

## **The effectiveness of medical education in schizophrenia depending on the mental state and type of treatment in forensic psychiatric patients**

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### **Summary**

**Aim.** The main objective of the study was to answer the question of whether the clinical condition of the patient and the type of antipsychotic drug used affect the educational opportunities of patients hospitalised in forensic psychiatry departments participating in a health education programme.

**Material and methods.** The study was conducted at the State Hospital for the Mentally and Neurologically Ill in Rybnik in the forensic psychiatry wards and lasted from December 2019 to May 2020. During the study, patients gained knowledge of health education. The study group consisted of 67 men aged 22–73 with a diagnosis of schizophrenia. The control group consisted of 40 patients aged 23–72 with the same diagnosis who were not educated. A dual measurement method was used (before and after the health education cycle) using the CGI-S scale and a proprietary questionnaire of patients' knowledge from the applied educational programme.

**Results.** The study showed that the severity of mental illness symptoms had a significant impact on patients' educational opportunities. The variety of antipsychotic medications used (atypical and classic) did not affect patients' educational opportunities. In addition, the study showed that the educational level of the patients had a significant impact on their educational opportunities.

**Conclusions.** The effectiveness of educational interventions depends on the severity of symptoms in patients diagnosed with schizophrenia, but does not depend on the type of pharmacotherapy used.

**Key words:** schizophrenia, treatment, disease severity

## Introduction

Educating a patient in a forensic psychiatry department involves intentionally influencing the patient's personality by shaping health behaviour, and a sense of responsibility for health, and preparing the patient to cooperate and collaborate in the nursing and treatment process. This includes imparting medical knowledge to the patient and developing his social skills [1, 2].

In forensic psychiatry departments, psycho-educational interactions, including health education, are used when the mental state of patients is good enough that they can think critically and understand the information provided to them. The process of educational interactions should therefore be preceded by an analysis of the patient's health status, including, among other things, an assessment of the severity of mental disorders and the effectiveness of the pharmacotherapy administered to the patient, which allows the planning of educational activities tailored to the patient's current capabilities [3–5]. The potential side effects of antipsychotic drugs are known to affect the patient's functioning, and thus can pose a great difficulty in the educational process [6].

Although the mainstay of schizophrenia treatment is pharmacotherapy, the treatment of this disease should be comprehensive and additionally include various non-pharmacological interactions [7]. Patient education is an intervention needed to prevent and maintain the patient's health and life. Studies show that effective prevention and treatment are two key factors that can reduce the burden of mental illness on the patient, his family and the healthcare system [8, 9].

The positive effect of health education among patients interned in forensic psychiatry wards on some elements of quality of life, which we showed earlier, indicates the desirability of conducting educational programmes among these patients [1]. The effect of these interventions may be influenced by the antipsychotic drugs used, as well as the patient's mental state. To date, there has been no research on the effect of antipsychotic treatment and the mental state of patients on the effectiveness of health education interventions, therefore the purpose of this study was to determine the relationship between the effectiveness of medical education, the mental state of the patient and the pharmacotherapy administered to the patient.

## Material and methods

### Study design and sample

The study was conducted at the State Hospital for the Nervous and Mentally Ill in Rybnik in 5 forensic psychiatry wards. The study lasted 6 months from December 2019 to May 2020. Recruitment of participants in the clinical trial was carried out

with inclusion and exclusion criteria. The study included men with a diagnosis of schizophrenia, residing in a forensic psychiatry department at the time of the study's commencement, against whom a so-called judicial detention was ordered. Male gender and a diagnosis of schizophrenia formed the basis for inclusion in the study group as well as the reference group. The choice of such a group of patients meant that the recruited group of study participants was homogeneous, did not include exceptional cases, and its characteristics corresponded to the population of patients treated in forensic psychiatry departments. The criteria for exclusion from the study were female gender, a diagnosis other than schizophrenia and lack of patient consent to participate in the study.

The study group consisted of 115 patients: 67 men, aged 22–73, with a diagnosis of schizophrenia, who participated in an educational programme over 6 months (details of the implementation of the educational program are described later in the article). The reference group consisted of 48 patients with a diagnosis of schizophrenia, of similar age to the patients of the study group, also hospitalised in the forensic psychiatry department. Health education activities were not conducted among this group of patients, so it was possible to determine how they affected the studied parameters.

Patients participating in the study (both study and reference group) were assessed twice using the same clinical scales, 6 months apart. Statistical analysis showed that the study and reference group were not statistically significantly different (Table 1).

Participants who did not complete the entire educational cycle, or who did not complete the study for other reasons (e.g. discharge from the ward during the programme), were excluded from the study: in the study group, this was 6 patients, and in the reference group, 8 patients. For this reason, these individuals were not included in the final comparative analyses.

**Table 1. Sociodemographic characteristic of respondents – comparison of differences between the studied groups**

Variable	Total n; % 115; 100%			p-Value*
		Study group n; % 67; 100%	Reference group n; % 48; 100%	
Age (years)				
<25	5; 4.4%	2; 2.9%	3; 6.2%	0.31*
25-35	29; 25.2%	19; 28.4%	10; 20.8%	
36-45	29; 25.2%	19; 28.4%	10;20.8%	
46-55	23; 20.0%	14; 20.9%	9; 18.8%	
56-65	23; 20.0%	10; 14.9%	13; 27.2%	
>65	6; 5.2%	3; 4.5%	3; 6.2%	
Marital status				

*table continued on the next page*

Single	93; 80.9%	56; 83.6%	37; 77.1%	0.13**
Married	6; 5.2%	1; 1.5%	5; 10.4%	
Divorced	16; 13.9%	10; 14.9%	6; 12.5%	
Housing status				
I live alone	50; 43.5%	25; 37.3%	25; 52.1%	0.23**
I live with my family	56; 48.7%	35; 52.2%	21; 43.8%	
Institutional care	9; 7.8%	7; 10.4%	2; 4.2%	
Education				
None	3; 2.6%	2; 3.0%	1; 2.1%	0.07**
Primary education	23; 20.0%	13; 19.4%	10; 20.8%	
Lower secondary school	8; 7.0%	3; 4.5%	5; 10.4%	
Vocational	47; 40.9%	22; 32.8%	25; 52.1%	
Secondary education	28; 24.3%	23; 34.3%	5; 10.4%	
Higher	6; 5.2%	4; 6.0%	2; 4.2%	
Length of stay in the ward				
Up to 1 year	28; 24.3%	21; 31.3%	7; 14.6%	0.31**
1:3 years	46; 40.0%	25; 37.3%	21; 43.8%	
4:5 years	20; 17.4%	7; 10.4%	13; 27.1%	
6:9 years	10; 8.7%	6; 9.0%	4; 8.3%	
>9 years	11; 9.6%	8; 11.9%	3; 6.3%	
Antipsychotic drag				
Classic	29; 25.2%	13; 19.4%	16; 33.3%	0.13**
Atypical	86; 74.8%	54; 80.6%	32; 66.7%	

\* Student's *t*-test; \*\* Yates-corrected  $\chi^2$  test.

