

# Knowledge Gain by Psychoeducation for Patients with Schizophrenia: Associations with Sociodemographic Data, Psychopathology, Insight and Global Neurocognitive Performance

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**Abstract:** *Purpose:* In the psychiatric hospital of the Technische Universität München a prospective intervention study (PIP II) was conducted from the year 2004 to 2006 with schizophrenic patients to investigate the knowledge gain of patients after psychoeducation.

*Methods:* Psychoeducation was performed standardized by APES manual with eight meetings for a period of four weeks. A psychiatric and a neuropsychological assessment were carried out before and after psychoeducation. In addition, two questionnaires (Knowledge of Illness Questionnaire, Illness Concept Scale) were used. They were analysed to see to what extent the sociodemographic data, the psychopathology, the participation rate of the patients in psychoeducation, the neurocognition and the insight of the patients influence the knowledge gain.

*Results:* Comparison of pre and post data of 62 patients showed CGI declined from 5.0 to 3.2 ( $p < 0.000$ ), PANSS decline from 81.8 to 54.7 ( $p < 0.000$ ). The knowledge increased (0–107 points possible) from 82.6 to 88.5 points ( $p < 0.000$ ). Severely cognitively impaired patients had a knowledge increase from 77.4 to 86.3 points and mildly cognitively impaired patients from 86.8 to 92.8 points ( $p = 0.106$ ). Regression analysis showed that the knowledge score before psychoeducation ( $p < 0.000$ ) is the strongest predictor for knowledge gain.

*Conclusion:* Psychopathology does not limit knowledge gain. Insight into illness is not absolutely necessary for the participation in a psychoeducational group. In this study even cognitively impaired patients have been able to benefit from psychoeducation.

**Keywords:** Psychoeducation, schizophrenia, knowledge gain, neurocognition, insight.

## INTRODUCTION

The concept "Psychoeducation" was introduced in 1980 by Anderson as a "professional clarification of patients with a schizophrenia and their family about the illness and drugs, linked with a program to the training of basal, social and communicative skills as well as problem solving strategies [1]. Today the concept of "Psychoeducation" is summarised according to German Society for Psychoeducation (DGPE=Deutsche Gesellschaft für Psychoedukation) as a systematic didactic-psychotherapeutic intervention to inform patients and their relatives about the illness and their treatment, to promote their understanding of the illness and act responsibly with the illness and to support them by coping with their illness [2]. Within behavioural-therapeutic psychotherapy, psychoeducation represents a treatment component for which active informing of patients and relatives, exchange of experience between the affected persons and processing aspects of disease is most important [3, 4]. Hamann *et al.* showed that shared decision making with schizophrenic patients could help to improve schizophrenia related health outcomes [5].

Meanwhile, many accepted manuals exist for psychoeducation [6] e.g. the psychoeducational training for patients with schizophrenia (PTS) of Kieserg and Hornung (1994) or the psychoeducational group work with patients with schizophrenia and schizoaffective disorder (PEGASUS) of Wienberg (1995). The contents of the programmes are split into modules. The psychoeducational interventions in this study were arranged according to the concept of the Munich Psychoses Information Project (PIP) study [7] and the APES (Arbeitsmanual Psychoedukation bei Schizophrenie) manual [8].

Psychoeducation is analysed under different aspects and becomes an increasingly more inherent part in the treatment of psychiatric diseases [9-12]. Long-term effects of the psychoeducation on the illness course of the patients as for example the rehospitalization rate and the hospital days were examined [13, 14]. After 12 and 24 months the rehospitalization rate in patients with psychoeducation was significantly reduced [7]. In the 7-year follow-up in the Munich Psychoses Information Project (PIP) study the rehospitalization rate in the intervention group was clearly lower (54%) compared to the control group (88%) which had received no psychoeducation. Relating to the hospital days there was also a

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significant difference [15]. A review by Merinder showed that knowledge and compliance was improved by psychoeducational interventions [16]. However, no study into the knowledge gain has been carried out until now. It is therefore important to examine the short-term knowledge gain after a psychoeducational group more exactly. Conclusions can be drawn on the effectiveness of psychoeducation from these analyses. The study also tried to integrate severely ill patients with schizophrenia into psychoeducation. It was also of interest to see whether severely ill patients can profit from psychoeducation.

