Appointment attendance in patients with schizophrenia

Practice points

- Appointment attendance in patients with schizophrenia is a significant and understudied issue.
- A sizable percentage of patients with schizophrenia miss appointments. The transition from inpatient to outpatient care appears to be a time for higher risk of missed appointments.
- Rates and correlates of appointment attendance vary greatly based on the population studied.
- There is a strong association between appointment attendance and level of psychopathology.
- Objective measures of missed appointment rates should be included in investigations of appointment attendance, treatment adherence and treatment engagement.
- Psychoeducation and appointment reminders show promise for improving rates of appointment attendance in patients with schizophrenia.
- Future research and interventions to improve appointment attendance should make use of emerging technologies.

Karin Daniels*,1, Muruga Loganathan2, Rose Wilson1 & John Kasckow3,4

1VA Pittsburgh Health Care System, Research Service, Research Office Building, University Drive C, Pittsburgh, PA 15240, USA
2Allegheny General Hospital, Department of Psychiatry, 4 Allegheny Center, 8th floor, Pittsburgh PA 15212, USA
3VA Pittsburgh Health Care System, MIRECC, CHERP & Behavioral Health Service, University Drive C, Pittsburgh, PA 15240, USA
4UPMC Western Psychiatric Institute & Clinics, 3811 O'Hara Street, Pittsburgh, PA 15213, USA
*Author for correspondence:
Tel.: +1 412 360 2470
karin.daniels@va.gov

We conducted a review of recent studies of appointment attendance in patients with schizophrenia. Appointment attendance is identified as an important issue, but the amount of attention addressing it is limited. Rates of missed appointments in the studies reviewed range from 20 to 67%. The transition from inpatient to outpatient care appears to be a time of higher rates of missed appointments. Correlates of missed appointments vary greatly across studies, with the most consistent relationship found between increased levels of psychopathology and decreased appointment attendance. Review of the limited literature on the relationship between missed appointments and suicide in patients with schizophrenia reveals an increase in mental health contacts prior to and following suicidal behaviors. Interventional studies demonstrate that appointment attendance can be improved. Psychoeducation and appointment reminders show promise in improving attendance. Future research on appointment attendance is likely to be facilitated by the use of emerging technologies.

Keywords: appointment • attendance • psychosis • schizophrenia • treatment adherence

Appointment attendance is an ongoing challenge in mental healthcare settings and of particular concern for patients with a severe mental illness (SMI) [1–3]. Patients with a diagnosis of schizophrenia are reported to be at high risk for negative consequences as a result of poor treatment adherence [4,5].

Not only do patients with a schizophrenia diagnosis require ongoing care, they are also likely to exhibit cognitive and behavioral challenges that make such occurrences more likely and more costly [4,5]. In the literature, the focus on treatment adherence in schizophrenia has not often included information

Future Medicine part of fsg

on missed appointments. Rather, the focus has been on the broader construct of treatment disengagement [4] or the related issue of medication adherence [5].

Recent reviews of treatment disengagement in patients diagnosed with schizophrenia and other SMI note the difficulty in defining the construct of engagement. Engagement has been defined narrowly as contact with mental health services. It has also been defined more broadly as collaboration and investment in the treatment process. Treatment disengagement is difficult to define operationally and to measure consistently [4,6]. Missed appointments are more easily defined and measured. Using this approach is likely to contribute to the understanding and clinical care of patients in this population.

Studies of treatment adherence in patients with schizophrenia tend to focus on the issue of medication adherence rather than appointment attendance [5]. The meta-analysis of Nose et al. included studies that utilized either type of adherence as a primary outcome [5]. From 1980 to 2003, this review revealed an overall rate of nonadherence of 27% (95% CI: 24–30) with a mean weighted rate of nonattendance to appointments of 24% (95% CI: 21–28). Psychopathology was the most frequently reported factor related to treatment nonadherence, with 15% of studies reviewed reporting increased levels of psychopathology related to nonadherence [5]. Factors that were found to be significantly related to treatment adherence in 10% or more of the studies included lack of insight, past nonadherence, younger age, substance abuse and unemployment. Linear regression analysis determined the predictive effect of various characteristics on overall adherence rates. Rates of nonadherence were found to decrease with increasing sample size. Significantly higher adherence rates were found in patients who were already receiving treatment compared with patients who had a history of low adherence or who were 'first contact patients'.

Absent from the literature on appointment attendance in patients with schizophrenia is the investigation of the hypothesis that missed appointments lead to greater suicide risk. Many of the characteristics associated with poor appointment adherence overlap with the reported risk factors for suicide in this population. These include young age, male gender, substance abuse, insight into illness and level of psychopathology [7–9]. A relationship between suicide risk and poor adherence to treatment in patients with schizophrenia was also noted in the review of Hawton et al. [10]. However, this association was based only on four studies between the years of 1984 and 2001, and included medication adherence. As adequate treatment is an important factor in reducing suicide risk in this population, this gap appears to be an area in need of study.

The purpose of this study is to review the recent literature specifically related to appointment attendance in patients with schizophrenia as an update to the review by Nose et al. [5]. We begin with a review of the recently reported rates of missed appointments in patients with schizophrenia. Next, we discuss the recently reported correlates and predictors of appointment attendance. We then specifically review the relationship between missed appointments and suicide in this population. This is followed by a summary of recent interventional studies in which appointment attendance was a primary or secondary outcome. Finally, we discuss the implications of these findings for current clinical care and future research.

Methods

We searched the following databases for articles published between January 2003 and November 2013: MEDLINE, PsycINFO, CINAHL and the Cochrane library. The searches combined the term "schizophrenia" with each of the following: "appointment or attend", "outpatient or office or outpatient clinics or outpatient care or outpatient services or outpatient treatment", "compliance or patient compliance or treatment compliance", "adherence or patient adherence or treatment adherence", "schedule or keep or attend", "miss or no show or patient drop out", "absent or fail" and "suicide". The search of MEDLINE yielded 4272 articles, PsycINFO yielded 4665, CINAHL yielded 600 and the Cochrane library yielded 508. A further search of references in articles identified as relevant was also conducted. Articles were included if they were original research studies, included the rate of appointment attendance as a primary or secondary outcome measure and had a sample that included subjects diagnosed with a schizophrenia spectrum disorder or psychosis. Studies that included a larger SMI sample were included if attendance rates were reported for the subsample of patients with a schizophrenia diagnosis. Articles were excluded if the outcome measure was dropout or disengagement without specifically mentioning missed appointment rates. Articles were excluded if the primary outcome was medication adherence. Two of the authors (K Daniels and M Loganathan) examined the lists of articles that were obtained and identified relevant references. A meeting was held with three authors (K Daniels, M Loganathan and J Kasckow) to review any differences and agreement was reached to include 14 articles that met these criteria [11–24]. Because of the small number of articles that met the criteria, supplemental articles that used outcomes other than the rate of missed appointments were considered. Five articles that used treatment adherence scales as an outcome measure were included

for this purpose [25–29]. Two articles that examined the relationship of suicide and service utilization were also included as relevant supplemental articles [30,31]. Thus, 21 articles are included as the basis of this review.

