

## LONG TERM TELEMEDICINE STUDY OF COMPLIANCE IN PARANOID SCHIZOPHRENIA

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### SUMMARY

**Background:** Low compliance is one of the crucial problems of contemporary psychiatry. Relapses, deterioration of cognitive functioning, negative symptoms, neuroleptic resistance are the examples of many consequences of noncompliance in schizophrenia

**Subjects and methods:** The study was designed to assess the compliance in the 200 patients diagnosed with paranoid schizophrenia, all in the state of symptomatic remission and on the stable neuroleptic treatment. The compliance was assessed using a telepsychiatric system, sending reminders: 1 hour before the planned dose to remind them that drug intake is approaching, and at the moment of intake to check if they took the drug. The confirmed drug intakes were counted by the telepsychiatric system.

**Results:** 158 patients completed the study period. The compliance in the first month of the treatment was 44.6% and decreased over the rest of the period to the level of 33.4%. 50% of the schizophrenic patients were compliant at a level lower than 37%. This group was considered the low compliance group, and in this group the compliance increased after 6 months from 9.3% to 10.3% ( $p < 0.0001$ ).

**Conclusions:** The compliance in the group of schizophrenic patients in remission is very low. The telemedicine system improves the compliance in the patients with the worst compliance.

**Key words:** schizophrenia - neuroleptic treatment – compliance – telemedicine – telepsychiatry

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### INTRODUCTION

Low adherence to treatment is one of the major problems in the treatment of schizophrenia. In this progressive and long term disease around 60% of patients stop the treatment after 2-3 months without the consultation with the physician, and after 2 years 80% of schizophrenic patients discontinue neuroleptic treatment (Kemmler 2005). In the long term study CATIE 74% of patients discontinued the treatment in the first year of the study (Lieberman 2005). In EUFEST 30% of patients stopped the treatment before the end of the study period (Kahn 2008).

The continuous treatment of schizophrenia is necessary to control the symptoms and prevent relapse. Early discontinuation and irregular treatment results in relapses, drug intolerance and drug resistance. Finding ways to increase the drug compliance may change the situation and improve the prognosis in schizophrenia.

In literature different methods have been proposed to improve the adherence in patients, e.g. pill counts, pharmacy records, serum levels analyses (Velligan 2009). One of the contemporary therapeutic approaches in psychiatry is telemedicine. It utilizes electronic information and telecommunication technology to provide remote medical care to patients (Angaran 1999). E-health provides medical education about diseases and prophylaxis, supports the diagnostic process and in some cases allows prescribing drugs (Angaran 1999). Cyberhealth may also turn out to be useful in the improvement of drug intake (Schneider 2013). Some telemedicine

pioneering programs were started round 50 years ago (Preston 1992) and over that time the further development of e-health has been observed. In psychiatry the telemedicine approach has been already used in the treatment of different groups of patients, e.g. in addictions (Moreira Tde 2014), or in Alzheimers's disease (Noda 2014), in depression (Gervasoni 2010), and schizophrenia (Byerly 2007). Telepsychiatry consulting started in Poland in 2003 when patients used e-mails describing their mental problems and they obtained medical advices from a psychiatrist (Krzystanek 2003). In recent years the knowledge about this new therapeutic method has been increasing in our country (Gawdzik 2015).

Due to the limited number of studies of the effectiveness of telepsychiatry in psychiatry it was decided to evaluate how a telemedicine system may influence the compliance in schizophrenia. A group of schizophrenia patients in the stable symptomatic remission was chosen, expecting the compliance in this group to be good and assuming the group may benefit from the use of a telepsychiatric platform.

### SUBJECTS AND METHODS

The 6 months clinical study of compliance in paranoid schizophrenia was performed on the group of 200 patients. The group consisted of paranoid schizophrenia patients, diagnosed according to ICD-10. All the patients recruited to the study were in symptomatic remission (according to Andreasen 2005). 59.6% of the group (n=94) were males and 40.5% were females, the

mean age was 31.8 years (SD=5.8). The patients were treated by a group of 45 psychiatrists, using tablets to contact patients on their smartphones. 158 patients completed the 6 months period of the study, records from 150 patients were valid for statistical analysis.

Every patient in the study was given a smartphone with the preinstalled original telemedicine platform (Telemedicine Moneo Platform). According to the therapeutic plan, introduced by the investigator on the visit in the outpatient clinic, the telemedicine platform sent reminders to the patient about drug intake. Patients were reminded two times – the first time 1 hour before the planned drug intake and then right on the time of the intake. The second communication, that was appearing on the patient's smartphone was a question as to whether they took the drug. The patient confirmed the drug intake, ticking the appropriate box on the touch screen. The telemedicine system recorded every confirmation and according to that the compliance was counted as the percent of the doses confirmed in relation to the planned ones.