**Aims of the Study**

It was of interest to see which factors the knowledge gain is possibly dependent on, how ill can patients be to profit from psychoeducation and whether there are predictors which can forecast, for example, a better or worse knowledge gain. Therefore no control group without psychoeducation exists.

First the associations between knowledge gain and different aspects were analysed:

1. Does sociodemographic data influence the knowledge gain?
2. To what extent does psychopatholgy influence knowledge gain? Is there a differential effect of

depressive symptoms, positive symptoms or negative symptoms?

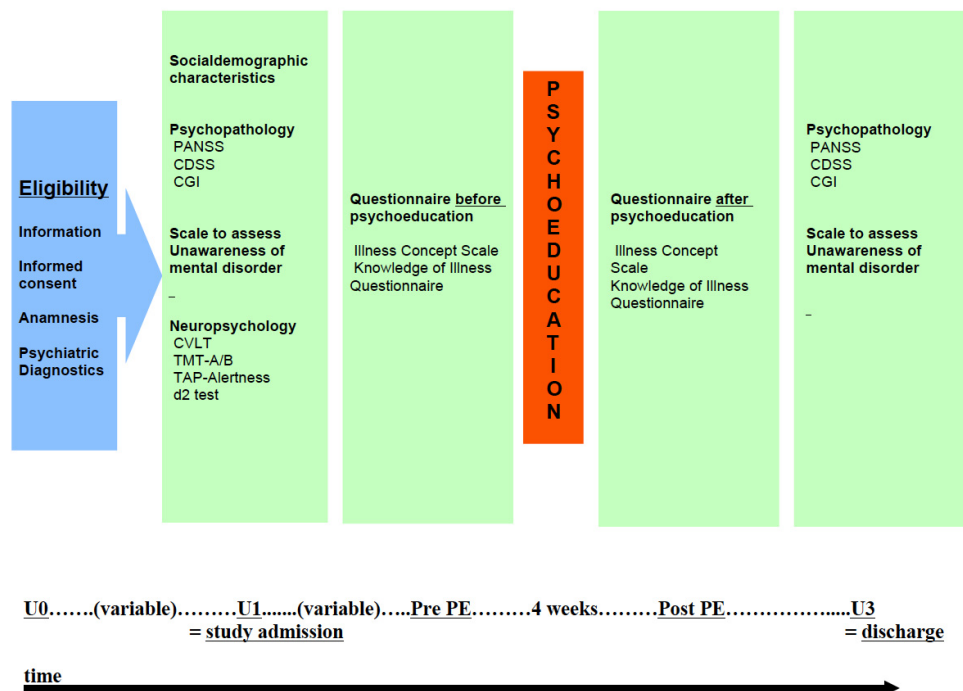
3. Is there a connection between the participation rate of the patients in psychoeducation and knowledge gain? For example, do patients with a higher participation rate also have a greater knowledge gain?
4. Is the knowledge gain dependent on global neurocognitive performance? Are severe or moderate cognitively impaired patients able to increase their knowledge level in the course of psychoeducation?
5. Does insight into illness or the patients' illness concept change with knowledge gain?

Secondly, the study analysed which of the factors listed above (for example sociodemographic data, psychopathology etc.) have the best predictive power for good knowledge gain.

**MATERIAL AND METHODS**

**Design**

A prospective intervention study (PIP II) as follow-up to the Munich Psychoses Information Project (PIP)



**Figure 1:** Study design.

study was conducted at the psychiatric hospital of the Technische Universität München from January 2004 to March 2006.

During the course of the study, five measurement points (U1-U5) were planned. The first measurement (U1), the third measurement (U3) as well as the psychoeducation pre-post data were introduced into the present evaluation. The first measurement, U1, took place at study admission with neuropsychological testing and a medical examination of the psychopathology. The third measurement, U3, occurred at the time of discharge. Psychoeducation with eight meetings for a period of four weeks took place between the measurement points. The study design is shown in Figure 1.

The psychoeducational groups consisted of eight to twelve patients as participants. Attention was paid to ensure the groups were closed groups. This means that further participants were not integrated during a continuous psychoeducational group. A session lasted 60 minutes and two sessions were held every week. The psychoeducational interventions in this study were standardized according to the concept of the Munich Psychoses Information Project (PIP) study and the APES manual [8].