Results

Below we describe the recent literature on appointment attendance in patients with schizophrenia. The 21 studies included in this review are summarized in Table 1. Twelve included data on rates or correlates of appointment attendance [11–18,25–28]. Of these, nine focused exclusively on patients diagnosed with schizophrenia or a psychotic disorder [11,12,14,15,17,25–28]. Three reported rates of missed appointments in patients with schizophrenia as part of a larger study of appointment attendance in a psychiatric sample [13,16,18]. Four articles included some measure of appointment attendance or mental health service utilization as part of an investigation of suicide in schizophrenia [19,20,30,31]. Five articles included appointment attendance as a primary or secondary outcome measure in an interventional study [21–24,29].

Rates & correlates of appointment attendance in patients with schizophrenia

Of the 16 studies included below, four assessed rates of attendance in outpatients [11–14]. One study included patients referred from both inpatient and outpatient care [15]. Three reported rates of attendance of recently discharged inpatients [16–18]. Four utilized scores on a treatment adherence scale as the outcome measure [25–28]. Four reported data related to mental health service utilization in patients with schizophrenia and suicidal behavior [19,20,30,31]. If appointment attendance data was included in a study but the rate of missed appointments was not specified, the missed appointment rate was calculated from the data presented.
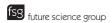
Coodin *et al.* examined factors predictive of missed appointments for outpatients participating in a Canadian schizophrenia treatment program [11]. An overall rate of missed first appointment of 22% was obtained through chart review of 342 outpatients with a DSM-IV diagnosis of schizophrenia, schizoaffective or delusional disorder. Subjects were classified as 'high nonattenders' (n = 180) if their rate of missed appointments was 20% or greater. They were compared with 'low nonattenders' (n = 162). 'High nonattenders' differed significantly from low nonattenders in several ways. They were younger (mean: 39 vs 42 years of age; p < 0.05), were more likely to have a past or current substance abuse problem (p < 0.001), and had lower levels of community functioning. Significant differences were not found between the two groups when examining gender, education, employment status, income source, type of residence or communication skills.

Adelufosi *et al.* investigated attendance at a Nigerian outpatient mental health clinic as a function of perceived family support [12]. The sample included 313 patients with a Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV) diagnosis of schizophrenia. Patients who missed an appointment within the study period and did not attend within 2 weeks were categorized as a 'defaulters' (20%). 'Defaulters' differed significantly from 'nondefaulters' on several variables. They were more likely to live far from the hospital (p = 0.014), to have missed more of their last four appointments (p < 0.001), to have higher Brief Psychiatric Rating Scale (BPRS) scores (p < 0.001) and to have lower satisfaction with care (p = 0.003). Forward stepwise logistic regression analysis revealed that there were three independent predictors of outpatient default: distance from the hospital, number of missed appointments and satisfaction with care.

Adeponle *et al.* examined rates of attendance to the first follow-up appointment at a regional psychiatric facility [13]. This sample included 212 newly registered outpatients with schizophrenia or other SMI. The rate of missed first appointment for the entire sample was 27%. For the 82 patients with an International Classification of Diseases, Tenth Revision (ICD-10) diagnosis of schizophrenia, the rate of missed first appointment was 24%. This was not significantly different than the overall rate. Factors affecting appointment attendance were not reported for the subsample of patients with schizophrenia. For the entire sample, missed appointments were more likely if the patient was employed (p < 0.05), Christian versus Islamic (p < 0.05) or older (p < 0.05).

In Beebe's descriptive study, 'missed appointments' was the problem most frequently reported by a sample of 12 patients [14]. The participants were community dwellers with a DSM-IV chart diagnosis of "schizophrenia, any subtype" and without a psychiatric hospitalization in the past 6 months. They comprised the intervention group of a study of tele-nursing and medication adherence. Over 3 months, they received a weekly telephone call to identify and solve problems associated with medications, appointments, symptoms, substances and social interactions. During that 3-month period, 67% of patients reported missing at least one appointment.

Fanning *et al.* investigated the factors correlated with patients' adherence to a 12-session course of cognitive behavioral therapy (CBT) [15]. Patients with a documented first episode of a schizophrenia spectrum

Table 1. Summary of appointment attendance in patients diagnosed with schizophrenia or psychosis.

Study (year)	Country	Patients	Patients (n)[†]	Attendance measure	Missed appointment rate (%)[‡]	Key results	Ref.
Rates, correlates or predictors of appointment attendance							
Coodin et al. (2004)	Canada	OP	342	Rate of attendance to nurse therapist appointments	22	Patients who missed more than 20% of appointments were younger, had substance abuse problems and lower levels of community functioning	[11]
Adelufosi et al. (2013)	Nigeria	OP	313	Percentage of patients that missed an outpatient appointment and did not reschedule	20	Poor attendance was predicted by distance from hospital, number of missed appointments and satisfaction with care	[12]
Adeponle et al. (2007)	Nigeria	OP[§]	82 (212)	Percentage of patients that missed first outpatient follow-up appointment	24 (27%)	In SMI sample, attendance was associated with religion, occupational status and age. Correlates of missed appointments were not reported for the schizophrenia subsample	[13]
Beebe (2010)	USA	OP	12	Percentage of patients that reported at least one missed appointment over 3 months	67	The majority of patients enrolled in a telephone intervention reported at least one missed appointment within a 3-month period	[14]
Fanning et al. (2012)	Ireland	IP, OP	52[¶]	Percentage of patients that attended less than half of 12-session cognitive behavioral therapy	23	Adherence to cognitive behavioral therapy was predicted by fewer negative symptoms 17% completed all sessions	[15]
Compton et al. (2006)	USA	RD[§]	141 (221)	Percentage of patients that missed first outpatient appointment after discharge	60 (64%)	In SMI sample, poor attendance was predicted by involuntary status, no established OP clinician, Axis IV stressor and longer interval to OP appointment. Correlates of missed appointments were not reported for the schizophrenia subsample	[16]
Lin and Lee (2008)	Taiwan	RD	5441	Percentage of patients that missed all outpatient appointments within 60 days of discharge	37	Chart review of national health insurance database. Rehospitalization was more likely for patients who missed appointments. A longer interval between discharge and follow-up was associated with increased rehospitalization	[17]

[†]For studies conducted with a SMI sample, the sample size is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by sample size for entire study.
[‡]If study was conducted with a SMI sample, the missed appointment rate is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by the rate for entire study sample.
[§]SMI sample.
[¶]Subset of patients who attended CBT.
[#]Subset of patients who identified appointment attendance as a treatment goal.
If study was an intervention, missed appointment rate is listed for the control condition followed in parentheses by the rate for the intervention group.
IP: Inpatient; NR: Not reported; OP: Outpatient; RD:Recently discharged; SMI: Severe mental illness; TAU: Treatment as usual.

Table 1. Summary of studies of appointment attendance in patients diagnosed with schizophrenia or psychosis (cont.).