### Education programme

During the course of the study, patients in the study group gained knowledge and social competence during lectures on broad health education as part of a health education programme specially developed for the study. The developed educational programme then formed the basis for assessing the impact of the patients' clinical condition and the antipsychotic drug used on the educational interventions.

The education programme was implemented in the form of lectures (40 meetings), which were conducted by specialists in psychiatric nursing. Lectures were held twice a week, for 6 months. Educational topics were included in 5 modules: education on the patient's social life, mental health (two modules), healthy lifestyle, and patient

functioning in the forensic psychiatry department. Each module includes 8 topics, closely related to the specific module, such as social norms and roles, values in human life, family as a value, self-diagnosis of one's skills and limitations, conflict resolution, life goals, analysis of situations that are difficult for human beings (e.g. stress, aggression, violence), schizophrenia as a disease, antipsychotic treatment, psychiatric rehabilitation, stimulants, physical activity, healthy eating, body hygiene, overweight and obesity, self-monitoring of health, first aid, legal aspects of judicial detention, issues of the Mental Health Act, patient rights and direct coercion.

The author's health education programme was designed to equip the patient with the necessary knowledge about health and illness but was also intended to provide the information necessary for the patient to function properly in society.

Measurements using scales were taken of each patient participating in the study before the educational interventions began and after they were completed, after 6 months.

### Measurement tools

During the study, patients were assessed twice using the *Clinical Global Impression – Severity* (CGI-S) scale. The CGI-S is a 7-item scale used by a physician to assess the severity of mental illness symptoms. This scale was used in the study to monitor the patient's condition during the study by assessing the severity of the mental illness before and after the educational programme used in the study. The CGI-S scale assesses the subjective clinical impression of the examiner, and the evaluation is based on a global assessment of the patient's observed and reported symptoms, behaviour and functioning rather than an assessment of individual symptoms.

The prerequisites for patients' participation in the study were a stable, i.e. unchanging over time, mental state, and the exclusion of the effects of antipsychotic drugs on the effects of the educational cycle being conducted. To achieve this goal, patients who had not had a change in antipsychotic treatment for at least six months were eligible for the study. Patients were allowed to take additional medications, including antipsychotics provided that those medications were used in subtherapeutic doses for the treatment of schizophrenia.

The type of antipsychotic medication administered to the patient was assigned to a drug group (atypical or classic) and monitored throughout the study. The analysis of these data was expected to confirm the hypothetical advantage of atypical drugs over typical ones in terms of fewer side effects possibly affecting patients' learning process, which was not confirmed in the study. It was hypothesised that antipsychotics with a mild side effect profile might have an advantage in this process. In the case of the use of several antipsychotic drugs in a patient, the decisive criterion for inclusion in a drug group was the main drug in the treatment of that patient.

The main drug in treatment is the drug that was used continuously during the study and that was chosen because of the patient's diagnosis – in the study, these were drugs from the antipsychotic group; the secondary (additional) drug is an antipsychotic drug that was additionally administered during the study as a symptomatic drug to correct either insomnia or anxiety and was used at a dose below the therapeutic dose used to

treat schizophrenia. In the study group, the number of patients taking one antipsychotic drug was 21 and 46 patients were taking more than one drug. In the reference group, the number of patients taking more than one antipsychotic drug was 22 and 26 patients were taking more than one drug. In the course of treatment, classic and atypical neuroleptics were used simultaneously by 26 patients of the study group and 18 patients of the reference group.

The drugs used in the study group were: risperidone, olanzapine, clozapine, aripiprazole, quetiapine, chlorprotixene, amisulpride, levomepromazine, promazine, haloperidol, sulpiride, perazine, clopixol. The drugs used in the reference group were: perazine, risperidone, levomepromazine, olanzapine, clozapine, amisulpride, aripiprazole, haloperidol, clopixol, quetiapine.

Evaluation of the effects of health education was carried out using a knowledge test performed twice, before and after the educational cycle. The knowledge test conducted before the educational lecture cycle was aimed at assessing the patients' initial level of knowledge on the topics that would appear in the lecture cycle. After the lecture cycle, the same knowledge test was conducted again, based on which it was possible to determine the possible progress of the knowledge of the patients participating in the study.

### Statistical analysis

Statistical calculations assessed the difference in the CGI-S score between the second and first measurement in the study and reference group, the number of correct answers in both groups and the influence of age and gender, marital status, place of residence, education, professional activity, length of stay in the ward as well as the type of drug used on the effectiveness of the educational programme. The drugs were analysed in two categories: classic (perazine, haloperidol, levomepromazine, sulpiride) and atypical antipsychotics (aripiprazole, clozapine, risperidone, olanzapine, amisulpride).

Statistical analyses were performed in IBM SPSS Statistics 28.0.1.0. Data for all outcomes are reported for all participants. The relationship between variables was evaluated by using the Chi-squared test with the Yates correction. Answers to questions are presented with a total number of respondents (*n*) and frequencies (%). For all analyses, a *p*-level of <0.05 was considered statistically significant.

For significant results obtained in statistical tests, effect sizes were calculated in the form of an indicator characteristic of a given test. These indicators were:

1.  $\omega^2$  for qualitative factors in ANCOVA and ANOVA tests,
2. Yule's  $\phi$  for exact Fisher's test,
3. Serlin, Carra and Marascuil's  $\eta^2Q$ , for Cochran's *Q* test,
4. *r*C matched-pairs rank biserial correlation coefficient for Wilcoxon's test.