### Participants

During the defined admission period 1/04 - 3/06, 160 patients with schizophrenia or schizoaffective disorder (ICD 10: F20, F22, F23, F25) were screened at the psychiatric hospital of the Technische Universität München. Inclusion criteria for the admission to the study were a schizophrenic illness of both male and female sex, aged between 18 and 65 and inpatients. The following exclusion criteria were fixed: treatment with first generation antipsychotic, separate substance abuse disorders, IQ below 80 determined by a neuropsychological testing, lack of German language skill, serious uncontrolled additional disorders like for example substance abuse, pregnant or nursing patients and no sufficient contraception.

The informed consent of the screened patients was obtained after inspecting the inclusion and exclusion criteria. 13 Patients were excluded and 42 refused to participate. Therefore, 105 patients gave informed consent. After having given informed consent, the patients were registered as study patients. Four patients were subsequently excluded (one patient with chemotherapy, two patients with typical neuroleptical

treatment, two patients with other diagnoses) and two patients withdrew informed consent. In total, there were 98 study patients. Reasons for dropping out were as follows: protocol violations like withdrawal of informed consent, change of residence, no reaction to establishing contacts, low participation in psychoeducational group, i.e. attending less than four meetings, not completing pre/post knowledge questionnaire and logistic reasons.

There is complete psychoeducation pre/post, psychopathology and neuropsychological data for 62 patients.

Figure 2 shows the participant flow.

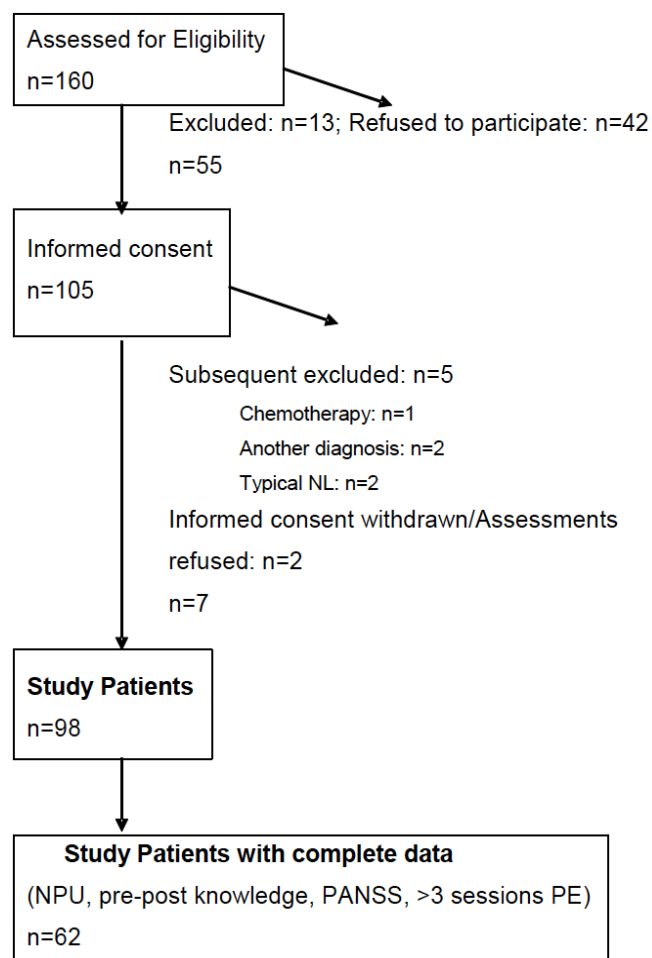


Figure 2: Participant flow.

### Clinical Measures

The following measures were used:

Prior to the intervention, diagnosis was confirmed by a psychiatrist using ICD-10 checklists. Clinical and sociodemographic data was also recorded with the

AMDP (Arbeitsgemeinschaft für Methodik und Dokumentation in der Psychiatrie) short anamnesis [17].

The psychopathology of the patients was rated by a psychiatrist using the Positive and Negative Syndrome Scale (PANSS) [18]. The scale contains 30 items on a 7-point severity scale from 1 (nonexistent) to 7 (extreme severe). The items were added up for a PANSS total score (1-30), PANSS Positive Symptoms score (P1-P7) and PANSS Negative Symptoms score (N1-N7). Depressive symptoms were assessed with the German version of the Calgary Depression Rating Scale for Schizophrenia (CDSS) [19]. The CDSS consists of nine items on a 4-point scale from 0 (clear absence of a symptom) to 3 (severe). For interpretation the total score of the nine items is important. The Clinical Global Impression (CGI) [20] was used to evaluate the general severity of the illness. The CGI ranges are from 0 (cannot be evaluated) to 7 (very severely ill).

