

A Systematic Review of Self-Management Health Care Models for Individuals With Serious Mental Illnesses

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Objective: The general medical health of individuals with serious mental illnesses is compromised relative to those without serious mental illnesses. To address this health disparity, numerous integrated care strategies are being employed from the system level to the level of individual patients. However, self-management of health care, a strategy considered an integral aspect of typical care, has been infrequently included in interventions for this population. Despite reservations about the capacity of those with serious mental illnesses to self-manage health care, a subset of new interventions focused on general medical health in this population has tested whether models including self-management strategies have empirical support. To understand whether these models are supported, the authors reviewed the evidence for self-management models. **Methods:** This systematic review examined collaborative and integrated care models that include self-management components for individuals with serious mental illnesses. **Results:** Across the 14 studies identified in this review, promising evidence was found that individuals with serious mental health issues can collaborate with health professionals or be trained to self-manage their health and health care. The evidence supports the use of mental health peers or professional staff to implement health care interventions. However, the substantial heterogeneity in study design, types of training, and examined outcomes limited conclusions about the comparative effectiveness of existing studies. **Conclusions:** This review found preliminary support that self-management interventions targeting the general medical health of those with serious mental illnesses are efficacious, but future work is needed to determine what elements of training or skills lead to the most salient changes. (*Psychiatric Services* 65:1300–1310, 2014; doi: 10.1176/appi.ps.201300502)

There is an urgent need to develop service delivery models that increase access to, use of, and quality of care available to individuals with co-occurring mental and

general medical illnesses. Several reports by the Institute of Medicine (1), the President's New Freedom Commission on Mental Health (2), and the Milbank Memorial Fund (3) have highlighted

health and service disparities, particularly among individuals with serious mental illnesses. Accordingly, policy makers, planners, and providers of general medical and behavioral health care have attempted during the past several decades to develop coordinated care service delivery models that connect mental health and general medical providers, enabling the delivery of effective, comprehensive health services.

Despite recent widespread attention to integration of mental and general medical services, reform has been slow, and numerous barriers remain across multiple levels of the service delivery system, from the system level to the individual level (4,5). For example, system-level barriers, such as disparate funding streams, have hindered full integration of services across mental and general medical care delivery systems, and individuals with general medical conditions who have co-occurring serious mental illness have proven very expensive to treat (6,7). For example, individuals with serious mental illness in Ohio account for 22% of the Medicaid population; however, 44% of Medicaid expenditures in that state are for patients with co-occurring chronic general medical conditions and serious mental illness, because those chronic conditions are more prevalent than among individuals without a serious mental illness (8). A study of Missouri's Medicaid benefits demonstrated that 2,000 care recipients with a diagnosis of schizophrenia accounted for \$100 million in

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Medicaid claims, 80% of which were related to urgent care and to emergency department and inpatient treatment (9). Because it is particularly expensive to treat people with serious mental illnesses for general medical issues, developing effective interventions for this population is a high priority.

To address these issues and improve the health of people with mental illnesses, the Patient Protection and Affordable Care Act (ACA) requires integration of mental health and general medical services. However, the optimal forms of integration for those with serious mental illness remain undetermined because the needs of individuals with mental illness can differ substantially from the needs of those without serious mental illness. Individuals with serious mental illness often face challenges beyond those presented by mental health and general medical issues, including housing, employment, and social difficulties, and they require much more support in dealing with general medical issues than those with less serious mental health concerns (2). Therefore, service delivery systems for this population need to be tailored to the level of need. A combination of top-down and bottom-up strategies is required, because a single strategy is unlikely to effect change across all levels of the service delivery system, especially in the case of subpopulations (for example, immigrants and those with serious mental illnesses).

Top-down and bottom-up strategies

To address system factors that inhibit effective use of health care services and to create an integrated health care system, a top-down approach can be used to effectively jumpstart the process of addressing numerous structural barriers that reduce access to, utilization of, and quality of health care. Top-down strategies can effect broad policy changes related to insurance coverage, training of general medical and mental health professionals, and reimbursement rules and payment structures. Specifically, the Wellstone-Domenici Mental Health Parity Act of 2008 broadly expanded mental health and substance abuse insurance coverage by requiring small-group and individual market plans to cover mental health and substance use disorder services at parity with medical

and surgical coverage. Moreover, the ACA encourages states to provide “health homes” for people with chronic conditions, a category that includes individuals with serious mental illnesses. Health homes can offer many services, including comprehensive care management, care coordination and health promotion, comprehensive transitional care, patient and family support, or some combination of those approaches.

