

THE PsyLOG MOBILE APPLICATION: DEVELOPMENT OF A TOOL FOR THE ASSESSMENT AND MONITORING OF SIDE EFFECTS OF PSYCHOTROPIC MEDICATION

Martina Rojnic Kuzman^{1,2}, Olivier Andlauer³, Kai Burmeister⁴, Boris Dvoracek^{5,6}, Rebekka Lencer⁴, Katja Koelkebeck⁴, Alexander Nawka^{5,6} & Florian Riese⁷

¹Department of Psychiatry, University Hospital Center Zagreb, Zagreb, Croatia

²School of Medicine, University of Zagreb, Zagreb, Croatia

³East London NHS Foundation Trust, London, UK

⁴Westphalian Wilhelms-University Muenster and University Hospital Muenster, Department of Psychiatry and Psychotherapy, Muenster, Germany

⁵Institute of Neuropsychiatric Care (INEP), Prague, Czech Republic

⁶Department of Psychiatry, First Faculty of Medicine, Charles University, Prague, Czech Republic

⁷Psychiatric University Hospital Zurich, Zurich, Switzerland

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SUMMARY

Mobile health interventions are regarded as affordable and accessible tools that can enhance standard psychiatric care. As part of the mHealth Psycho-Educational Intervention Versus Antipsychotic-Induced Side Effects (mPIVAS) project (www.psylog.eu), we developed the mobile application "PsyLOG" based on mobile "smartphone" technology to monitor antipsychotic-induced side effects. The aim of this paper is to describe the rationale and development of the PsyLOG and its clinical use. The PsyLOG application runs on smartphones with Android operating system. The application is currently available in seven languages (Croatian, Czech, English, French, German, Japanese and Serbian). It consists of several categories: "My Drug Effects", "My Life Styles", "My Charts", "My Medication", "My Strategies", "My Supporters", "Settings" and "About". The main category "My Drug Effects" includes a list of 30 side effects with the possibility to add three additional side effects. Side effects are each accompanied by an appropriate description and the possibility to rate its severity on a visual analogue scale from 0-100%. The PsyLOG application is intended to enhance the link between patients and mental health professionals, serving as a tool that more objectively monitors side-effects over certain periods of time. To the best of our knowledge, no such applications have so far been developed for patients taking antipsychotic medication or for their therapists.

Key words: m-health – antipsychotics - medication side effects – psychosis - e-health

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Introduction and background

Antipsychotic medications are used to treat a significant number of mental disorders and have documented efficacy. However, they are associated with side-effects, which contribute to reduced quality-of-life and secondary morbidity in a significant number of patients. Furthermore, they frequently cause the patients to autonomously stop taking their medications. This in turn causes relapses in a significant number of cases (Emsley et al. 2013). Adverse effects are rarely monitored in a standardized way, largely depending on ad-hoc reporting from patients to their treating physicians. Hence, it is not uncommon in clinical practice that some side effects persist for a long time before they are appropriately treated.

The use of modern communication and information technology in the mental health sector has the potential to reduce gaps in mental health care. So-called mobile health interventions (mHealth), i.e. smartphone applications (apps), could serve as cheap and accessible tools to extend standard psychiatric care. Compared to "treat-

ment as usual", mHealth interventions may have several advantages: a) delivering targeted psychoeducation tailored to the patient/user profile, b) serving as a platform for self-monitoring, c) serving as a conduit for delivery of selected medical information to assess and even prevent side-effects, c) being cheaper and time-saving as compared to traditional forms of treatment aids such as educational courses d) supporting communication between patients and healthcare providers.

In spite of a high number of mobile applications available for medical purposes (European Directory of Health Apps 2012), only a limited number of mobile applications for patients with psychotic disorders exist. In a recent review summarizing the current work on mHealth interventions in schizophrenia, Alvarez-Jimenez et al. (2014), concluded that Internet and mobile-based interventions for patients with psychosis seem to be acceptable, feasible and have the potential to improve clinical and social outcomes. However, the heterogeneity and poor quality of the data due to the early stage of current research precludes any definite conclusions.

