Original Article
Study of a comprehensive follow-up intervention for recently discharged patients with schizophrenia

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Abstract: Objective: To investigate the effect of a comprehensive follow-up intervention, including internet-based, telephone, and in-person return visit follow-up components, on the quality of life, symptom recurrence rate, and aberrant behavior in individuals previously diagnosed with schizophrenia. Method: In total, 600 participants, previously treated for schizophrenia and then discharged, were randomly and evenly divided into a control group and a study group. Participants in the study group received comprehensive clinical follow-up via an internet platform, telephone, and in-person clinic visits. Participants in the control group received only standard, in-person clinic follow-up support. Outcome measures included assessment of participants' symptom recurrence rate and troublemaking danger level after discharge. The Personal and Social Performance (PSP) scale was further used to assess the quality of life of all participants across both groups. Results: Mean personal and social performance scores for participants in the study group were greater than those in the control group (P < 0.05). One- and two-year recurrence rates were lower in individuals in the study group (P < 0.01), as were the number of patients with serious troublemaking danger levels after 2 years (P < 0.01). Conclusions: An internet-based, comprehensive follow-up intervention can effectively reduce the recurrence rate and troublemaking danger level in individuals previously treated for schizophrenia. These results suggest a promising potential therapeutic option that may improve the quality of life of patients with debilitating psychiatric disease.

Keywords: Internet follow-up, schizophrenia, troublemaking, quality of life

Introduction

Patients with severe mental illnesses such as schizophrenia often commit acts of violence because of poorly controlled psychopathological symptoms [1]. This can disrupt the stability and harmony within families and more broadly in society [2, 3]. The attention from government agencies and society has increasingly been drawn to adverse social events involving individuals with schizophrenia, who also often have high symptom recurrence and disability rates, as well as a diminished quality of life [4, 5]. For the management and treatment of individuals with severe psychiatric diseases including schizophrenia, systematic health education in conjunction with pharmaceutical therapeutics is especially important. Although the Chinese federal government's investment in mental health services has increased and hospital-based treatment conditions for patients with severe mental illnesses have improved greatly in recent years, resources available to the post-discharge patient community, including rehabilitation and follow-up management, are lacking [6, 7].

Symptom recurrence rate, troublemaking danger level, and the quality of life of patients with schizophrenia after hospital discharge were investigated in this study. The feasibility of integrating post-discharge rehabilitation measures, including a more comprehensive follow-up protocol, is discussed. A more comprehensive follow-up protocol including internet-based, telephone, and regular, in-person return visits, or extended psychiatric medical services from the hospital into patients' homes was conducted. As demonstrated here, this extension of current follow-up practices to a more comprehensive model, as was provided to the participants in our study group, greatly improved patient quali-

Table 1. Analysis of general information

General information	Study group (n=300)	Control group (n=300)	*P* value
Sex			
Male	146	138	0.513
Female	154	162	
Age (years)	40.51 ± 13.30	39.10 ± 12.90	0.188
Course of disease (months)	6.2 ± 3.9	5.9 ± 3.7	0.334
Premorbid psychiatric symptoms			
Predominantly positive symptoms	224	238	0.454
Predominantly negative symptoms	123	116	
Pre-hospitalization troublemaking danger level			
Level 0	44	55	0.850
Level 1	130	125	
Level 2	70	63	
Level 3	35	33	
Level 4	18	20	
Level 5	3	4	
Prescription drugs at discharge			0.446
Paliperidone extended-release tablets	60	67	
Olanzapine	101	97	
Risperidone	80	90	
Others (including drug combination)	59	46	

ty of life, reduced the recurrence of disease symptoms, and decreased the rate of trouble-making when compared to control individuals who receive standard follow-up care.

Materials and methods

Clinical data

In total, 600 patients with schizophrenia who were discharged from our hospital between February 2013 and May 2015 were recruited for this study. This study was reviewed and approved by the Ethics Committee of our hospital.

Methods

Ethics Committee approval prior to data collection, as well as the approval of the research committee of the hospital were obtained. Participant inclusion criteria included a previous clinical diagnosis of schizophrenia, as defined by the ICD-10 [8]. Participants willingly consented to participate in the study and signed the informed consent form. Exclusion criteria included participants having any serious physical diseases and being illiterate or otherwise unable to competently use WeChat and other internet platforms.

Control group

Individuals assigned to the control group continued with typical post-discharge management. This included routine and regular visits to the hospital outpatient clinics. If participants were found to have had significant relapse and were in need of hospital treatment, they were hospitalized and treated according to their original program of intervention. These individuals were not withdrawn from the study.

