All studies are small and results are thus considered preliminary. A large-scale longitudinal study is needed.

The third stage (categorical) search produced approximately 50 evidence-based articles related to diet and schizophrenia, and fewer than one-third of these are related specifically to dietary interventions as treatment. Irving et al. (2006) report again the need for well, designed large-scale studies, as their results are inconclusive. Supplementation with omega-3 improves psychotic symptoms in one study, but many features of interest (e.g. type of fatty acid, dosage) have not been addressed, and studies are small. Bly et al. (2014) found only minor differences (slightly increased fiber and decreased calories) in the dietary intake patterns of people with schizophrenia compared with controls. Many articles, e.g. Pearsall et al. (2016), note that there is a lack of data to make conclusions about dietary interventions. This treatment modality remains experimental and awaits large-scale, well-designed studies to provide an evidence-basis for widespread recommendations.

Physical Treatment

There are a few factors to indicate that physical activity may have an impact on recovery. Schizophrenia and intelligence (while young) are correlated (Gale, et al., 2010), while the disease itself manifests in some cognitive (i.e. memory) deficits (Kiefer, et al., 2002). Thus, interventions that increase cognitive function, such as physical activity, may reasonably be attempted. In fact, there are some studies showing positive impacts with exercise (Beebe, et al., 2005).

Yoga has been demonstrated to have some efficacy, as well (Duraismamy, et al., 2007), as has meditation (Johnson, et al., 2011). A meta-study by Lee et al. (2009) showed some treatment promise with acupuncture. Likewise, cold as therapy has been met with some success (Chong & Castle, 2004), as has natural light therapy (Vanelle, 2009). Some of the genes that code for circadian rhythm functions are shared with the disease (Mansour, et al., 2009). Notably missing are studies with any more than moderate physical activity used as treatment. It is an open question whether extreme physical activity would be curative.

The second (general) search stage produced the following results from the Cochrane literature. Of the two evidence-based results in the 226 articles studied, one study (on dance therapy) lacked sufficient data to draw any conclusions (Xia & Grant, 2010), while the other study was able to report only suggestive results owing to small sample sizes: Gorczynski and Faulkner (2010) report amelioration of negative symptoms (but not positive symptoms) and improvement of mental state and overall health in two small trials testing exercise as an intervention in schizophrenia whose results are significant and follow an evidence basis.

The third (categorical) stage search produced approximately 70 relevant evidence-based articles related to exercise and schizophrenia. Firth et al. (2015) report that approximately 90 minutes of moderate-to-vigorous exercise per week significantly reduced psychiatric symptoms in a systematic review; Scheewe et al. (2013) report similar results (from exercise once or twice a week) in a small randomized controlled trial ($n = 31$). Other articles show similar results—highlighting the need for larger, well-designed trials. Likewise, several articles, e.g. Varambally et al. (2012), show amelioration of symptoms from yoga intervention in randomized, controlled trials. Ho et al. (2016) show symptoms improvement from Tai Chi that is significant yet less than traditional exercise in a randomized, controlled trial. The evidence-basis for exercise as a valid treatment modality for schizophrenia—especially in assessing amount and type, is inadequate at present. Though promising, these treatments remain experimental.

Social Difficulties, Treatment

Schizophrenia can be defined or diagnosed according to language evaluation (Boucard & Laffy-Beaufils, 2008; Spironelli, et al., 2008), a result that implies a social element to the disease. Likewise, religion plays a part in the disease with some symptoms overlapping with religious experiences (Mohr & Huguelet, 2004). Further, social standing may influence disease outcomes (Gallagher, et al., 2006). Various strategies have been likewise employed to provide treatment within the social realm, notably occupation or work serving as therapy (Eklund & Leufstadius, 2007). Music has been used as a promising treatment as well (Grocke, et al., 2008).

By far the largest social treatments of schizophrenia are various talk therapies, and cognitive therapy has had some demonstrated success (Grant, Reisweber, Luther, Brinen & Beck, 2013). Various studies address healing presence in therapy as well as spirituality (McDonough-Means, Kreitzer, & Bell, 2004; Revheim & Greenberg, 2007; Stanghellini, 2005). There are also studies extant strongly focused on the beneficial effect of recovery of a client living within the community, and of how

communities can be therapeutic (Hansen & Slevin, 1996; Jorm, et al., 2005). The opposite, structural violence, has been demonstrated to have detrimental effects (Kelly, 2005). Jung and Newton (2009) provide a broad overview of non-medication treatments.

