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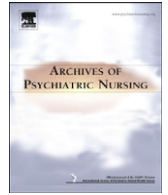
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A B S T R A C T

The objective of this study was to evaluate the clinical utility of the nursing psychoeducation program (NPE) for improving the acceptance of medication of inpatients with schizophrenia as well as their knowledge regarding their illness and the effects of medication on it. This study was a quasi-experimental study involving a convenience sample and was performed at the acute treatment units of two Japanese psychiatric hospitals. The subjects were recruited from among the inpatients being treated at the acute treatment units and were assigned to either the experimental or control group. The experimental group took part in the NPE, and the control group received the standard treatments for schizophrenia. Data were collected using structured questionnaires; i.e., the Medication Perception Scale for Patients with Schizophrenia (MPS), Drug Attitude Inventory–10 Questionnaire (DAI-10), and Knowledge of Illness and Drugs Inventory. Forty-three patients (13 men and 30 women) agreed in writing to participate in this study. During pre-/postintervention comparisons, the total MPS score, the 'efficacy of medication' subscale score, and the total DAI-10 score exhibited significant group × time interactions.

Many patients with schizophrenia require long courses of drug treatment to improve their psychological symptoms and prevent relapses. However, patients who live in local communities after being discharged are often repeatedly hospitalized due to relapses caused by poor medication adherence, poor family support, poor interpersonal relationships, and stressful life events (Xiao, Mi, Li, Shi, & Zhang, 2015).

In a study conducted by Schennach, Obermeier, Meyer, et al. (2012), it was found that 52% of patients with schizophrenia suffered at least one relapse within a year of their discharge from hospital. In another study, it was demonstrated that medication discontinuation was the cause of readmission (based on self-judgment) in more than 70% of patients who were readmitted within a year of being discharged from hospital (Kissling, 1991). Furthermore, the following factors were demonstrated to be significant predictors of rehospitalization and relapse after hospital discharge: a higher Hamilton Depression Rating Scale (HAMD-17) score, an increased frequency of side effects, a negative attitude to treatment, and not having a job (Schennach et al., 2012).

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Regarding the factors affecting medication discontinuation, it is considered that medication discontinuation is influenced by the patient–healthcare professional relationship (Day, Bentall, Roberts, et al., 2005), the side effects of antipsychotics such as pyramidal symptoms and sedation (Dibonaventura, Gabriel, Dupclay, Gupta, & Kim, 2012; Eticha, Teklu, Ali, Solomon, & Alemayehu, 2015), patients' beliefs about the effects of medication (Higashi et al., 2013), psychological symptoms (Barkhof, Meijer, de Sonneville, Linszen, & de Haan, 2012; Higashi et al., 2013), patients' awareness of the symptoms of their illness (Barkhof et al., 2012; Higashi et al., 2013; Novick et al., 2015), and cognitive dysfunction (Masand, Roca, Turner, & Kane, 2009). Therefore, mental health professionals should implement measures that have beneficial effects on these factors.

In Japan, mental health professionals are keenly aware of the importance of comprehensive community psychiatric treatment based on the bio-psycho-social model and have a strong interest in using psychosocial treatment to improve the quality of life (QOL) of patients who are discharged from hospital. In particular, psychoeducation about psycho-social treatment is widely recognized to provide patients with psychological support and information about their illness and medication, enable patients to share their experiences, and aid the acquirement of coping skills, and it has been shown to be effective at empowering patients with schizophrenia (The Japanese Network of Psychoeducation and Family Support Program, 2000).

Psychoeducation programs for patients with schizophrenia have been shown to have the following positive effects: to induce improvements in medication adherence (von Maffei, Görges, Kissling, Schreiber,

& Rummel-Kluge, 2015; Xia, Merinder, & Belgamwar, 2011), patients' views about medication (Hayama et al., 2002; Hornung, Klingberg, Feldmann, Schonauer, & Schulze Mönking, 1998), the acquisition of condition-specific knowledge (Aho-Mustonen et al., 2010; Hasan, Callaghan, & Lymn, 2015; Renri, 1995), patients' awareness of the symptoms of their illness (Chien & Thompson, 2014), patients' coping and social skills (Chien & Thompson, 2014), and QOL (Guo, Zhai, Liu, et al., 2010; von Maffei et al., 2015) and to reduce the frequency of relapse and rehospitalization (Hasan et al., 2015; Pekkala & Merinder, 2002) and the severity of self-stigma (Uchino, Maeda, & Uchimura, 2012).