Study group

Individuals assigned to the study group were administered a more comprehensive follow-up regimen involving an internet-based intervention, telephone follow-up, and regular, in-person return visits. Patient's name, sex, age, admission number, discharge time, contact number, WeChat ID, home address, and therapeutic regimen were all recorded, just as they were in the control group. A WeChat ID was assigned to each study-group participant. Fujian Province Home of Mental Health special personnel were responsible for training partici-

Table 2. Comparison of PSP score results between the two groups

Group	At discharge	6 months after discharge	12 months after discharge	18 months after discharge	24 months after discharge	Comparison between 12 and 24 months after discharge	
						t	p
Study group n=282	60.81 ± 8.41	63.74 ± 6.51	65.18 ± 7.51	67.26 ± 3.22	69.44 ± 9.40	5.946	< 0.001
Control group n=277	60.24 ± 7.92	62.27 ± 3.94	62.51 ± 8.40	66.24 ± 4.19	63.56 ± 7.85	1.520	0.129
T (t')	1.325	3.223	3.963	3.231	8.020	9.451	---
P value	0.733	0.001	< 0.001	0.001	< 0.001	< 0.001	---

Table 3. Comparison of recurrence between the two groups

Group	Number of cases	Cumulative recurrence rate (number of cases)		Cumulative recurrence times (x ± s)	
		12 months after discharge	24 months after discharge	12 months after discharge	24 months after discharge
Study group	282	68	114	1.2 ± 0.28	9.8 ± 0.83
Control group	277	102	145	3.4 ± 0.54	12.7 ± 1.33
X^2/t		10.666	7.986	6.062	3.109
P value		0.001	0.005	< 0.001	0.002

pants and/or family members upon discharge in the use of the WeChat website and features. Additionally, all doctors and nurses in the department were also added to the WeChat group and one doctor and one nurse were designated to release relevant disease knowledge to the participants on a weekly basis. Clinic personnel were assigned to be online and login WeChat group at 7 p.m. every day to answer any questions raised by the participants and their family members and offer helpful solutions. A telephone follow-up was then conducted once during the first week following discharge and then one or two times per month. Participants were also required to visit the clinic for in-person consultations. A psychological consultant recorded the return visit and evaluated the recording for adherence to predetermined guidance measures for each session. The recording also included assessing whether the conditions of the patients had fluctuated.

Evaluation index

The Personal and Social Performance (PSP) scale was used to evaluate four dimensions of participant function in a final composite score [9]. The higher the total score, the better the individual's interpersonal social function. Each score belonged to one of three levels: 71-100 corresponded to patients with only mild interpersonal difficulty; 31-70 to those with varying degrees of interpersonal disability; and 0-30 to those with very poor interpersonal ability. A troublemaking and dangerous behavior assessment was also administered to all participants. This assessment was divided into six levels where level zero represented no abnormal behavior; level one represented use of verbal threats and shouting but no destructive behaviors; level two represented exhibition of destructive behavior; level three represented exhibition of obvious destructive behavior, regardless of the setting, aimed at property, and the patient could not be persuaded to stop; level four represented exhibition of continuous destructive behavior, regardless of the setting; and level five represented exhibition of overtly violent acts including possession of weapons and threats toward others, committing arson, explosive behaviors regardless of the setting. The participants were assessed and assigned a score on this scale by two senior attending physicians.

Statistical analysis

SPSS 20.0 (IBM Corp., Armonk, NY, USA) was used for data processing. All data collected followed a normal distribution curve, represented by (Mean ± SD). Continuous data were analyzed by the 2-tailed Student *t* test. Categorical variables were analyzed using the Chi-square test. P < 0.05 was considered with statistically significant difference.

Table 4. Comparison of troublemaking danger level 24 months after discharge

Group	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5	Mild (cases)	Serious (cases)
Study group n=282	182	63	25	6	4	2	270	12
Control group n=277	138	77	31	18	8	5	246	31
X^2	12.370	2.217	0.839	6.496	4.437	1.357		9.468
P value	< 0.001	0.137	0.360	0.011	0.231	0.244		0.002

Results

Participant characteristics

Participants were randomly divided into a control group and a study group with 300 participants in each group. The study group included 146 men and 154 women with ages ranging from 1859 (40.51 ± 13.30) years and a course of disease duration of 1-16 (6.2 ± 3.9) months; the control group included 138 men and 162 women with ages ranging from 19-60 (39.10 ± 12.90) years and a course of disease duration of 1-19 (5.9 ± 3.7) months. There were no significant differences between the groups based on age, sex, course of disease duration, premorbid psychiatric symptoms, troublemaking danger level, and medication regimen (all, P > 0.05) (**Table 1**).