Study (year)	Country	Patients	Patients (n)[†]	Attendance measure	Missed appointment rate (%)[‡]	Key results	Ref.
Adeponle et al. (2009)	Nigeria	RD[§]	48 (81)	Percentage of patients that missed appointments within 3 months of discharge without rescheduling	48 (49%)	In SMI sample, attendance was negatively related to substance abuse and psychpathology and positively related to family involvement. Correlates of missed appointments were not reported for the subsample with nonaffective psychosis	[18]
Lecomte et al. (2008)	Canada	OP	118	Services Engagement Scale	NR	Low service engagement was more likely in men and those with a legal history. Poor service engagement was predicted by a history of physical abuse	[25]
Staring et al. (2009)	The Netherlands	OP	114	Services Engagement Scale	NR	Low service engagement was associated with poor insight	[26]
Tsang et al. (2010)	China	OP	105	Psychosocial Treatment Compliance Scale	NR	Better attendance subscale scores were correlated with decreased symptomatology, increased global functioning, increased insight and a 'maintenance' stage of change. Better attendance subscale scores were predicted by decreased symptomatology and female gender	[27]
Fung et al. (2010)	China	OP	105	Psychosocial Treatment Compliance Scale	NR	Increased psychopathology and increased self-stigmatization predicted poorer treatment adherence	[28]
Suicide and appointment attendance							
Hunt et al. (2006)	UK	IP, OP[§]	960 (4696)	Percentage of patients that missed final appointment prior to suicide	27 (28%)	National clinical survey of completed suicide in patients with SMI. For entire sample missed appointments were more likely with younger age. 20% of suicide completers had a schizophrenia diagnosis	[19]

[†]For studies conducted with a SMI sample, the sample size is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by sample size for entire study.
[‡]If study was conducted with a SMI sample, the missed appointment rate is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by the rate for entire study sample.
[§]SMI sample.
[¶]Subset of patients who attended CBT.
[#]Subset of patients who identified appointment attendance as a treatment goal.
If study was an intervention, missed appointment rate is listed for the control condition followed in parentheses by the rate for the intervention group.
IP: Inpatient; NR: Not reported; OP: Outpatient; RD: Recently discharged; SMI: Severe mental illness; TAU: Treatment as usual.

Table 1. Summary of studies of appointment attendance in patients diagnosed with schizophrenia or psychosis (cont.).

Study (year)	Country	Patients	Patients (n)[†]	Attendance measure	Missed appointment rate (%)[‡]	Key results	Ref.
Hunt et al. (2006)	UK	IP, OP[§]	960 (4696)	Percentage of patients that missed final appointment prior to suicide	27	Patients with a schizophrenia diagnosis had greater contact with services the week before suicide completion than those with other diagnoses Comorbid substance abuse increased likelihood of being out of contact with services, but did not increase likelihood of a missed last appointment	[20]
Routhier et al. (2012)	Canada	IP[§]	195 (525)	Percentage of patients that had no mental health contact 3 months prior to suicide attempt	23 (36%)	Included patients with schizophrenia or depression diagnosis Patient with schizophrenia were more likely than patients with depression to have specialized mental health contact prior to suicide attempt 17% of patients with schizophrenia had no contact with mental health services in the three months following an attempt	[30]
Lee et al. (2012)	Taiwan	IP, OP	1655	Number of follow-up clinic visits during year prior to suicide attempt	NR	Suicide attempts were predicted by increased mental health contacts, increased involuntary hospitalization and increased harm toward self or others	[31]
Interventions to improve appointment attendance							
Petersen et al. (2005)	Denmark	IP, OP	547	Percentage of patients that missed all outpatient visits at 1 year	15 (4%)	Randomized clinical trial Patients who received 'integrated treatment' were less likely to miss all visits at 12 and 24 months compared with TAU At 12 months they were less likely to discontinue treatment for >1 month or in spite of need	[21]

[†]For studies conducted with a SMI sample, the sample size is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by sample size for entire study.
[‡]If study was conducted with a SMI sample, the missed appointment rate is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by the rate for entire study sample.
[§]SMI sample.
[¶]Subset of patients who attended CBT.
[#]Subset of patients who identified appointment attendance as a treatment goal.
If study was an intervention, missed appointment rate is listed for the control condition followed in parentheses by the rate for the intervention group.
IP.: Inpatient; NR: Not reported; OP: Outpatient; RD: Recently discharged; SMI: Severe mental Illness; TAU: Treatment as usual.

Table 1. Summary of studies of appointment attendance in patients diagnosed with schizophrenia or psychosis (cont.).

Study (year)	Country	Patients	Patients (n)[†]	Attendance measure	Missed appointment rate (%)[‡]	Key results	Ref.
Price (2007)	USA	RD	13	Percentage of patients that missed first outpatient appointment following discharge	50 (29%)	Pilot study. Patients randomized to a community based intervention had better attendance to first follow-up appointment compared with TAU. Difference not significant due to small sample size	[22]
Agara and Onibi (2007)	Nigeria	RD[§]	48	Percentage of patients that missed all appointments over 9 months	65 (8%)	Randomized controlled trial. Patients who attended an inpatient group psychoeducation program had significantly better outpatient clinic attendance compared with TAU	[23]
Staring et al. (2010)	The Netherlands	OP	109	Services Engagement Scale	NR	Randomized controlled trial. Patients who received treatment adherence therapy had significantly better treatment engagement scores at 6 months compared with TAU	[29]
Pijnenborg et al. (2010)	The Netherlands	IP, OP	38[#]	Mean percentage of missed appointments	61 (35%)	Waiting list controlled trial. Mean percentage of appointments attended increased from 39 to 65% when patients received text message reminders	[24]

[†]For studies conducted with a SMI sample, the sample size is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by sample size for entire study.
[‡]If study was conducted with a SMI sample, the missed appointment rate is listed for the subgroup with a schizophrenia-related diagnosis, followed in parentheses by the rate for entire study sample.
[§]SMI sample.
[¶]Subset of patients who attended CBT.
[#]Subset of patients who identified appointment attendance as a treatment goal.
If study was an intervention, missed appointment rate is listed for the control condition followed in parentheses by the rate for the intervention group.
IP: Inpatient; NR: Not reported; OP: Outpatient; RD: Recently discharged; SMI: Severe mental illness; TAU: Treatment as usual.

disorder, affective disorder with psychotic features or substance-induced psychotic disorder were eligible for inclusion. Of a sample of 124 patients, 88 were referred to CBT from both outpatient and inpatient settings. In total, 59% of the patients referred to CBT attended. 'Attendance' was associated with higher levels of education (p < 0.03). Of these 52 patients, 23% attended less than half of the sessions and were classified 'did not adhere'. Logistic regression analysis revealed that adherence was predicted by fewer negative symptoms (p < 0.05) on the 'Global Attention' subscale of the Scale for Assessment of Negative Symptoms. Only 17% of those who agreed to attend CBT completed all 12 sessions.

Three studies examined rates of missed appointments of recently discharged patients with a schizophrenia diagnosis. The rates ranged from 37 to 60%. In two of the studies patients diagnosed with schizophrenia or psychosis were part of a larger SMI sample [16,18].

Compton et al. conducted an investigation of factors related to a missed initial outpatient appointment following acute inpatient mental healthcare [16]. The sample included 221 recently discharged mental health patients at an urban, county hospital. Data were obtained via chart review and confirmed by consultation with clinical providers. Of the 141 patients (64%) in the sample diagnosed with schizophrenia or other psychotic disorder, 60% missed their first appointment. A total of 64% of the entire SMI sample did not keep their scheduled follow-up appointment. Attendance rate did not differ as a function of diagnosis. For the entire sample, factors predictive of a missed appointment included involuntary admission status, the lack of an established outpatient clinician, a longer interval between discharge and outpatient appointment and having an Axis IV stressor. The predictors of a missed appointment were not assessed for the subset of patients with a schizophrenia diagnosis.