There is also some evidence that narrative, i.e. giving voice to a client, helps significantly with recovery (Greben, Schweitzer, & Bargaenquast, 2014; Stanghellini & Lysaker, 2006). Several studies have attempted to give voice to patient experience (Corstens, Longden, McCarthy-Jones, Waddingham, & Thomas, 2014; de Wet, Swartz, L., & Chiliza, 2014; Fabris, 2012; Lovejoy, 1984; Lysaker, Ringer, Maxwell, McGuire, & Lecomte, 2010; Morella, 2008; Paz, 1997). Some have looked at the experience of family members, including mothers (Schneider, 2005), and at clients' romantic relations (Volman & Landeen, 2007; Yu & Shim, 2009). Others have looked at the material artifacts of those who are in recovery (Romano, McCay, & Boydell, 2012). There also exist larger works, such as Davidson's (2003) *Living Outside Mental Illness: Qualitative Studies of Recovery in Schizophrenia* and Pilgrim's (2015) *Understanding Mental Health: A Critical Realist Exploration*. These are in addition to recent accounts of recovery from major mental illness, like those by Elyn Saks and Sandra MacKay (MacKay, 2010; Saks, 2007). A common theme is one of emergent process perhaps leading to healthy outcomes.

The second (general) search stage produced the following results from the Cochrane literature. Cognitive and psychological (talk) therapies received the most attention, with 13 relevant studies appearing in the search results, compared with 113 for the next highest topic, psychiatric medication treatment outcomes. Results range from inconclusive (e.g. Hayes & McGrath, 2001) to enduring increased perception of control over psychotic symptoms (Drury, Birchwood & Cochrane, 2000). Jones et al. (2012) report considerable variability in the findings of various studies that meet the evidence-basis criteria. It is currently not possible to form a strong, evidence-based opinion of the efficacy of cognitive behavior therapy or other psychological interventions for schizophrenia.

The general evidence-basis review stage also found nine articles related to socially-attuned interventions, e.g. related to assuming positive roles in society, or training in lifeskills. Of these, two have been withdrawn, and seven lack enough data to draw any useful conclusion. A notable article explored the use of a behavior therapy technique (i.e. a token economy, wherein something of value is given in exchange for a desired behavior) that had previously been used in various settings (McMonagle & Sultana, 2000). Yet not enough data exist to form an evidence-basis for treatment adoption. The third (categorical) review stage produced much the same result, with lifeskills or other social programs showing inconclusive results from lack of data.

Medication

A brief section on medication is included here to provide a basis for comparison. As with other drugs, psychiatric medications have been shown to affect electroencephalograms (Takahashi, et al., 2010). A moderate percent of clients who take psychiatric medications regularly have a stable life, enough so that the concept of recovery has been redefined professionally to refer to patients on medication who are asymptomatic for a long period of time (Collier, 2010; Jääskeläinen, et al., 2012; Jenkins & Carpenter-Song, 2005; McEvoy, 2008; Torgalsbøen & Rund, 2010; Treuer, et al., 2010; Warner, 2009). By extension, drug-regimen compliance by patients has become a major focus of some professionals (Ahmed, et al., 2007; Velligan, et al., 2010). Several authors have also looked at treatment outcomes broadly (Carone, et al., 1991; Patel, et al., 2006). Several recent studies looking at outcomes have issued broad recommendations to stay the course (Buchanan, et al., & Schizophrenia Patient Outcomes Research Team (PORT), 2010; Dixon, et al., & Schizophrenia Patient Outcomes Research Team (PORT), 2010). Others want minor adjustments in professional tools, such as diagnostic

instruments (Leucht, et al., 2010).

On the other side of the fence are authors who question whether psychiatric medications are ultimately beneficial (Rosenfield, 2007; Schanda & Stompe, 2010). There has been abundant research on the side effects of psychiatric medications (*cf.* Lencz & Malhotra, 2009) or other negative impacts of taking psych meds (Awad, 2010), e.g. in PubMed there are more than 2200 papers about side effects of antipsychotics. There are several studies which suggest that outcomes that include less psychiatric medication or none at all are better long-term than those with more medication (Dunayevich, et al., 2007; Gordon & Green, 2011; Harrow, Jobe, & Faull, 2012; Harrow & Jobe, 2013; Lauronen, et al., 2005; Molchanova, 1978; Myers, 2011; Rund, 1990; Wunderink, Nieboer, Wiersma, Sytema, & Nienhuis, 2013).