However, psychoeducation is only performed in approximately 30% of psychiatric institutions in Japan (Fukui, 2011). This might be due to factors such as the difficulty of delivering psychoeducation in poorly environmental conditions, as well as a lack of knowledge and skills regarding psychoeducation among nurses and other medical staff and labor shortages at psychiatric hospitals (in 2010 the numbers of psychiatrists and nurses per 100 psychiatric beds in Japan were 3.5 and 20.5, respectively) (Ministry of Health, Labour, and Welfare, 2013).

Thus, a nurse-led version of a psychoeducation program for patients with schizophrenia, the Nursing Psychoeducation Program (NPE), was developed by Matsuda (2008). In a previous study, the clinical usefulness of the NPE was evaluated using a mixed-method research design. Qualitative data were collected using semi-structured interviews and used to explain the process to which patients with schizophrenia that were undergoing psychoeducation accepted their illness and the need for medication, and quantitative data were collected in a one-group pre-test/post-test study to assess the changes in the patients' knowledge regarding their illness and the effects of medication on it brought about by the intervention. As a result, it was demonstrated that the program was useful for helping patients accept their illness and the need to take medication and for improving the patients' condition-specific knowledge. However, a pre-experimental design was used for the abovementioned quantitative research; consequently, there is insufficient evidence to support the utility of the NPE. Therefore, we considered that it was extremely important to use a quasi-experimental design to assess the usefulness of the NPE.

The objective of this study was to evaluate the clinical utility of the NPE for inpatients with schizophrenia using a quasi-experimental design. In particular, we focused on acceptance of medication and patients' knowledge concerning their illness and the effects of medication on it.

METHODS

Study Design

This study was a quasi-experimental study involving convenience samples, a non-equivalent control group, and a pre-test/post-test design.

Subjects

The study was performed at the acute treatment units of two Japanese psychiatric hospitals run by the Department of Psychiatry. The acute treatment units run by the Department of Psychiatry have to meet certain criteria established by the Ministry of Health, Labour and Welfare, e.g., they have to discharge over 40% of their patients within 3 months and employ appropriate numbers of medical professionals.

The subjects were recruited from among the patients that were admitted to the abovementioned acute treatment units based on the inclusion and exclusion criteria outlined below. The recruitment of subjects were conducted by patient's primary nurses and primary doctors. The inclusion criteria were as follows: having being diagnosed with schizophrenia according to the *International Classification of Diseases–Revision*: 2013 (*ICD-10*: codes F20 to F25), being given oral antipsychotic medication, being able to attend a 1-hour session, being capable of verbal communication, and being aged ≧20. The exclusion criteria for the subjects were as follows: having an intellectual disability, refusing to participate in this study, and being difficult to seat during the sessions.

Table 1
Contents of the NPE.

Goals:
The aims of the NPE are to encourage schizophrenic patients to accept their illness and the need to take medication, improve their medication adherence, and protect against the relapse of symptoms.
Time:
60–90 minutes/day, 1 day/week, total of 4 days
Group structure:
A closed group with 5–7 subjects
Method:
Information is provided using a textbook and via the sharing of experiences
Learning materials: Textbook
1. Symptoms of psychogenic illness
2. Association between psychogenic illness and stress
3. Primary effects and side effects of medication
4. How patients should adjust to living with their illness in the community

All of the patients who met the inclusion criteria were invited to participate in this study. The patients who agreed to participate in the study were assigned to either the experimental or control group. The experimental group took part in the NPE, and the control group received the current standard treatment for schizophrenia.