The following threshold values for the calculated indicators were adopted:

1.  $\omega^2$ : 0.01 – small effect; 0.06 – moderate effect; 0.14 – large effect,
2.  $\phi$ ,  $\eta^2Q$  and *r*C: 0.10 – small effect; 0.30 – moderate effect; 0.50 – large effect.

An analysis of variance (ANOVA) or analysis of covariance (ANCOVA) was performed to determine whether the factors given in the characteristics of the groups correlate with patients' knowledge of health education. For those numbers of correct answers to the knowledge test questions for which correlation with other independent quantities was found, an analysis of covariance (ANCOVA) was performed; in those situations where no such correlation was found, an analysis of variance (ANOVA) was performed. Qualitative factors were quantities describing the characteristics of the groups (marital status, place of residence, education, etc.). Wilcoxon's paired-order test (paired samples) was also used.

### Ethical considerations

Every patient gave informed consent to complete the survey. The study was approved by the Bioethics Committee of the Medical University of Silesia (protocol code PCN/0022/KB/133/20 of 13/08/2020).

## Results

### *Global Clinical Impression Scale – Severity (CGI-S)*

The distribution of the number of patients with clinical status assessments in the first and second measurement for the study and reference group is shown in Table 2. For the first measurement, patients with moderate schizophrenic disorders dominated in both groups. In the study group it was 26 men (38.8% of the group) and in the reference group – 18 (37.5% of the group). Severe and very severe schizophrenia occurred in 2 patients of the study group (3.0% of the group) for each of these assessments. In the reference group, the most severe disorders were those described as “severe” and occurred in 4 men (8.3% of the group). For the purposes of statistical analysis, due to single numbers, the categories “minimal severity” and “mild severity” were combined, and the categories “significant”, “severe” and “very severe” were combined into one category. The  $\text{CHI}^2$  test with Yates' correction did not show a statistically significant difference in distributions ( $p = 0.45$ ).

In the study group, 61 men took part in the second measurement, and in the reference group – 40. Among the 61 patients in the study group, moderate assessments of the severity of schizophrenic disorders prevailed ( $n = 32$ ; 52.5% of the group), and among the 40 men in the reference group, the most numerous were men with mild schizophrenia ( $n = 14$ ; 35% of the group). In the statistical analysis, due to single numbers, the categories “not present”, “minimal” and “mild” were combined and into one assessment category: “significant” and “severe”. The  $\text{CHI}^2$  test with Yates' correction did not show a statistically significant difference in distributions ( $p = 0.13$ ).

**Table 2. Distributions of the CGI-S scale of the assessment of the clinical condition of patients in two measurements in the study group and the reference group**

	The assessment of the clinical condition of patients –CGI-S scale			
	Measurement I**		Measurement II***	
	Study group (n; %)	Reference group (n; %)	Study group (n; %)	Reference group (n; %)
<b>1 – not present</b>	0; 0%	0; 0%	1; 1.6%	0; 0%
<b>2 – minimal</b>	6; 9%	2; 4.2%	2; 3.3%	0; 0%
<b>3 – mild</b>	18; 26.9%	11; 22.9%	10; 16.4%	14; 35%
<b>4 – moderate</b>	26; 38.8%	18; 37.5%	32; 52.5%	13; 32.5%
<b>5 – significant</b>	13; 19.4%	13; 27.1%	14; 23.0%	13; 32.5%
<b>6 – severe</b>	2; 3%	4; 8.3%	2; 3.3%	0; 0%
<b>7 – very severe</b>	2; 3%	0; 0%	0; 0%	0; 0%
<b>p*</b>	0.45		0.13	

\* CHI<sup>2</sup> test with Yates' correction

\*\* For statistical analysis categories 2 and 3, as well as categories 5, 6 and 7 were combined.

\*\*\* For statistical analysis categories 1, 2 and 3, as well as categories 5 and 6 were combined.

Table 3 shows the distribution of individual changes between measures of schizophrenia symptom severity on the CGI-S scale. Changes are expressed by the difference in the CGI-S scale between the second and first measurement, and negative change values indicate an improvement in the clinical condition. In the study group of 61 patients, 16 (26.2%) patients experienced improvement in their clinical condition. In the study group, 24 men (39.3% of the group) showed no change in their clinical condition after 6 months, and a deterioration of their clinical condition was observed in 21 patients (34.3%). In the reference group, in the second measurement, 20 patients (50%) remained unchanged in their clinical condition, 11 (27.5%) improved and 9 (22.5%) worsened. The Wilcoxon pairwise order test within each of the obtained groups of results did not show statistically significant individual changes in the values of the CGI-S clinical status assessment scale (test group:  $p = 0.50$ ; reference group:  $p = 0.58$ ). There was also no statistically significant difference in the distribution of individual changes between the study and reference group (CHI<sup>2</sup> test with Yates' correction:  $p = 0.40$ ).



Table 3. Distributions of individual changes in the CGI-S scale points between the second and first measurement in the study and reference group

Change of scores (categories) of the CGI-S scale (measurement result II – measurement result I)	Study group (n = 61; 100%)	Control group (n = 40; 100%)
-3 <sup>#</sup>	1 (1.6%)	0
-2 <sup>#</sup>	3 (4.9%)	1 (2.5%)
-1	12 (19.7%)	10 (25.0%)
0	24 (39.3%)	20 (50.0%)
1	16 (26.2%)	9 (22.5%)
2 <sup>*</sup>	4 (6.6%)	0
3 <sup>*</sup>	1 (1.6%)	0
Wilcoxon rank-sum test for significance of group changes	NS (p = 0.50)	NS (p = 0.58)
Chi <sup>2</sup> test with Yates' correction of comparisons of distributions between groups	NS (p = 0.40)	

Note: for the CHI<sup>2</sup> test categories /# combined into one, as well as /\* combined into one.

The results of analyses of covariance (ANCOVA) and variance (ANOVA) for the results of the first and second measurement in the study and reference group were summarised. The significance level for individual effects contributed to the dependent variable (number of correct answers to the test questions) by the analysed pairs of variables for ANCOVA analyses and for the qualitative variable in ANOVA analysis was given. Among the qualitative factors, a significant effect on the number of correct answers was found for education and the CGI-S scale in both measurements of the study group. The analysis also shows that the type of antipsychotic drug used was not significant in correlation with the number of correct answers to the questions of the knowledge test. However, in all analyses in the reference group, no effect of interaction with individual qualitative factors was observed. A detailed summary of the results of ANCOVA and ANOVA analyses is presented in Table 4.