Despite the promise of the ACA to improve health and health care for the general population, several researchers have questioned whether greater coordination among physicians will be sufficient for vulnerable subpopulations such as people with serious mental illnesses (10,11). Several studies have noted that many factors beyond those addressed in the ACA affect the health and health care of individuals with serious mental illness. Interventions that use bottom-up strategies typically target provider- and patient-level issues. Provider-related issues in health settings include lack of specialized training; discomfort in regard to treating people with serious mental illness; communication problems; location, equipment, and space issues; the need to hire additional staff with specialized knowledge; and a lack of providers for referrals (5,10–14). Consumers may lack motivation, have little knowledge of health and self-care strategies, be reluctant to disclose their mental illness to physicians because of negative experiences, have communication problems with physicians, find health care settings overwhelming both socially and cognitively, and experience logistical challenges (for example, transportation and finances)—all of which can contribute to poorer health outcomes and a need for more support (4).

Several bottom-up service delivery models have been proposed that typically fall under the umbrellas of collaborative care or integrated care. Collaborative care and integrated care describe different types of cooperation between behavioral health and general medical providers and can reflect various levels of top-down or bottom-up approaches to care (15). A recent meta-analysis of 57 collaborative chronic care models for depression, bipolar, and anxiety disorders across primary, specialty, and behavioral health care found that these

models can significantly improve the mental and general medical health of patients but that they do not reduce costs (16). Six components have been identified by the Improving Chronic Illness Care Initiative as constituting collaborative care: patient self-management support, clinical information systems, delivery system redesign, decision support, organizational support, and community resource linkage. Notably, 19 of the 20 studies that included patient self-management showed significant improvements in patient outcomes.

Integrating the patient into care

In mental health treatment, it is increasingly recognized that individual empowerment and self-management of psychiatric illnesses are essential goals and that recovery for people with a mental illness is possible (17). This recognition has led to calls to formally address issues of self-efficacy and of self-care of psychiatric symptoms among persons with serious mental illnesses (11), and interventions such as Illness Management and Recovery have received considerable research attention and support (18–20). Among people without mental illnesses, tests of formalized training approaches have significantly improved the self-management of chronic conditions, such as cardiovascular disease (21). However, concerns about whether individuals with serious mental illness have limited capacity to self-manage their health care have led some to dismiss the inclusion of this population in self-management interventions (11).

The study reported here aimed to review interventions that use self-management training to improve the general medical health and health care of people with serious mental illness. Comparisons were devised in terms of research design, populations included, intervention format (manualized, group, or individualized), provider (peers or professionals), intervention setting (classroom or in vivo), general medical and behavioral outcomes (objective and self-reported), service use changes, and development of self-management skills. We explored the nature of various intervention models and supporting research, and we offer suggestions for further intervention development and research.

Methods

Search strategy

An a priori search strategy was developed to identify all studies of interventions designed to improve health care use by individuals with serious mental illnesses. We included studies that identified self-management of health or health care as a component of the intervention. We excluded studies that addressed only self-management of lifestyle goals, such as exercise or diet, because our review focused on health care use; we did not exclude studies that addressed these issues in addition to health care. Also, to maintain the focus of the review on those with serious mental illnesses, we included only studies that primarily addressed schizophrenia, schizoaffective disorder, bipolar disorder, and major depressive disorder and excluded studies that identified participants as having mental health symptoms but not diagnoses.

A comprehensive search was conducted in August 2013 by using PsycINFO, Google Scholar, PubMed, MEDLINE, and the University of Southern California library to identify all reports of interventions designed to improve the quality of medical care for people with serious mental illnesses. Searches included the following terms, alone and in various combinations: serious mental illness, severe mental disorders, schizophrenia, bipolar disorder, major depressive disorder, integrated health care, self-management, patient education, patient activation, collaborative health care, mental and physical health care integration, and behavioral and physical health care integration.

Data extraction, assessment of relevance, and data synthesis

Three assessors (ELK, KMF, and HC) with graduate degrees independently screened all citations, index terms, abstracts, and text of all articles considered potentially relevant. Reference lists were also scanned for other potentially relevant studies. Using a standardized extraction sheet, assessors entered information about the study design, intervention strategies, population, sample size, general medical and mental health conditions, main intervention providers, type of training model (group based, individual, or both), whether training and education occurred in vivo or in a

clinic setting, the country where the study was conducted, and outcomes affected by the intervention. Because of the small number of identified studies, the prevalence of pilot studies, the broad range of study designs and populations, and the considerable variability in outcomes, a review of studies was considered more appropriate than a meta-analysis.