Lin and Lee investigated the association between missed appointments and rehospitalization in a cohort of 5441 patients identified from a National Health Insurance Research Database in Taiwan [17]. Patients were included if they had a principal diagnosis of a 'schizophrenic disorder' according to the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) and a hospitalization for acute psychiatric care within the 10-month duration of the study without readmission within 60 days. Chart review revealed that 37% of the sample missed all outpatient appointments 60 days following discharge. When compared with those who kept at least one appointment in the same time period, the nonadherent group was more likely to be rehospitalized between 90 and 365 days following discharge. These differences remained significant even after adjusting for covariates of gender, age, length of initial hospitalization and substance abuse or dependence. A longer interval between discharge and outpatient care was associated with an increase in rehospitalizations.

Adeponle et al. conducted a prospective cohort study of the effect of family involvement on appointment and medication adherence [18]. Participants were 81 psychiatric patients recently discharged from a public psychiatric hospital in Nigeria. The overall rate of nonadherence to appointments within 3 months of discharge was 49%. Of the 48 patients with a diagnosis of nonaffective psychosis, 48% did not attend or reschedule their follow-up appointments. Factors affecting appointment attendance were not reported for the subsample of patients with nonaffective psychosis. For the entire SMI sample, patients who adhered to appointments were less likely to have a substance abuse disorder. They also had lower BPRS scores and were more likely to have family involved in treatment.

Appointment attendance as measured by treatment engagement scales

Four studies utilized treatment adherence scales in place of calculating the rate of missed appointments in outpatients [25–28]. The Services Engagement Scale (SES) was the outcome measure in two investigations. The SES is a 14-item provider rated scale of engagement with psychiatric services developed specifically for the assessment of patients with psychotic disorders. Its four subscales measure: 'availability', 'collaboration', 'help seeking' and 'treatment adherence' [32]. The Psychosocial Treatment Compliance Scale (PCTS) was the outcome measure in two additional investigations. The PTCS is a 17-item provider rated scale with subscales of 'attendance' and 'participation'. Items related to patient compliance such as 'attended prescribed psychosocial treatment on time' and 'actively participated in prescribed psychosocial treatment' are rated on a five-point Likert scale. Responses range from 'never' to 'always'. Higher scores are indicative of better treatment compliance [33].

Lecomte et al. examined a large number of predictors of poor adherence to medication and psychiatric services [25]. Their sample included 118 patients diagnosed with schizophrenia, schizoaffective disorder, bipolar disorder, psychosis not otherwise specified or 'early psychosis'. The participants' clinicians completed the SES as the outcome measure. Trained interviewers obtained data on a wide range of potential predictors of adherence from chart review, self-report questionnaires and semi-structured interviews. Predictors of service engagement were analyzed with a stepwise linear regression model. Childhood physical abuse was

predictive of poor service engagement. Alliance with a primary clinician, knowledge of consumer rights, high neuroticism and low agreeableness all predicted good service engagement. Participants were then classified as 'high' or 'low' in service engagement based on an SES cut-off score of ten. Those with difficulty engaging in services could be distinguished by a history of physical abuse, agreeableness and poor alliance with a therapist. Patients with low service engagement were more likely to be male and to have a history of legal trouble.

Staring *et al.* also used the SES as the outcome measure in their investigation of the relationship between insight, stigma and service engagement [26]. Participants were part of a multicenter trial in Rotterdam (The Netherlands), aimed at improving service engagement. This study involved 114 patients with a DSM-IV diagnosis of a schizophrenia spectrum disorder and problems with service engagement. Low service engagement was associated with poor insight ($p < 0.01$).

Tsang *et al.* examined the relationship between self-stigma and stages of change on treatment adherence, as measured with the PTCS [27]. The sample included 105 patients with a DSM-IV diagnosis of schizophrenia recruited from 'community treatment settings' in China. PTCS 'attendance' and 'participation' scores were analyzed separately. The 'attendance' subscale scores are most closely aligned with the issue of appointment attendance and are thus considered here. 'Attendance' scale scores were found to be significantly correlated with increased insight into the benefits of medication therapy and increased 'maintenance' subscale scores on a measure of patients' 'readiness for treatment'. 'Attendance' subscale scores were also found to be significantly correlated with less severe symptomatology on the BPRS and increased Global Assessment of Functioning (GAF) scores. However, these findings were potentially confounded by the fact that the raters of the PTCS were also raters of the BPRS and GAF.

A stepwise multiple regression revealed that better scores on the 'attendance' subscale were predicted by less severe psychiatric symptoms (beta = -0.260; $p < 0.01$) as well as female gender (beta = 0.204; $p < 0.05$). However, the relationship between the BPRS and 'attendance' subscale ratings may have been biased since the same clinicians were the raters of both measures. The better 'attendance' scale scores by female patients may be confounded by the fact that females had significantly lower scores on the BPRS than males.

Fung *et al.* also analyzed the data from this sample using combined 'attendance' and 'participation' z-scores [28]. This composite measure of psychosocial treatment adherence was positively correlated with 'readiness for changing mental health problems'

($r = -0.320$; $p < 0.005$) and less severe psychiatric symptoms ($r = -0.329$; $p < 0.005$). Path analysis explained 20% of the variance. A direct effect of psychopathology on treatment adherence was demonstrated. Self-stigmatization was also found to predict decreased treatment adherence. This effect was mediated by poor insight and reduced levels of "readiness for changing mental health problems."

Appointment attendance & suicide

There are few studies investigating the relationship between appointment attendance and suicide in patients with schizophrenia. Two articles were identified that reported specific data related to missed appointments [19,20]. Two articles reported on rates of contact with mental health services and are also included in this review [30,31]. Hunt and colleagues investigated the differential effects of psychiatric diagnosis on suicide deaths and the characteristics of patients diagnosed with schizophrenia who completed suicide [19,20]. They reviewed records from a national register in England and Wales (UK) over a 48-month period. Individuals who had been in contact with mental health services in the year prior to a completed suicide were identified. Additional data were obtained through questionnaires completed by the patients' treating psychiatrists. Review of these 4696 cases revealed that 20% of the patients who completed suicide had a primary diagnosis of schizophrenia or other delusional disorder. Across all diagnoses, younger patients were more likely to miss their final appointment before a completed suicide [19]. Further investigation into the characteristics of patients with schizophrenia who died by suicide revealed that they were more likely than the rest of the sample to be young, male, unmarried, unemployed and from an ethnic minority. They also had higher rates of past violence and drug abuse [20].