Table 4. ANCOVA (measure I) and ANOVA (measure II) results of the number of correct answers to the knowledge test questions with respect to age of life and quality factors among patients of the study and reference group with two measurements (for ANCOVA test predictor = age)

Quantitative predictor = age/ quality factor	Study group (n = 61)		Reference group (n = 40)	
	Measurement I	Measurement II	Measurement I	Measurement II
Age	p = 0.002	—	p = 0.05	—
Marital status	NS (p = 0.60)	NS (p = 0.36)	NS (p = 0.20)	NS (p = 0.12)
Age	p = 0.008	—	p = 0.05	—

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Residence	NS ( $p = 0.94$ )	NS ( $p = 0.86$ )	NS ( $p = 0.19$ )	NS ( $p = 0.06$ )
Age	$p = 0.002$	—	$p = 0.05$	—
Education	$p = 0.01$ (ES = 0.11)	$p = 0.009$ (ES = 0.12)	NS ( $p = 0.50$ )	NS ( $p = 0.64$ )
Age	$p = 0.003$	—	NS ( $p = 0.07$ )	—
Professional activity	NS ( $p = 0.23$ )	NS ( $p = 0.40$ )	NS ( $p = 0.41$ )	NS ( $p = 0.65$ )
Age	$p = 0.007$	—	$p = 0.05$	—
Length of stay in the unit	NS ( $p = 0.65$ )	NS ( $p = 0.34$ )	NS ( $p = 0.79$ )	NS ( $p = 0.35$ )
Age	$p = 0.008$	—	$p = 0.05$	—
CGI-S scale	$p = 0.01$ (ES = 0.11)	$p = 0.05$ (ES = 0.08)	NS ( $p = 0.80$ )	NS ( $p = 0.92$ )
Age	$p = 0.003$	—	$p = 0.05$	—
Type of antipsychotic medication used	NS ( $p = 0.36$ )	NS ( $p = 0.61$ )	NS ( $p = 0.55$ )	NS ( $p = 0.74$ )

Note: ES = effect size;  $\omega^2$  – indicator

The results presented in Figure 1 show that as the severity of clinical disorders increases, the number of correct answers decreases in both the first and second measurements. Mean values with standard errors varied from  $35.0 \pm 0.8$  through  $32.5 \pm 0.7$  to  $30.4 \pm 0.9$  in the first measurement and from  $37.0 \pm 1.3$  through  $33.9 \pm 0.8$  to  $33.0 \pm 1.1$  in the second measurement. These results indicate that as the severity of mental disorders in patients increases, a poorer effect of health education interventions is observed.

#### The type of antipsychotic drug

In the study group, 54 men (80.6% of the group) were treated with an atypical antipsychotic drug, and 13 (19.4% of the group) with a first-generation antipsychotic drug. In the reference group, these numbers were: 32 (66.7% of the group) and 16 (33.3% of the group), respectively (Figure 2). The difference in distributions was not statistically significant at the significance level of  $p = 0.05$  (CHI<sup>2</sup> test with Yates' correction;  $p = 0.13$ ). Also, the results shown in Table 4 indicate that the type of antipsychotic drug used had no significant impact on the number of correct answers to the knowledge test questions.

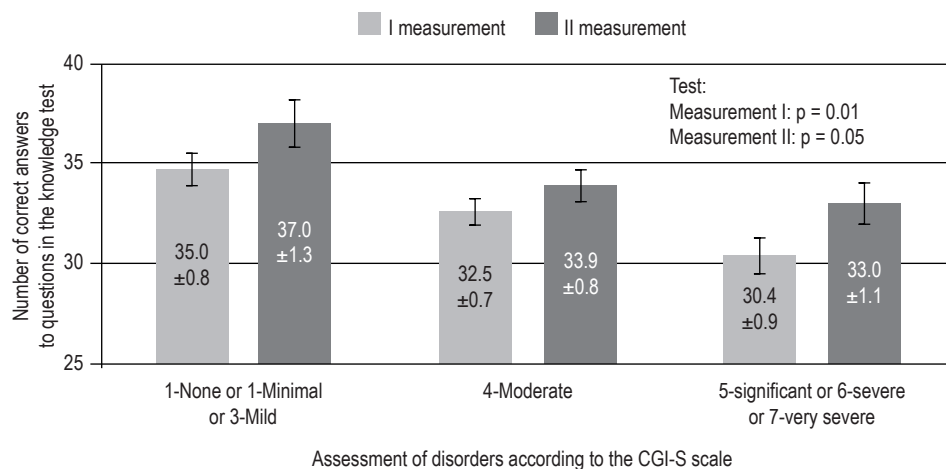


Figure 1. Mean values of the number of correct answers to the questions of the knowledge test among the patients of the study group in the first and second measurement, depending on the assessment of disorders according to the CGI-S scale (with the standard error of the mean)

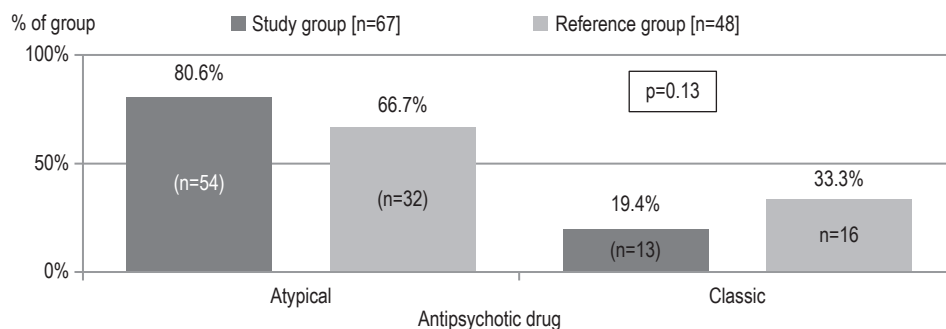


Figure 2. Antipsychotics used by patients in the study group and in the reference group

### Health education knowledge test

Table 5 includes the incidence of correct answers to questions of the health education knowledge test in the first and second measurement among men of the study and control group. Fisher's exact test was used for statistical comparison between groups.