Interventions

The NPE is a four-session intervention program covering four topics: the symptoms of psychotic illness, the association between psychogenic illnesses and stress, the primary effects and side effects of antipsychotic medication, and how patients can learn to live with their illness in the community. In each session, an original textbook is used as a learning material (Table 1). The textbook has five main sections: (a) an illustration of the relationship between psychotic illnesses, stress, antipsychotic therapy, and psychiatric rehabilitation; (b) discussion points about the patients' past and current status; (c) a workbook about the primary effects and side effects of antipsychotic medication; (d) lists of questions and answers designed to allay patients' fears; and (e) changes patients should make to their lives to prevent relapses. The sessions were conducted once a week for 60–90 minutes (a total of four times) in a closed group setting. The program was conducted by two psychiatric nurses (a leader and a co-leader. The nurses who conducted the NPE sessions made a special effort to get the patients to share their experiences of their illness, and to provide the patients with psychological support. The nurses received training in the NPE in advance.

The training for the NPE took the form of the psychoeducational practitioner training program (PPTP) developed by Matsuda and Kono (2015) and was conducted on two consecutive days in a workshop style. The PPTP comprises three learning strategies: lectures, audiovisual aids, and role-plays. In the lecture, the nurses received explanations based on original learning materials (text and slides), and the program developer provided explanations of how the program should be delivered while the nurses watched a DVD about the NPE. Furthermore, the nurses also learnt the theory behind the NPE (Table 2).

Table 2
PPTP Methods.

Learning materials: Prepared textbook and DVD
Time: 8 hours/day for 2 consecutive days
Group structure: A closed group with not more than 30 subjects
Methods:
• Lectures: Basic principles of psychoeducation
(Summary of the NPE: it provides basic information about diseases, treatment, and nursing. Lectures were given by the NPE developer.)
• DVD: Showing simulated psychoeducation practices
• Contents of the DVD: a simulation in which the NPE developer played the leader role, and nurses with experience in NPE practice played the co-leader and patient roles.
• Role-play: These activities were followed by role-plays involving the subjects. (The subjects played the roles of nurses and patients. Other subjects and the PPTP developers provided feedback, comments, and advice.)

Data Collection

In both the intervention and control groups, data were collected immediately before and after the intervention period using structured questionnaires. However, the data regarding the subjects' characteristics [except for the antipsychotic regimens administered and the subjects' Global Assessment of Functioning (GAF) scores] were collected before the intervention.

Instruments

The structured questionnaires used are described below.

Subjects' Characteristics

The following characteristics were examined: age, gender, the number of times the subjects had been hospitalized, the antipsychotic regimens administered, and the subjects' GAF scores. Data regarding all of these characteristics were collected from the patients' medical records by nurses. The GAF was completed by primary healthcare nurses. The GAF includes two scales, which are used to evaluate patients' symptoms and functions. The GAF is a widely used scale and runs from 0 to 100, with higher scores representing better functioning. All antipsychotic drug doses were converted to chlorpromazine equivalents.

Primary Outcome: Acceptance of Medication

Medication Perception Scale for Patients with Schizophrenia (MPS)

This scale, which was developed by Matsuda et al. (2012), is used to evaluate the degree to which patients with schizophrenia have accepted their illness and the need to take medication. The MPS consists of a self-reported scale including 13 items and three sub-scales: 7 items for 'efficacy of medication', such as "If I continue to take antipsychotic medication, I think that can avoid rehospitalization"; 3 items for 'worries about side effects', such as "I seize with fear when thinking about the side effects of antipsychotic medication" and "I think that taking antipsychotic medication will have adverse effects on my future children"; and 3 items for 'fear of discontinuing medication', such as "I become anxious when I do not have medicine close at hand" and "I am afraid about forgetting to take medicine". The patients were asked to respond to each item on a 4-point Likert scale (1–4 points), with higher scores representing greater medication adherence.

The Cronbach's alpha coefficient for this instrument had been reported to be .75 for 'efficacy of medication' subscale, .75 for 'worries about side effects' subscale, .75 for 'fear of discontinuing medication' subscale, and .69 for the total scale (Matsuda et al., 2012).

Drug Attitude Inventory–10 Questionnaire

This inventory is a modified version of the Drug Attitude Inventory-30 Questionnaire, which was originally developed by Hogan, Awad, and Eastwood (1983). Specifically, it is a shortened version of the original inventory containing 10 instead of 30 items. The DAI-10 is a self-reported measure in which patients are asked to agree or disagree with various statements. The total score ranges from − 10 to 10, with higher scores representing greater subjective responses to medication. This inventory is commonly used to evaluate medication adherence in Japan. In the current study, the Cronbach's alpha coefficient had been reported to be .73 for the total scale (Shimodaira et al., 2012).