Likewise, outcomes vary by country, and long-term patient outcomes in countries with poor or moderate economies (where psychiatric medications are scarce) are better than long-term outcomes in wealthy countries (where psych meds are prevalent) (Saha, et al., 2005; Sartorius, et al., 1996; Warner, 1983). A few professionals recommend a new course of treatment that de-emphasizes psychiatric medications for long-term care (Littrell, 2014). Notwithstanding, the evidence-basis for this type of assertion remains indeterminate from lack of data. Moreover, it ought to be emphasized that schizophrenia and related disorders are grave and potentially fatal illnesses. Short-term treatment modalities especially ought to reflect the severity of the disease and emphasize client/patient safety.

Fully half the number of articles (i.e. 113 out of 226) that appear in the stage two (general) search results are related to the evidence basis of psychiatric medication treatment outcomes. An evidence-basis clearly exists for the efficacy of medication in the short term. More details will not be given here, and the reader is encouraged to explore the numerous offerings available elsewhere (e.g. Buchanan, et al., & Schizophrenia Patient Outcomes Research Team (PORT), 2010; Dixon, et al., & Schizophrenia Patient Outcomes Research Team (PORT), 2010).

Discussion

The results of the literature review are summarized in Table 2. One can readily see that there have not been enough double-blind, randomized, controlled trials to allow for conclusive evidence-based results. In one regard, it is a tragedy that so much has been afforded to studies of psychiatric drug trials, yet important and promising information about potentially safer lifestyle interventions remains inconclusive. On the other hand, a sensitive clinician or other practitioner might find utility in these results. They provide new directions for empirical and experimental work on a case-by-case basis with patients.

The practice of guiding recovery from schizophrenia ought to recognize both short-term and long-term strategies for success. Up until this point, the focus on medication-based treatments, coupled with an array of genetic studies to try to understand differences between individuals with schizophrenia and the general population, has created a decades-long sense of hope that outcomes for schizophrenia will be decent for most patients. Thus long-term studies of obvious non-medical interventions are needed for an evidence basis to provide practitioners with a much larger array of tools with which to look at and treat both causes and symptoms. Having a clear notion that cause and symptom ought to be looked at separately for short-term treatment and holistically for long-term health supports the type of future progress that is hoped for.

The first-stage research articles were gathered by the author based on personal interest and experiences of recovery from the disease. As such, they do not meet the standard of a basis for general recommendations, but provide preliminary hypotheses for alternative or complementary treatment

options. The Cochrane results likewise are of interest, and it should be noted that several protocols were found in the search results of future planned studies. Eventually, the evidence basis should catch up to the practice. Until that time, one might adopt a view of looking at a relevant risk-benefit ratio in deciding for experimental modalities. Non-medical interventions can be attempted modestly, but to be effective, for example having a trainer help with 20 hours of exercise per week, the evidence basis needs to be more complete so that funding for supports such as this can be instituted. Small-scale efforts will help patients, but this is not enough. Schizophrenia is one of several major mental illnesses and long-term treatment efforts have the potential to transform the treatment of several.

Table 2

Preliminary Review of Causes, Features, and Treatments of Schizophrenia Found in the Scholarly Literature

Causes, Features and Treatments of Schizophrenia	Preliminary Ideas	Evidence-Basis
Dietary Causes	<ul style="list-style-type: none"> • Autoimmune related to diet • Vitamin or mineral deficiencies • Abnormal lipid metabolism • Gluten sensitivity. 	inconclusive
Dietary Treatments	<ul style="list-style-type: none"> • Amino acid supplementation • Fasting 	inconclusive
Physical Activity Treatments	<ul style="list-style-type: none"> • Exercise • Yoga • Meditation • Acupuncture • Cold exposure • Natural light exposure 	inconclusive
Social Features	<ul style="list-style-type: none"> • Language use • Religious sentiments • Social standing • Structural violence 	not assessed
Social Treatments	<ul style="list-style-type: none"> • Work as therapy • Music • Talk therapy (especially cognitive therapy) • Spirituality • Communal living (community-based recovery) • Narrative as therapy 	inconclusive
Medication Treatments	<ul style="list-style-type: none"> • Affect EEG • Promote patient stability • Compliance focus • Possible poorer outcomes long-term 	not assessed

Conclusions

Mental illness exists within community. The symptoms are socially mediated and may arise from different causes in different individuals. Evidence-based studies of non-medical interventions for long-term recovery from schizophrenia are warranted. These will have a large impact on the medical community: the distal impacts are unknown, as with any model, but might be predicted to include a benefit to treating other major mental illnesses as well, plus a benefit to larger national cultures, and an economic benefit to the society as more people attempt to live a healthier lifestyle (*cf.* Weisbrod, Test, & Stein, 1980). The aim of this review was to summarize the literature to look for themes that will help for further study, and this has been accomplished.

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