In the second measurement, that is, after the completion of the health education cycle, there were statistically significant differences in the frequency of correct answers given for thirteen questions of the questionnaire. For all these questions, a higher frequency of correct answers occurred in the study group and these results reached statistical significance.

Table 5. Correct answers to questions of the health education knowledge test, patients in the study and reference group for the two measurements

Question No.	measurement 1			measurement 2		
	Study group (n = 67; 100%)	Reference group (n = 48; 100%)	Fisher's exact test	Study group (n = 61; 100%)	Reference group (n = 40; 100%)	Fisher's exact test
1	43 (64.2%)	31 (64.6%)	NS (p = 0.56)	49 (80.3%)	20 (50.0%)	<b>p = 0.001</b>
2	41 (61.2%)	36 (75.0%)	NS (p = 0.09)	56 (91.8%)	34 (85.0%)	NS (p = 0.23)
3	65 (97.0%)	45 (93.8%)	NS (p = 0.34)	59 (96.7%)	30 (75.0%)	<b>p = 0.001</b>
4	54 (80.6%)	34 (70.8%)	NS (p = 0.16)	49 (80.3%)	30 (75.0%)	NS (p = 0.35)
5	60 (89.6%)	38 (79.2%)	NS (p = 0.10)	58 (95.1%)	31 (77.5%)	<b>p = 0.01</b>
6	54 (80.6%)	41 (85.4%)	NS (p = 0.34)	58 (95.1%)	33 (82.5%)	<b>p = 0.04</b>
7	60 (89.6%)	37 (77.1%)	NS (p = 0.06)	56 (91.8%)	33 (82.5%)	NS (p = 0.14)
8	40 (59.7%)	31 (64.6%)	NS (p = 0.37)	43 (70.5%)	19 (47.5%)	<b>p = 0.02</b>
9	59 (88.1%)	39 (81.3%)	NS (p = 0.23)	58 (95.1%)	29 (72.5%)	<b>p = 0.002</b>
10	37 (55.2%)	22 (45.8%)	NS (p = 0.21)	37 (60.7%)	15 (37.5%)	<b>p = 0.02</b>
11	57 (85.1%)	39 (81.3%)	NS (p = 0.38)	55 (90.2%)	34 (85.0%)	NS (p = 0.32)
12	46 (68.7%)	31 (64.6%)	NS (p = 0.40)	43 (70.5%)	28 (70.0%)	NS (p = 0.56)
13	67 (100%)	44 (91.7%)	<b>p = 0.03</b>	59 (96.7%)	36 (90.0%)	NS (p = 0.17)
14	62 (92.5%)	41 (85.4%)	NS (p = 0.18)	59 (96.7%)	32 (80.0%)	<b>p = 0.008</b>
15	43 (64.2%)	24 (50.0%)	NS (p = 0.10)	39 (63.9%)	15 (37.5%)	p = 0.008
16	64 (95.5%)	46 (95.8%)	NS (p = 0.65)	55 (90.2%)	39 (97.5%)	NS (p = 0.15)
17	59 (88.1%)	45 (93.8%)	NS (p = 0.24)	58 (95.1%)	33 (82.5%)	<b>p = 0.04</b>
18	57 (85.1%)	43 (89.6%)	NS (p = 0.34)	58 (95.1%)	39 (97.5%)	NS (p = 0.48)
19	61 (91.0%)	37 (77.1%)	<b>p = 0.04</b>	57 (93.4%)	36 (90.0%)	NS (p = 0.39)
20	62 (92.5%)	33 (68.8%)	<b>p = 0.001</b>	49 (80.3%)	30 (75.0%)	NS (p = 0.34)
21	55 (82.1%)	36 (75.0%)	NS (p = 0.24)	54 (88.5%)	29 (72.5%)	<b>p = 0.04</b>
22	66 (98.5%)	42 (87.5%)	<b>p = 0.02</b>	58 (95.1%)	35 (83.3%)	NS (p = 0.16)
23	59 (88.1%)	38 (79.2%)	NS (p = 0.15)	57 (93.4%)	27 (67.5%)	<b>p = 0.0009</b>
24	57 (85.1%)	36 (75.0%)	NS (p = 0.13)	53 (86.9%)	29 (72.5%)	NS (p = 0.06)

*table continued on the next page*

25	53 (79.1%)	28 (58.3%)	<b><math>p = 0.01</math></b>	51 (83.6%)	31 (77.5%)	NS ( $p = 0.30$ )
26	65 (97.0%)	46 (95.8%)	NS ( $p = 0.56$ )	60 (98.4%)	36 (90.0%)	NS ( $p = 0.08$ )
27	65 (97.0%)	41 (85.4%)	<b><math>p = 0.03</math></b>	59 (96.7%)	33 (82.5%)	<b><math>p = 0.02</math></b>
28	53 (79.1%)	38 (79.2%)	NS ( $p = 0.59$ )	47 (77.1%)	32 (80.0%)	NS ( $p = 0.46$ )
29	46 (68.7%)	39 (81.3%)	NS ( $p = 0.10$ )	43 (70.5%)	29 (72.5%)	NS ( $p = 0.51$ )
30	61 (91.0%)	45 (93.8%)	NS ( $p = 0.44$ )	57 (93.4%)	40 (100%)	NS ( $p = 0.13$ )
31	61 (91.0%)	45 (93.8%)	NS ( $p = 0.44$ )	57 (93.4%)	35 (87.5%)	NS ( $p = 0.25$ )
32	26 (38.8%)	23 (47.9%)	NS ( $p = 0.22$ )	22 (36.1%)	15 (37.5%)	NS ( $p = 0.52$ )
33	38 (56.7%)	25 (52.1%)	NS ( $p = 0.38$ )	39 (63.9%)	21 (52.5%)	NS ( $p = 0.17$ )
34	48 (71.6%)	35 (72.9%)	NS ( $p = 0.53$ )	44 (72.1%)	30 (75.0%)	NS ( $p = 0.47$ )
35	58 (86.6%)	36 (75.0%)	NS ( $p = 0.10$ )	52 (85.3%)	33 (82.5%)	NS ( $p = 0.46$ )
36	61 (91.0%)	38 (79.2%)	NS ( $p = 0.07$ )	58 (95.1%)	36 (87.5%)	NS ( $p = 0.16$ )
37	61 (91.0%)	42 (87.5%)	NS ( $p = 0.38$ )	59 (96.7%)	32 (80.0%)	<b><math>p = 0.008</math></b>
38	53 (80.3%)	40 (83.3%)	NS ( $p = 0.44$ )	54 (88.5%)	31 (77.5%)	NS ( $p = 0.11$ )
39	60 (89.6%)	40 (83.3%)	NS ( $p = 0.24$ )	56 (91.8%)	35 (87.5%)	NS ( $p = 0.35$ )
40	65 (97.0%)	46 (95.8%)	NS ( $p = 0.55$ )	58 (95.1%)	34 (85.0%)	NS ( $p = 0.09$ )

The status of men's overall knowledge of health education was assessed as the total number of correct answers to all questions on the test. Parameters of descriptive statistics of the number of correct answers in the first and second measurement in the test and reference group are included in Table 6.