Results

The search terms turned up 1,288 articles, and 1,177 were excluded after brief review of the titles and abstracts. The full text of 111 articles was examined, and 97 articles were excluded. Fourteen studies met inclusion criteria (22–35). Ten were randomized controlled trials (RCTs) (23–25,27–30,32–34) (Table 1), and four were within-person pre-post designs (22,26,31,35) (Table 2). Six studies were fully powered (five RCTs [24,25,28,30,32] and one pre-post, within-subjects comparison trial [26]), and eight were pilot studies (five RCTs [23,27,29,33,34] and three pre-post, within-subjects trials [22,31,35]). Only one study was based outside the United States (in Australia [22]).

Sample composition

A broad range of serious mental illnesses was targeted in 11 of the studies (22,26–35), and three studies specifically targeted mood disorders, either bipolar disorder or depression (23–25). Mean ages of study participants ranged from 38 to 66.5 years, and more than two-thirds of the studies reported mean sample ages in the 40s and 50s. Participants in ten of the 13 studies that provided gender data were fairly evenly split between genders; however, two of the studies were conducted among veteran populations with predominantly male samples (23,24), and one study's sample was nearly 75% female (26).

The most commonly represented racial groups were Caucasian and African American; six of the studies were conducted with mostly (>50%) Caucasian populations (23–25,29–31), and four studies were conducted with mostly (>50%) African-American populations (32–35). Even though the samples of the remaining studies were more evenly distributed among multiple racial and ethnic groups, only one study sample had more than 10% Latino participants

(27), and only one study provided data on the percentage of Asian participants (28), indicating limited information on how health self-management interventions affect outcomes across racial-ethnic groups. It should be noted, however, that several studies did not provide detailed racial-ethnic information about the sample, instead grouping numerous racial and ethnic groups into a single “other” category and thus limiting conclusions.

Self-management

Six studies tested unique approaches to self-management (25,27,29–32). One model, Helping Older People Experience Success, was tested in two studies included in this review (29,30). The other eight studies modified existing models. Four studies tested modified versions of the Chronic Disease Self-Management Program (22,26,33,34), three studies were based on the Life Goals Program and Collaborative Care Model (23,24,35,36)—one in conjunction with the Diabetes Awareness and Rehabilitation Training intervention (35,37)—and one study tested basic primary care services plus wellness training, an adaptation of the Moller-Murphy Symptom Management Assessment Tool (28,38). All but one of the 14 studies (25) used manualized or workbook-directed training programs.

The interventions were delivered by nursing staff in seven of the studies (23,25,28–32), three studies exclusively used mental health peers (26,27,33), three studies used peers combined with a mental health specialist or nurse (22,34,35), and one study used a master's-level health specialist (24). Duration of participant training in self-management skills varied widely, from four weeks (23) to six months (27) or up to 12 months (25,28–30,32), and two models included booster sessions beyond 12 months (24,29,30).

In terms of self-management skills development, all interventions included patient education, although the use of specific techniques, such as modeling, role-play, coaching, prompting, reinforcement, action planning, peer support, nursing support, exercise and diet support, and social skills training, varied widely. To capture the development of skills, eight of the 14 studies used a self-report measure (22,23,27–30,33,34), and six collected evidence of behavioral

changes that require self-management efforts by participants (for example, medication adherence, visits to primary care, and health indicators such as diabetes or blood pressure control) (24–26,31,32,35). Among the studies that measured self-reported self-management, five found evidence of significant change (one RCT, $d=.33$ [30]; two pilot studies, d values ranged from .46 [29] to .55–.65 across three measures [34]; and two pilot studies did not report effect sizes [22,33]). However, in one pilot study, some self-management skills were no longer significantly better in the intervention group than in the treatment-as-usual group at the two-month follow-up assessment (34). Three studies reported changes that were not statistically significant (23,27,28), including two that reported negligible effects on self-management (27,28). In the remaining six studies that did not include a specific measure of self-management (24–26,31,32,35), each study reported significant improvements in general medical or health care outcomes that would require self-management by participants (for example, diabetes control and increased connection to primary care).

Medical and behavioral outcomes

Eight of the interventions were aimed at reducing risks (hypertension, hyperlipidemia, obesity, or body mass index greater than 25) related to specific health conditions. Of these eight studies, two focused specifically on diabetes (33,39) and six focused on multiple chronic diseases, such as cardiovascular diseases, hyperlipidemia, asthma, high blood pressure, and diabetes (23–26,32,34). In the other six studies the interventions were designed to improve general medical health without targeting specific diseases (22,27–30,32).