The knowledge was rated with the "Knowledge of Illness Questionnaire" ("Wissensfragebogen", WFB) before and after psychoeducation. The Knowledge of Illness Questionnaire was created for the Munich Psychoses-Information-Project (PIP). It is an instrument for assessing knowledge of patients with schizophrenia about symptoms, causes, treatment and warning signs. These topics were discussed in psychoeducation. The questionnaire contains 21 multiple choice questions with a total of 107 answer alternatives (0-107 points reachable). The questionnaire is reliable (reliability coefficient  $\alpha=0,91$ ) [21].

The Illness Concept Scale for patients with schizophrenia (KK-Scale) is a valid and reliable instrument [22]. This questionnaire has been used before and after psychoeducation. It includes 29 items for assessing patients' illness-related attitudes and it is graduated in seven dimensions: confidence in their medication (CONMED, scores from 0 to 20), confidence in their doctor (CONDOC, scores from 0 to 16), negative expectations toward medication (NEGMED, scores from 0 to 20), attribution of illness to chance (CHANCE, scores from 0 to 20), susceptibility to illness and to relapse (SUSC, scores from 0 to 12), attribution of guilt (GUILT, scores from 0 to 12), and fear of the side effects of medication (SIDEFF, scores from 0 to 16). Insight into illness was rated with the 3-point Scale to assess unawareness of mental disorder [23].

For assessment of neurocognitive performance, four neurocognitive measures were used.

The California Verbal Learning Test (CVLT) is a widely used test to examine individual's ability to learn and remember verbal material. Two wordlists with 16 items in each case are applied. Wordlist A is the learning list and wordlist B serves as an interference task. The wordlist A is read out five times by the instructor. The sensitivity of the learning process is examined by the subsequent presentation of a second wordlist B. After a 5 minutes time interval and then again after a 20 minutes time interval the memory test is performed. The wordlists are first recalled in a free and then in a cued condition.

The Trail Making test (TMT) is a test procedure for the cognitive processing speed (version A) and for the selective attention (version B). Version A has similarity with the number connection test. There are numbers from 1 to 25 on a work sheet. The task consists in connecting the numbers as quickly as possible in arising order with a pencil. On a work sheet numbers from 1 to 13 and letters from A to L are ordered. Test person is asked to connect the numbers and letters in alternating order, i.e. 1 - A - 2 - B - 3 - C etc as fast as possible.

The Test for Attentional Performance (TAP) is a computer-based test. There are different subtests to examine alertness and divided attention. Divided attention is for example evaluated by choice reaction tasks with disrupting stimulus. Subtest alertness includes the reaction to a visual stimulus with and without warning sound.

Test of attention (D2 test) measures processing speed, rule compliance and quality of performance. The task consists recognizing the letter d with two lines from a row of similar marks. The timeframe for every line is 20 seconds. The test consists altogether of 14 lines.

The neurocognitive performance was used to place the patients into three groups with different cognitive impairment. Patients were classified as severely cognitively impaired, moderately cognitively impaired and slightly cognitively impaired. Therefore 12 items of the California Verbal Learning Test [24], three items of the Test of Attention [25], three items of the test for Attentional Performance, Subtest Alertness [26] and two items of the Trail Making Test A/B [27] were used for a global neurocognitive performance index. Patients were divided evenly into three groups with different cognitive impairment.

### Statistical Analyses

According to the statistical distribution of the study variables, the level of measurement as well as the dependence or independence of the particular sample, an adequate statistical test procedure has been selected. The distribution of the variables was checked by scatterplots for normal distribution. The following statistical procedures were used adequately: descriptive statistics (frequency, mean, median, standard deviation), mean comparisons/nonparametric procedures (parametric: t-test for dependent samples; nonparametric: Wilcoxon-test for dependent sample;

qualitative: Chi2 test), comparison of more than two groups (variance analysis ANOVA), correlations and linear regression analysis.

All calculations were done with SPSS for Windows, Version 15.0.