Secondary Outcome: Knowledge of Psychiatric Illness and Antipsychotic Drugs

Knowledge of Illness and Drugs Inventory; KIDI

This inventory was developed by Maeda, Mukasa, and Ogoh (1992) to assess patients' knowledge regarding their illness and the effects of medication on it. The KIDI comprises two sub-scales: 10 items assessing the patients' knowledge of their illness and 10 items assessing the patients' knowledge of the effects of antipsychotic drugs. This inventory consists of a self-reported inventory that asks patients to select the correct answer from three choices, with higher scores representing greater knowledge. In the current study, the Cronbach's alphas coefficient had been reported to be .83 for the total scale (Matsuda, 2008).

Data Analysis

Descriptive statistics were used to understand the characteristics of the intervention and control groups. The independent samples t-test or chi-square test was used to verify the homogeneity of the distribution of each characteristic between the two groups. The intervention group who completed the program were analyzed. Two-way factorial repeated measures ANOVA was used to evaluate the effects of the NPE on acceptance of medication and the patients' knowledge regarding their illness and the effects of medication on it. The two factors were "group" (intervention group and control group) and "time" (before and after the intervention). The data were analyzed using SPSS 20.0 for Windows.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki (2013) and with the approval of the institutional review boards of our affiliated facilities. After the study contents had been explained to the subjects in writing, each subject was asked to write their name on an informed consent form. The following ethical considerations were taken into account in this study: (1) decisions to consent should be made of the subjects' own free will; (2) the subjects should not suffer any loss, even if they do not consent to take part in the study or withdraw from the study after initially consenting to take part in it; (3) completed questionnaires should be labeled with serial numbers instead of names; (4) all personal information obtained in the study should be strictly protected; (5) the study outcomes should be mainly published in academic journals, and appropriate measures should be taken to avoid the identification of individuals; (6) questions regarding the study or its outcomes should be appropriately managed at all times; and (7) the collected data should be deleted or destroyed using shredders at the end of the study.

RESULTS

Subjects' Characteristics

The subjects were 56 schizophrenia patients who agreed in writing to take part in this study. The final analysis included 24 patients for the experimental group and 19 patients for the control group. All of the examined characteristics, except age and the GAF score, exhibited similar distributions in both groups (Fig. 1). The subjects' characteristics are shown in Table 3.

Effects of the Intervention

In the intervention group, the mean scores for all measurements were significantly better after the intervention than before the intervention. During pre-/post-intervention comparisons, the group x time interaction had a significant effect on the total MPS score (F (1, 41) = 24.85, $p < 0.01$). Furthermore, the group × time interaction had a significant effect on the 'efficacy of medication' subscale score [$F(1, 41)$ = 14.69, $p < 0.01$], and a significant main effect of time on the 'fear of discontinuing medication' subscale score was also detected. However time had no significant main effect on the 'worries about side effect' subscale score, then the effect of the group × time interaction was not significant. The total DAI-10 score was significantly influenced by the group × time interaction [$F(1, 41) = 9.18, p < 0.01$].
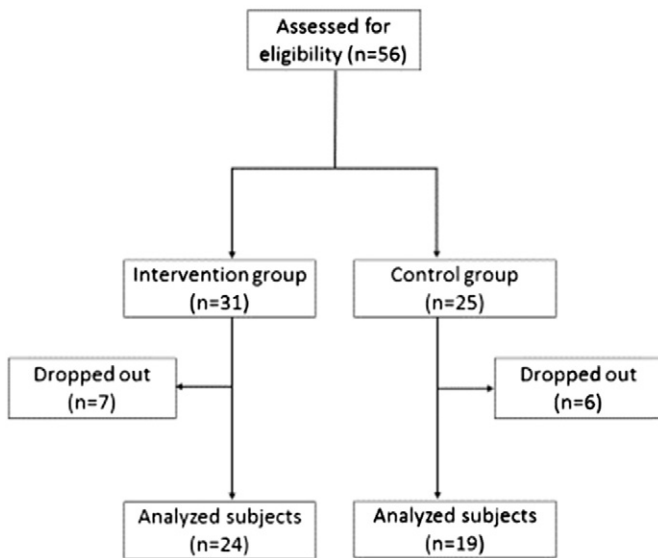
Fig. 1. Diagram of the flow of subjects through the study.