Ten studies used either the 36-item Short-Form Health Survey (SF-36) (28,30,33,34) or its variants, the SF-12 (22–24,34,35) and the SF-6D (27), as self-report measures of health-related quality of life. The SF-36/SF-12 is composed of eight scales that yield two summary scores for physical and mental health. Of the studies reporting SF-36/SF-12 outcomes, six reported physical and mental health summary scores (22–24,30,33,35), two reported results from one or more individual scales (24,28), and one reported both summary scores

and individual scale scores (32). Of the studies reporting physical health summary scores, one reported significant postintervention improvement (23), one reported clinically relevant improvement in a pilot test (35), and the remaining studies, including the three largest RCTs, did not yield statistically significant results (24,30,32,33). Of the three studies that reported individual scale scores on the SF-36/SF-12, only one reported significantly greater improvement in the intervention group on the physical health summary score and the physical functioning scale (28). Another study reported significant improvement on the physical health summary score and the physical functioning scale immediately postintervention, but that change was no longer statistically significant at the two-month follow-up (34).

Studies that used other self-report measures (not the SF-36/SF-12) of general medical health reported largely positive findings. Chiverton and colleagues (31) found significant differences between groups postintervention with the Gordian Personal Health Analysis. Kelly and colleagues (27) found that the intervention group experienced a significant reduction in pain issues compared with the control group and found a positive trend between groups in terms of the number of reported health conditions after six months. From pre- to postintervention, Lorig and colleagues (26) found significantly fewer bad health days, less health distress, and fewer days in which health problems prevented engagement in usual activities among intervention participants, although they found no difference on a single-item rating of general medical health.

Objective measures of general medical outcomes included the hemoglobin A1c test (25,31,35), blood pressure (24,25), and cholesterol (24,25). Two studies found that A1c significantly improved as a result of the intervention (25,31), and a pilot study found clinically important but nonsignificant improvements after the intervention (35). Two studies found that blood pressure significantly improved in the intervention group compared with the control group (24,25). One study measuring low-density lipoprotein cholesterol found statistically significant results (25), whereas another found no difference between

intervention and control groups (24). Two studies used the Framingham Cardiovascular Risk Index (24,33); one found no difference between groups (24), whereas the pilot study found significantly lower risk among the intervention group compared with the control group, but not over time (33).

Health care services

A compelling indicator of health care access is the routine use of a primary care physician. Three studies took place within primary care settings, which meant that access was high (24,25,35). However, of the seven studies that measured primary care access (23,26,27,29,32–34), only three reported significantly more visits to providers (32–34); one pilot study reported improvement but did not conduct a statistical test of significance of the change (29). Of the three studies that found no changes to primary care access (23,26,27), primary care visits increased in both pilot studies (23,27), suggesting that these studies were underpowered to detect effects. This interpretation is bolstered by the report that one pilot program changed the preferred locus of care from emergency or urgent care to primary care settings (27).

Intervention setting

Intervention setting was examined to determine its potential impact on self-management outcomes. Almost all the studies had elements of both classroom-based and in vivo training. Ten studies conducted group-based education classes (22–24,26,29–31,33–35), and four studies were completely individualized or clinic-based in their approach (25,27,28,32). However, of the ten studies that used group-based approaches, only two used group-based training exclusively (26,32), and the remaining studies involved in vivo interaction beyond the classroom, such as accompanying people to appointments, conducting reminder phone calls, or communicating directly with providers. All five studies that reported significant improvement in self-management skills included a group-based education class (22,29,30,33,34). Four of the remaining group-based interventions did not test self-management skills (22,24,26,31), and another did not find significant improvement (23). Of the

Table 1

Randomized controlled trials (RCTs) of self-management health care models for individuals with serious mental illnesses included in the review