As a part of the mHealth Psychoeducational Intervention Versus Antipsychotic-Induced Side effects (mPIVAS) project (www.psylog.eu), the authors of these paper, representing partners from five countries (University Hospital Centre Zagreb and Croatian Psychiatric Association from Croatia, Department of Psychiatry, First Faculty of Medicine, Charles University in Prague from Czech Republic, European Psychiatric Association (EPA) from France, Westfälische-Wilhelms-Universität Münster (WWU) and German Association for Psychiatry, Psychotherapy, Psychosomatics and Nervous Disease (DGPPN) from Germany, University of Zurich - Division of Psychiatry Research and Psychogeriatric Medicine from Switzerland) developed the mobile application "PsyLOG" based on a mobile "smart phone" technology to monitor side-effects as well as lifestyle aspects of patients treated with antipsychotic medications (Figure 1).



Figure 1. The PsyLOG logo

Our aim was to develop the mobile application PsyLOG, as a freely available, low-cost and time-saving tool that can effectively assist patients and health professionals (e.g. therapists) in the treatment process. The PsyLOG application was developed according to the expected needs of patients and professionals in a consensus process involving all authors during a series of personal and Skype meetings. All partners participated in the development of the specification documents for the PsyLOG development. Once the technical development was finalized, the authors finalized a manual for PsyLOG use. All partners contributed to the development of the contracts that included details on data management security and patients' anonymity issues, assuring the conformity of PsyLOG to all EU legislation relevant to the topic.

To the best of our knowledge, no applications specifically directed at patients taking antipsychotic medication and their therapists have so far been developed.

We hypothesized that using the PsyLOG application, patients and their therapists may be able to detect side-effects earlier and more frequent, and thus reduce adverse effects over the course of time. This could on the one hand lead to higher medication adherence rates. Also, and, on the other hand, perception of self-efficacy could be higher in patients using the novel tool.

Technical details

The use of PsyLOG is intended for patients suffering from mental disorders and their therapists. The system consists of the mobile application used by the patients and a web-backend, with a web portal and video instructions accessible by patients and healthcare providers. A manual with the system description is also available for users.

The PsyLOG application runs on smartphones with Android platforms. The application is meanwhile available in seven languages (Croatian, Czech, English, French, German, Japanese and Serbian). It comprises several categories: "My Drug Effects", "My Life Styles", "My Charts", "My Medication", "My Strategies", "My Supporters", "Settings" and "About" (Figure 2).

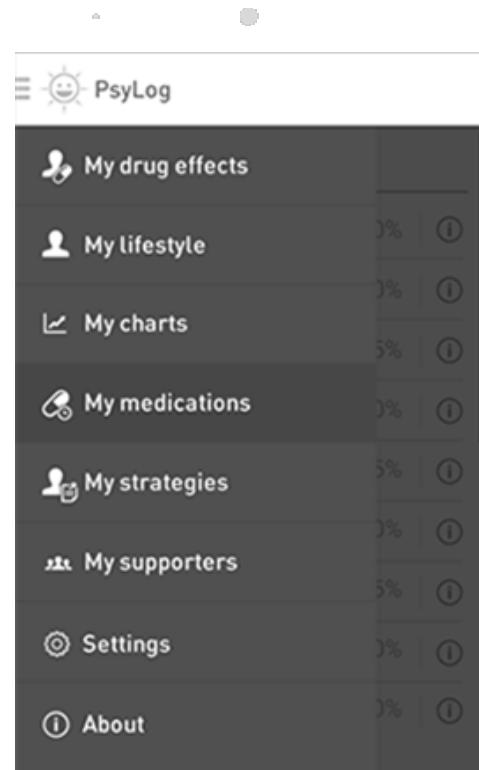


Figure 2. The PsyLOG main menu page

The category "My Drug Effects" comprises a list of side-effects with the possibility to add additional three individual side-effects. Side-effects are accompanied by appropriate descriptions of each side-effect and the possibility to rate its severity on a visual analogue scale from 0-100%. The list of "My Drug Effects" comprises the following: Anxiety, Bed wetting, Blood pressure changes, Blurry vision, Change in menstrual periods, Constipation, Delayed ejaculation, Drooling, Dry mouth, Drowsiness/Dizziness, Fatigue, Fever, Hair loss, Headache, Heart beating, Impairment of coordination, Insomnia, Loss of interest or pleasure in sex, Muscular rigidity/stiffness, Nasal congestion, Nausea/Vomiting, Painful early dyskinesia/dystonic reaction, Restlessness/

Akathisia, Skin changes, Swollen limbs, Swollen nipples/fluid from nipples, Thirst/frequent urination, Tremor, Nightmares and Weight gain.