Significant main effects of time were detected on the total KIDI score [$F(1, 41) = 11.52$, $p \leq 0.01$] and the 'knowledge of drug' subscale score [$F(1, 41) = 16.32$, $p \leq 0.01$], but these scores were not significantly affected by the group × time interaction (Table 4).

DISCUSSION

The main purpose of this study was to evaluate whether the NPE contributes to improving schizophrenic patients' acceptance of medication and their knowledge of psychiatric illness and the effects of antipsychotic drugs. The present study examined the short-term effects of the NPE using a quasi-experimental research design. As a result, it was demonstrated that the NPE is useful for improving acceptance of medication in patients with schizophrenia.

In this study, acceptance of medication was examined using two measurements: the MPS and DAI-10. During pre-/post-intervention comparisons, it was found that the group × time interaction had significant effects on the total MPS score, the 'efficacy of medication' subscale score, and the DAI-10 score. Thus, the NPE might change how patients with schizophrenia think about antipsychotic medications. However, the score for the MPS subscale of 'fear of discontinuing medication' was influenced by time, but not the group × time interaction, in both groups. It is considered that patients' resistance to antipsychotic medications is reduced as they become more aware of the improvements in their psychotic symptoms and become used to taking prescribed medication on a daily basis. The exact reasons for our results are unclear, but they might be explained by the effects of antipsychotic medications and the fact that the patients would have got into the habit of taking

antipsychotic medicines on time in hospital. In particular, to improve acceptance of medication it is necessary to make patients aware of the improvements in their psychotic symptoms brought about by antipsychotic medications.

The findings of this study were consistent with those of previous studies that found that providing psychoeducation to patients with schizophrenia was effective at improving medication adherence (von Maffei et al., 2015; Xia et al., 2011). Furthermore, the present study supported Matsuda's (2008) qualitative research, which found that the mindset of patients with schizophrenia was characterized by "suspicion and fear about drugs" before they participated in the NPE sessions, whereas it was characterized by a "reliance on drugs" and the ability to "maintain a normal life with medication". On the basis of the present study, it can be said that the NPE contributes to improving patients' acceptance of medication.

On the other hand, the scores for the KIDI subscales related to knowledge about the effects of drugs increased with time in both groups. This might have been due to the fact that the control group was also provided with information about the characteristics of their psychotic illnesses and the effectiveness of antipsychotic drugs during their care. However, the scores for the KIDI subscales related to knowledge of the effects of drugs were not significantly affected by the group × time interaction, and thus, we concluded that the NPE does not directly contribute to improving patients' knowledge about this topic. In recent years, it has become clear that the acquisition of condition-specific knowledge is necessary, but not sufficient, for behavioral modification in patients with schizophrenia, and that changing patients' attitudes is more important than increasing their knowledge (Ministry of Health, Labour and Welfare, 2000). In other words, such knowledge is essential for behavioral modification; however, there is no direct relationship between medication adherence and condition-specific knowledge (Day et al., 2005). Knowledge about psychotic illness and the effects of medication might be indirectly associated with the degree to which patients accept the reality of their situation and are aware of the symptoms of their illness.

The findings of this study might have been influenced by the fact that the NPE was conducted using an original textbook in a group setting. In addition, the success or failure of the NPE is considered to depend on the quality of the interactions between the nurses providing it and the patients participating in it. In particular, group sessions are considered to help patients with schizophrenia to understand that other people are having similar experiences to them and encourage them to take advice from other patients and nurses.

Limitations and Future Studies

The present study showed that the NPE reversed patients' negative views of antipsychotic medication. Therefore, the NPE might be a useful nursing intervention for improving acceptance of medication in patients with schizophrenia. However, this study had several limitations that require consideration.