The Mann-Whitney  $U$  test showed no statistically significant difference in the results between the groups for the first measurement, while for the second measurement statistical significance was obtained at  $p = 0.00001$ . The Wilcoxon test for comparing the results of the two measurements showed a statistically significant difference for the study group ( $p = 0.0008$ ). In the reference group, it showed no such difference. Based on these analyses, we conclude that the medical knowledge of patients in the study group significantly improved after the health education cycle.

Table 6. Descriptive statistics of the number of correct answers in the knowledge test among patients of the study and reference group for the first and second measurement

Statistical parameter	Measurement I		Measurement II	
	Study group	Reference group	Study group	Reference group
Abundance	67	48	61	40
Mean	32.9	31.2	34.3	30.5

*table continued on the next page*

Standard deviation	4.0	5.1	4.6	4.3
Minimum	19	19	17	22
25 percentile (lower quartile)	30	29	32	28
50 percentile (median)	34	32	35	31
75 percentile (upper quartile)	36	35	37	33
Maximum	40	40	40	39
Test of normality of distribution Kolmogorov-Smirnov	p <0.01	NS (p >0.20)	p <0.005	NS (p >0.20)
Mann-Whitney U test for comparisons between groups	NS (p = 0.09)		<b>p = 0.00001</b>	
Wilcoxon paired- order test for group changes	Study group: <b>p = 0.0008</b> Reference group: NS (p = 0.59)			

## Discussion

Education of patients with schizophrenia not only about mental illness, but also about healthy lifestyles, consists of a multidimensional pattern of perceptions and actions that are self-initiated and committed to maintaining and promoting health and self-improvement. Although these activities do not always prevent disease, they often help maintain or improve health, so in forensic psychiatry departments health education is an important part of the overall rehabilitation process. Educational programmes can be profiled for specific mental disorders. Since schizophrenia symptoms are known to be related to sociodemographic, clinical, genetic, and environmental characteristics, certain clinical features should therefore be taken into account when evaluating a patient in planning appropriate strategies for his or her rehabilitation [10–13].

The study showed that the factors significantly affecting the effectiveness of the education programme were education and the severity of disease symptoms. As the level of education increases, patients' knowledge of health education increases, while as the severity of the disorder increases, their knowledge of health education decreases. The results therefore indicate that the level of severity of mental illness symptoms has a negative impact on patients' educational opportunities. As shown in previous studies, patients' knowledge improves after a cycle of health education, which is evidence of the effectiveness of these measures in this group of patients [1].

The severity of mental disorders in patients impairs learning and memory, as has been shown in other scientific studies. Cognitive impairment is present in most men-

tal disorders and is also associated with impaired functioning in people with mental illness. Among other things, schizophrenia is associated with memory impairment, which affects patients in their daily lives [14]. Studies on schizophrenia have shown dysfunctions in working memory, attention, processing speed, visual and verbal learning with significant deficits in reasoning, planning, abstract thinking and problem solving. The ability to properly process information and use it to generate appropriate responses to situations is also impaired. Therefore, it is recommended that certain therapeutic strategies be implemented in schizophrenia, such as psychoeducation, pharmacotherapy, psychotherapy, and social skills training, in order to improve health and reduce disability caused by mental illness [15].

Research studies report that the distribution of antipsychotic medications used among schizophrenia patients indicates the benefit of atypical drugs. On the one hand, these results confirm clinical observations that atypical antipsychotics are effective in controlling the psychotic symptoms of schizophrenia and have a preferential tolerability profile compared to first-generation antipsychotics [16, 17]. On the other hand, the effect of atypical antipsychotics on improving cognitive deficits is small or unclear, indicating the need for other methods of improving the cognitive functioning of patients with schizophrenia, such as educational interventions [18].

As the results obtained in the study indicate, the type of antipsychotic treatment does not have a significant impact on the process of educational interventions. Thus, it was shown that educational interventions can also be effective in patients treated with classic antipsychotic drugs, which has important implications for conducting educational programmes among patients treated with antipsychotic drugs. This may also indicate that the possibility of improving patients' knowledge is independent of the type of drug, but only of the effectiveness of schizophrenia treatment, and that education itself may be a component of therapy. Perhaps improving the level of patient knowledge can become an element of comprehensive rehabilitation and treatment of psychiatric patients.

Any psychosocial interaction, as well as rehabilitation, neutralises the causes of patients' social withdrawal and teaches them to return to a situation where they can function properly in their environment. Promoting good mental health is particularly important because it leads to increased well-being, competence and resilience, and causes patients to improve and control their mental health [19]. With regard to the group of patients in forensic psychiatry units, this information provides important guidance in the therapy and treatment process.

It is worth mentioning that almost all the patients of forensic psychiatry departments participating in the educational programme, regardless of the difficulties related to their mental health, completed the entire training cycle despite its long duration of six months. The educational programme received a lot of interest from patients and was evaluated very positively by them [20]. This shows that educational programmes not only meet the goals of the healthcare system, improving patients' functioning but also respond to their personal need to expand their knowledge and development.

However, the study has several limitations. The analysis of a relatively small and closed population allowed precise tracking of changes in the population, but the results

should be transferred to a larger group of patients with great caution. The results obtained in the study may have been influenced by other factors besides the implemented educational programme that were not included in the analyses, such as the severity of psychopathology, the presence of another chronic disease in the patient, the occurrence of adverse drug reactions, etc. Evaluation of the impact of these factors may be a topic for continuation of this research.