Study	Intervention description	Sample	Design	Self-management	Main health outcomes
Bartels et al., 2013 (30)	Nurses delivered 1 year of weekly skills training classes (clinic and classroom based) consisting of specific skills-building and role-playing sessions twice per day, bimonthly community practice trips, and monthly nurse visits. Postintervention monthly booster sessions (classroom based and in vivo) were launched to maintain skills for 1 year.	183 participants: 90 in the intervention group and 93 in the wait-list control group; 169 completed the 1-year follow-up assessment; $M \pm SD$ age=60.2 \pm 7.9; 42% male; 86% white; psychiatric conditions, schizophrenia, schizoaffective disorder, bipolar disorder, and major depressive disorder	RCT with 1-year intervention and 3 years of follow-up	The intervention group showed significant improvement (group main effect, $d=.33$) on the Revised Self-Efficacy Scale (perceived self-efficacy in social functioning and in managing symptoms).	Health status was assessed with the 36-item Short-Form Health Survey (SF-36) and the interview-based version of the Charlson Comorbidity Index. No significant difference was found between groups. Significantly more health screenings and preventive care occurred for the intervention group.
Bartels et al., 2004 (29)	Hour-long group skills training (clinic and classroom based) twice a week for 1 year, co-led by a nurse case manager and a bachelor's-level case worker; training and education on social skills (generally and with providers), health, medication, and illness self-management	24 participants: 12 in the active control group and 12 in the intervention group; total sample: $M \pm SD$ age=66.5 \pm 5.7; 29% male; 100% white; psychiatric conditions, schizophrenia, schizoaffective disorder, bipolar disorder, other psychotic disorders, and refractive depression	RCT pilot study with 1-year intervention, 2-year follow-up, and active control	Improved scores on functioning as measured by the Independent Living Skills Survey ($d=.63$) and on the health maintenance subscale ($d=.45$)	At 2-year follow-up, all 24 patients in the intervention had an assigned primary care physician, and all had had at least 1 physical examination.
Chafetz et al., 2008 (28)	1 year of individual classroom-based skills training provided by psychiatric nurses using a clinical manual and workbook. Goals are to promote skills in self-assessment, self-monitoring, and self-management of general medical health problems and health services.	309 participants: 155 in the intervention group and 154 in the control group; $M \pm SD$ age=38.2 \pm 10.1; 43% white; 24% African American; 8% Asian; 6% Hispanic; 20% other or mixed; 68% male; psychiatric conditions, depressive disorder, schizophrenia, bipolar, and other	RCT with assessment at baseline and 12 months	No significant improvements in health care efficacy were noted as measured by self-report.	In the intervention group, positive improvement over time was noted in perceived physical functioning ($p=.02$) and general health status as measured by the SF-36 ($p<.006$).
Druss et al., 2010 (33)	Mental health peers delivered a manualized, classroom-based, 6-session intervention tailored to persons with serious mental illnesses and adapted from the Chronic Disease Self-Management Program. Training components include instruction on self-management, exercise and physical activity, pain and fatigue management, nutrition on a budget, medication management, and finding and accessing a physician.	80 participants: 41 in the intervention group and 39 in the control group; 83% African American; 16% white, 1% other; $M \pm SD$ age=47.8 \pm 10.1 in the intervention group and 48.4 \pm 10.1 in the control group; 30% male; psychiatric conditions, schizophrenia, bipolar disorder, major depression, and PTSD	RCT pilot study; participants attended a mean of 4.5 weekly groups; follow-up at 6 months	In a random-effects model, significant improvement was noted for the intervention group on the Patient Activation Measure ($p=.03$; 8% improvement for the intervention group and 6% decline for the control group); improvement (not significant) was also noted in medication adherence (14% improvement for the intervention group and 7% decline for the control group).	Significant improvement was noted in the proportion of the intervention group reporting one or more visit to a primary care provider (8% improvement for the intervention group and 17% decline for the control group; $p=.04$ for the group \times time interaction).

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Study	Intervention description	Sample	Design	Self-management	Main health outcomes
Druss et al., 2010 (32)	Nurses delivered a manualized care coordination protocol based on standardized approaches in care management literature. Services include psychoeducation about medical conditions, information about available community providers, development of action plans, planning for upcoming appointments, motivational interviewing, coaching, and accompaniment to doctors.	407 participants: 205 in the intervention group and 202 in the control group; intervention group: $M \pm SD$ age=47.0 \pm 8.1; 49% male; 77% African American; 2% Latino; control group: $M \pm SD$ age=46.3 \pm 8.1; 55% male; 79% African American; 1% Latino; psychiatric conditions, schizophrenia, schizoaffective disorder, bipolar, PTSD, and depression	RCT, assessments at baseline and 12 months	None reported	At the 12-month follow-up, the intervention group had had significantly more preventive screenings and cardiovascular service use than the control group (based on chart reviews). The intervention group significantly improved in sustaining a primary care provider compared with the control group (from 50% to 71% of the group over the 12 months vs. from 48% to 52% $p=.001$). The Living Well group used emergency rooms less frequently (31% at baseline and 11% at follow-up) than the control group (27% at baseline and 28% at follow-up) (between-group difference not significant).
Goldberg et al., 2013 (34)	In vivo and classroom-based, abridged version of the peer-delivered Living Well intervention (13 weekly sessions, each 60–75 minutes) with a focus on self-management, action planning, peer feedback and support, modeling, problem solving, and specific disease management techniques and use of skills for lifestyle, sleep, medication, addictive behaviors, and coordination of general medical and psychiatric services. Peer facilitators tracked progress between sessions.	63 participants: 32 in the intervention group and 31 in the control group; $M \pm SD$ age=49.5 \pm 9.1; 29% white; 67% African American; 4% mixed race; 48% male; psychiatric conditions, schizophrenia spectrum disorder and bipolar disorder with psychotic features	RCT pilot study; 13-week intervention with 2-month follow-up assessment	Postintervention, the Living Well group had significantly higher mean scores than the control group on the Lorig Self-Management Efficacy Scale ($d=.65$) and the Patient Activation Measure. At follow-up, the Living Well group had significantly higher mean scores than the control group ($d=.66$, $p=.018$) on the internal locus of control subscale of the Multidimensional Health Locus of Control.	No difference between intervention and control groups in diet and exercise. Intervention patients were more likely to have 1 or more adjustments of insulin ($p=.006$) or antihypertensive medications ($p<.001$) and improvement in hemoglobin A1C, low-density lipoprotein cholesterol, and systolic blood pressure.
Katon et al., 2010 (25)	A clinic-based, 12-month intervention by a nurse working alongside physicians, who visit patients every 2–3 weeks to provide collaborative care management, help manage depression, improve hemoglobin A1C levels, blood pressure, and lipid control. Nurses provide support and used “motivational and encouraging coaching” to help patients solve problems and set goals for medication adherence and self-care.	214 participants: 106 in the intervention group and 108 in the control group; intervention group: 52% male, 25% nonwhite or Hispanic, $M \pm SD$ age=57.4 \pm 10.5; control group: 44% male, 22% nonwhite or Hispanic, $M \pm SD$ age=56.3 \pm 12.1; psychiatric condition, depression only	RCT; single-blind design (research assistants unaware of intervention status); 12-month intervention with follow-up at 6 and 12 months	None reported	No difference between intervention and control groups in diet and exercise. Intervention patients were more likely to have 1 or more adjustments of insulin ($p=.006$) or antihypertensive medications ($p<.001$) and improvement in hemoglobin A1C, low-density lipoprotein cholesterol, and systolic blood pressure.