Table 3
Comparison of the Characteristics of the Experimental and Control Groups ($N = 43$).

Characteristics	Experimental group ($n = 24$)		Control group ($n = 19$)		T-test	p
	Mean ($\pm$ SD) or n (%)		Mean ($\pm$ SD) or n (%)			
Age	34.04	($\pm$10.74)	46.89	($\pm$14.15)	−3.28	0.002**
Gender						
Male	6	(25.00)	7	(36.84)	0.705[a]	0.509
Female	18	(75.00)	12	(63.15)		
Number of hospitalizations	2.38	($\pm$2.65)	2.32	($\pm$3.20)	0.07	0.949
GAF score	62.92	($\pm$16.28)	47.89	($\pm$12.28)	3.45	0.001**
Chlorpromazine equivalent	943.08	($\pm$517.50)	771.00	($\pm$470.74)	1.13	0.267

*$p < 0.05$.
[a] Chi-square test.
** $p < 0.01$.

Table 4
Short-Term Effects of the NPE ($N = 43$).

Scale	Group	Pre-test		Post-test		Group		Time		Group × time	
		Mean	(±SD)	Mean	(±SD)	F	p	F	P	F	p
MPS											
Total	Exp.	18.00	(±6.72)	23.17	(±6.28)	1.235	0.273	5.858	0.020[*]	24.854	0.000[**]
	Cont.	23.68	(±6.08)	21.89	(±8.30)						
Efficacy of medication	Exp.	11.96	(±4.29)	14.92	(±4.54)	0.908	0.346	1.228	0.274	14.694	0.000[**]
	Cont.	15.58	(±4.38)	13.95	(±6.47)						
Worries about side effects	Exp.	3.04	(±2.74)	4.08	(±2.47)	0.138	0.713	0.559	0.459	3.105	0.086
	Cont.	4.05	(±3.03)	3.63	(±3.04)						
Fear of discontinuing medication	Exp.	3.00	(±2.41)	4.17	(±2.67)	0.554	0.461	5.322	0.026[*]	2.125	0.153
	Cont.	4.05	(±3.14)	4.32	(±3.13)						
DAI	Exp.	2.79	(±4.51)	5.54	(±3.41)	0.239	0.627	3.058	0.088	9.175	0.004[**]
	Cont.	4.00	(±3.64)	3.26	(±4.45)						
KIDI											
Total	Exp.	12.13	(±3.71)	14.29	(±3.54)	14.146	0.001[**]	11.522	0.002[**]	0.140	0.711
	Cont.	8.21	(±4.54)	9.95	(±4.55)						
Illness	Exp.	6.54	(±2.28)	7.13	(±2.07)	12.641	0.001[**]	3.916	0.055	0.053	0.819
	Cont.	4.16	(±2.34)	4.89	(±2.85)						
Drugs	Exp.	5.58	(±1.86)	7.17	(±1.79)	9.686	0.003[**]	16.317	0.000[**]	0.832	0.367
	Cont.	4.05	(±2.68)	5.05	(±2.42)						

NOTE. Exp., experimental group ($n = 24$); Cont., control group ($n = 19$).
ANOVA
* $p < 0.05$.
** $p < 0.01$.

First, because the subjects were not assigned randomly in this study the study groups were not homogeneous. Thus, in future studies randomization should be utilized or a randomized-control trial should be performed after consulting with the staff of the participating institutions. Second, the results of this study only represent the short-term effects of the NPE. In future, it will be necessary to examine the long-term effects of the program. Third, this study was conducted in acute treatment units. In future studies, the usefulness of the NPE should be evaluated in various settings, such as in outpatient departments and day-care centers for people with mental disorders.

CONCLUSIONS

This study was conducted using a quasi-experimental research design and aimed to evaluate the clinical usefulness of the NPE for patients with schizophrenia. The NPE improved the acceptance of medication of patients with schizophrenia, but it did not increase their knowledge about their illness or the effects of medication on it. The NPE could be useful for improving acceptance of medication in patients with schizophrenia. Therefore, in future studies, it will be necessary to utilize a randomized approach, determine the long-term effects of the NPE, and evaluate the usefulness of the NPE in various settings.

Acknowledgment

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