In total, 27% of patients with schizophrenia missed their last appointment prior to suicide completion. Of those schizophrenia patients who completed suicide while outpatients, 20% completed their suicide within 3 months of discharge. This occurred despite 96% having scheduled follow-up appointments. When comparing suicide completers with schizophrenia to those without a schizophrenia diagnosis, several differences emerged. Suicide completers with schizophrenia were more likely to have had contact with mental health services the week before death (64 vs 45%; $p < 0.001$). Patients with schizophrenia were more likely to be noncompliant with their medications (30%) compared with the rest of the sample (21%; $p < 0.001$). They also had a higher percentage of suicides that occurred during an inpatient stay (27 vs 13%; $p < 0.001$). Those with inpatient status were more likely to be detained

involuntarily (47 vs 18%; p < 0.001). Within the subsample of suicide completers with schizophrenia, those with comorbid substance dependence were more likely to be out of contact with mental health services (19%) than those who did not have comorbid substance dependence (11%; p = 0.006). They were also more likely to be noncompliant with medications (39 vs 28%; p < 0.05). However, they were not more likely to have missed their final appointment prior to suicide completion [20].

Routhier *et al.* examined service utilization in patients with schizophrenia and depression both before and after a suicide attempt [30]. Their sample included 525 patients with an ICD-9 psychiatric diagnosis who had been hospitalized in the Quebec (Canada) public health system. Of the 195 patients with schizophrenia, 23% did not have a mental healthcare contact within 3 months prior to the attempt. Patients with a schizophrenia diagnosis had significantly higher rates of inpatient and outpatient contact in the year prior to the attempt than patients diagnosed with depression. Patients with schizophrenia had longer inpatient stays following the attempt (mean: 23 days) than those with a depression diagnosis (mean: 14 days; p = 0.001). Although the percentage of patients who did not have an appointment within the 3 months following a suicide attempt remained lower for patients with schizophrenia (17%) than patients with a diagnosis of depression (23%), diagnosis was not found to be a significant predictor of aftercare. For the entire sample, the likelihood of receiving mental health aftercare following a suicide attempt was lower in patients whose presuicide care was limited to emergency services. The likelihood of receiving mental health care following a suicide attempt was higher in men who had a co-occurring substance use disorder compared with men without a co-occurring substance use disorder.

Lee *et al.* investigated the predictors of suicide attempts in a sample of 1655 patients with schizophrenia treated in community-based public health centers in rural Taiwan [31]. The number of follow-up clinic visits for psychiatric care was assessed by a review of hospital records. Stepwise regression analysis revealed that the number of follow-up visits during the previous year was a significant predictor of the number of suicide attempts (p < 0.05). Suicide attempts were also predicted by an increased number of involuntary hospitalizations, increased self-harm and violence toward others.

Summary of rates & correlates of missed appointments

There are a limited number of recent studies that report rates and correlates of missed appointments in patients with a schizophrenia diagnosis. Rates of missed appointments reported for this population ranged from 20 to 67%. The highest rate, 67%, was reported by Beebe [14]. This was based on retrospective patient reports. It does not appear to be comparable with the other studies reviewed, which used objective counts of missed appointments as the outcome measure. With the exclusion of the Beebe study, rates for missed outpatient appointments ranged from 20 to 24%. This is consistent with the existing literature [5]. Rates of missed appointments for patients who attempted or completed suicide ranged from 23 to 27%. There was no evidence for a higher rate of missed appointments for this group. The rate of missed appointments was higher for recently discharged inpatient samples (37–60%) than for other samples. Overall, it is difficult to compare rates and draw definitive conclusions because of the different treatment settings, countries and patient populations included in this limited number of studies.

The reported correlates and predictors of missed appointments varied greatly across the studies, a finding consistent with the earlier literature [5]. In many cases investigators did not look at comparable outcomes. Lin and Lee's investigation was the only study in this review that looked at rehospitalization rates [17]. Adelofusi *et al.* were the only investigators to report on satisfaction with care and overall appointment attendance [12]. Lecomte *et al.* reported several correlates of treatment adherence that were not assessed in the other studies reviewed. These included childhood abuse, knowledge of consumer rights, high neuroticism and low agreeableness [25].

The most consistent correlate of missed appointments found across the studies was level of psychopathology. Congruent with the existing literature, increased levels of psychiatric symptomatology were frequently found to be associated with decreased attendance. Of the six studies that included a measure of level of symptomatology, five found increased levels of symptoms to be correlated with poorer attendance [12,15,18,27–28]. Lecomte *et al.* did not find a significant relationship between psychopathology and treatment engagement [25]. This may be due to characteristics of the subject sample. The Lecomte *et al.* sample included patients who were relatively young (mean: 25 years; SD = 5.9), were within 2 years of the initial episode of psychosis and had the highest BPRS scores of all the studies reviewed. Because of the very high scores, it is possible that there was not enough variability in subject scores to demonstrate an effect of symptomatology on appointment adherence. In addition, the outcome measure and BPRS were completed by the same treatment provider, which may have biased the results.

In the literature, treatment adherence has been associated with age, gender and substance abuse [5]. However, the review of these more recent studies revealed inconsistent associations. The relationship between age and missed appointments was assessed in eight of the investigations. Surprisingly, age was not found to be a significant predictor of missed appointments in six of these studies [12,15,16,18,25,27]. Coodin *et al.* reported a finding congruent with the existing literature – that is, younger age was associated with poorer attendance [11]. Adeponle *et al.* found that younger age was predictive of good attendance [13]. This difference diverges from what was previously reported. This may be due to the inclusion of patients under the age of 18 years. It may also be a result of cultural factors. The authors stated that the effect of younger age on good attendance was attributable to the attendance of males in the 11–20-year age range. They hypothesized that the cultural importance placed on the boys' care may have led to the increased attendance rates.

In the literature, males are reported to have poorer attendance than females [5]. However, the findings in these more recent investigations were mixed. One study found an interaction between age and gender in an unexpected direction – that is, patients who were male and young had better attendance than females or older males [13]. The likely reasons for this were described previously in our discussion of age. In five of the nine studies that assessed this issue, gender was not found to be significantly associated with appointment attendance [11–12,15–16,18]. All studies that did not find a significant effect included objective counts of missed appointments. Furthermore, the expected association between male gender and poor treatment adherence was found only in studies that used provider-rated scale to assess attendance and treatment engagement. Male gender was associated with lower scores on the SES and PTCS [25,27]. It is possible that male patients attend appointments at rates equal to female patients, but are less likely to participate or engage in the treatment process.
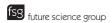
Only four studies considered the relationship between substance abuse and appointment attendance [11,16,18,25]. Two reported the expected relationship – that is, comorbid substance abuse is associated with worse attendance [11,18]. Two studies did not find a significant relationship between substance abuse and appointment attendance. Compton *et al.* did not find a secondary diagnosis of a 'substance use disorder' to be related to appointment adherence in their sample of patients with diagnoses of schizophrenia and other SMI [16]. Lecomte *et al.* did not find a substance abuse diagnosis to be related to scores on the SES [25].

Insight is reported in the literature as a significant predictor of appointment attendance; that is, patients who demonstrate poor insight have decreased treatment adherence [5]. Insight was measured in all of the studies that utilized treatment engagement and compliance scales as an outcome measure [25–28]. Three studies reported a relationship in the expected direction and one study found no relationship between insight and service engagement. Insight was assessed in only one study that used the rate of appointment attendance as an outcome measure [15]. While insight was not found to be associated with adherence to a 12-session course of CBT, it was found to be associated with the likelihood of being referred to CBT and the likelihood of some level of attendance. The absence of a measure of insight in studies of appointment attendance reflects a knowledge gap. Including an assessment of insight will strengthen future investigations of appointment attendance.