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Study	Intervention description	Sample	Design	Self-management	Main health outcomes
Kelly et al., 2014 (27)	A 6-month, clinic-based and in vivo individualized, manualized intervention led by peers and with four components: assessment and care planning, coordinated linkages and referrals, consumer education, and self-advocacy. Consumers are taught to navigate the health care system through coaching, role-play, modeling, and fading to allow consumer self-sufficiency.	23 participants: 12 in the intervention group and 11 in the control group; $M \pm SD$ age=46.78 \pm 8.45; 57% male; 26% white; 35% African American; 13% Latino; 26% mixed race or other; psychiatric conditions, any serious mental illness	RCT pilot study; baseline and 6 month follow-up assessments	Outcomes were measured with the Health Care Efficacy Scale. No significant changes were detected either within or between groups.	The intervention group significantly reduced pain compared with the control group ($d=.91$), and patients changed their orientation to care seeking to a primary care provider (83% in the intervention group vs. 44% in the control group) rather than the emergency department (none in the intervention group vs. 56% in the control group). The intervention group reported fewer health problems posttreatment (trend-level significance). At 6 months, the intervention group was less likely than the control group to report problems accessing medical care (7% vs. 23%; not significant). At 6 months, the control group had a significant decline in general medical health as measured by the SF-36 ($p=.04$).
Kilbourne et al., 2008 (23)	Classroom-based intervention over 6 months that includes a self-management component, delivered over 4 weekly 2-hour sessions, about the importance of managing health conditions and psychoeducation about management of bipolar disorder; a care management component with nurse liaisons; and a guideline implementation component, delivered in 2 1-hour sessions, for improving medical care	58 participants: 27 in the intervention group and 31 in the control group; $M \pm SD$ age=55.3 \pm 8.4; 91% male; 90% white; 10% African American; psychiatric condition, bipolar disorder	RCT pilot study, 6-month intervention; follow-up at 3 and 6 months	At 6 months, mean change in the Lorig Self-Management Efficacy Scale score was higher for the intervention group than for the control group (not significant).	At 6 months, the intervention group was less likely than the control group to report problems accessing medical care (7% vs. 23%; not significant). At 6 months, the control group had a significant decline in general medical health as measured by the SF-36 ($p=.04$).
Kilbourne et al., 2013 (24)	A 12-month, clinic- and classroom-based intervention run by a health specialist with the following components: life goals collaborative care (weekly 2-hour group sessions on the chronic care model enhanced by social cognitive theory to focus on health behavior change), care management (specialist tracked symptoms and medical needs), clinical registry tracking (information given to providers about patients' cardiovascular disease risk factors), and guideline support (shared treatment guidelines with providers)	118 participants: 58 in the intervention group and 60 in enhanced usual care; $M \pm SD$ age=52.8 \pm 9.9; 83% male, 5% nonwhite; psychiatric conditions, bipolar I and II disorder	RCT; follow-up at 6, 12, and 24 months	None reported	At 24 months, the intervention group had reduced systolic blood pressure (borderline significance, $d=-.20$) and significantly reduced diastolic blood pressure ($d=-.24$). After post-hoc Bonferroni adjustment, these findings were not statistically significant. No significant differences were found between groups on low- or high-density lipoprotein cholesterol and body mass index.