The analysis was performed comparing first – and second-generation antipsychotics. A comparative analysis of antipsychotic drugs in the context of specific formulations was not performed due to their diversity. For this reason, it was decided to group the drugs and compare two groups: classic and atypical drugs.

A major limitation of the study was the failure to assess whether the educational topics included in the original programme were comprehensive or did not contain redundant elements. The same or similar studies were not found in the literature, so the conducted study is pioneering and may become the subject of such comparisons in other subsequent studies. Another limitation of the study was the lack of observation and verification of the patients' level of knowledge, e.g. one year after the end of the educational cycle, which would have made it possible to assess the sustainability of the effect of the educational programme.

The study may also have been limited by the smaller size of the reference group compared to the study group, which may have affected the results of the study, as well as the fact that only men were analysed (it would be interesting to see if there are differences in the impact of education between men and women). The study was conducted in only one centre. Further studies would need to increase the number of centres in order to compare results and draw general conclusions. The results of the presented study apply only to inpatient patients and cannot be directly extrapolated to other groups of psychiatric patients. Confirmation of the real effects of the educational programme would require studies in other specific groups of patients.

## Conclusions

The severity of mental illness symptoms affects the educational opportunities of schizophrenic patients. As the severity of schizophrenic disorders increases, the effectiveness of the education provided to them decreases. In contrast, the type of antipsychotic drugs used does not affect the effectiveness of educational programmes in schizophrenic patients.

Subject to effective treatment of psychotic symptoms, structured medical education can become part of rehabilitation interventions in forensic psychiatry.

## References

1. Fojcik J, Górski M, Borowska A, Krzystanek M. *The impact of health education on the quality of life of patients hospitalized in forensic psychiatry wards*. Int. J. Environ. Res. Public Health 2023; 20(5): 4533. Doi: 10.3390/ijerph20054533. PMID: 36901541. PMCID: PMC10001608.



2. Musich SA, Adams L, Edington DW. *Effectiveness of health promotion programs in moderating medical costs in the USA*. Health Promotion International 2000; 15(1): 5–15.
3. MacInnes D, Masino S. *Psychological and psychosocial interventions offered to forensic mental health inpatients: A systematic review*. BMJ Open 2019; 9(3): e024351. Doi: 10.1136/bmjopen-2018-024351.
4. Gibbon S, Duggan C, Stoffers J, Huband N, Völlm BA, Ferriter M et al. *Psychological interventions for antisocial personality disorder*. Cochrane Database Syst. Rev. 2010; (6): CD007668. Doi: 10.1002/14651858.CD007668.pub2.
5. Adshead G. *Care or custody? Ethical dilemmas in forensic psychiatry*. J. Med. Ethics 2000; 26(5): 302–304. Doi: 10.1136/jme.26.5.302.
6. Silva MA, Restrepo D. *Functional recovery in schizophrenia*. Rev. Colomb. Psiquiatr. (Engl. Ed.). 2017; 48(4): 252–260. English, Spanish. Doi: 10.1016/j.rcp.2017.08.004. Epub 2017 Nov 2. PMID: 31779876.
7. Escandell MJ, Prat G, Garcia-Franco M, Martín-Martínez JR, Ochoa S, Tortades I et al. *Clinical symptoms and social functioning in schizophrenia*. Rev. Psiquiatr. Salud. Ment. (Engl. Ed.). 2022; 15(4): 251–258. Doi: 10.1016/j.rpsmen.2020.05.003. PMID: 36513401.
8. Bueno-Antequera J, Munguía-Izquierdo D. *Exercise and schizophrenia*. Adv. Exp. Med. Biol. 2020; 1228: 317–332. Doi: 10.1007/978-981-15-1792-1\_21. PMID: 32342467.
9. Nielsen RE, Banner J, Jensen SE. *Cardiovascular disease in patients with severe mental illness*. Nat. Rev. Cardiol. 2021; 18(2): 136–145. Doi: 10.1038/s41569-020-00463-7. Epub 2020 Oct 30. PMID: 33128044.
10. Coulibaly SDP, Ba B, Mounkoro PP, Diakite B, Kassogue Y, Maiga M et al. *Descriptive study of cases of schizophrenia in the Malian population*. BMC Psychiatry 2021; 21(1): 413. Doi: 10.1186/s12888-021-03422-9. PMID: 34416862. PMCID: PMC8377978.
11. Pinho de LG, Pereira A, Chaves C. *Influence of sociodemographic and clinical characteristics on the quality of life of patients with schizophrenia*. Rev. Esc. Enferm. USP. 2017; 51: e03244. English, Portuguese, Spanish. Doi: 10.1590/S1980-220X2016031903244. PMID: 28902324.
12. Hasan AA. *The correlation between the quality of life and clinical variables among out patients with schizophrenia*. Psychiatry Res. 2019; 271: 39–45. Doi: 10.1016/j.psychres.2018.09.062. Epub 2018 Oct 2. PMID: 30465980.
13. Lu L, Zeng LN, Zong QQ, Rao WW, Ng CH, Ungvari GS et al. *Quality of life in Chinese patients with schizophrenia: A meta-analysis*. Psychiatry Res. 2018; 268: 392–399. Doi: 10.1016/j.psychres.2018.07.003. Epub 2018 Jul 24. PMID: 30125870.
14. Kwok SC, Xu X, Duan W, Wang X, Tang Y, Allé MC et al. *Autobiographical and episodic memory deficits in schizophrenia: A narrative review and proposed agenda for research*. Clin. Psychol. Rev. 2021; 83: 101956. Doi: 10.1016/j.cpr.2020.101956. Epub 2020 Dec 11. PMID: 33385717.
15. Mihaljević-Peješ A, Bajs Janović M, Šagud M, Živković M, Janović Š, Jevtović S. *Cognitive deficit in schizophrenia: An overview*. Psychiatr. Danub. 2019; 31(Suppl 2): 139–142. PMID: 31158113.
16. Orzelska-Górka J, Mikulska J, Wiszniewska A, Biała G. *New atypical antipsychotics in the treatment of schizophrenia and depression*. Int. J. Mol. Sci. 2022; 23(18): 10624. Doi: 10.3390/ijms231810624. PMID: 36142523. PMCID: PMC9500595.
17. Huhn M, Nikolakopoulou A, Schneider-Thoma J, Krause M, Samara M, Peter N et al. *Comparative efficacy and tolerability of 32 oral antipsychotics for the acute treatment of adults with multi-episode schizophrenia: A systematic review and network meta-analysis*. Lancet 2019;