### RESULTS

#### Sociodemographic and Clinical Characteristics

Mean age of the participants was 35. Most patients were single (74.2%). 53.2% of the patients had finished college. 59.7% of the study patients were diagnosed

**Table 1: Demographic and Clinical Characteristics of the Sample**

Variable	Parameter value	Percent
Gender	female	53.2% (n=33)
	male	46.8% (n=29)
Age in years	mean (SD 12)	35
	median	34
	minimum - maximum	18 - 62
Family status	single	74.2% (n=46)
	married	9.7% (n=6)
	divorced	9.7% (n=6)
	separated	6.5% (n=4)
	widowed	0% (n=0)
Education	school for handicapped/special school	1.6% (n=1)
	Elementary school	16.1% (n=10)
	Secondary school	29.0% (n=18)
	College	53.2% (n=33)
Diagnosis	Schizophrenia	59.7% (n=37)
	Delusional disorder	8% (n=5)
	Schizoaffective disorder	32.3% (n=20)
Course of disease	Acute	25.8% (n=16)
	Chronic	30.6% (n=19)
	Intermittent	41.9% (n=26)
	Otherwise	1.6% (n=1)
Duration of illness in years	mean (SD 7.5)	8.3
	median	6
	minimum - maximum	0 - 30
Number of psychiatric admissions	mean (SD 2.4)	3.5
	median	3
	minimum - maximum	1 - 11
CGI	marginal case=2	1.6% (n=1)
	mildly ill=3	3.2% (n=2)
	moderately ill=4	14.5% (n=9)
	markedly ill=5	53.2% (n=33)
	severely ill=6	25.8% (n=16)
	extreme severely ill=7	1.6% (n=1)
Antipsychotics	Monotherapy	50% (n=31)
	2 Antipsychotics	33.8% (n=21)
	> 2 Antipsychotics	16.1% (n=11)

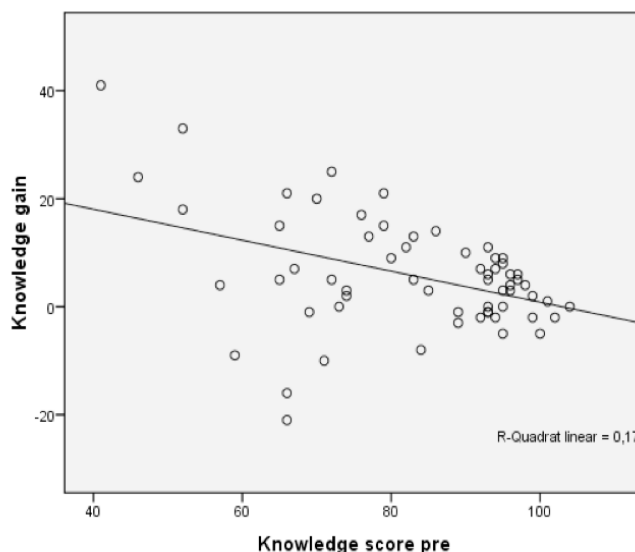
with a schizophrenic disorder, 32.3% with a schizoaffective disorder and 8 % with a delusional disorder. 27.4% were assessed by CGI rating as extremely/severely ill. The mean duration of illness in years was 8.3 years. 25.8% of the patients were classified as acute, 30.6% as chronic and 41.9% as intermittent. Half of the patients 50% were treated with one antipsychotic, 33.8% with two antipsychotics and 16.1% with more than two antipsychotics.

As far as the soziodemographic and clinical characteristics were concerned, there were no correlations with knowledge gain. Only school education showed a significant association with the knowledge score before ( $p=0.001$ ) and after psychoeducation ( $p=0.000$ ).

The sociodemographic and clinical characteristics of the study patients are presented in Table 1.

### Knowledge

The mean knowledge score before psychoeducation was 82.6 points (107 points maximum). 77.2% of the maximum score were achieved. After psychoeducation the mean knowledge score was 88.5 points (82.7% of the maximum score). This shows that patients could profit from psychoeducation and had a significant knowledge gain of 5.9 points (Wilcoxon test;  $p<0.001$ ). Knowledge gain correlated negatively with the knowledge score before psychoeducation ( $r=-0.412$ ;  $p=0.001$ ). Patients with a lower knowledge score before psychoeducation had a significant higher knowledge gain after psychoeducation (Figure 3).



**Figure 3:** Correlation between knowledge gain and knowledge score before psychoeducation.

### Psychopathology

Psychopathology was assessed at first measurement (U1) and third measurement (U3).