The list of the category "My Life Styles" includes Alcohol use, Appetite, Physical Activity, Smoking, Weight and a "How are you" category. It is possible to add three additional items and to grade the item severity on a visual analogue scale from "—" to "++". Also, the number of drinks and cigarettes for the items "Alcohol" and "Smoking" can be indicated respectively.

The web portal accompanies the mobile application, including an explanation of the function of PsyLOG as well as project information. Moreover, psychoeducational resources (www.psylog.eu) and the log-in access for PsyLOG users are available via this site. Using the web-backend, researchers can import patient data, including medications, and may visually monitor side-effects and their relationship with life-style features and medications on graphs that can be created using the available data.

Procedures

In the ongoing study, but also applicable in clinical use, patients are included by their treating therapists, who enter the patient information into the system. The recruitment protocol is as follows: 1) the researcher who was previously trained on the use of PsyLOG explains the process of handling the PsyLOG application to the patients. This includes the function of the application and of the web platform on www.psylog.eu using an example. The researcher also explains the the process of downloading the application; 2) the researcher creates a new patient file in the web-backend and the system generates a random username and password. This password is given to the patient in paper form; 3) the researcher enters the patient's initial medication in the web-backend and – if applicable –updates types and dosing of medications in the course of the treatment.

The patients download the PsyLOG application to their smartphones and log-in using their appointed username and password. After the first log-in, patients are asked by the system to change the password in order to preserve their full anonymity. The patients are instructed to import all side-effects they experience, as often as they wish. The patients may choose a predefined side-effect from a list or add a new one, score its severity on the appropriate menu and monitor its progress over time. If a side-effect is not selected by the patient, it is considered as not being experienced.

Future perspectives

The PsyLOG application is intended to enhance the link between patients and mental health professionals, serving as a tool that more objectively monitors side-effects over certain periods of time. It is supposed to help therapists in decision-making processes, especially

given the fact that many patients are treated with several antipsychotic drugs at a time, which might cause interaction effects.

The mobile application, the web-backend and the legal documents allow all interested parties to use PsyLOG free of charge in the following manner:

- The administrative background is available in English and can serve as a template for all potential interested parties, as they are fully in line with the European legal requirements.
- The IT developers have envisaged the possibility to add as many languages as needed, so the application can be easily translated into other languages.
- The PsyLOG application also allows the possibility to expand its use among patients with other mental disorders taking psychotropic medication. Using PsyLOG, it is possible to monitor side-effects of antipsychotics, antidepressants, mood stabilizers, sedatives and antidiementives - basically all available psychiatric medication - and antiepileptic (neurologic) medication. Thus, it can easily be transferred – to patients suffering from depression, anxiety disorders, mood disorders, bipolar disorders and epilepsy and even patients with dementia. In the last case and other cases, PsyLOG can be used by caregivers and family members as well to provide the necessary data.

Pilot data on the usefulness of PsyLOG as a detection, intervention and research tool are currently under analysis.

Contribution of individual authors:

Martina Rojnic Kuzman was the project leader, developed the PsyLOG application, designed and performed the study, analyzed the data and wrote the first draft of the study;

Olivier Andlauer developed the PsyLOG application, designed the study, critically analyzed the data, gave critical comments and revised the first draft of the study;

Kai Burmeister developed the PsyLOG application, designed the study, analyzed the data and gave critical comments and revised the first draft of the study;

Boris Dvoracek developed the PsyLOG application, and gave critical comments and revised the first draft of the study;

Rebekka Lencer and Katja Koelkebeck developed the PsyLOG application, designed and performed the study, analyzed the data and wrote the first draft of the study; and gave critical comments and revised the drafts of the study;

Alexander Nawka developed the PsyLOG application, designed the study, critically analyzed the data, gave critical comments and revised the first draft of the study;

Florian Riese developed the PsyLOG application, designed the study, critically analyzed the data, gave critical comments and revised the first draft of the study.

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Conflict of interest:

The PsyLOG was developed in collaboration with the IT partners (Infinum d.o.o (Croatia). The authors declare no further conflicts of interest.

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Correspondence:

Martina Rojnic Kuzman, MD, PhD
Department of Psychiatry, Zagreb University Hospital Centre
Kispaliceva 12, 10000 Zagreb, Croatia
E-mail: mrojnic@gmail.com