Table 2

Pre-post, within-subjects comparison trials of self-management health care models for individuals with serious mental illnesses included in the review

Study	Intervention description	Sample	Design	Self-management	Main health outcomes
Chiverton et al., 2007 (31)	Classroom-based intervention featuring psychiatric nurses with case management experience delivered in 16 training sessions that address client assessment, education, and support in major areas of wellness and diabetes self-management. Patients are taught about lifestyle; stress management; proper medication usage; use of a glucometer; skin, foot and eye care; and community resources.	74 participants; mean age=46; 32% male; 58% white; 34% African American, 8% unidentified; psychiatric conditions, substance use disorders, episodic mood disorder, schizophrenia, and personality disorders	Pre-post pilot, within-subjects comparison over 16 total sessions (duration not specified)	None reported	Mean health risk status, measured with the Gordon Personal Health Analysis, improved significantly from baseline to program completion ($p<.001$). The hemoglobin A1C level declined significantly after the program ($p<.05$).
Lawn et al., 2007 (22)	The 6-month study used 2 generic approaches to self-management support: all received the Flinders clinician-administered care planning approach, which provides self-management support, linkage to resources, and active management of patient-provider relations; and 17 received the Stanford model, a peer-led, 6-week education course that teaches self-management (3 attended only the Stanford groups).	38 participants; 55% female (mean age=46); 45% male (mean age=39); psychiatric conditions, schizophrenia, schizoaffective disorder, bipolar disorder, anxiety, major depression, personality disorders, and PTSD	Pre-post pilot, within-subjects comparison over 6 months	Patients' Partners in Health (PIH) scores showed significant change on all self-management parameters (knowledge, lifestyle choices, and managing the impact of their condition). At 6 months, a significant relationship was noted between the PIH knowledge subscale and the SF-12 physical functioning subscale.	No significant change was noted in the SF-12 physical summary scores. A case note audit showed that no patients required hospitalization during the study period, and patients had fewer hospital admissions 12 months after study participation compared with 12 months before (not significant).
Lorig et al., 2014 (26)	Peer-led, classroom-based, 6-session trainings over 6 months that focus on self-management education and chronic disease management and feature weekly action planning and feedback on progress toward self-management and problem solving	139 participants; $M\pm SD$ age=48.2 \pm 11.0; 24% African American; 27% male; psychiatric conditions, depression, bipolar disorder, schizophrenia, and schizoaffective disorder	Pre-post, within-subjects comparison over 6 months	None reported	At 6 months, 8 of 10 health indicators (for example, fatigue, quality of life, health distress, bad physical health days, and bad mental health days) and health behaviors (communication with a physician and adherence to medical care) improved significantly. None of the 4 medical utilization measures changed significantly.
Sajatovic et al., 2011 (35)	Nurse and peer-led training in illness management adapted to the primary care setting for persons with serious mental illnesses and diabetes, which includes 2 phases: 12 weekly group sessions lasting 60–90 minutes and 4 weekly telephone follow-up sessions	12 participants; median age=49.5; all had type 2 diabetes; psychiatric conditions, <i>DSM-IV</i> diagnosis of serious mental illness (schizophrenia or schizoaffective disorder, bipolar disorder, and major depressive disorder)	Pre-post pilot, within-subjects comparison over 16 weeks	None reported	At week 16, hemoglobin A1c had improved at clinically significant levels for 8 participants (67%, mean=83 \pm .74), 1 participant maintained controlled diabetes, and 3 had slightly increased hemoglobin A1c. Weight loss was insignificant, but significant improvement was noted in dietary behaviors.

four studies that did not use a group-based intervention model (25,27,28,32), two did not measure self-management skills (25,32) and two did not detect significant improvements in self-management skills despite improvements in health (27,28).

Discussion

This review suggests that the aggregate evidence supports self-management models for general medical issues of individuals with serious mental illnesses as feasible and efficacious in improving certain health outcomes. However, there are important caveats because this conclusion is based on a small number of studies that had significant heterogeneity in sample sizes, outcome measures, study length, intervention length, and participant conditions.

Large RCTs are required that test which features of self-management are most effective and sustainable or which outcomes are most affected by improvements in self-management. It is unclear whether these positive findings reflect the importance of empowering individuals to take charge of their health care to the greatest degree possible or whether the positive findings were the result of improved collaborative care communication between physicians, mental health providers, and consumers. Despite the limitations noted above, the preponderance of the evidence suggests that models that motivate individuals with serious mental illnesses to address their general medical health (with the support of a professional or peer) can improve health, medication adherence, and health care use in this population.