At U1 the PANSS total score was 81.8, the PANSS Positive Subscale score was 18.3 and the PANSS Negative Subscale score was 20.5. PANSS showed a significant improvement from U1 to U3 (Wilcoxon test;  $p<0.001$ ). At U3 the PANSS total score was 54.7, the PANSS Positive Subscale score was 10.3 and the PANSS Negative Subscale score was 15.5.

The CDSS sum score decreased significantly with 6.6 at U1 to 3.1 at U3 (Wilcoxon test;  $p<0.000$ ). There was also a significant improvement of the degree of severity of disease (CGI) with 5.0 at U1 and 3.3 at U3 (T-test;  $p<0.001$ ).

No significant associations were found between knowledge gain and psychopathology (PANSS, CDSS, CGI). The PANSS total score ( $r=-0.317$ ;  $p=0.012$ ) and the PANSS Positive Subscale score ( $r=-0.254$ ;  $p=0.046$ ) at U1 correlated negatively with the knowledge score after psychoeducation. The PANSS total score at U3 was negatively associated with the knowledge score before ( $r=-0.4$ ;  $p=0.001$ ) and the knowledge score after psychoeducation ( $r=-0.427$ ;  $p=0.001$ ). The PANSS Positive Subscale score correlated also negatively with the knowledge score before ( $r=-0.272$ ;  $p=0.033$ ) and after psychoeducation ( $r=-0.371$ ;  $p=0.003$ ). There was also a negative association between the PANSS Negative Subscale score and knowledge score before ( $r=-0.376$ ;  $p=0.003$ ) and after psychoeducation ( $r=-0.439$ ;  $p<0.001$ ).

At U3 the CGI score correlated negatively with the knowledge score before ( $r=-0.335$ ;  $p=0.008$ ) and after psychoeducation ( $r=-0.335$ ;  $p=0.008$ ). The depressive symptomatology was neither correlated with knowledge nor with knowledge gain.

### Participation Rate

All patients attended four psychoeducational sessions. Nearly half the patients 48.4% ( $n=30$ ) took part in all eight sessions. 22.6% ( $n=14$ ) of the patients participated in seven sessions, 12.9% ( $n=8$ ) of the patients in six sessions, 4.8% ( $n=3$ ) of the patients in five sessions and 11.3% ( $n=7$ ) of the patients attended the minimum of four sessions. There was no significant association between the participation rate and the knowledge. Patients with seven or eight psychoedu-

**Table 2: Knowledge and Global Neurocognitive Performance**

Variable	Knowledge gain (mean)	Knowledge score pre (mean)	Knowledge score post (mean)
Global Neurocognitive Performance:	ANOVA; p=0.106	ANOVA; p=0.111	ANOVA; p=0.218
Severely cognitively impaired (n=22)	8.9	77.4	86.3
Moderately cognitively impaired (n=18)	1.8	84.0	85.8
Slightly cognitively impaired (n=22)	6.1	86.8	92.8

<sup>1</sup>**bold**: significant association (p<0.0).

<sup>2</sup>*italics*: weak association (p<0.1)

educational sessions had no greater knowledge gain than patients who had taken part in fewer sessions.

**Global Neurocognitive Performance**

The sample was divided into three subgroups according to their global neurocognitive performance. 35.5% of the patients (n=22) were severely cognitively impaired, 29.0% of the patients (n=18) were moderately cognitively impaired and 35.5% of the patients (n=22) were slightly cognitively impaired. There was no significant association between the global neurocognitive performance at U1 and knowledge gain (ANOVA; p=0.106). Even severely cognitively impaired patients had a good knowledge gain (Table 2).

**Illness Concept, Insight into Illness**

The Illness Concept Scale showed a significant improvement from U1 to U3 in the dimension confidence in their medication (Wilcoxon-test; p=0.001) and confidence in their doctor (Wilcoxon-test; p=0.043). All the results of these dimensions are

presented in Table 3. Improvement of confidence in their medication (r=0.499; p<0.001) and of confidence in their doctor (r=0.309; p=0.015) was positively correlated with knowledge gain.

