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Effective assessment of psychotropic medication side effects using PsyLOG mobile application

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The aim of our study was to compare users and non-users of a novel mobile application for tracking antipsychotic-induced side effects, PsyLOG. The PsyLOG runs on smartphones with Android operating system, and is available in seven languages (www.psylog.eu). It consists of several categories. The category 'My Drug Effects' includes a list of 30 side effects with the possibility to add three additional ones. Side effects are each accompanied by an appropriate description and the possibility to rate their severity on a visual analogue scale from 0 to 100% (Rojnic Kuzman et al., 2017).

The study sample consisted of 78 patients diagnosed with schizophrenia spectrum or bipolar disorder type I admitted to four psychiatric facilities in Croatia and one in Serbia. Patients were assigned to the treatment group (PsyLOG+, N = 36) if they owned a smartphone based on Android technology or the treatment as usual (TAU) group (PsyLOG−, N = 42) if they owned no smartphones or smartphones running non-Android platform (iPhones, N = 30; Nokia IoS, N = 4; Windows phone, N = 3). The PsyLOG+ group was instructed to enter all side effects as they experienced them and to consult the information on medication effects in the app. If a side effect was not selected, it was considered as non-relevant to the patient. Patients were followed-up over six months in four time points.

Comparable to other studies, 64.1% of the patients completed the study (Alvarez-Jimenez et al., 2014; Granholm et al., 2012). The use of PsyLOG did not impact psychopathology (measured with Brief Psychiatric Rating Scale (BPRS)) (Overall and Gorham, 1988) or side effect rates (measured with Glasgow Antipsychotic Side effect Scale (GASS) (Waddell and Taylor, 2008), body mass index, glucose and lipids in blood) contrary to previous studies (Spaniel et al., 2012; Spaniel et al., 2008).

However, in contrast to standardized psychiatric assessments tools, using the application enabled patients to report more side effects (Table 1), and to report them in the course of treatment as they occur with a median (interquartile range) of 5 (3–9.5) days after the last assessment point. Frequently, mental health services allow no more than one consultation per month for out-patients. Thus, time between reporting side effects and their treatment might be considerably too long. The use of PsyLOG may shorten the time of recording the side effects and possibly allow timely contact with the therapist.

The PsyLOG may be useful among frequent cases of polypharmacy (Gallego et al., 2012), considering that standard antipsychotic assessment scales cover only one class of drugs, assuming that a more comprehensive list of side effects may cover a broader spectrum.

The majority of the study participants used the PsyLOG application regularly over the first five months (N = 31). The duration of PsyLOG use (days) correlated significantly with baseline GASS scores (Spearman correlation 0.366, p = 0.036), and with the BPRS scores at the first month of treatment (Spearman correlation 0.486, p = 0.01). This

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Table 1
Comparison in the number of reported side effects using the PsyLOG app and the self-assessment scales in the PsyLOG group during the follow-up.

Assessment time	Month 0			Month 1			Month 3		
Side effect, N	GASS N = 36	PsyLOG N = 36	X^2, p	GASS N = 36	PsyLOG N = 36	X^2, p	GASS N = 36	PsyLOG N = 36	X^2, p
Sedation/CNS	23	21	p = 0.63	15	18	p = 0.48	11	10	p = 0.8
Cardiovascular	12	10	p = 0.61	6	9	p = 0.38	2	2	p = 1
Exrapyramidal	18	17	p = 0.81	12	15	p = 0.47	10	11	p = 0.8
Anticholinergic	14	9	p = 0.21	5	9	p = 0.23	6	8	p = 0.55
Gastrointestinal/genitourinary	6	13	p = 0.06	8	10	p = 0.59	2	4	p = 0.39
Screening for DM/weight gain	13	16	p = 0.47	15	15	p = 1	16	12	p = 0.33
Prolactinemia	8	8	p = 1	8	10	p = 0.59	6	5	p = 0.74
Other		12			12			13	
Nasal congestion	ND	4		ND	4		ND	3	
Headache	ND	3		ND	1		ND	0	
Insomnia	ND	4		ND	4		ND	2	
Nightmares	ND	4		ND	2		ND	1	
Delayed ejaculation	ND	1		ND	3		ND	2	
Swollen limbs	ND	1		ND	1		ND	1	
Skin changes	ND	4		ND	2		ND	2	
Fever	ND	0		ND	1		ND	2	
Hair loss	ND	0		ND	1		ND	2	

Data are presented as N of responses = frequencies of persons reporting the side effect pertaining to a particular group; ND = not detected.

may indicate that patients who suffered more symptoms or side effects may be more motivated to use PsyLOG as a possible self-aid. Young patients in the early course of illness are specifically challenging for treatment due to their vulnerability to side effects and depression leading to increased morbidity and mortality (Ayesa-Arriola et al., 2015; Pérez-Iglesias et al., 2014). Thus, the PsyLOG application can be a useful tool for patients especially in the first months of their out-patient treatment which usually requires dose adjustments and closer monitoring.

In conclusion, considering its efficacy to report side effects as compared to standardized psychiatric scales, the PsyLOG application can be regarded as a useful tool for clinical practice and research, especially for patients in the early course of treatment.

Contributors

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; **Nadja P. Maric** 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; **Maja Pantovic-Stefanovic** 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; **Florian Riese** developed the PsyLOG application, designed the study, critically analyzed the data, gave critical comments and revised the first draft of the study; **Branka Aukst Margetic**, **Dina Bošnjak**, **Mirela Celic Ruzic**, **Marko Curkovic**, **Jasmina Grubisin**, **Zoran Madzarac**, **Porin Makaric**, **Daniela Petric** and **Kresimir Radic** performed the study, analyzed the data and gave critical comments and revised the drafts of the study; **Aleksandar Savic** performed the study, analyzed the data and wrote the first draft of the study; and gave critical comments and revised the other drafts of the study. All authors approved the final version of the manuscript.

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Conflicts of interest

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