Comparison of PSP scores

In total, 18 and 23 participants from the study and control groups, respectively, did not complete the study. Reasons for failing to complete the study included, death, going abroad, or family-member concerns regarding privacy. Comparison of PSP scores between the two groups showed that the PSP scale scores at 6, 12, 18 and 24 months following discharge significantly differed between the two groups (P=0.0733, P=0.001, P < 0.001, P=0.001, P < 0.001), with the study-group scores surpassing those of the control group (**Table 2**).

Comparison of recurrence between the two groups

The cumulative symptom-recurrence rates and recurrence episodes at each evaluation time point after discharge were also assessed. The recurrence rates at 12 months and 24 months after discharge were significantly lower in the study group than in the control group (P=0.001, P=0.005). The number of recurrence episodes was significantly lower in the study group than in the control group, both at 12 and 24 months after discharge (P ≤ 0.001, P=0.002) (**Table 3**).

Comparison of troublemaking danger levels 24 months after discharge

A comparison of troublemaking danger levels 24 months after discharge also revealed a significant difference between the control and study groups. The number of patients with lower severity score (level 0) was significantly lower in the study group than in the control group (P ≤ 0.001, P=0.137, P=0.360, P=0.011, P=0.231, P=0.244, P=0.002) (**Table 4**).

Discussion

The advantages of using an internet-based intervention platform in concert with telephone and in-person follow-ups are multifold [10, 11]. Combined use of image and video allows for more vivid display of dynamic content [12, 13]. This enables patients and their family members becoming more intuitively knowledgeable about and skilled in managing severe psychotic disorders. It further helps reminding patients of the necessity of clinical compliance, including adhering to their medication protocol and visiting the clinic as appropriate. This can also strengthen patient sense of personal autonomy and control over their self-management [14, 15]. Accessibility is another benefit of a more comprehensive approach, which includes an internet platform [16] such as WeChat, for the post-discharge management of schizophrenia [17]. Clinicians can publish disease-related content at any time and from anywhere and answer patient/family-members' questions regarding the disease and medications in a timely manner [18, 19]. In this study, the process of patients' rehabilitation after discharge was supervised by the project team and executed by an attending physician and psychological consultant with whom the patient was familiar from the time during the hospitalization. This allowed a certain emotional foundation and familiarity between clinicians and patients for further communication [20-22]. A final benefit of a more streamlined, internet-based approach is to provide follow-up care for patients with

schizophrenia that includes reallocation of critical out-patient clinic hours to other patients who are in a more critical or acute condition. By bringing return visits and follow-up appointments to the patients, the process is more convenient for both the patients and their providers.

The 1-year and 2-year symptom recurrence rates of the patients in the study group were found to be 24.11% and 40.4%, respectively, which were significantly lower than that in control group participants-36.8% and 52.3%, respectively. These findings suggest that the proposed intervention protocol may improve the quality of life of patients with debilitating psychiatric disease and may be a promising potential therapeutic option.

The recurrences rates in the study group were lower than the previously reported 1-year schizophrenia recurrence rate of 40.8% and 2-year schizophrenia recurrence rate of 51.7% in China [23]. While our data were affected by the fact that they were collected from patients residing in different areas and belonging to variable economic environments, they nevertheless indicate that an internet-based, comprehensive intervention can effectively reduce the recurrence rate of schizophrenia symptoms.

Regarding quality of life, the results reported here show that the PSP scale scores at all time points were improved in the study group to a greater degree than in the control group, indicating that the improved quality of life of the patients following such psychiatric intervention can be maintained long term. Finally, the results on troublemaking danger level reported here indicate that participants in the study group demonstrated significant reductions in serious trouble-making behaviors after discharge as compared to control-group participants.

Although the more comprehensive follow-up model resulted in better outcomes than the standard follow-up care in this study, it is important to note several limitations. First, some family members refused to participate in the study. Additionally, certain participants concealed elements of their experiences during the follow ups, leading to the collection of incomplete data. Furthermore, some difficulty was experienced with family members failing to regularly visit the WeChat site. Altogether, these and other factors may reduce the accuracy of some elements of the data presented here.

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Disclosure of conflict of interest

None.

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