Insight into their illness increased significantly from U1 to U3 (Wilcoxon-test; p=0.001). At U1 35.5% (n=22) of the patients were aware, 45.2% (n=28) of the patients were somewhat aware and 19.4% (n=12) of the patients were severely unaware. At U3 the majority of the patients (56.5%; n=35) were aware, 37.1% (n=23) were somewhat aware and 6.5% (n=4) were severely unaware. There was a significant association between the insight into illness at U1 and the knowledge gain (ANOVA; p=0.006) and the knowledge score after psychoeducation (ANOVA; p=0.002) (Table 4). Accordingly, patients with a somewhat awareness at U1 had a good knowledge gain.

Linear Regression Analysis showed that knowledge score before psychoeducation is the best predictor for knowledge gain (p<0.000) (Table 5).

**Table 3: Illness Concept Scale**

Variable	mean pre psychoeducation	mean post psychoeducation	significance
Confidence in their medication (CONMED)	13.39	15.10	Wilcoxon-test; <b>p=0.001</b>
Confidence in their doctor (CONDOC)	11.02	11.82	Wilcoxon-test; <b>p=0.043</b>
Negativ expectations toward medication (NEGMED)	8.29	8.16	Wilcoxon-test; p=0.681
Attribution of guilt (GUILT)	4.32	4.72	Wilcoxon-test; p=0.163
Attribution of illness to chance (CHANCE)	8.11	8.53	Wilcoxon-test; p=0.437
Susceptibility to illness and to relapse (SUSC)	6.56	7.29	Wilcoxon-test; <b>p=0.038</b>
Fear of side effects of medication (SIDEFF)	7.03	6.69	Wilcoxon-test; p=0.534

<sup>1</sup>**bold**: significant association (p<0.05).

<sup>2</sup>*italics*: weak association (p<0.1).

**Table 4: Knowledge and Insight into Illness**

Variable	Knowledge gain (mean)	Knowledge score pre (mean)	Knowledge score post (mean)
Insight into Illness <b>U1</b> :	ANOVA; <b><i>p=0.006</i></b>	ANOVA; <i>p=0.068</i>	ANOVA; <b><i>p=0.002</i></b>
Aware (n=22)	3.6	88.1	91.7
Somewhat aware (n=28)	10.2	81.2	91.4
Severely unaware (n=12)	-0.3	75.9	75.6
Insight into Illness <b>U3</b> :	ANOVA; <i>p=0.758</i>	ANOVA; <i>p=0.170</i>	ANOVA; <i>p=0.058</i>
Aware (n=35)	5.9	85.3	91.3
Somewhat aware (n=23)	6.3	80.4	86.7
Severely unaware (n=4)	2.0	72.0	74.0

<sup>1</sup>**bold**: significant association ( $p < 0.05$ ).

<sup>2</sup>*italics*: weak association ( $p < 0.1$ ).

**Table 5: Result of Linear Regression Analysis with Knowledge Gain as Dependent Variable**

Predictor	Beta	T	significance
Constant		3.408	<b><i>p=0.001</i></b>
Education	0.098	0.783	<i>p=0.437</i>
PANSS Total score U1	-0.163	-1.292	<i>p=0.202</i>
Global Neurocognitive Performance	-0.059	-0.490	<i>p=0.626</i>
Insight into Illness U1	-0.092	-0.702	<i>p=0.485</i>
Knowledge score pre	-0.581	-4.548	<b><i>p=0.000</i></b>

dependent variable: knowledge gain.

## DISCUSSION AND CONCLUSION

We included 62 patients in the evaluation and examined the association between knowledge gain and sociodemographic data, psychopathology, insight and global neurocognitive performance. The results are important for the implementation of psychoeducational groups [28, 29].

### Sociodemographic and Clinical Characteristics

Gender had no influence on knowledge gain [30]. McWilliams observed that female carers gained more knowledge after psychoeducation [31]. In our study, only school education influenced the knowledge score before and after psychoeducation significantly. In our sample, the patients had a relatively high level of education. This is partly due to the fact that patients attending university hospitals tend to be better educated than those attending district hospitals. This is an outcome of clinical experience, studies about this phenomenon are unknown. Consequently, the knowledge score before psychoeducation was probably higher in comparison to other studies. Patients with a higher education had a higher level of knowledge before psychoeducation and it was even higher at the

end of psychoeducation. The knowledge gain itself was not dependent on education. Referring to this, there is a difference between psychoeducational groups for patients and relatives. Generally we assume that patients with a lower educational level can also profit from psychoeducation and enhance the knowledge about the illness as shown in the Munich COGPIP study [32]. Perhaps knowledge gain would be easier to achieve for these patients if they receive additional psychoeducational sessions. Patients would have more time to understand their illness as well as those patients with a higher school education.