- 394(10202): 939–951. Doi: 10.1016/S0140-6736(19)31135-3. Epub 2019 Jul 11. Erratum in: Lancet. Sep 14; 394(10202): 918. PMID: 31303314. PMCID: PMC6891890.
18. Ibi D, Nakasai G, Koide N, Sawahata M, Kohno T, Takaba R et al. *Reelin supplementation into the hippocampus rescues abnormal behavior in a mouse model of neurodevelopmental disorders*. Front. Cell Neurosci. 2020; 14: 285. Doi: 10.3389/fncel.2020.00285. PMID: 32982694. PMCID: PMC7492784.
  19. Fusar-Poli P, Salazar de Pablo G, De Micheli A, Nieman DH, Correll CU, Kessing LV et al. *What is good mental health? A scoping review*. Eur. Neuropsychopharmacol. 2020; 31: 33–46. Doi: 10.1016/j.euroneuro.2019.12.105. Epub 2019 Dec 31. PMID: 31901337.
  20. Fojcik J, Romańczyk M, Surma S, Krupka-Matuszczyk I, Krzystanek M. *Ocena rehabilitacji psychiatrycznej przez pacjentów hospitalizowanych na oddziałach psychiatrii sądowej*. Psychiatria 2022; 19(2): 111–118.

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### Annex no. 1

*Patient's initials/number.....*

**Author's questionnaire of patient's knowledge of health education in forensic psychiatry department.**

- Setting and achieving goals in life is not important for a person. It is better to live from day to day.
  - Yes
  - No
- A person has several social roles in his life. Each is a specific behaviour assigned to a person's social position.
  - Yes
  - No
- A tolerant person respects others' feelings, views, beliefs.
  - Yes
  - No
- There is a close relationship between alcohol abuse and violence.
  - Yes
  - No
- People under the influence of alcohol are more likely to commit crimes.
  - Yes
  - No
- A social norm is a guideline for appropriate behaviour in a given situation, place.
  - Yes
  - No
- The value system in a person's life determines the direction of actions taken.
  - Yes
  - No
- Conflicts are situations beyond my control, I can't prevent them.
  - Yes
  - No
- How my future will be shaped largely depends on me. I have a lot of influence on how my life will be.
  - Yes
  - No
- Assertive man expresses his own opinion, feelings often hurting other people in the process. He is guided by the motto – my rights come first.
  - Yes
  - No
- Being a patient in a hospital ward is also a social role. This is evidenced by the need for a certain behaviour of a person in the hospital environment.

- 
- Yes
  - No
  - There is no way to cope with stress. It is an emergency situation and I have no control over it.
    - Yes
    - No
  - Sleep, moderate exercise and a healthy diet are key to maintaining good mental health.
    - Yes
    - No
  - Loss of control over one's own behaviour can lead to aggressive behaviour.
    - Yes
    - No
  - Insulting others, making insults and name-calling is not considered violence. It is a way of expressing one's thoughts and feelings about another person.
    - Yes
    - No
  - When dealing with other people, the desirable way to communicate is to remain calm, control emotions and respect each other.
    - Yes
    - No
  - A person's appearance – his clothes, hairstyle, makeup in a woman, smell has a significant impact on the perception of others. Appearance can be a hallmark of mental health.
    - Yes
    - No
  - Medications used in psychiatry are essential in the treatment process. They guarantee an improvement in the patient's health and well-being.
    - Yes
    - No
  - The main reason for relapse of mental illness is the lack of continuation of treatment, the abandonment of pharmacotherapy by the patient.
    - Yes
    - No
  - Schizophrenia is a disease I suffer from.
    - Yes
    - No
  - A patient in the forensic psychiatry unit can request discharge from the hospital at any time.
    - Yes
    - No

- Forensic detention is the forced stay of a patient in a forensic psychiatry ward due to his committing a criminal act under conditions of insanity.
  - Yes
  - No
- Healthy foods include fast food, candy, sugary sodas, fatty meats.
  - Yes
  - No
- To stay healthy, you should avoid exercise, as it causes fatigue and weakness.
  - Yes
  - No
- The rule of healthy eating is 5 servings a day of fruits and vegetables.
  - Yes
  - No
- Good relationship in the family is based mainly on mutual respect and love for its members. All members of the family must make every effort to ensure that the relationship in the family is correct – family members should take care of good relationships, support each other in difficult times, take care of each other.
  - Yes
  - No
- Cooperation with the treating physician is the foundation of successful therapy and treatment of mental disorders.
  - Yes
  - No
- A patient in a forensic psychiatry unit has the right to visitation, uncontrolled correspondence and leave.
  - Yes
  - No
- Smoking is allowed in healthcare facilities, e.g. hospital.
  - Yes
  - No
- Increasing my knowledge about the disease – its symptoms, treatment, coping – will benefit my well-being and allow me to function better in my daily life.
  - Yes
  - No
- Relaxation exercises (listening to music, visualisation, drawing) help reduce stress, mental tension.
  - Yes
  - No
- In interpersonal communication, non-verbal speech is the direct transmission of information.

- 
- Yes
  - No
  - The use of stimulants, e.g. alcohol, drugs, cigarettes, causes addictions but they are not dangerous to humans.
    - Yes
    - No
  - Lung cancer is a disease that is largely preventable by humans.
    - Yes
    - No
  - Delusions – are disorders of thinking, e.g. false judgments, beliefs, resistant to all argumentation and evidence of their falsity.
    - Yes
    - No
  - Schizophrenia is an abnormal perception of the real world.
    - Yes
    - No
  - Feelings of sadness, apathy, sleep disturbances, increasing anxiety, and fear can herald a relapse of a mental illness
    - Yes
    - No
  - Forensic psychiatric opinion on the condition of a patient under judicial detention is sent to the court once every 2 years.
    - Yes
    - No
  - A patient in a forensic psychiatry unit should actively participate in all kinds of psychiatric rehabilitation activities.
    - Yes
    - No
  - The purpose of forensic psychiatry wards is to prepare the patient to live in a social environment in accordance with the prevailing social norms.
    - Yes
    - No