There are few recent studies investigating the relationship between suicide and appointment attendance. In the four reported in this review, there is no evidence of an increase in the number of missed appointments prior to a completed or attempted suicide. Rather, the literature suggests that in patients with a schizophrenia diagnosis, suicidal behavior is related to increased rates of contact with mental health services [19–20,30–31]. This may reflect attempts on the part of providers to adjust their care in response to symptom exacerbation. While the majority of patients are receiving increased care at this important time, it appears that a substantial minority are not. Of concern for suicide prevention efforts are the findings that 27% of patients with schizophrenia who completed suicide missed their final appointment prior to the act, 23% of suicide attempters had no appointment within the 3 months prior to the attempt and 17% did not have an appointment within 3 months following an attempt [19–20,30]. Studies also suggest that the lack of an established relationship with a provider prior to an attempt predicts a decreased likelihood of contact after the attempt [30]. Further research is needed to determine the best way to identify those who are not presenting for care and facilitate their appointment attendance.

Interventions to improve appointment attendance in patients with schizophrenia

Five recent studies assessed whether certain interventions can improve appointment attendance in patients with schizophrenia. Four compared an intervention to 'Treatment as Usual' (TAU) [21–23,29]. Three used treatment attendance rates as an outcome measure [21–23] and one used a treatment engagement scale as the outcome measure [29]. The final study evaluated

the effect of text message reminders on appointment attendance [24].

A study by Petersen *et al.* used a randomized controlled design to examine the effect of 'integrated treatment' on psychotic and negative symptoms [21]. Their sample included 547 patients with first-episode psychosis and an ICD-10 diagnosis of a schizophrenia spectrum disorder. They were recruited from both inpatient and outpatient mental health services in Denmark over a 2-year period. The intervention was an assertive community-based treatment. It was coordinated by a primary team member with a caseload of approximately ten patients. The intervention included home visits, family psychoeducation and social skills training. Appointment reminders were not reported as a specific aspect of the treatment, although those considered 'reluctant about treatment' were actively followed and encouraged. The team was available to patients by phone during business hours. The intervention was compared with TAU, which included appointments provided at a community mental health center by staff with caseloads of 20–30 patients. Attendance was assessed by a review of patient records. At 1 year, a lower percentage of patients in integrated treatment missed all outpatient visits (4%) than those receiving TAU (15%; p < 0.001). A similar pattern was seen at 2 years, with 7% of patients receiving integrated treatment missing all outpatient visits compared with 31% in TAU (p < 0.001). At 1 year, a lower percentage of patients in the integrated treatment condition (8%) versus TAU (22%) discontinued treatment for greater than 1 month (p < 0.001) or stopped treatment despite need (3 vs 15%; p < 0.001). Significant differences did not persist through the second year of treatment. Those in the integrated treatment condition showed a decrease in psychotic and negative symptoms at 1 and 2 years following intervention. However, a relationship between the improvement of symptoms and attendance was not explored.

A pilot trial by Price examined the effectiveness of a 'Transition to Community' program to improve a number of outcomes, including adherence to outpatient appointments [22]. The sample included 13 inpatients that were discharged to independent community living soon after consent. The participants had received a DSM-IV diagnosis of schizophrenia or schizoaffective disorder within the past 5 years. They were randomized to either the experimental intervention or TAU. The intervention included the following: a review of discharge arrangements and follow-up appointments, provision of a prepaid cellular phone to provide two safety checks and appointment reminders, continuous phone availability of an intervention team member and an informational contact between the intervention team and the patient's community case manager. Patients in the treatment group had a higher rate of adherence to the first outpatient appointment following discharge (71%), compared with 50% of the comparison group. This difference was not significant, likely due to the small sample size. Patients in the intervention group also had better medication adherence and fewer hospitalization days compared with TAU, although these differences did not achieve significance.

Agara and Onibi investigated the difference between TAU and an inpatient psychoeducational intervention on rates of adherence to outpatient appointments [23]. Subjects were 48 patients diagnosed with a psychotic disorder according to ICD-10 criteria. The sample included patients with both schizophrenia and depressive disorder diagnoses. Subjects in the intervention group were provided with four group sessions. These included instruction on the signs of relapse, a review of the importance of attending appointments and discussion of patient beliefs that might affect appointment attendance. Attendance to follow-up appointments was assessed over 9 months. Patients in the intervention group had better appointment attendance compared with the control group (p = 0.0009). A total of 8% of the experimental group missed all appointments compared with 65% of the control group. A total of 48% of the experimental group attended one or two visits, compared with 35% of the control group. In total, 44% of the experimental group attended more than two visits, while none of the participants in the control group attended more than two visits.

A randomized controlled trial by Staring *et al.* examined the effects of 'treatment adherence therapy' (TAT) on medication adherence and service engagement [29]. Their sample included 109 patients with a DSM-IV diagnosis of schizophrenia or schizoaffective disorder and documented problems with service engagement. Patients in the TAT condition were assessed and matched to needed intervention modules. Forty subjects participated in motivational interviewing to address poor integration of illness and treatment into life, eight subjects received medication optimization treatment to address medication dissatisfaction, and 12 patients were provided behavioral training to address cognitive and behavioral issues. Service engagement was assessed with the total score of the three nonmedication subscales of the SES: 'availability', 'collaboration' and 'help seeking'. Logistic regression analysis revealed significant differences in service engagement as a result of TAT when compared with TAU at 6 months (d = 0.48; p < 0.028). Significance was not maintained at a further 6-month follow-up. TAT was also not found to lead to significant changes

in insight, symptoms, therapeutic alliance, recovery style or stigma.

Pijnenborg *et al.* investigated the use of text messages to improve patient identified goal-directed behaviors [24]. Their sample included 47 participants with a DSM-IV diagnosis of a schizophrenia spectrum disorder and deficits in goal directed behavior. Improvement of appointment attendance was identified as a treatment goal by 38 patients. The baseline rate of appointment attendance for this group was 39%. During the 7-week intervention, two text message prompts were sent prior to each appointment. Rates of appointment attendance improved to 65%. When text message reminders were discontinued for 3 weeks, the mean percentage of goals achieved decreased to 56%. These effects were significant based on logistic regression (p < 0.05).

Further analyses were conducted across all goal categories. Patients who demonstrated a 20% or greater increase in goal-directed behaviors were categorized as 'responders'. Responders were compared with 'nonresponders' on a number of variables at baseline and following intervention. Responders had lower initial rates of goal-directed behaviors (34%) than nonresponders (60%). At baseline, they also had more positive symptoms and lower scores on measures of memory and affect recognition. Hence, it was the patients with poorer functioning and greater symptomatology who demonstrated the most improvement from the text message prompts. Following the intervention, the responder group also demonstrated improvement in negative symptom scores. The majority of patients who participated in the study rated the intervention positively (70%) and nearly half reported that they would be willing to continue the intervention (47%).