One critical area that needs more attention is assessment of self-management skills. Despite a stated goal of providing self-management skills training, almost half of the studies in this review did not include explicit measures of self-management. Of the studies that did, three did not find that self-management improved significantly despite objective improvements in health and health care use. The lack of significant results could indicate that self-report measures that ask participants to rate their confidence about accessing health care or their knowledge about health conditions may not accurately capture participants' skill development. Future

studies should include at least one objective measure of self-management skills or a self-report measure of specific behavioral changes. Similarly, access to medical care was largely examined by using participant self-report. In future studies, Medicaid records or other objective records of health care use should be used to assess changes in health care service utilization.

Evidence indicates that models that use group-based training are associated with significant improvements in self-management skills. Of eight studies that included self-management, the five that reported significant improvements in self-management skills had a group-based component; however, these positive findings must be considered in light of the fact that four of the ten group-based studies did not assess self-management skills. It is also unclear whether intervention settings (classroom based, in vivo, or both) resulted in effective self-management strategies. Only two studies reported being strictly classroom based, including one that did not test self-management and one that found some evidence for self-management. Of studies that included self-management, support for classroom-based interventions, in vivo interventions, or both was found by at least one study each. Of the remaining studies that did not find significantly improved self-management via self-report, two used classroom and in vivo training and one was classroom based only. There may be more support for studies that use in vivo approaches exclusively; however, given the limited number of studies that specifically measured self-management skills or explicitly described the intervention setting, this issue requires more attention in future research.

In eight studies, delivery of the intervention was primarily completed by nurses or other staff with advanced training, whereas in six studies trained peers assisted or delivered the intervention themselves. Of note, three of the five studies that found significant improvements in self-management skills used peer trainers (alone or in combination with a nurse or mental health worker), and the two studies that used a nurse and found significant improvements in self-management tested the same model. However, there did not

appear to be systematic differences in outcomes related to whether the models depend on peers, professionals, or a combined approach. Peers, those who have lived experience with mental or general medical issues, are increasingly becoming part of health services, and although prior research has established that peers and professionals are effective, it is unclear which approach is more cost-effective because few studies analyzed cost. If peers are cost-effective, this could have important implications for employment opportunities for people with mental health issues or lived experience of serious mental illness.

In terms of patient characteristics, there was a high degree of overlap in psychiatric diagnoses across studies, with support for interventions that target specific mental disorders and those that included participants with any serious mental disorders. There was insufficient evidence to determine whether interventions that targeted a specific mental disorder or serious mental illnesses in general were more effective in terms of developing self-management skills. Study inclusion criteria did not appear to introduce systematic biases across gender or age. However, these studies largely focused on Caucasians or African Americans, with the exception of two studies that included Hispanic and Asian samples. This finding highlights a need to pay attention to differential intervention effects on the basis of participant characteristics and to more complete reporting of sample characteristics. Similarly, these interventions either focus on specific diseases exclusively or on general medical issues. Studies should examine whether disease-specific models enhance general medical health status on the basis of improved use of preventive and routine care and whether the generalist models lead to the effective use of specialty care when needed.

Given that improving the health of persons with serious mental illness is now a national priority, there was notable heterogeneity across studies in the outcome measures used. This finding deserves attention from researchers because such heterogeneity limits the degree to which generalizable conclusions can be drawn. Similarly, more attention should be paid in future studies to measuring service utilization

and cost across studies. These utilization and cost data are critical to making informed policy decisions about the utility of interventions. This could be a very opportune time for assembling a federally sponsored workgroup to make recommendations about outcome domains and methods in these studies.

A few limitations of this review should be noted. First, as noted above, only a small number of studies met the specified inclusion criteria. This is both a limitation and a point of interest, because it indicates a great need for research on the degree to which people with serious mental illness can be included in the management of their general medical care. Several recent reports that presented untested models were excluded from this review, but researchers should report results soon (9,40), suggesting that this is an area experiencing growth and attention. Another limitation was that several of the studies in this review were pilot studies or used within-subjects designs, and the evidence should therefore be viewed as preliminary. Finally, all articles in this review included some positive results, indicating that the review may be limited by publication bias.

Conclusions

Although multiple top-down models of system integration are being developed through the ACA (single-roof models such as health homes, linkage models, and provider-extender models), it is likely that these efforts must be blended with bottom-up efforts (for example, health navigators and manualized group interventions) to create an integrated service approach for people with serious mental illness. An effective integrated care model would combine a responsive and receptive system of care with a receptive and responsive patient who is prepared to access and utilize the system, educated or trained to have a successful care experience, and supported and empowered to effectively navigate the system. Ultimately, we must combine both top-down and bottom-up strategies to develop an integrated and successful health care system for individuals with serious mental illness.

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