### Knowledge and Psychopathology

Patients had on average a significant increase in knowledge gain of 6.5 points. Between knowledge gain and psychopathology (PANSS, CDSS, CGI) at U1 and at U3 was no significant correlation. The relationship between knowledge and changes in psychopathology had not been analysed in previous studies. Contrary to expectation, the positive and negative symptoms did not restrict the knowledge gain. Thus, even severely ill patients can participate in psychoeducation. Particular severely ill patients with a lower baseline knowledge score and patients with a lower educational degree



have an especially good chance for a high knowledge gain according to linear regression analysis (Table 5). As a result, these patients should not be excluded from psychoeducation, but psychoeducation should rather be adapted to their special needs and neurocognitive performance for example with repetitions, pictures, videos and symbols. Especially patients with their first episode of schizophrenia usually have relatively little knowledge of the illness and can profit well by psychoeducation.

### Participation Rate

Almost 75% of the patients participated in at least 7 psychoeducational sessions. There was no correlation between knowledge gain and the participation rate of patients. One explanation for this would be that healthier patients were discharged before completion of psychoeducation, but with a good knowledge increase. Sicker patients may have participated in more sessions because of the longer treatment duration and thus had a comparably higher increase in knowledge than the first group of patients. Another explanation for the knowledge gain, regardless of the number of sessions, could be the repetitious content. An important element of psychoeducation are repetitions in order to facilitate the patient's intake of new information. Patients who have not attended to all psychoeducational sessions, still have the opportunity to experience all the content.

### Global Neurocognitive Performance

The study demonstrated that patients with reduced cognitive performance can benefit from psychoeducation and have an increase of knowledge. The neurocognitive performance of patients is very important for a treatment plan and for the therapeutic outcome. The increase of knowledge according to the neurocognitive capacity was previously rarely analysed [33, 34] and is therefore an important outcome. Cognitive impairment does not restrict the increase of knowledge. This confirms again that there is no contraindication for psychoeducation and therefore it should be offered to all patients. Nevertheless, further consideration to improve neurocognition should be employed to optimise the cognitive base level.

### Illness Concept, Insight into Illness

Insight into illness increased after psychoeducation. High level of insight can be associated with depressive symptoms as shown in some studies [35], but in our study depressive symptoms decreased after psychoeducation. Good insight into illness was not absolutely

necessary for participation in psychoeducation and good knowledge gain. In particular patients with a somewhat awareness or severely unawareness have ambivalent attitude toward participation in a psychoeducational session. However, these patients can often be motivated to participate in a psychoeducational session within their „double accountancy“. Attention should be given to ensure that these patients do not recede into the background as a result of their rather bad attitude to any therapy offers, because the highest knowledge gain can be ascertained with the patients with a somewhat awareness. The patients' subjective opinion of psychoeducation plays an important role in their motivation to participate in the sessions. For many patients not only the information is important, but also the possibility of exchanging experiences with others [36]. Therefore, this aspect must always be taken into account.

This study has some limitations as the composition of the sample concerning school education and professional education and data collection based on knowledge questionnaire with perhaps too low severity of questions. In further studies a modification of the knowledge questionnaire is planned. Above all we have chosen a study design without control group. In the Munich Psychoses Information Project (PIP) study patients were randomly allocated to an intervention group or a control group and a knowledge gain after psychoeducation could be showed. The aim of this study as a follow-up study was to specify the effects of psychoeducation, especially the influencing factors of knowledge gain. Other effects during inpatient stay like psychotherapy can be excluded because psychotherapy was not offered to the patient in the period of psychoeducation. In summary, we have shown that psychopathology does not restrict knowledge gain and also that cognitively impaired patients can profit from psychoeducation. Moreover, regression analysis has verified that the knowledge score before psychoeducation is the strongest predictor for knowledge gain. Even patients with a somewhat awareness showed a particular good knowledge gain. Therefore insight into illness is not absolutely necessary for the participation in a psychoeducational group and we should motivate more patients to take part in psychoeducational groups. In further studies motivation and neurocognition should be investigated and new strategies should be developed to reach patients with unawareness.

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**CONFLICT OF INTEREST**

None.

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