In summary, a variety of interventions have been shown to improve appointment attendance significantly [21,23–24,29]. Price's pilot was limited by its small sample size. However, it was innovative in both its provision of cellular phones to patients and the use of phone reminders. Further investigation of this intervention with a larger sample would be of interest [22]. The randomized controlled trial of Staring *et al.* demonstrated that a TAT intervention led to improved scores on the SES. This study is of interest because it matched intervention to patient need. The findings were limited by the small sample size, the fact that raters of the SES were not blind to treatment assignment and because the patients in the intervention had more total sessions than TAU [29]. Petersen *et al.*'s intervention led to both a significant improvement in appointment attendance and a decrease in psychiatric symptomatology. However, the raters of psychopathology were not blinded to the treatment

assignment which may have biased the results [21]. Investigations of psychoeducation and text reminders provided preliminary evidence that lower cost interventions can facilitate attendance improvement [23,24]. While the effect of psychoeducation on appointment attendance was marked in Agara and Onibi's randomized controlled study, there are two aspects of the trial that may have contributed to this effect [23]. First, substance abuse was an exclusion. This is important because substance abuse has been shown contribute to lower levels of treatment adherence [5]. In addition, the study was conducted in a setting that does not routinely incorporate psychoeducation into treatment. Pijnenborg *et al.*'s study provides preliminary evidence of the potential for text message reminders to improve appointment attendance in patients with schizophrenia [24]. A weakness of the study was that the assessors of goal completion were not blinded to the treatment goal.

Discussion

Appointment attendance has been identified as an important issue for patients diagnosed with schizophrenia. From the literature reviewed, this issue has been addressed in only a limited number of studies. Rates of missed appointments were higher for recently discharged inpatients than for other samples. It appears that the transition from inpatient to outpatient care is a time of greater risk for missed appointments and can be thought of as an opportunity to implement intervention. There is limited research investigating the relationship between missed appointments and suicide. This recent literature indicates that patients with schizophrenia who exhibit suicidal behavior are more likely than those without schizophrenia to have contact with mental health services. Despite this, a sizeable percentage of patients with schizophrenia did not have a mental health contact before or after exhibiting suicidal behavior. This finding is of concern and future studies are needed to investigate this in more depth.

Recent studies of the factors associated with missed appointments reveal a consistent relationship between increased psychopathology and decreased appointment attendance. In most studies reviewed, the expected relationship of appointment attendance with both age and gender was not supported. Although definitive conclusions cannot be drawn at this time, it may be that measures of appointment attendance assess a construct distinct from the broader constructs of treatment adherence and engagement reported previously in the literature. The more specific outcome of missed appointments may not be affected by gender and age. Measures of insight and substance abuse, also expected to be correlated with missed appointments,

were not included in several of the studies. This gap in the recent literature makes it difficult to draw conclusions about the relationship of these characteristics and appointment attendance. Future studies of missed appointments should include measures of substance abuse and insight to help establish and clarify these likely associations.

Recent research has involved the use of treatment scales to objectively assess the constructs of treatment compliance and engagement. The use of treatment scales is an excellent step to help define and quantify these broad constructs. In future studies utilizing such scales, the inclusion of an objective count of missed appointments would be a useful adjunct measure. This would help to provide independent confirmation of the attendance subscale ratings. In addition, collecting both types of data could help to refine the constructs of 'treatment compliance' and 'treatment engagement' by clarifying their relationship with appointment attendance. Studies of various interventions provide evidence that appointment attendance can be improved. Preliminary findings of the effect of psychoeducational interventions and text reminders on missed appointments suggest that these interventions may be well received by patients, relatively easy to implement and have a low cost. However, definitive conclusions cannot be drawn because of the limited studies available.

Limitations

Several limitations should be noted. Articles included in the review were limited to those that reported the rate of appointment attendance. Studies that focused on related patient outcomes such as treatment dropout, discontinuation or loss to care were not included. The studies included were conducted in many different countries, each with its own unique healthcare system. These differences are likely to affect the outcomes measured as well as the generalizability of the interventions. The diversity of the patient samples may also limit generalizability. Studies included patients with a broad range of psychotic disorders treated in a variety of settings. We were able to distinguish studies in which patients were recently discharged. However, we could not do the same as a function of disease stage or intensity of care. In several studies, the patients with schizophrenia were part of a larger SMI sample. While rates of missed appointments were reported for these subsamples, the characteristics correlated with missed appointments were not. Thus, the studies may not have captured findings specific to schizophrenia.

Further limiting generalizability is that patients with the poorest attendance were less likely to be included in the research samples. Studies that included only consented patients may have missed those with the most severe deficits in appointment attendance since those who did not present to treatment could not be invited to participate. Studies based on chart review or sequentially referred cases more likely captured some patients with very poor adherence. While several interventions show promise for improving appointment attendance, this may also reflect publication bias, since studies involving similar interventions that did not lead to attendance improvements may be less likely to be published.

Conclusion & future perspective

Further research should focus on improving appointment attendance and the effect this has on clinical outcomes. As missed appointments appear to be most common during the transition from inpatient to outpatient care, efforts that focus on this transition would be an important next step. Interventions that include psychoeducation during inpatient treatment and the utilization of appointment reminders following discharge are promising approaches. While the use of reminders could be a cost-effective way to improve appointment adherence, there is limited research on its effectiveness for patients with a schizophrenia diagnosis; thus, further research is warranted [34]. In addition to mail and text reminders, other technologies may hold promise for improving appointment attendance. Internet-based interventions, video conferencing and other telephone-based modalities could inform both research and clinical practice with this population [35–37]. These technologies are likely avenues for further research and intervention. Such methods can provide the means to reinforce psychoeducational messages, facilitate patient/provider communication and track important clinical outcomes that include symptomatology, medication adherence and suicidal behavior. All of these approaches could improve appointment attendance in this population of patients.

References

Papers of special note have been highlighted as:
• of interest; •• of considerable interest.

1   Lefforge NL, Donohue B, Strada MJ. Improving session attendance in mental health and substance abuse settings: a review of controlled studies. *Behav. Ther.* 38(1), 1–22 (2007).

2   Killaspy H, Banerjee S, King M, Lloyd M. Prospective controlled study of psychiatric out-patient non-attendance: characteristics and outcome. *Br. J. Psychiatry* 176(2), 160–165 (2000).

3   Mitchell AJ, Selmes T. A comparative survey of missed initial and follow-up appointments to psychiatric specialties in the United Kingdom. *Psychiatr. Serv.* 58(6), 868–871 (2007).

4   Kreyenbuhl J, Nossel IR, Dixon LB. Disengagement from mental health treatment among individuals with schizophrenia and strategies for facilitating connections to care: a review of the literature. *Schizophr. Bull.* 35(4), 696–703 (2009).

5   Nose M, Barbui C, Tansella M. How often do patients with psychosis fail to adhere to treatment programmes? A systematic review. *Psychol. Med.* 33(7), 1149–1160 (2003).

•• Review and meta-analysis of rates and factors associated with medication adherence and treatment attendance in patients diagnosed with schizophrenia.

6   O'Brien A, Fahmy R, Singh SP. Disengagement from mental health services. *Soc. Psychiatry Psychiatr. Epidemiol.* 44(7), 558–568 (2009).

7   Hor K, Taylor M. Review: suicide and schizophrenia: a systematic review of rates and risk factors. *J. Psychopharmacol.* 24(11 Suppl. 4), 81–90 (2010).