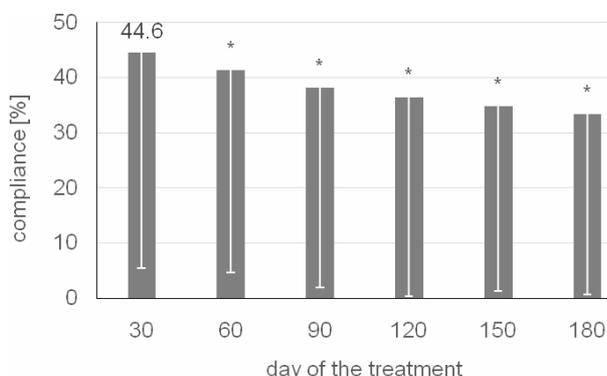
The monthly compliance was counted and compared in the whole studied group, and in the 50% of the group with the lower compliance (two lower quartiles, n=75).

In the statistical analysis Wilcoxon test was used. This test is a non-parametric alternative to the t-test for dependent samples when the differences are non-normally distributed. The level considered significant was  $p < 0.05$ .

## RESULTS

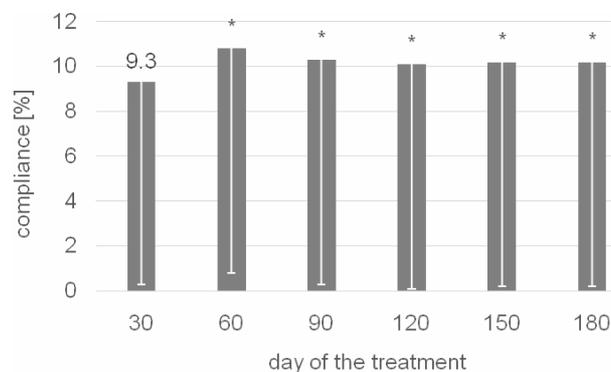
The first significant finding of the study is the very low compliance in the first month in the symptomatic remission patients. In the first month of the study patients confirmed only 44.6% of the doses as taken. In the low compliance group the data was even lower, and only 9.3% of the doses were confirmed. Results were shown on the Figure 1 and Figure 2.

When analyzed in the total group compliance significantly decreased over the 6 months period ( $p < 0.001$ ) (Figure 1). After 6 months of observation compliance decreased by 25.2%.



**Figure 1.** Compliance in the total group of patients (n=150) in the 6 months study period. The bars present the mean – SD. \* $p < 0.001$

An interesting finding was revealed in the worse compliance half of the patients. As shown on the Figure 2 the ratio of the confirmed doses significantly increased during the whole 6 months ( $p < 0.001$ ). Finally, after 6 months compliance in the initially worse compliance patients increased by 10.7% ( $p < 0.001$ ).



**Figure 2.** Compliance in the lower compliance group of patients with the compliance in the first month lower than 37% (n=75). The bars present the mean – SD. \* $p < 0.001$

## DISCUSSION

In our study we observed a very low compliance in the first month in symptomatic remission patients. But the telemedicine monitoring system applied by us improved the compliance in those patients, in whom the compliance was the worst. Telepsychiatry is a new branch of psychiatry offering broad possibilities but still with limited data confirming its effectiveness (Brusco 2012). Kasckow et al. (2014) reviewed the different modes of telehealth technology modes (telephone-based, internet-based or video-based) in the treatment of schizophrenia. He concludes the telehealth approach in schizophrenia is feasible and may improve the outcome of the disease. The author underlines the access to limited data available and insists on the need of further studies on the topic. Telepsychiatric intervention using web-based application was proved in a one year study to improve the mental state, stability and education in schizophrenic patients (Rotondi 2010). Similar to the telepsychiatric platform used in this study is the ITAREPS system, evaluated by Spaniel et al. (2007) in their project. ITAREPS uses PC-to-smartphone sms platform to identify the early symptoms of relapse. Using the system in 45 psychotic patients the authors observed the decrease of the number of relapses by 60% over one year period of observation. Frangou (2005) confirmed in an 8-weeks study the effectiveness of telemonitoring of the treatment adherence in reduction of intensity of schizophrenia symptoms and in the number of medical appointments. One of the possibilities of the e-health application is the mobile health (mHealth) approach used in this study. Some examples of this attitude have already been accessible in the literature. Brondi et al. (2013) used an application Dr.Drin on a smartphone. The preliminary results of their 3-month observation showed a better

adherence to therapy in patients. Mobile phones are frequently used and well accepted by schizophrenic patients (Ben-Zeev 2013). Schizophrenic patients believe they benefit from the use of mobiles in the treatment of schizophrenia. Ainsworth et al. (2013) showed that mobile phone based systems may provide a useful and reliable tool, able to help schizophrenic patients. Applications on the smartphone may be helpful in supporting the assessment and diagnosing the symptoms in schizophrenia.

## CONCLUSIONS

Even in the symptomatic remission in schizophrenic patients the compliance is very low.

Telemedicine monitoring system improves the compliance in those patients, in whom the compliance is the worst.

### Acknowledgements:

The study was financed by the NCBiR grant number POIG.01.04.00-04-219/12.

**Conflict of interest:** None to declare.

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