8   Kasckow J, Felmet K, Zisook S. Managing suicide risk in patients with schizophrenia. *CNS Drugs* 25(2), 129–143 (2011).

9   Roy A, Pompili M. Management of schizophrenia with suicide risk. *Psychiatr. Clin. North Am.* 32(4), 863–883 (2009).

10 Hawton K, Sutton L, Haw C, Sinclair J, Deeks, JJ. Schizophrenia and suicide: systematic review of risk factors. *Br. J. Psychiatry* 187(1), 9–20 (2005).

11 Coodin S, Staley D, Cortens B, Desrochers R, McLandress S. Patient factors associated with missed appointments in persons with schizophrenia. *Can. J. Psychiatry* 49(2), 145–148 (2004).

12 Adelufosi AO, Ogunwale A, Adeponle AB, Abayomi O. Pattern of attendance and predictors of default among Nigerian outpatients with schizophrenia. *Afr. J. Psychiatry (Johannesburg)* 16(4), 283–287 (2013).

13 Adeponle AB, Obembe AO, Suleiman GT, Adeyemi OS. Missed first appointments: prevalence and associated factors in first-time attendees at an outpatient psychiatric clinic in Nigeria. *Ment. Health Relig. Cult.* 10(6), 609–620 (2007).

14 Beebe LH. What community living problems do persons with schizophrenia report during periods of stability? *Perspect. Psychiatr. Care* 46(1), 48–55 (2010).

15 Fanning F, Foley S, Lawlor E *et al.* Group cognitive behavioural therapy for first episode psychosis: who's referred, who attends and who completes it? *Early Interv. Psychiatry* 6(4), 432–441 (2012).

16 Compton MT, Rudisch BE, Craw J, Thompson T, Owens DA. Predictors of missed first appointments at community mental health centers after psychiatric hospitalization. *Psychiatr. Serv.* 57(4), 531–537 (2006).

17 Lin HC, Lee HC. The association between timely outpatient visits and the likelihood of re-hospitalization for schizophrenia patients. *Am. J. Orthopsychiatry* 78(4), 494–497 (2008).

•   Demonstrated that missed outpatient appointments are predictive of re-hospitalization in a large cohort of patients diagnosed with schizophrenia.

18 Adeponle AB, Thombs BD, Adelekan ML, Kirmayer LJ. Family participation in treatment, post-discharge appointment and medication adherence at a Nigerian psychiatric hospital. *Br. J. Psychiatry* 194(1), 86–87 (2009).

19 Hunt IM, Kapur N, Robinson J *et al.* Suicide within 12 months of mental health service contact in different age and diagnostic groups: national clinical survey. *Br. J. Psychiatry* 188(2), 135–142 (2006).

20 Hunt IM, Kapur N, Windfuhr K *et al.* Suicide in schizophrenia: findings from a national clinical survey. *J. Psychiatr. Pract.* 12(3), 139–147 (2006).

•   Large-scale, descriptive study of patients diagnosed with schizophrenia who died by suicide.

21 Petersen L, Jeppesen P, Thorup A *et al.* A randomised multicentre trial of integrated versus standard treatment for patients with a first episode of psychotic illness. *BMJ* 331(7517), 602 (2005).

22 Price LM. Transition to community: a program to help clients with schizophrenia move from inpatient to community care; a pilot study. *Arch. Psychiatr. Nurs.* 21(6), 336–344 (2007).

23 Agara AJ, Onibi OE. Effects of group psychoeducation (GPE) on compliance with scheduled clinic appointments in a neuro-psychiatric hospital in southwest Nigeria: a randomised control trial (RCT). *Ann. Acad. Med. Singapore* 36(4), 272–276 (2007).

•• Randomized controlled trial that demonstrated improvement in outpatient clinic attendance in recently discharged patients with schizophrenia following participation in an inpatient psychoeducation program.

24 Pijnenborg GHM, Withaar FK, Brouwer WH, Timmerman ME, Van den Bosch RJ, Evans JJ. The efficacy of SMS text messages to compensate for the effects of cognitive impairments in schizophrenia. *Br. J. Clin. Psychol.* 49, 259–274 (2010).

•• Quasi-randomized controlled trial that demonstrated the efficacy of text message reminders to improve appointment attendance in patients diagnosed with schizophrenia.

25 Lecomte T, Spidel A, Leclerc C, MacEwan GW, Greaves C, Bentall RP. Predictors and profiles of treatment non-adherence and engagement in services problems in early psychosis. *Schizophr. Res.* 102(1), 295–302 (2008).

26   Staring ABP, Van der Gaag M, Van den Berge M, Duivenvoorden HJ, Mulder CL. Stigma moderates the associations of insight with depressed mood, low self-esteem, and low quality of life in patients with schizophrenia spectrum disorders. *Schizophr. Res.* 115(2), 363–369 (2009).

27   Tsang HWH, Fung KMT, Chung RCK. Self-stigma and stages of change as predictors of treatment adherence of individuals with schizophrenia. *Psychiatr. Res.* 180(1), 10–15 (2010).

28   Fung KMT, Tsang HWH, Chan F. Self-stigma, stages of change and psychosocial treatment adherence among Chinese people with schizophrenia: a path analysis. *Soc. Psychiatry Psychiatr. Epidemiol.* 45(5), 561–568 (2010).

29   Staring ABP, Van der Gaag M, Koopmans GT *et al.* Treatment adherence therapy in people with psychotic disorders: randomised controlled trial. *Br. J. Psychiatry* 197(6), 448–455 (2010).

30   Routhier D, Leduc N, Lesage A, Benigeri M. Service utilization by hospitalized suicide attempters with schizophrenia or depression in Montreal. *Psychiatr. Serv.* 63(4), 364–369 (2012).

31   Lee JL, Ma WF, Yen WJ, Huang XY, Chiang LC. Predicting the likelihood of suicide attempts for rural outpatients with schizophrenia. *J. Clin. Nurs.* 21, 2896–2904 (2012).

32   Tait L, Birchwood M, Trower P. A new scale (SES) to measure engagement with community mental health services. *J. Ment. Health* 11(2), 191–198 (2002).

33   Tsang HWH, Fung KMT, Corrigan PW. Psychosocial treatment compliance scale for people with psychotic disorders. *Aust. NZ J. Psychiatry* 40(6–7), 561–569 (2006).

34   Reda S, Rowett M, Makhoul S. Prompts to encourage appointment attendance for people with serious mental illness. *Cochrane Database Syst. Rev.* 2, CD002085 (2001).

35   Rotondi AJ, Sinkule J, Haas GL *et al.* Designing websites for persons with cognitive deficits: design and usability of a psychoeducational intervention for persons with severe mental illness. *Psychol. Serv.* 4(3), 202–224 (2007).

36   Shen J, Kobak KA, Zhao Y, Alexander MM, Kane JM. Use of remote centralized raters via live 2 way video in a multicenter clinical trial for schizophrenia. *J. Clin. Psychopharmacol.* 28, 691–693 (2008).

37   Spaniel F, Vohlidka P, Hrdlicka J *et al.* ITAREPS: information technology aided relapse prevention programme in schizophrenia. *Schizophr. Res.* 98(1–3), 312–317 (2008).